

A Management Plan for
Okaloacoochee Slough
Wildlife Management Area
2014 - 2024



Hendry 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
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CLIFFORD D. WILSON III
INTERIM SECRETARY

December 2, 2014

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

RE: Okaloacoochee Slough Wildlife Management Area - Lease No. 4245

Dear Mr. Cochran:

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 Okaloacoochee Slough Wildlife Management Area management plan. The next management plan update is due December 2, 2024.

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,

Marianne S. Gengenbach
Office of Environmental Services
Division of State Lands

www.dep.state.fl.us

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**A Management Plan
for
Okaloacoochee Slough Wildlife Management Area**

Hendry County, Florida

Owned by the Board of Trustees of the Internal Improvement Trust Fund of the
State of Florida

Managed by the Florida Fish and Wildlife Conservation Commission



December 2014

Approved *Thomas H. Eason*
Thomas Eason, Division Director
Division of Habitat and Species Conservation

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LAND MANAGEMENT PLAN EXECUTIVE SUMMARY

Lead Agency: Florida Fish and Wildlife Conservation Commission (FWC)
 Common Name of Property: Okaloacoochee Slough Wildlife Management Area
 Location: Hendry County, Florida
 Acreage Total: 2992.61 acres
 Acreage Breakdown:

<u>Land Cover Classification</u>	<u>Acres</u>	<u>Percent of Total Area</u>
Mesic hammock	73.91	2.47%
Mesic flatwoods	216.17	7.22%
Restoration mesic flatwoods	317.93	10.62%
Wet flatwoods	14.37	0.48%
Wet prairie	132.80	4.44%
Depression marsh	587.97	19.65%
Swale	231.22	7.73%
Pasture - semi-improved	1006.73	33.64%
Pasture - improved	69.23	2.31%
Clearing/regeneration	94.94	3.17%
Agriculture	207.58	6.94%
Artificial pond	21.28	0.71%
Canal/ditch	18.48	0.62%

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

Lease/Management Agreement No.: 4245 (Appendix 13.1)

Use: Single _____ Management Responsibilities:
 Multiple X Agency FWC Responsibilities
LEAD, SUBLESSEE (Wildlife Management Area, resource protection, law enforcement)

Designated Land Use: Wildlife Management Area

Sublease (s): None

Encumbrances: None

Type Acquisition: Fish and Wildlife Habitat Program

Unique Features: Natural: Okaloacoochee Slough, natural communities

Archaeological/Historical: One archaeological and one historical site on OSWMA.

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: 0 acres FWC Additions and Inholdings list; 82,995 acres remaining in the Devil's Garden Florida Forever Project (Figure 4).

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: _____

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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	1
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	6, 107-125
4	The legal description and acreage of the property.	18-2.018 & 18-2.021	2, 126-128
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	4-5, 70
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	51
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	71, 73
8	Identification of adjacent land uses that conflict with the planned use of the property, if any.	18-2.021	6-7
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, 48,49
10	Proximity of property to other significant State, local or federal land or water resources.	18-2.021	6, 9-12

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	50
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	50-51, 62
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	76
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	76, 82, 327
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	76, 103

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)	49, 51
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	103, 104
19	Letter of compliance from the local government stating that the LMP is in compliance with the Local Government Comprehensive Plan.	BOT requirement	351
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	51, 57, 85
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	50-51, 49
22	If the lead managing agency determines that timber resource management is not in conflict with the primary management objectives of the managed area, a component or section, prepared by a qualified professional forester, that assesses the feasibility of managing timber resources pursuant to section 253.036, F.S.	18-021	N/A
23	A statement regarding incompatible use in reference to Ch. 253.034(10).	253.034(10)	3, 50, 51

*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	13-13
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)	159-184

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)	13-13, 141-147
27	Summary of comments and concerns expressed by the advisory group for parcels over 160 acres	18-2.021	141, 147
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)	13-13, 151-152
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	57
30	Summary of comments and concerns expressed by the management review team, if required by Section 259.036, F.S.	18-2.021	N/A
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	14-16
33	Insert FNAI based natural community maps when available.	ARC consensus	17
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	17-34
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	17-34
36	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding beaches and dunes.	18-2.021	46
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	46

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	17-34
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	28-34
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	17-34, 57
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)	57-102
42	Habitat Restoration and Improvement	259.032(10) & 253.034(5)	
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.	↓	57-102
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.		77-98
42-C.	The associated measurable objectives to achieve the goals.		77-98
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>		303-326
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.		100-102, 331-341
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)	17-34
44	Sustainable Forest Management, including implementation of prescribed fire management		
44-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).		57-102
44-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).	18-2.021, 253.034(5) & 259.032(10) ↓	77-86
44-C.	Measurable objectives (see requirement for #42-C).		77-86
44-D.	Related activities (see requirement for #42-D).		77-86, 303-326
44-E.	Budgets (see requirement for #42-E).		100-102, 331
45	Imperiled species, habitat maintenance, enhancement, restoration or population restoration	259.032(10) & 253.034(5)	
45-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	57-102

45-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		77-86
45-C.	Measurable objectives (see requirement for #42-C).		77-86
45-D.	Related activities (see requirement for #42-D).		211, 303
45-E.	Budgets (see requirement for #42-E).		100-102, 331
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)	29, 40
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	342
48	Exotic and invasive species maintenance and control	259.032(10) & 253.034(5)	
48-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	64, 99, 79
48-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		79
48-C.	Measurable objectives (see requirement for #42-C).		79
48-D.	Related activities (see requirement for #42-D).		64, 99, 79
48-E.	Budgets (see requirement for #42-E).		100-102, 331

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	6
50	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding water resources, including water classification for each water body and the identification of any such water body that is designated as an Outstanding Florida Water under Rule 62-302.700, F.A.C.	18-2.021	46
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	17-34, 46
52	***Quantitative description of the land regarding an inventory of hydrological features and associated acreage. <i>See footnote.</i>	253.034(5)	46, 67
53	Hydrological Preservation and Restoration	259.032(10) & 253.034(5)	
53-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	67, 81, 99
53-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		81
53-C.	Measurable objectives (see requirement for #42-C).		81

53-D.	Related activities (see requirement for #42-D).		67-81
53-E.	Budgets (see requirement for #42-E).		100-102, 331

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	46, 327
55	***Quantitative data description of the land regarding an inventory of significant land, cultural or historical features and associated acreage.	253.034(5)	46, 327
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	46, 327
57	Cultural and Historical Resources	259.032(10) & 253.034(5)	
57-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	46, 82
57-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		82
57-C.	Measurable objectives (see requirement for #42-C).		82
57-D.	Related activities (see requirement for #42-D).		82, 327
57-E.	Budgets (see requirement for #42-E).		100-102, 331

**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)	69-70
59	Capital Facilities and Infrastructure	259.032(10) & 253.034(5)	
59-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	65-67, 69-70
59-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		80
59-C.	Measurable objectives (see requirement for #42-C).		80
59-D.	Related activities (see requirement for #42-D).		80
59-E.	Budgets (see requirement for #42-E).		100-102, 331
60	*** Quantitative data description of the land regarding an inventory of recreational facilities and associated acreage.	253.034(5)	69-70
61	Public Access and Recreational Opportunities	259.032(10) & 253.034(5)	

61-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	65-67
61-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		80
61-C.	Measurable objectives (see requirement for #42-C).		80
61-D.	Related activities (see requirement for #42-D).		80
61-E.	Budgets (see requirement for #42-E).		100-102, 331

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	vi
63	Place the Executive Summary at the front of the LMP. Include a physical description of the land.	ARC and 253.034(5)	v
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	52-56
65	Key management activities necessary to achieve the desired outcomes regarding other appropriate resource management.	259.032(10)	57-100
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)	100-102, 331
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)	100-102, 331
68	A statement of gross income generated, net income and expenses.	18-2.018	100-102, 331

*** = 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.

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1 Introduction and General Information

Forming the headwaters of the flow of waters that eventually supply the Fakahatchee Strand and the mangrove swamps of Ten Thousand Islands, Okaloacoochee Slough is a large, nearly pristine sawgrass marsh surrounded by a vast landscape of pinelands, hammocks, and marshes set within a landscape mosaic of conservation and agricultural lands. This region is one of the few places in Florida where the pre-Columbian landscape can be observed. Connecting the Big Cypress Swamp with the Caloosahatchee River to the north, Okaloacoochee Slough and the adjacent Okaloacoochee Slough Wildlife Management Area (OSWMA) and Okaloacoochee Slough State Forest (OSSF) conserve habitat and provide a wildlife corridor critical to the survival of the Florida panther and to protecting the watershed and natural systems of downstream conservation lands, Fakahatchee Strand and Ten Thousand Islands, that are dependent on it.

The OSWMA, managed by the Fish and Wildlife Conservation Commission (FWC), lies just to the east of its namesake slough. The OSWMA, along with FWC-managed Spirit of the Wild Wildlife Management Area and Dinner Island Ranch Wildlife Management Area and the Department of Agriculture and Consumer Services, Florida Forest Service (FFS) managed OSSF, provide over 64,000 acres of contiguous habitat for a diverse assemblage of wildlife species. OSWMA is managed by the FWC to conserve habitat for an array of imperiled and more common native wildlife including the Florida panther, Florida black bear, Audubon's crested caracara, Florida sandhill crane, and wood stork, among others, while also providing stellar opportunities for wildlife viewing and other fish and wildlife based public outdoor recreation opportunities such as hunting and hiking.

1.1 Management Plan Purpose

This Management Plan serves as the basic statement of policy and direction for the management of OSWMA. It provides information including the past usage, conservation acquisition history, and descriptions of the natural and cultural resources found on the OSWMA. Furthermore, it identifies FWC's future management intent, goals and associated short and long-term objectives, as well as identifying challenges and solutions. This Management Plan has been developed to guide each aspect of OSWMA'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 Division of State Lands (DSL), in compliance with paragraph seven of Lease No. 4245 (Appendix 13.1) and pursuant to Chapters 253 and 259, Florida Statutes (F.S.), 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 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 (Appendix 13.10).

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 OSWMA Management Plan (Sections 5 – 8).

Additional 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 OSWMA. The LMR report (Section 5.1, 13.2) 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 guide the implementation of the LMR team recommendations on the OSWMA.

Additionally, 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 the DSL and the ARC for review and consideration.

1.2 Location

The OSWMA is a diamond shaped parcel that is approximately 2,923 acres in size (Figure 1). As shown in Figure 2, the OSWMA lies within Sections 20, 21, 22, 23, 26, 27, 28, 33 and 34, Township 44 South, Range 30 East, in Hendry County, Florida.

The OSWMA is located in west-central Hendry County, eight miles southeast of Port La Belle, five miles east of State Road (SR) 29, 8.5 miles south of SR 80, and 1.3 miles north of County Road (CR) 832. Access to the OSWMA is available from Twin Mills Grade off of CR 832.

1.3 Acquisition

The OSWMA was purchased in December 1998 from Alico, Inc., an agribusiness and land management company that was formerly a subsidiary of the Atlantic Coast Line Railroad Company. The OSWMA was purchased by the FWC under the FWC Preservation 2000 Inholdings and Additions land acquisition program.

1.4 Purpose for Acquisition of the Property

The OSWMA was purchased to protect the watershed and waters of Okaloacoochee Slough, its dependent imperiled and other native wildlife, and provide resource-based public outdoor recreation including mitigation for the loss of hunting opportunities on Brown's Farm Wildlife Management Area (BFWMA) in Palm Beach County. In 1994, the South Florida Water Management District (SFWMD) removed Brown's Farm from the wildlife management area system to be used as a part of the Everglades Restoration Project. As a provision of the Everglades Forever Act, Chapter 94-115, F. S., there was a requirement that the loss of hunting opportunities on BFWMA be mitigated by the acquisition of the OSWMA and additional lands. Those additional lands were acquired by the Board of Trustees, SFWMD and the FFS and are managed by the FFS as the OSSF.

The SFWMD participation in the acquisition of portions of the OSWMA is pursuant to this provision. Since the FWC is not the lead manager for the majority of the OSWMA, the FWC continues to cooperate with the FFS and the SFWMD to provide public hunting opportunities and other wildlife management expertise on lands within the OSWMA on which the FWC is not the lead managing agency

1.5 Management Authority

The FWC is the designated lead managing agency for OSWMA under the authority granted by Lease Number 4245 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, 372, 373, 375, 378, 403, 487, 870, and 597 of the F.S. These constitutional provisions and laws provide FWC the authority to protect, conserve, and manage the State's fish and wildlife resources.

1.6 Management Directives

The 50-year Board of Trustees' Lease Agreement Number 4245 with FWC 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."

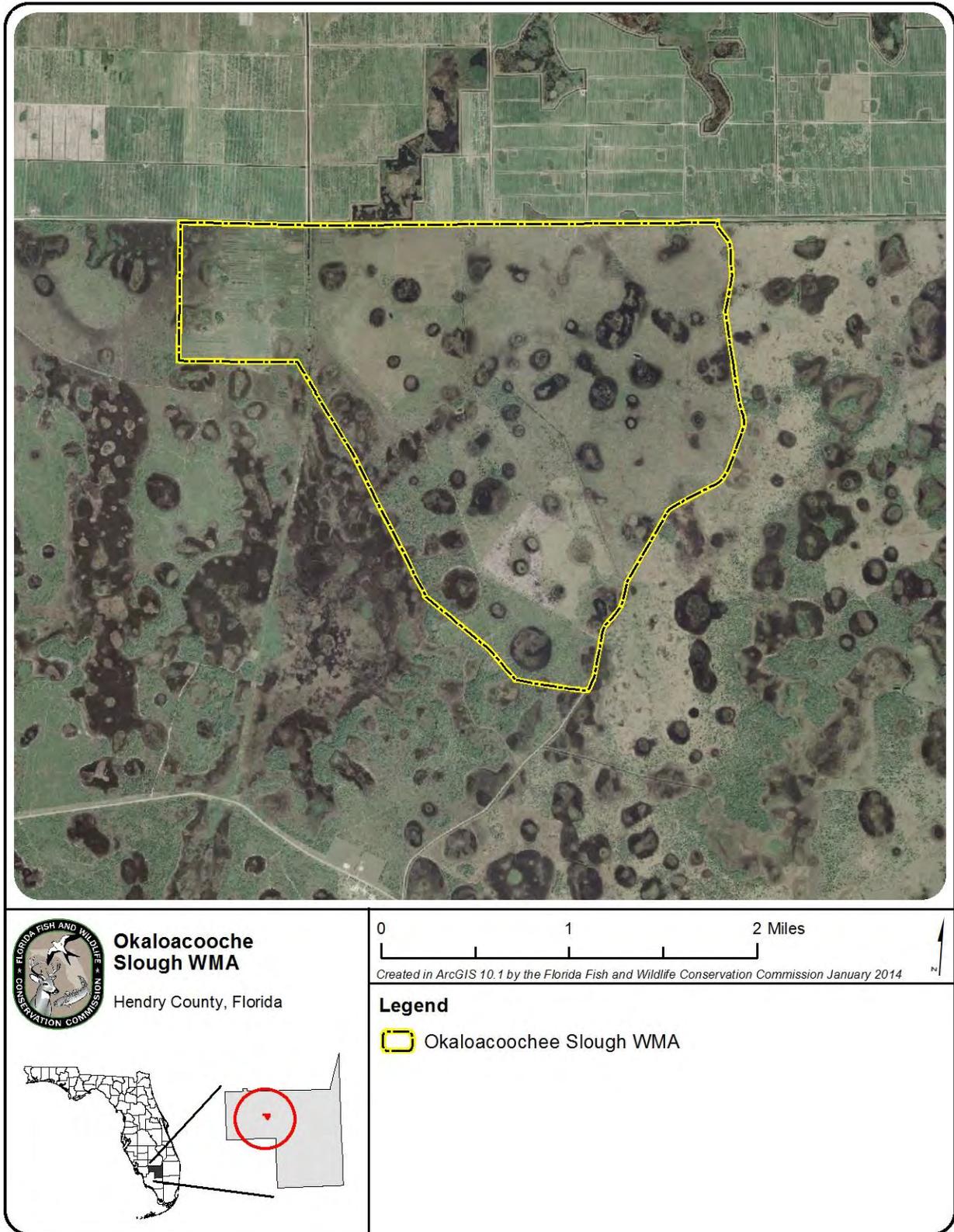


Figure 1: Aerial Imagery

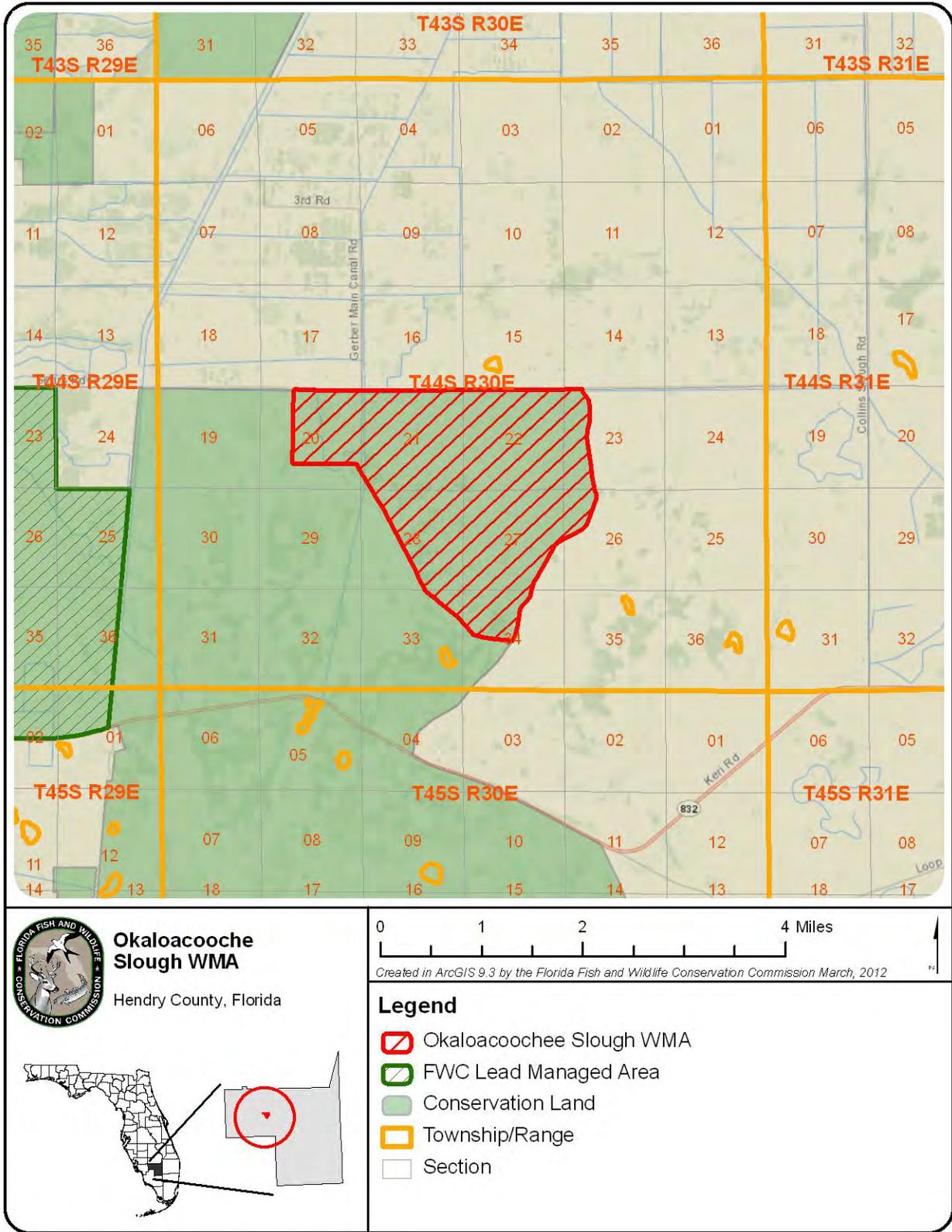


Figure 2: Section, Township, and Range Location

1.7 Title Interest and Encumbrances

As State-owned lands, title to the OSWMA is vested in the Board of Trustees (Governor and Cabinet, Figure 3). In 1998, the DSL, as staff to the Board of Trustees, entered into Lease Agreement Number 4245, a 50 year lease agreement, granting FWC management authority for OSWMA. There are no known apparent encumbrances to the property.

1.8 Proximity to Other Public Properties

As shown in Figure 4, the OSWMA is in the vicinity of a large number of publicly owned conservation areas and several Florida Forever Projects. Tables 1 and 2 list the conservation lands and Florida Forever projects within a 20-mile radius of the OSWMA, including lands managed by public and private entities, that conserve cultural and natural resources within this region of south Florida.

Most of the public conservation lands listed in Table 1 are owned in full fee by a public entity. However, some of these conservation lands are protected by less-than-fee conservation easements consisting primarily of privately owned and managed ranchlands with a public or private entity holding and monitoring a conservation easement. Conservation easements may be held by either public agencies or private entities, while the landowner who sells or otherwise grants the conservation easement retains the remaining title interests. The OSWMA is not located within any Area of Critical State Concern (Chapter 380.05, F.S.)

1.9 Adjacent Land Uses

The land within and surrounding the OSWMA is currently zoned as General Agricultural (A-2). This designation in Hendry County allows primarily for agricultural, single-family and mobile home residential, recreational, and conservation uses. Residential uses are allowed with a maximum density of one dwelling unit per five acres. The site is listed in the *Hendry County Comprehensive Land Use Plan* as “Agricultural.”

The OSWMA is bordered to the south and west by the OSSF. Farther to the west is Spirit of the Wild WMA and to the southeast is Dinner Island WMA. To the north is private agricultural land, mainly citrus owned by multiple (8) landowners and divided into two private water control districts: Gerber Groves Water Control District and Collins Slough Water Control District; the area to the north is downstream from the FWC property. The area to the east is owned by Alico Inc. and is managed for cattle grazing on the property adjacent to the OSWMA. At least two miles east of the pasture, the land is agricultural and currently is used for sugarcane production. The area east of OSWMA is also a private water control district, the Devil’s Garden Water Control District. Alico owns the property southeast of the OSWMA and is planning to develop the Keri Road Sand Mine 1.8 miles from the OSWMA property on approximately 866 acres just north of CR 832 (Keri Road) and east of OSSF; the actual pit is proposed to be approximately 125 feet deep. The mine is adjacent to a large wetland that drains through a canal into the OSSF and the Okaloacoochee Slough, which could affect OSWMA hydrology since the area is downstream.

Farther out, except for Dinner Island and Spirit of the Wild WMAs, the area is primarily privately owned pasture and agriculture, including citrus and row crops. The OSWMA is located approximately 7.5 miles north of the Big Cypress Area of Critical State Concern, which encompasses the Okaloacoochee Slough from its headwaters in the OSSF south to the Florida Panther National Wildlife Refuge, Fakahatchee Strand State Park, and the Big Cypress National Preserve.

Since water flows north on OSWMA, agricultural activities to the north should not affect the FWC property except for amount and timing of water discharging from the C-2

canal; this canal flows north through the OSWMA to an adjustable weir at Sears Road on the north boundary of the OSWMA which is controlled by Gerber Groves Water Control District. There should be no adverse affects from agricultural practices to the south since the headwaters of the Okaloacoochee Slough are located on the OSSF near CR832 (Keri Road), so water outside the OSSF is flowing away from the OSWMA. The biggest potential for agricultural input is from the east, where the land slopes down to the slough. Except for the ditch near the proposed Keri Road Sand Mine, major ditches flow north or south. Still, surface and groundwater flow west toward the slough from land to the east of OSWMA. The ditch along the east boundary of OSWMA could also cause some drainage and water quality problems from the east, and water does flow west over Twin Mills Grade along the east boundary during some wet seasons.



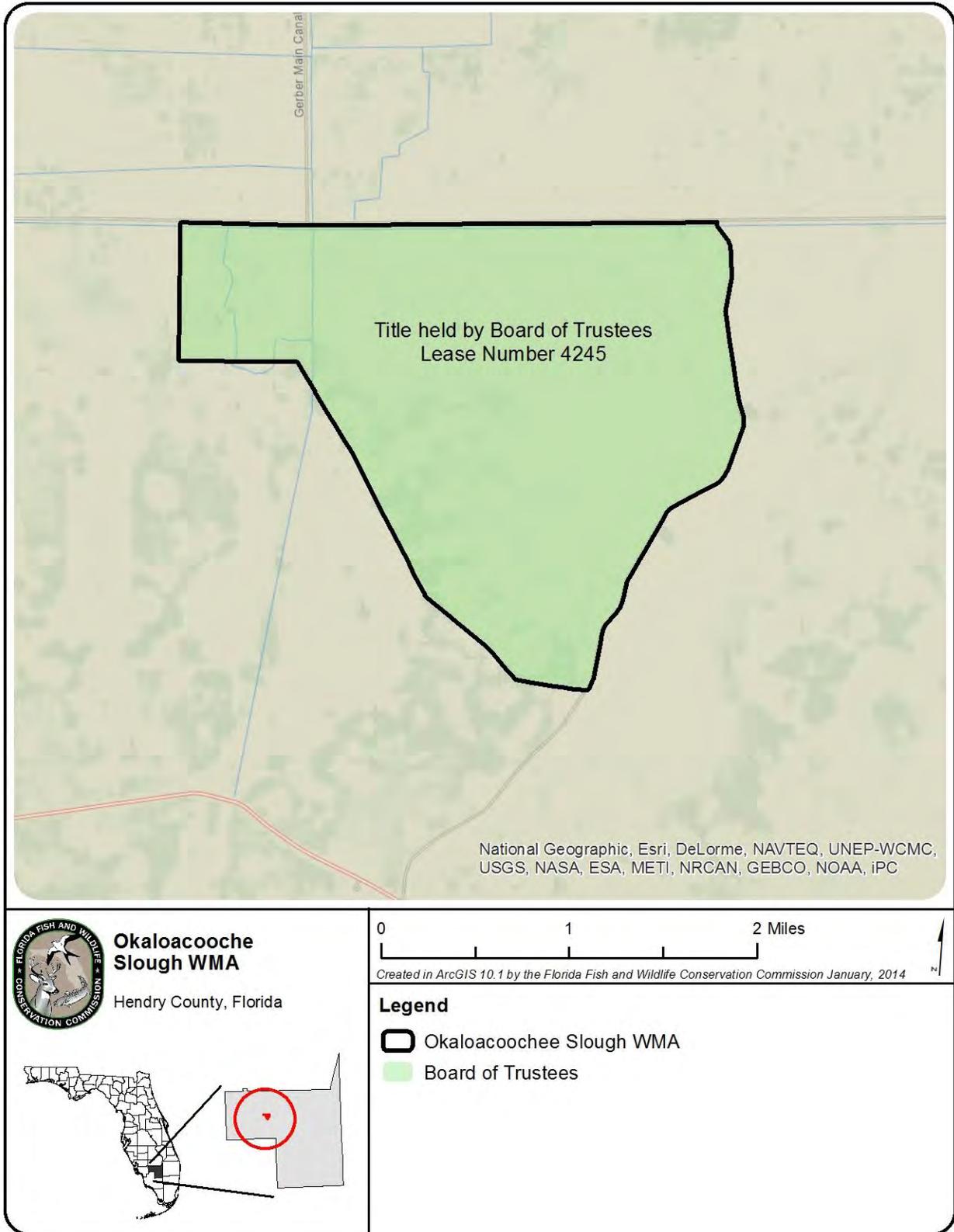


Figure 3: Title Interest

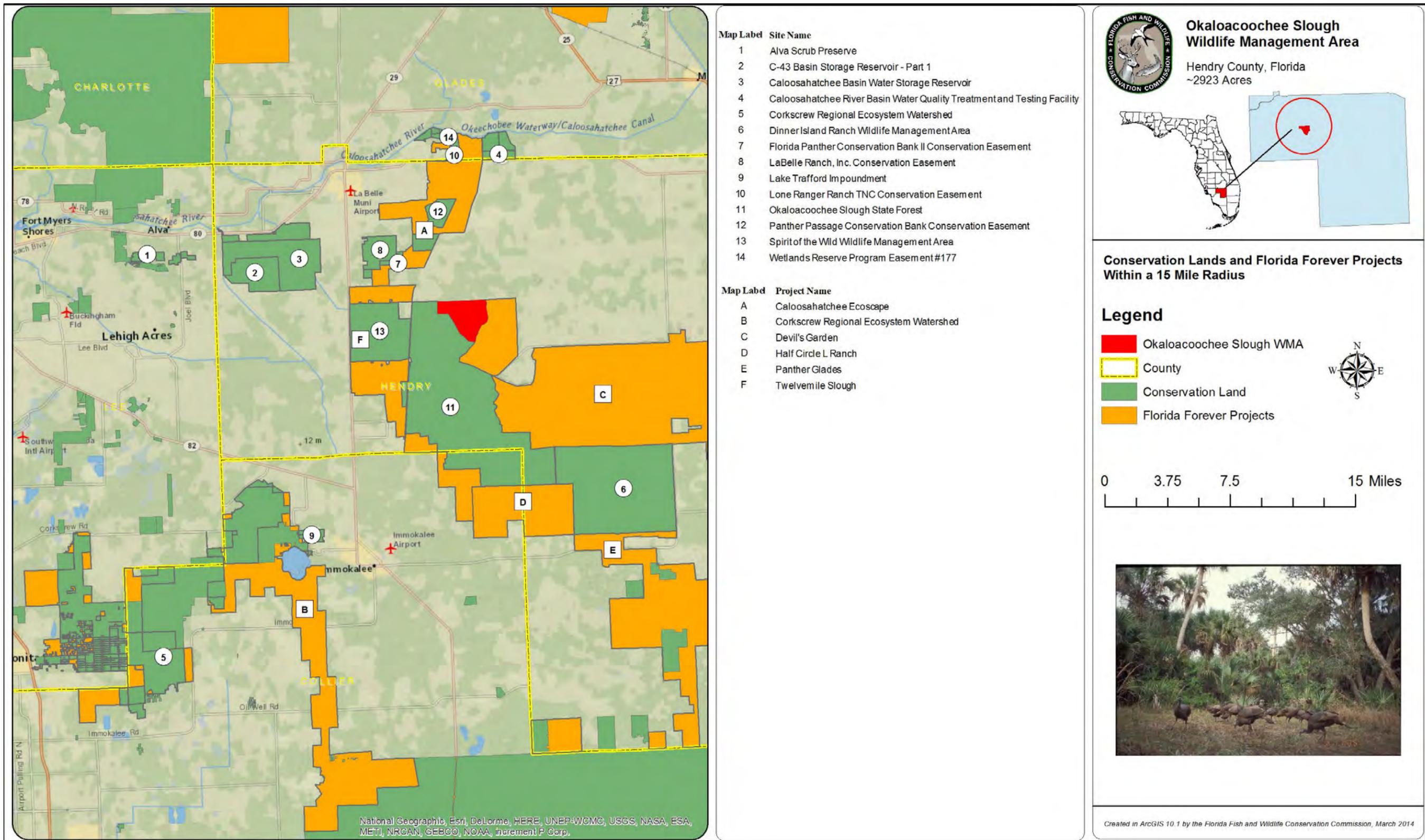


Figure 4: Conservation Land and Florida Forever Projects

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Table 1: Conservation Lands in Proximity to the OSWMA

State of Florida Conservation Lands	Managing Agency
Babcock Ranch Preserve	FWC/FFS/Babcock Ranch Management, LLC
Caloosahatchee Regional Park	Lee County
Dinner Island Ranch Wildlife Management Area	FWC
Fisheating Creek Wildlife Management Area	FWC
Lake Okeechobee Sanctuaries	National Audubon Society, Inc.
Spirit of the Wild Wildlife Management Area	FWC
Water Management District Conservation Lands	Managing Agency
C-43 Basin Storage Reservoir - Part 1	SFWMD
Caloosahatchee Basin Water Storage Reservoir	SFWMD
Caloosahatchee River Basin Water Quality Treatment and Testing Facility	SFWMD
Corkscrew Regional Ecosystem Watershed	SFWMD
Corkscrew Regional Mitigation Bank	SFWMD
Deer Fence Canal	SFWMD
Fisheating Creek	SFWMD
Lake Trafford Impoundment	SFWMD
Okaloacoochee Slough State Forest	FFS/SFWMD
River of Grass	SFWMD
County Conservation Lands	Managing Agency
Alva Cypress Preserve	Lee County
Alva Scrub Preserve	Lee County
Caracara Prairie Preserve	Collier County
Charlie's Marsh Preserve	Lee County
Daniels Preserve at Spanish Creek	Lee County
Flint Pen Strand	Lee County
Greenbriar Swamp Preserve	Lee County
Hickey Creek Wildlife and Environmental Area	Lee County/FWC
Hickey's Creek/Greenbriar Connector	Lee County
Hickey's Creek Mitigation Park	Lee County
Imperial Marsh Preserve	Lee County
Limpkin Marsh Preserve	Collier County
Meadowbrook Park	Lee County
Panther Walk Preserve	Collier County
Pepper Ranch Preserve	Collier County
Persimmon Ridge Preserve	Lee County
Sam Galloway Tract at Imperial Marsh Preserve	Lee County
Savannah Lakes	Lee County
Telegraph Creek Preserve	Lee County

Table 1: Conservation Lands in Proximity to the OSWMA

Private Conservation Lands and Organization	Managing Agency
Corkscrew Swamp Sanctuary	National Audubon Society, Inc.
Florida Panther Conservation Bank Conservation Easement	Florida Panther Conservation, LLC
Florida Panther Conservation Bank II Conservation Easement	Florida Panther Conservation, LLC
Moya Preserve	Floraglates Foundation
Conservation Easements	Monitoring Agency
BR Bar Ranch Conservation Easement	DEP
Fisheating Creek/Lykes Brothers Conservation Easement	FWC
Floraglates Preserve	Floraglates Foundation
Florida Panther Conservation Bank Conservation Easement	USDI-FWS
Florida Panther Conservation Bank II Conservation Easement	USDI-FWS
LaBelle Ranch, Inc. Conservation Easement	DEP
Nicodemus Slough Flowage Easement	SFWMD
Panther Passage Conservation Bank Conservation Easement	FWC

Acronym Key	Agency Name
DEP	Florida Department of Environmental Protection
FWC	Florida Fish and Wildlife Conservation Commission
SFWMD	South Florida Water Management District
USDI-FWS	United States Department of the Interior, Fish and Wildlife Service

Table 2: Florida Forever Projects in Proximity to the OSWMA

Project Name	Project Acres	Percent Complete
Caloosahatchee Ecoscape	18,497	16%
Corkscrew Regional Ecosystem Watershed	69,500	38%
Devil's Garden	82,995	0%
Fisheating Creek Ecosystem	177,319	34%
Half Circle L Ranch	11,203	0%
Panther Glades	64,809	34%
Twelvemile Slough	15,967	47%

1.10 Public Involvement

FWC conducted a MAG meeting in Clewiston, Florida on April 11, 2012, to obtain input from both public and private stakeholders regarding management of OSWMA. Results of this meeting were used by 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 B. Further input and testimony was received at a public hearing, as required by Chapter 259.032(10), F.S., that was held in Clewiston on May 24, 2012. The report of that hearing is also contained in Appendix B. An FWC website is also maintained for receipt of public input:

<http://myfwc.com/conservation/terrestrial/management-plans/develop-mps/>

Other 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 Cultural Resources

2.1 Physiography

2.1.1 Climate

Hendry County is located in the warm, subtropical, southern peninsular part of Florida. The average annual temperature is 75.1 degrees Fahrenheit.¹ In summer the average daily maximum temperature is 91.9 degrees, and in winter the average daily minimum temperatures is 49.0 degrees. Rainfall averages 49 inches annually with average monthly precipitation ranging from two to nine inches. The wet season normally extends from April through September, while winter is the normal dry season.

2.1.2 Topography

The majority of Hendry County and all of the OSWMA lie within the Immokalee Rise physiographic



province. This province is located between the Caloosahatchee Valley to the north and west, the Everglades to the east, and Big Cypress Spur and Southwestern Slope to the south. The Immokalee Rise is primarily composed of medium fine sand and silt and numerous depressions and sinks.

The lands comprising and surrounding the OSWMA contain two slightly elevated ridges that support flatwoods, which flank the central slough system that is the namesake of the area. The easternmost ridge supports most of the upland vegetation because most of the western ridge has been cleared for agricultural uses. Several topographically-higher islands occur within the central slough.

Elevations within the Immokalee Rise vary from approximately 15 feet above mean sea level (MSL) at the outer edge of the province to approximately 45 feet above MSL in the central area of the province. Within the OSWMA, elevations range from approximately 25 to 35 feet above MSL.

2.1.3 Soils

Sixteen soil map units were identified at the OSWMA based on a review of the Soil Survey of Hendry County, Florida, Soil Conservation Survey.

The U.S. Department of Agriculture, Natural Resources Conservation Service 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 5 provides aggregation data for the OSWMA map units, including a more complete listing of attributes and soil minor components. Figure 6 provides depth to water table information for the soil types found at the OSWMA.

2.1.4 Geologic Conditions

To date, there are no known outstanding mineral interests on the lands acquired within OSWMA. The geology of this region represents Pliocene and Pleistocene epochs of the Tertiary Quaternary period. The formation type is shelly sediments of the Plio-Pleistocene age.¹

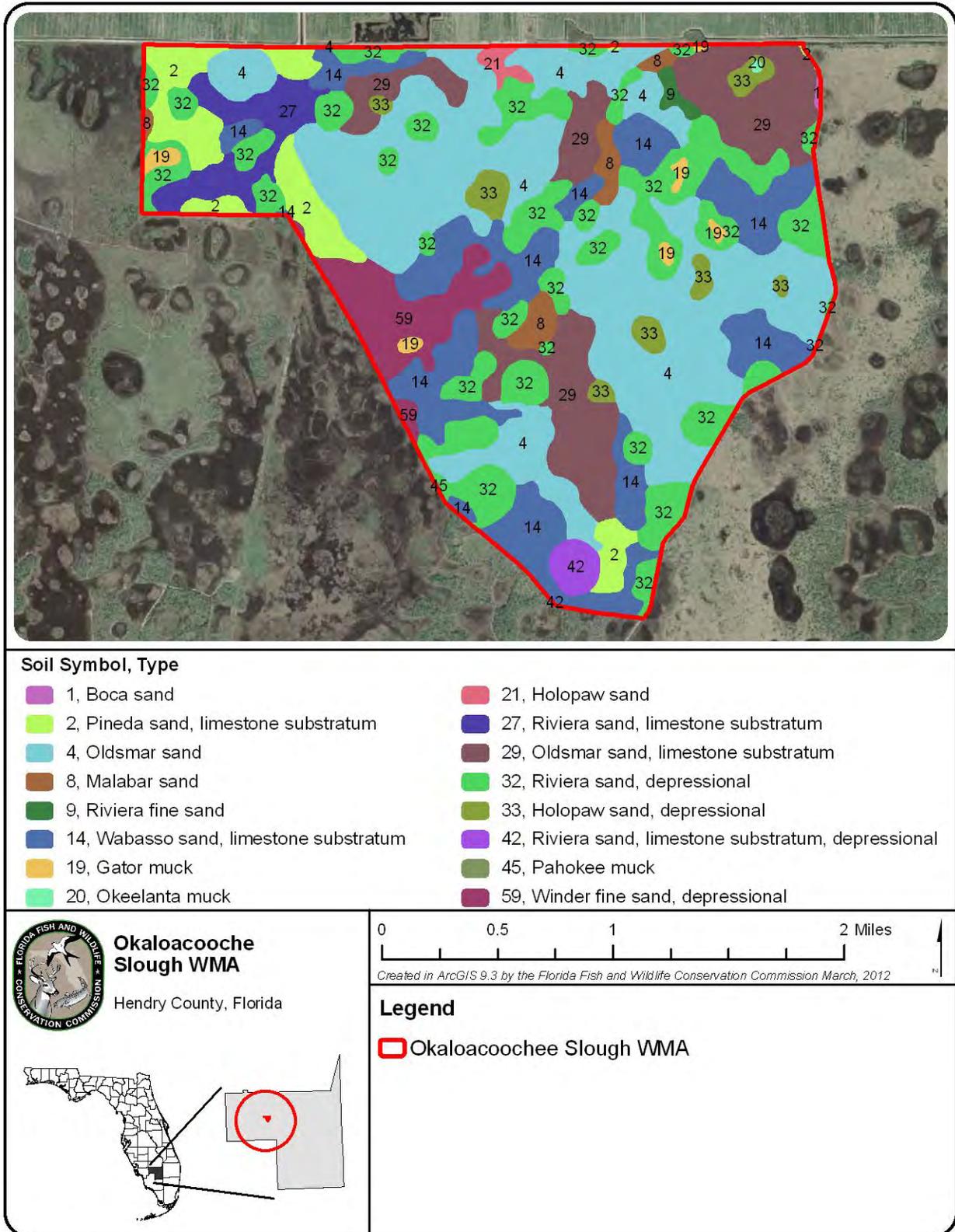


Figure 5: Soils

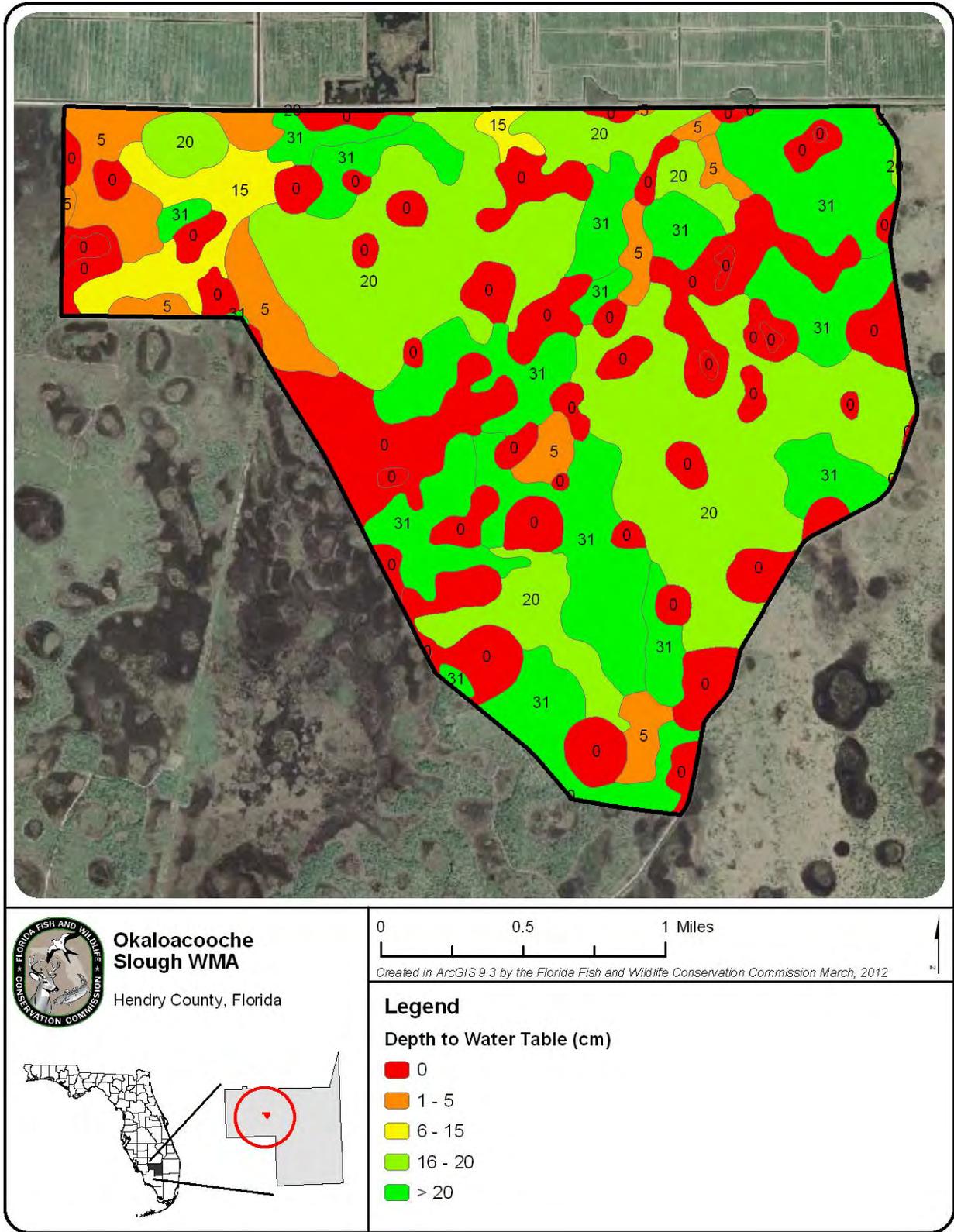


Figure 6: Soil Depth to Water Table

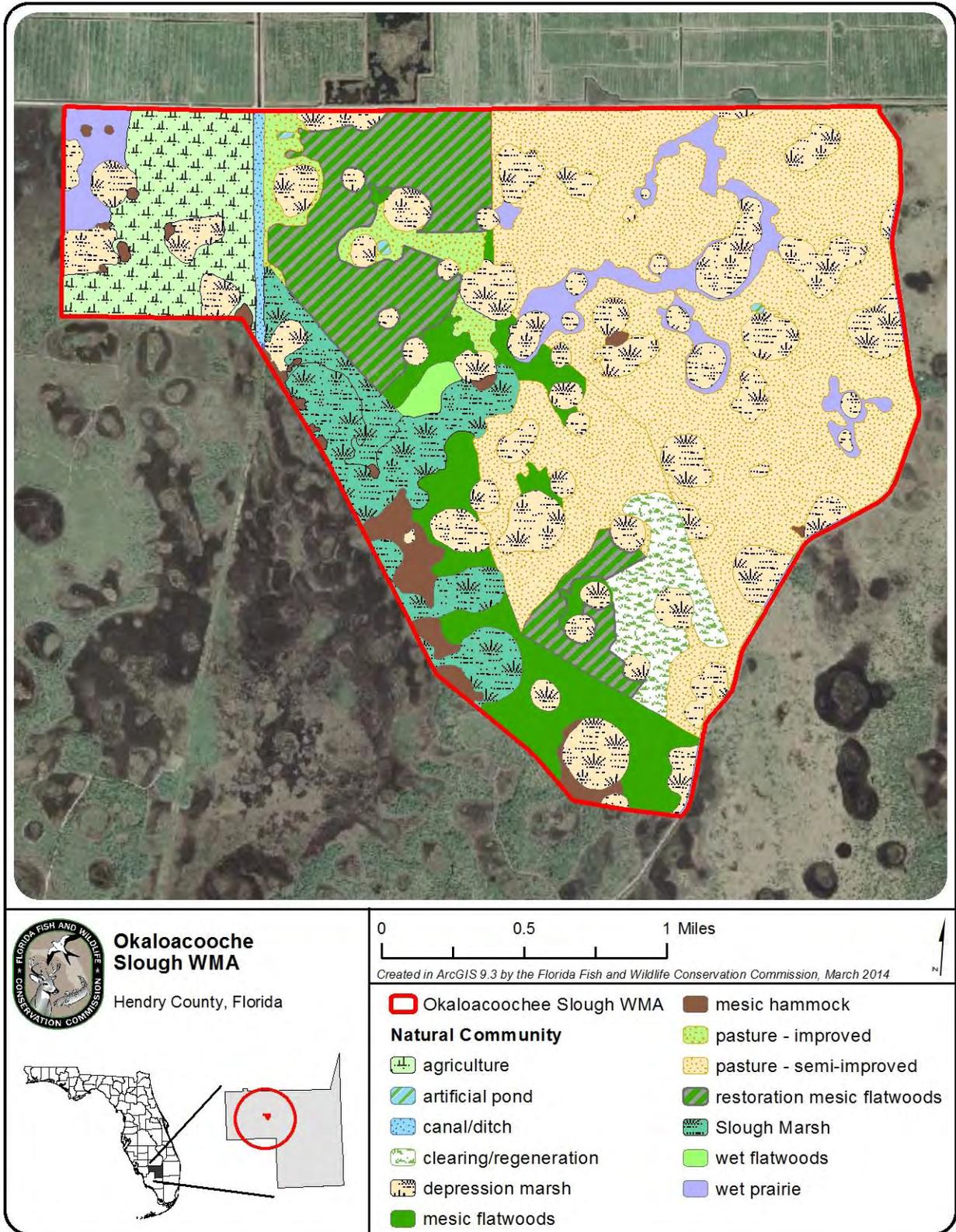


Figure 7: Natural Communities of OSWMA

2.2 Vegetation

The primary vegetative communities found within the OSWMA are semi-improved pasture, mesic flatwoods, depression marsh, slough marsh, agriculture (oldfield), and wet prairie.

The FWC has completed historic and natural community mapping of OSWMA through the services of the Florida Natural Areas Inventory (FNAI). Through the work of both the FWC and the FNAI, a total of six historic and 12 current plant communities, ten rare plant species, and 27 exotic invasive plant species within the OSWMA have been identified. Following are tables listing native, rare and exotic invasive plant species known to occur on the OSWMA. Descriptions of the plant communities located on the OSWMA and shown in Figure 7, are provided immediately following the plant species tables presented in Tables 3, 4 and 5.

Table 3: Native Plant Species Observed on the OSWMA

Common Name	Scientific Name
Alabama supple-jack, rattan vine	<i>Berchemia scandens</i>
Alligatorflag	<i>Thalia geniculata</i>
Alligator-lily	<i>Hymenocallis palmeri</i>
American black nightshade	<i>Solanum americanum</i>
American cupscale	<i>Sacciolepis striata</i>
Annual saltmarsh aster	<i>Symphotrichum subulatum</i>
Arrowfeather threeawn	<i>Aristida purpurascens var. tenuispica</i>
Arrowhead	<i>Sagittaria lancifolia</i>
Axilflower	<i>Mecardonia acuminata subsp. peninsularis</i>
Baldsedge	<i>Rhynchospora nitens</i>
Baldwin's coyote-thistle	<i>Eryngium baldwinii</i>
Baldwin's flatsedge	<i>Cyperus croceus</i>
Baldwin's milkwort	<i>Polygala baldwinii</i>
Baldwin's nutrush	<i>Scleria baldwinii</i>
Baldwin's spikerush	<i>Eleocharis baldwinii</i>
Ballmoss	<i>Tillandsia recurvata</i>
Bantam-buttons	<i>Syngonanthus flavidulus</i>
Basketgrass	<i>Oplismenus hirtellus</i>
Bunched beaksedge	<i>Rhynchospora microcephala</i>
Beach false-foxglove	<i>Agalinis fasciculata</i>
Beaked panic grass	<i>Panicum anceps</i>
Beautyberry	<i>Callicarpa americana</i>
Beggar-ticks	<i>Bidens alba var. radiata</i>
Big carpetgrass	<i>Axonopus furcatus</i>
Bighead rush	<i>Juncus megacephalus</i>
Blackeyed Susan	<i>Rudbeckia hirta</i>
Blackroot	<i>Pterocaulon pycnostachyum</i>
Bladderwort	<i>Utricularia subulata</i>

Table 3: Native Plant Species Observed on the OSWMA

Common Name	Scientific Name
Blanket crabgrass	<i>Digitaria serotina</i>
Bloodleaf	<i>Iresine diffusa</i>
Bloodroot	<i>Lachnanthes caroliana</i>
Blueheart	<i>Buchnera americana</i>
Blue-joint panic grass	<i>Panicum tenerum</i>
Bog-buttons	<i>Lachnocaulon anceps</i>
Bottlebrush threeawn	<i>Aristida spiciformis</i>
Bracken fern	<i>Pteridium aquilinum var. pseudocaudatum</i>
Branched hedgehyssop	<i>Gratiola ramosa</i>
Bretonica peluda	<i>Melochia spicata</i>
Bristly greenbrier	<i>Smilax tamnoides</i>
Broadleaf arrowhead	<i>Sagittaria latifolia</i>
Broomsedge bluestem	<i>Andropogon virginicus var. decipiens</i>
Broomsedge bluestem	<i>Andropogon virginicus var. virginicus</i>
Bushy bluestem	<i>Andropogon glomeratus var. hirsutior</i>
Butterfly weed	<i>Asclepias tuberosa</i>
Butterweed	<i>Packera glabella</i>
Button rattlesnakemaster	<i>Eryngium yuccifolium</i>
Buttonweed	<i>Diodia virginiana</i>
Cabbage palm	<i>Sabal palmetto</i>
Calloose grape	<i>Vitis shuttleworthii</i>
Canada spikerush	<i>Eleocharis geniculata</i>
Canadian horseweed	<i>Conyza canadensis var. pusilla</i>
Candyroot	<i>Polygala nana</i>
Cardinal airplant	<i>Tillandsia fasciculata var. densispica</i>
Caribbean pruple everlasting	<i>Gamochaeta antillana</i>
Carolina fimbry	<i>Fimbristylis caroliniana</i>
Carolina yelloweyed grass	<i>Xyris caroliniana</i>
Carpetweed	<i>Phyla nodiflora</i>
Chalky broomsedge bluestem	<i>Andropogon virginicus var. glaucus</i>
Chapman's skeletongrass	<i>Gymnopogon chapmanianus</i>
Chestnutleaf falsecroton	<i>Caperonia castaneifolia</i>
Cinnamon fern	<i>Osmunda cinnamomea</i>
Climbing aster	<i>Symphotrichum carolinianum</i>
Climbing hempvine	<i>Mikania scandens</i>
Clustered bushmint	<i>Hyptis alata</i>
Clustered mille graines	<i>Oldenlandia uniflora</i>
Coast cockspur	<i>Echinochloa walteri</i>
Coastal sandbur	<i>Cenchrus spinifex</i>
Coastalplain chaffhead	<i>Carphephorus corymbosus</i>
Coastalplain hawkweed	<i>Hieracium megacephalon</i>
Coastalplain milkwort	<i>Polygala setacea</i>

Table 3: Native Plant Species Observed on the OSWMA

Common Name	Scientific Name
Coastalplain St. John's-wort	<i>Hypericum brachyphyllum</i>
Coastalplain willow	<i>Salix caroliniana</i>
Coastalplain yelloweyed grass	<i>Xyris ambigua</i>
Combleaf mermaidweed	<i>Proserpinaca pectinata</i>
Common buttonbush	<i>Cephalanthus occidentalis</i>
Common carpetgrass	<i>Axonopus fissifolius</i>
Common cattail	<i>Typha latifolia</i>
Common duckweed	<i>Spirodela polyrhiza</i>
Common ragweed	<i>Ambrosia artemisiifolia</i>
Common reed	<i>Phragmites australis</i>
Common wireweed	<i>Sida ulmifolia</i>
Coral bean	<i>Erythrina herbacea</i>
Corkwood	<i>Stillingia aquatica</i>
Corky-stem passion flower	<i>Passiflora suberosa</i>
Creeping bluestem	<i>Schizachyrium scoparium var. scoparium</i>
Creeping cucumber	<i>Melothria pendula</i>
Creeping primrosewillow	<i>Ludwigia repens</i>
Creeping woodsorrel	<i>Oxalis corniculata</i>
Cuban jute	<i>Sida rhombifolia</i>
Curtiss' primrosewillow	<i>Ludwigia curtissii</i>
Cutleaf groundcherry	<i>Physalis angulata</i>
Cutthroat grass	<i>Panicum abscissum</i>
Cypress witchgrass	<i>Dichantherium dichotomum</i>
Cypress witchgrass	<i>Dichantherium ensifolium var. ensifolium</i>
Cypress witchgrass	<i>Dichantherium ensifolium var. unciphyllum</i>
Dahoon holly	<i>Ilex cassine</i>
Danglepod	<i>Sesbania herbacea</i>
Darrow's blueberry	<i>Vaccinium darrowii</i>
Deer-tongue	<i>Carphephorus paniculatus</i>
Dense gayfeather	<i>Liatris spicata</i>
Dog fennel	<i>Eupatorium capillifolium</i>
Dotted smartweed	<i>Polygonum punctatum</i>
Dwarf huckleberry	<i>Gaylussacia dumosa</i>
Dwarf live oak	<i>Quercus minima</i>
Dwarf St. John's-wort	<i>Hypericum mutilum</i>
Dwarf sundew	<i>Drosera brevifolia</i>
Earleaf greenbriar	<i>Smilax auriculata</i>
Early paspalum	<i>Paspalum praecox</i>
Early whitetop fleabane	<i>Erigeron vernus</i>
Eastern false dragon-head	<i>Physostegia purpurea</i>
Eastern gamagrass	<i>Tripsacum dactyloides</i>
Eastern milkpea	<i>Galactia regularis</i>

Table 3: Native Plant Species Observed on the OSWMA

Common Name	Scientific Name
Eastern purple bladderwort	<i>Utricularia purpurea</i>
Egyptian paspalidium (tight butt)	<i>Paspalidium geminatum</i>
Elliott's lovegrass	<i>Eragrostis elliottii</i>
Elliott's bluestem	<i>Andropogon gyrans var. stenophyllus</i>
Elliott's yelloweyed grass	<i>Xyris elliottii</i>
Erect-leaf witchgrass	<i>Dichanthelium erectifolium</i>
Fall panic grass	<i>Panicum dichotomiflorum</i>
False fennel	<i>Eupatorium leptophyllum</i>
False pimpernel	<i>Lindernia grandiflora</i>
Fascicled beakrush	<i>Rhynchospora fascicularis</i>
Fernald's beakrush	<i>Rhynchospora fernaldii</i>
Fetterbush	<i>Lyonia lucida</i>
Fewflower beaksedge	<i>Rhynchospora rariflora</i>
Field paspalum	<i>Paspalum laeve</i>
Fine-stem lovevine	<i>Cassytha filiformis</i>
Fingergrass	<i>Eustachys petraea</i>
Fireweed	<i>Erechtites hieraciifolius</i>
Flat-joint carpetgrass	<i>Axonopus compressus</i>
Flattened pipewort	<i>Eriocaulon compressum</i>
Flat-topped goldenrod	<i>Euthamia caroliniana</i>
Floating heart	<i>Nymphoides aquatica</i>
Florida alicia	<i>Chapmannia floridana</i>
Florida bully	<i>Sideroxylon reclinatum</i>
Florida butterfly orchid	<i>Encyclia tampensis</i>
Florida false beardgrass	<i>Chrysopogon pauciflorus</i>
Florida grape	<i>Vitis cinerea var. floridana</i>
Florida jointail grass	<i>Coelorachis tuberculosa</i>
Florida keys hempvine	<i>Mikania cordifolia</i>
Florida paspalum	<i>Paspalum floridanum</i>
Florida tickseed	<i>Coreopsis floridana</i>
Florida yelloweyed grass	<i>Xyris floridana</i>
Forked blue curls	<i>Trichostema dichotomum</i>
Forked fimbry	<i>Fimbristylis dichotoma</i>
Fourleaf vetch	<i>Vicia acutifolia</i>
Fourpetal St. John's-wort	<i>Hypericum tetrapetalum</i>
Foxtail	<i>Setaria parviflora</i>
Fragrant beaksedge	<i>Rhynchospora odorata</i>
Fringed nutrush	<i>Scleria ciliata</i>
Gallberry	<i>Ilex glabra</i>
Gaping panicum	<i>Panicum hians</i>
Giant bristlegrass	<i>Setaria magna</i>
Giant ladies' tresses	<i>Spiranthes praecox forma albolabia</i>

Table 3: Native Plant Species Observed on the OSWMA

Common Name	Scientific Name
Giant orchid	<i>Pteroglossaspis ecristata</i>
Giant wild pine	<i>Tillandsia utriculata</i>
Glade lobelia	<i>Lobelia glandulosa</i>
Glades morning glory	<i>Ipomoea sagittata</i>
Globe beakrush	<i>Rhynchospora globularis</i>
Golden aster	<i>Pityopsis graminifolia</i>
Golden polypody	<i>Phlebodium aureum</i>
Graceful sandmat	<i>Chamaesyce hypericifolia</i>
Grassleaf barbara's buttons	<i>Marshallia graminifolia</i>
Grass-leaved ladies' tresses	<i>Spiranthes vernalis</i>
Grassy arrowhead	<i>Sagittaria graminea</i>
Graytwig	<i>Schoepfia chrysophylloides</i>
Gulf coast spikerush	<i>Eleocharis cellulosa</i>
Gulfdune paspalum	<i>Paspalum monostachyum</i>
Hackberry	<i>Celtis laevigata</i>
Hairawn muhly	<i>Muhlenbergia capillaris</i>
Hairy bluestem	<i>Andropogon longiberbis</i>
Hairy fimbry	<i>Fimbristylis puberula</i>
Hammock prairie-clover	<i>Dalea carnea</i> var. <i>carnea</i>
Haspan flatsedge	<i>Cyperus haspan</i>
Hemlock witchgrass	<i>Dichanthelium portoricense</i>
Herb-of-grace	<i>Bacopa monnieri</i>
Hoarypea	<i>Tephrosia</i> sp.
Horned bladderwort	<i>Utricularia cornuta</i>
Humped bladderwort	<i>Utricularia gibba</i>
Hurricanegrass	<i>Fimbristylis cymosa</i>
Husk tomatoe	<i>Physalis pubescens</i>
Innocence	<i>Houstonia procumbens</i>
Inundated beaksedge	<i>Rhynchospora inundata</i>
Knotgrass	<i>Paspalum distichum</i>
Kunth's maiden fern	<i>Thelypteris kunthii</i>
Lanceleaf greenbrier	<i>Smilax smallii</i>
Largeflowered rosegentian	<i>Sabatia grandiflora</i>
Laurel greenbriar	<i>Smilax laurifolia</i>
Leafless beaked ladiestresses	<i>Sacoila lanceolata</i> var. <i>lanceolata</i>
Leafless swallowwort	<i>Cynanchum scoparium</i>
Leafy bladderwort	<i>Utricularia foliosa</i>
Leavenworth's tickseed	<i>Coreopsis leavenworthii</i>
Leconte's flatsedge	<i>Cyperus lecontei</i>
Lemon bacopa	<i>Bacopa caroliniana</i>
Limestone sandmat	<i>Chamaesyce blodgettii</i>
Little blue maidencane	<i>Amphicarpum muhlenbergianum</i>

Table 3: Native Plant Species Observed on the OSWMA

Common Name	Scientific Name
Live oak	<i>Quercus virginiana</i>
Long strap fern	<i>Campyloneurum phyllitidis</i>
Longleaf milkweed	<i>Asclepias longifolia</i>
Longleaf panicum	<i>Panicum longifolium</i>
Longleaf threeawn	<i>Aristida palustris</i>
Long-leaf violet	<i>Viola lanceolata</i>
Long's sedge	<i>Carex longii</i>
Lopsided indiagrass	<i>Sorghastrum secundum</i>
Low nutrush	<i>Scleria verticillata</i>
Low pinebarren milkwort	<i>Polygala ramosa</i>
Lowland rotala	<i>Rotala ramosior</i>
Maidencane	<i>Panicum hemitomom</i>
Manyflower marshpennywort	<i>Hydrocotyle umbellata</i>
Manyspike flatsedge	<i>Cyperus polystachyos</i>
Marsh fimbry	<i>Fimbristylis spadicea</i>
Marsh mermaidweed	<i>Proserpinaca palustris</i>
Marsh seedbox	<i>Ludwigia palustris</i>
Mexican primrosewillow	<i>Ludwigia octovalvis</i>
Milk pea	<i>Galactia elliottii</i>
Mistflower	<i>Conoclinium coelestinum</i>
Mock bishop's weed	<i>Ptilimnium capillaceum</i>
Mohr's thoroughwort	<i>Eupatorium mohrii</i>
Moistbank pimpernel	<i>Lindernia dubia</i>
Muscadine grape	<i>Vitis rotundifolia</i>
Myrsine	<i>Myrsine cubana</i>
Narrow-leaf milkweed	<i>Asclepias lanceolata</i>
Needleleaf witchgrass	<i>Dichanthelium aciculare</i>
Needlepod rush	<i>Juncus scirpoides</i>
Netted nutrush	<i>Scleria reticularis</i>
Netted pawpaw	<i>Asimina reticulata</i>
Nuttall's meadowbeauty	<i>Rhexia nuttallii</i>
Nuttall's thistle	<i>Cirsium nuttallii</i>
Openflower witchgrass	<i>Dichanthelium laxiflorum</i>
Oppositeleaf spotflower	<i>Acmella oppositifolia</i> var. <i>repens</i>
Pale meadowbeauty	<i>Rhexia mariana</i>
Pan-American balsmscale	<i>Elionurus tripsacoides</i>
Papaya	<i>Carica papaya</i>
Partridge pea	<i>Chamaecrista fasciculata</i>
Pepper vine	<i>Ampelopsis arborea</i>
Persimmon	<i>Diospyros virginiana</i>
Pickerelweed	<i>Pontederia cordata</i>
Piedmont primrosewillow	<i>Ludwigia arcuata</i>

Table 3: Native Plant Species Observed on the OSWMA

Common Name	Scientific Name
Piedmont sumpweed	<i>Iva microcephala</i>
Pillpod sandmat	<i>Chamaesyce hirta</i>
Pine lily	<i>Lilium catesbaei</i>
Pinebarren flatsedge	<i>Cyperus ovatus</i>
Pinebarron goldenrod	<i>Solidago fistulosa</i>
Pineland heliotrope	<i>Heliotropium polyphyllum</i>
Pineland purple	<i>Carphephorus odoratissimus subtropicanus</i>
Pineland rayless goldenrod	<i>Bigelovia nudata subsp. australis</i>
Pineland twinflower	<i>Dyschoriste angusta</i>
Pink sundew	<i>Drosera capillaris</i>
Pipewort	<i>Eriocaulon decangulare</i>
Pitted stripeseed	<i>Piriqueta cistoides subsp. caroliniana</i>
Pointed blue-eye-grass	<i>Sisyrinchium angustifolium</i>
Poison ivy	<i>Toxicodendron radicans</i>
Pokeweed	<i>Phytolacca americana</i>
Pond cypress	<i>Taxodium ascendens</i>
Poorland flatsedge	<i>Cyperus compressus</i>
Possum grape	<i>Cissus verticillata</i>
Potbelly airplant	<i>Tillandsia paucifolia</i>
Procession flower	<i>Polygala incarnata</i>
Prostrate rattle-box	<i>Crotalaria rotundifolia</i>
Purple bluestem	<i>Andropogon glomeratus var. glaucopsis</i>
Purple false foxglove	<i>Agalinis purpurea</i>
Purple lovegrass	<i>Eragrostis spectabilis</i>
Purple thistle	<i>Cirsium horridulum</i>
Queen's-delight	<i>Stillingia sylvatica</i>
Ravenel's pipewort	<i>Eriocaulon ravenelii</i>
Rayless sunflower	<i>Helianthus radula</i>
Red maple	<i>Acer rubrum</i>
Red mulberry	<i>Morus rubra</i>
Reddish wild pine	<i>Tillandsia xsmalliana</i>
Redmargin zephyrlily	<i>Zephyranthes simpsonii</i>
Redtop panicum	<i>Panicum rigidulum</i>
Resurrection fern	<i>Pleopeltis polypodioides var. michauxiana</i>
Rice button aster	<i>Symphotrichum dumosum</i>
Richard's yelloweyed grass	<i>Xyris jupicai</i>
Rock Carolina leafflower	<i>Phyllanthus caroliniensis subsp. saxicola</i>
Rose-of-plymouth	<i>Sabatia stellaris</i>
Rosy camphorweed	<i>Pluchea baccharis</i>
Rouge plant	<i>Rivina humilis</i>
Roughhair witchgrass	<i>Dichanthelium strigosum var. glabrescens</i>
Roundleaf thoroughwort	<i>Eupatorium rotundifolium</i>

Table 3: Native Plant Species Observed on the OSWMA

Common Name	Scientific Name
Roundpod St. John's-wort	<i>Hypericum cistifolium</i>
Rustweed	<i>Polypremum procumbens</i>
Saltbush	<i>Baccharis halimifolia</i>
Saltmarsh fingergrass	<i>Eustachys glauca</i>
Saltmarsh umbrellasedge	<i>Fuirena breviseta</i>
Sand cordgrass	<i>Spartina bakeri</i>
Sandweed	<i>Hypericum fasciculatum</i>
Satinleaf	<i>Chrysophyllum oliviforme</i>
Savanna milkweed	<i>Asclepias pedicellata</i>
Savannah yelloweyed grass	<i>Xyris flabelliformis</i>
Saw greenbriar	<i>Smilax bona-nox</i>
Saw palmetto	<i>Serenoa repens</i>
Sawgrass	<i>Cladium jamaicense</i>
Scaleleaf aster	<i>Symphyotrichum adnatum</i>
Seaside goldenrod	<i>Solidago sempervirens</i>
Seaside primrose willow	<i>Ludwigia maritima</i>
Semaphore thorough-wort	<i>Eupatorium mikanioides</i>
Sensitive pea	<i>Chamaecrista nictitans var. aspera</i>
Shaggy hedgehyssop	<i>Gratiola pilosa</i>
Shiny blueberry	<i>Vaccinium myrsinites</i>
Shiny leafed wild coffee	<i>Psychotria nervosa</i>
Shiny woodoats	<i>Chasmanthium nitidum</i>
Shoestring fern	<i>Vittaria lineata</i>
Shore rush	<i>Juncus marginatus</i>
Shortleaf rosegentian	<i>Sabatia brevifolia</i>
Shortleaf wild coffee	<i>Psychotria sulzneri</i>
Shortleaf yelloweyed grass	<i>Xyris brevifolia</i>
Shortleafed gayfeather	<i>Liatris tenuifolia var. quadriflora</i>
Shortspike bluestem	<i>Andropogon brachystachyus</i>
Showy milkwort	<i>Polygala violacea</i>
Shrubby primrose willow	<i>Ludwigia suffruticosa</i>
Shyleaf	<i>Aeschynomene americana</i>
Silverling	<i>Baccharis glomeruliflora</i>
Simpson's stopper	<i>Myrcianthes fragrans</i>
Skyflower	<i>Hydrolea corymbosa</i>
Slash pine	<i>Pinus elliottii var. densa</i>
Slender adder's-tongue fern	<i>Ophioglossum nudicaule</i>
Slender fimbry	<i>Fimbristylis autumnalis</i>
Slender gayfeather	<i>Liatris gracilis</i>
Slenderfruit nutrush	<i>Scleria georgiana</i>
Small butterwort	<i>Pinguicula pumila</i>
Smallfruit primrose willow	<i>Ludwigia microcarpa</i>

Table 3: Native Plant Species Observed on the OSWMA

Common Name	Scientific Name
Smallfruit spikerush	<i>Eleocharis microcarpa</i>
Smallhead doll's daisy	<i>Boltonia diffusa</i>
Small's yelloweyed grass	<i>Xyris smalliana</i>
Sour paspalum	<i>Paspalum conjugatum</i>
South Florida bluestem	<i>Schizachyrium rhizomatum</i>
Southeast sneezeweed	<i>Helenium pinnatifidum</i>
Southeast sunflower	<i>Helianthus agrestis</i>
Southeastern primrosewillow	<i>Ludwigia linifolia</i>
Southern bayberry	<i>Myrica pusilla</i>
Southern beaksedge	<i>Rhynchospora microcarpa</i>
Southern cattail	<i>Typha domingensis</i>
Southern crabgrass	<i>Digitaria ciliaris</i>
Southern cutgrass	<i>Leersia hexandra</i>
Southern dewberry	<i>Rubus trivialis</i>
Southern fleabane	<i>Erigeron quercifolius</i>
Southern gaura	<i>Gaura angustifolia</i>
Southern needleleaf	<i>Tillandsia setacea</i>
Southern sandbur	<i>Cenchrus echinatus</i>
Southern umbrellasedge	<i>Fuirena scirpoidea</i>
Spadeleaf	<i>Centella asiatica</i>
Spanish moss	<i>Tillandsia usneoides</i>
Spanish stopper	<i>Eugenia foetida</i>
Spatterdock	<i>Nuphar advena var. advena</i>
Spider-orchid	<i>Habenaria floribunda</i>
Spikerush	<i>Eleocharis elongata</i>
Splitbeard bluestem	<i>Andropogon ternarius</i>
Spreading beaksedge	<i>Rhynchospora divergens</i>
Spreading cinchweed	<i>Pectis prostrata</i>
St. Andrew's-cross	<i>Hypericum hypericoides</i>
St. Augustine grass	<i>Stenotaphrum secundatum</i>
St. Peter's-wort	<i>Hypericum crux-andreae</i>
Staggerbush	<i>Lyonia fruticosa</i>
Stiff yellow flax	<i>Linum medium var. texanum</i>
Stinking camphorweed	<i>Pluchea foetida</i>
Strangler fig	<i>Ficus aurea</i>
String-lily	<i>Crinum americanum</i>
Sugarcane plumegrass	<i>Saccharum giganteum</i>
Swamp bay	<i>Persea palustris</i>
Swamp fern	<i>Blechnum serrulatum</i>
Swamp flatsedge	<i>Cyperus ligularis</i>
Swamp hibiscus	<i>Hibiscus grandiflorus</i>
Swamp hornpod	<i>Mitreola sessilifolia</i>

Table 3: Native Plant Species Observed on the OSWMA

Common Name	Scientific Name
Swamp laurel oak	<i>Quercus laurifolia</i>
Swamp smartweed	<i>Polygonum hydropiperoides</i>
Swamp sunflower	<i>Helianthus angustifolius</i>
Sweet broom	<i>Scoparia dulcis</i>
Sweet everlasting	<i>Pseudognaphalium obtusifolium</i>
Sweetscent camphorweed	<i>Pluchea odorata</i>
Switchgrass	<i>Panicum virgatum</i>
Sword fern	<i>Nephrolepis exaltata</i>
Tall elephantsfoot	<i>Elephantopus elatus</i>
Tall nutgrass	<i>Scleria triglomerata</i>
Tall threeawn	<i>Aristida patula</i>
Tall yelloweyed grass	<i>Xyris platylepis</i>
Tallow wood	<i>Ximenia americana</i>
Thin paspalum	<i>Paspalum setaceum</i>
Threesquare bulrush	<i>Schoenoplectus pungens</i>
Toadflax	<i>Linaria canadensis</i>
Tracy's beaksedge	<i>Rhynchospora tracyi</i>
Tropical flatsedge	<i>Cyperus surinamensis</i>
Tropical royalblue waterlily	<i>Nymphaea elegans</i>
Tropical water hyssop	<i>Bacopa innominata</i>
Twistedleaf goldenrod	<i>Solidago tortifolia</i>
Valley redstem	<i>Ammannia coccinea</i>
Variable witchgrass	<i>Dichanthelium commutatum</i>
Virginia chain fern	<i>Woodwardia virginica</i>
Virginia creeper	<i>Parthenocissus quinquefolia</i>
Viviparous spikerush	<i>Eleocharis vivipara</i>
Walter's groundcherry	<i>Physalis walteri</i>
Wand goldenrod	<i>Solidago stricta</i>
Warty panicgrass	<i>Panicum verrucosum</i>
Water cowbane	<i>Tiedemannia filiformis</i>
Water horn fern	<i>Ceratopteris pteridoides or thalictroides</i>
Watergrass, southern	<i>Luziola fluitans</i>
Water-willow	<i>Justicia angusta</i>
Wax-myrtle	<i>Myrica cerifera</i>
White crownbeard	<i>Verbesina virginica</i>
White stopper	<i>Eugenia axillaris</i>
White sunnybell	<i>Schoenolirion albiflorum</i>
White vine	<i>Sarcostemma clausum</i>
White waterlily	<i>Nymphaea odorata</i>
Whitemouth day-flower	<i>Commelina erecta</i>
Whitetop aster	<i>Oclemena reticulata</i>
White-top sedge	<i>Rhynchospora colorata</i>

Table 3: Native Plant Species Observed on the OSWMA

Common Name	Scientific Name
Whorled marshpennywort	<i>Hydrocotyle verticillata</i>
Wild bachelor's button	<i>Polygala lutea</i>
Wild coco orchid	<i>Eulophia alta</i>
Wild pennyroyal	<i>Piloblephis rigida</i>
Winged loosestrife	<i>Lythrum alatum</i>
Winged primrosewillow	<i>Ludwigia alata</i>
Winged sumac	<i>Rhus copallinum</i>
Wiregrass	<i>Aristida stricta</i> var. <i>beyrichiana</i>
Witchgrass	<i>Panicum chamaelonche</i>
Wood sage	<i>Teucrium canadense</i>
Woodland false buttonweed	<i>Spermacoce remota</i>
Wooly sunbonnets	<i>Chaptalia tomentosa</i>
Wright's beaksedge	<i>Rhynchospora wrightiana</i>
Wrinkled jointgrass	<i>Coelorachis rugosa</i>
Yellow bachelor's button	<i>Polygala rugelii</i>
Yellow flatsedge	<i>Cyperus flavescens</i>
Yellow spikerush	<i>Eleocharis flavescens</i>
Yellow-top flaveria	<i>Flaveria linearis</i>
Yerba de Tajo	<i>Eclipta prostrata</i>

Table 4: Rare Plant Species Observed on the OSWMA

Common Name	Scientific Name	Status
Cardinal airplant	<i>Tillandsia fasciculata</i> var. <i>densispica</i>	SE
Cutthroat grass	<i>Panicum abscissum</i>	SE
Florida jointtail grass	<i>Coelorachis tuberculosa</i>	ST
Giant orchid	<i>Pteroglossaspis ecristata</i>	ST
Giant wild pine	<i>Tillandsia utriculata</i>	SE
Leafless beaked ladiestresses	<i>Sacoila lanceolata</i> var. <i>lanceolata</i>	ST
Pine lily	<i>Lilium catesbaei</i>	ST
Redmargin zephyrlily	<i>Zephyranthes simpsonii</i>	ST
Satinleaf	<i>Chrysophyllum oliviforme</i>	ST
Simpson's stopper	<i>Myrcianthes fragrans</i>	ST

Abbreviation	Status
SCE	State Commercially Exploited
SE	State Endangered
ST	State Threatened

Table 5: Exotic Invasive Plant Species Observed on the OSWMA

Common Name	Scientific Name
Alligatorweed	<i>Alternanthera philoxeroides</i>
Brazilian pepper	<i>Schinus terebinthifolia</i>
Caesarweed	<i>Urena lobata</i>
Cogongrass	<i>Imperata cylindrica</i>
Crowfoot grass	<i>Dactyloctenium aegyptium</i>
Guava	<i>Psidium guajava</i>
Guineagrass	<i>Panicum maximum</i>
Indian laurel	<i>Ficus microcarpa</i>
Japanese climbing fern	<i>Lygodium japonicum</i>
Jaragua grass	<i>Hyparrhenia rufa</i>
Limpograss	<i>Hemarthria altissima</i>
Melaleuca	<i>Melaleuca quinquenervia</i>
Old World climbing fern	<i>Lygodium microphyllum</i>
Paragrass	<i>Urochloa mutica</i>
Peruvian primrose willow	<i>Ludwigia peruviana</i>
Rosary pea	<i>Abrus precatorius</i>
Rose natalgrass	<i>Melinis repens</i>
Shrub verbena	<i>Lantana camara</i>
Torpedograss	<i>Panicum repens</i>
Tropical soda apple	<i>Solanum viarum</i>
Water hyacinth	<i>Eichhornia crassipes</i>
Water lettuce	<i>Pistia stratiotes</i>
Water spangles	<i>Salvinia minima</i>
West Indian marsh grass	<i>Hymenachne amplexicaulis</i>
Wild balsam apple	<i>Momordica charantia</i>
Wild bush bean	<i>Macroptilium lathyroides</i>
Wright's nut-rush	<i>Scleria lacustris</i>

2.2.1 FNAI Natural Community Descriptions

The following are descriptions of the natural communities found at the OSWMA. These communities are depicted in Figure 7.

2.2.1.1 Depression Marsh

Depression marshes are isolated, herbaceous wetlands situated in shallow, relatively small and often rounded or oval shaped depressions. They are characterized by concentric zones of vegetation that reflect drier, more fluctuating hydrological conditions in the outer rings and wetter conditions proceeding to the center. The substrate is usually acid sand with deepening peat toward the center. Hydrological conditions vary, with most depression marshes drying in most years. Hydroperiods range widely from as few as 50 days or less to more than 200 days per year.

Depression marshes are scattered throughout the OSWMA and range in size from 0.5 acres to 70 acres. The largest marshes appear to be a convergence of two or more historically separate depressions. They are irregular in shape and still retain multiple deeper water centers with the outer zones forming shallower connections.

Because water depth in depression marshes usually increases toward the center, vegetation typically forms distinctive zones corresponding to depth. On the OSWMA, there is usually an inner, central zone occupied by arrowhead, pickerelweed, or both. Deeper depression marshes may contain fireflag, sawgrass, and occasionally willow. The zone encircling the center is often dominated by maidencane and corkwood with little blue maidencane commonly dominating the outermost herbaceous edge. Other herbaceous species found mainly in the outer zones include pipeworts, yelloweyed grass, beakrushes, lemon bacopa, bladderworts, floating-hearts, water cowbane, Piedmont sumpweed, southern umbrellasedge, erect-leaf witchgrass, and blue-joint panic grass. The outermost zone often includes scattered St. John's-wort and corkwood.

Fire is important in maintaining the open herbaceous character of depression marshes by restricting shrub invasion to encourage flowering and reproduction of grasses, sedges, and the formation of peat. Almost all of the marshes in the western half of the OSWMA have been affected to some degree by an inter-connecting network of small drainage ditches that likely impede the natural hydroperiod.

2.2.1.2 Mesic Flatwoods

Mesic flatwoods on the OSWMA are upland areas with an open pine canopy or no canopy, scattered cabbage palm subcanopy, and an understory dominated by saw palmetto or gallberry, with a variety of other shrubs, forbs, grasses, and sedges, including pasture grasses depending on their location. They comprise approximately 804 acres on the OSWMA. The largest area, approximately 120 acres, occurs between the North Loop road running southeast to northwest off Twin Mills Road and the southern boundary of the WMA. The remaining acreage of mesic flatwoods occurs as small remnant patches and in several areas where groundcover restoration has restored over 300 acres of pasture to mesic flatwoods vegetation. Historically, mesic to wet flatwoods, interspersed with depression marshes, comprised the majority of the OSWMA landscape.

The largest area of mesic flatwoods on the OSWMA is also the area least effected by past cattle operations. The area was logged and cleared in the early 1990's, but not altered for cattle grazing. These flatwoods now have a shrubby understory with various amounts and differing composition of canopy and subcanopy cover depending on the relatively recent clearing activities. Slash pine and/or cabbage palm are generally present in the canopy, although some sites have no canopy. Oaks typically occur in the subcanopy or as a tall shrub layer. The shrub cover is generally dense and may include saw palmetto, gallberry, wax myrtle, fetterbush, staggerbush, winged sumac, St John's-wort, shiny blueberry, dwarf huckleberry, myrsine, and dwarf live oak. The herbaceous

cover is generally sparse to moderate although a few areas are exceptions to this. Species include blackroot, bottlebrush threeawn, little blue maidencane, panic grasses, spikerush, pale meadow beauty, and bloodroot. Weedy species are generally sparse to moderate and include bluestem, pinebarron goldenrod, and saltbush. Some areas within this larger flatwoods seem to be a mixture of hammock and flatwoods and are difficult to categorize.

Seven other areas within the OSWMA were delineated as mesic flatwoods and total approximately 93 acres, with an average size of 18 acres. One area, approximately 15 acres, also appears to have been cutover but not “improved”. This area is one of the few places where wiregrass is found outside the groundcover restoration areas. This area also has low areas with more hydric species. Some spots appear to have been created when the site was logged but other areas may be natural wet prairie. Additional species not mentioned above include Malaysian false pimpernel, wild pennyroyal, pinebarron goldenrod, thistles, and button rattlesnakemaster. Most of the other flatwoods are smaller and have dense pockets of saw palmetto and a more disturbed groundcover. The pasture areas have additional areas where pockets of pines have been left or young pines are abundant.

An additional 318 acres have been converted from pasture to mesic flatwoods vegetation. These areas have a diverse groundcover including wiregrass, lopsided indiagrass, many species of bluestems, witchgrasses, beakrushes, flatsedges, spikerushes and forbs such as blackeyed susans, sunflowers, water hyssops, tall elephantsfoot, and pale meadow beauty.

Fire is an important natural element in the control of the high shrub density at most of the flatwoods sites. Fire will also help increase the herbaceous cover, including wiregrass. Some of the flatwoods are sandwiched between depression marshes or are adjacent to the main swale system in the southern central portion of the OSWMA. These areas may naturally be subject to more moist conditions and less frequent fires because of their location.

2.2.1.3 Slough Marsh

Slough marshes are situated in broad shallow channels with slow flowing water. They are generally dominated by emergent grasses, sedges, and herbaceous species. Slough marshes resemble basin marshes and depression marshes in vegetation, except that they are typically dominated by large areas of sawgrass. There may be deeper channels within slough marshes that typically contain of willow, and fireflag. Soils in slough marshes may be peat, unless they have been removed by severe fire during drought, or sands.

Four areas within the OSWMA were classified as slough marsh communities. These areas are located on the southwestern boundary, south of the North Loop road, and connect to Okaloacoochee Slough on the adjacent OSSF. These marshes exhibit

characteristics of depression marsh communities. Herbaceous cover is moderate to high and includes maidencane, lemon bacopa, rushes, sand cordgrass, spikerushes, Piedmont sumpweed, and yelloweyed grass. Wax myrtle and corkwood are sparse. Patches of fireflag, sawgrass and willow are visible. More extensive swaths of sawgrass can be seen looking west on the State Forest.

2.2.1.4 Wet Flatwoods

Wet flatwoods comprise only 14 acres of the OSWMA, although historically it probably made up a large portion of the flatwoods matrix community. The remnant parcels have a sparse canopy of slash pine with a relatively open understory of scattered shrubs and dense groundcover of hydrophytic herbaceous species. One area described below has no pine canopy.

Wet flatwoods are pine forests with a dense groundcover of hydrophytic grasses, herbs and low shrubs. A feature of wet flatwoods that distinguishes them from mesic flatwoods is the absence, or small amount, of saw palmetto. Because of the open understory and generally wet soil conditions, wet flatwoods support a rich ground layer of grasses, forbs, and sedges. Only one area is classified as wet flatwoods. It consists of scattered cabbage palm and oak, with and some areas with very dense, tall wax myrtle, saw palmetto and some fetterbush and gallberry. Swamp fern and Virginia chain fern are also present. This area has been cutover and lacks a pine overstory, does not appear to have been improved for cattle grazing, and contains wiregrass. These areas have sparse to abundant canopy cover of mature slash pine and a moderate shrub cover that includes wax myrtle, saw palmetto, swamp laurel oak, netted pawpaw, and cabbage palm. The herbaceous cover is high and includes bahiagrass, wiregrass, little blue maidencane, maidencane, thin paspalum, bluestems, rosy camphorweed, dog fennel, umbrellasedges, spadeleaf, beaksedges, seaside primrose willow, tickseeds, queen's delight, pokeweed, clustered mille grains, clustered bushmint, and swamp fern. Torpedo grass and Caesarweed are exotic species that occur in these flatwoods. Fire is an important natural element in the control of the high shrub density at most of the flatwoods sites. Fire will also help increase the herbaceous cover, including wiregrass.

2.2.1.5 Mesic Hammocks

Mesic hammocks are closed-canopy forests usually dominated by live oak and cabbage palm with a diverse shrub layer that may include tropical species. Mesic hammocks are naturally protected from fire by their position on the landscape. On the OSWMA, they typically occur as "tree islands" in a wetland or sandwiched among wetlands. Soils in mesic hammocks are moist because of a dense litter layer and the humid conditions that prevail under the closed canopy, but are rarely inundated.

All of the hammocks within the OSWMA were classified as mesic. The canopy and subcanopy are generally comprised of live oak, swamp laurel oak, cabbage palm and/or slash pine. Most hammocks have a moderate to high shrub strata dominated by

cabbage palm, saw palmetto, and myrsine. Occasional species include, wax myrtle, hackberry, swamp bay, hog plum, and Florida bully. Some of the tropical species found in the understory include myrsine, strangler fig, and Spanish stopper. Herbaceous cover is typically sparse and mostly found in canopy gaps or ground disturbance caused by natural or artificial means. Some of the herbs present are swamp fern, smartweed, whorled marshpennywort, common dayflower, and graminoids. Most of the hammocks observed have an abundance of oak leaf litter and palm fronds covering the ground.

Caesarweed is occupying the areas disturbed by the hogs and was abundant in these hammocks before chemical treatment, but numbers are now reduced but not yet at maintenance level. Brazilian pepper was also present when the property was purchased, but has been removed with chemical treatments.

2.2.1.6 Wet Prairie

Wet prairie is a mostly treeless herbaceous community with few shrubs, found in continually wet, but not inundated soils. It often occurs as an ecotone between lower lying depressional wetlands and adjacent upland communities. Wet prairie on the OSWMA occurs in 4 areas of the OSWMA. Historically, the northwestern area was a broad, shallow prairie/swale between two deeper portions of Okaloacoochee Slough. Agriculture and ditching to the east, and a dike to the north have greatly altered the natural hydrology of the adjacent area. Extensive orange groves lie north of this section of the management area. What remains is approximately 75 acres of wet prairie, depression marshes, and small hammocks on the northwestern boundary of the OSWMA. The rest of the former prairie, approximately 200 acres east to the canal, is an old agricultural field. Three other examples of wet prairie occur east of the canal as low herbaceous ecotones around marshes or small openings in flatwoods communities. The largest weaves between a series of wetlands and is the upper extent of a slough drainage extending northeast from the slough marsh. Wet prairies are seasonally inundated or saturated for 50 to 100 days each year and burn every 2 to 4 years.

Shrub cover is generally moderate with corkwood and Saint John's-worts most common. Herb cover is high and includes a variety of asters, Piedmont sumpweed, sundews, mermaidweeds and others. Grasses and sedges are abundant and may include gulfdune paspalum, little blue maidencane, maidencane, arrowfeather threeawn, Elliot's lovegrass, hairawn muhly grass, blue-joint panicgrass, and flatsedges. Fire is an important natural element in the structure of the wet prairie community, especially in controlling shrub densities. Fire will also help increase the herbaceous cover, including wiregrass.

The invasive exotics, West Indian marsh grass and torpedo grass were frequent in the margins of the wet prairie community but are much reduced after several years of chemical treatment. Torpedograss was dominant in the adjacent old agriculture fields but chemical treatment started in 2014 on the field.

2.2.1.7 Pastures

Improved and semi-improved pastures make up approximately 1,075 acres of the OSWMA. The pasture types found on the area are identified as improved and semi-improved depending on the presence of native vegetation, which corresponds to the severity of disturbance sustained by the historical community. Pasture acreage is much reduced due to an active groundcover restoration program on OSWMA. The management area was periodically logged from the early part of the 20th century until 1992. By 1984, the improved area had been converted to pasture with a few pockets of pines left standing, usually adjacent to depression marshes. The semi-improved portion appears to have been logged and cleared of most of the palmetto cover, and presumably other groundcover, by 1994. It had been managed primarily for cattle from the late 1980s until State acquisition and management.

Improved pastures are dominated by bahiagrass, bluestems, smutgrass, and dog fennel. Shrub species are occasional and tree species are infrequent, since wax myrtles, which were very dense, have been burned and mechanically and chemically treated. There are small patches where slash pine is the overstory and areas where pines are regenerating naturally. Additional herbaceous species present include smutgrass, vasey grass, carpetgrass, beakrushes, sweet broom, Caesarweed, and others. The few shrub species that occur are usually wax myrtle, saw palmetto, gallberry, staggerbush, and saltbush. Slash pine and cabbage palm are infrequent.

Semi-improved pasture shares many of the same species as improved pasture but shows more affinity to the historic natural community. More species typical of mesic flatwoods are present in greater abundance. Semi-improved pasture has great potential for restoration.

Vegetation occurring in the semi-improved pastures includes smutgrass, vaseygrass, carpetgrass, flatsedge, rushes, bluestems, beaksedges, spikerushes, little blue maidencane, threeawns, panic grasses, yelloweyed grass, pinebarron goldenrod, dog fennel, spadeleaf, wild pennyroyal, sweet broom, button rattlesnakemaster, wand goldenrod, bloodroot, milkworts, Caesarweed, pale meadowbeauty, clustered bushmint, blackroot, tickseeds, camphorweeds, and others. Shrub species that occur are wax myrtle, saw palmetto, gallberry, staggerbush, winged sumac, St. John's-wort, dwarf live oak, and beautybush. Wax myrtles have been greatly reduced and exotic pasture grasses have been treated, so the composition of semi-improved pastures is composed of more natives and less exotics than at time of purchase. Slash pine, live and laurel oaks, and cabbage palm are infrequent.

A small patch of cutthroat grass was found in the eastern part of the semi-improved pasture. An additional location has since been found in formerly improved pasture now converted to mesic flatwoods vegetation. Giant orchid was located in the improved pasture area.

2.2.2 Forest Resources

There are no major forest resources of significant commercial value located on the portion of the OSWMA that is leased to the FWC for lead management. If it is determined that reforestation is appropriate, the FWC will consult and cooperate with the FFS in the development of forest resources on the portion of OSWMA leased to the FWC.

2.3 Fish and Wildlife Resources

A diversity of wildlife species is found on the OSWMA. These species are listed in Tables 6 through 11. Opportunities for bird watching abound on the OSWMA, and several bird counts are conducted annually. The species of birds observed on OSWMA are listed in Table 7. A handful of non-native animal species have been documented to occur at OSWMA, and these species are listed in Table 12.

Table 6: Mammal Species Observed on OSWMA

Common Name	Scientific Name
Bobcat	<i>Felix rufous</i>
Brazilian/Mexican free-tailed bat	<i>Tadarida brasiliensis</i>
Cotton mouse	<i>Peromyscus gossypinus</i>
Cottontail rabbit	<i>Sylvilagus floridanus</i>
Coyote	<i>Canis latrans</i>
Eastern grey squirrel	<i>Sciurus carolinensis</i>
Eastern pipistrelle	<i>Perimyotis subflavus</i>
Eastern spotted skunk	<i>Spilogale putorius</i>
Evening bat	<i>Nycticeius humeralis</i>
Florida black bear	<i>Ursus americanus floridanus</i>
Florida mouse	<i>Podomys floridanus</i>
Florida panther	<i>Felix concolor coryi</i>
Gray fox	<i>Urocyon cinereoargenteus</i>
Hispid cotton rat	<i>Sigmodon hispidus</i>
House mouse	<i>Mus musculus</i>
Marsh rabbit	<i>Sylvilagus palustris</i>
Nine-banded armadillo	<i>Dasypus novemcinctus</i>
Northern yellow bat	<i>Lasiurus intermedius</i>
Raccoon	<i>Procyon lotox</i>
River otter	<i>Lutra canadensis</i>
Round-tailed muskrat	<i>Neofiber alleni</i>
Seminole bat	<i>Lasiurus seminolus</i>
Striped skunk	<i>Mephitis mephitis</i>
Virginia opossum	<i>Didelphis virginiana</i>
White-tailed deer	<i>Odocoileus virginianus</i>
Wild hog	<i>Sus scrofa</i>

Table 7: Bird Species Observed on OSWMA

Common Name	Scientific Name
American bittern	<i>Botaurus lentiginosus</i>
American coot	<i>Fulica americana</i>
American crow	<i>Corvus brachyrhynchos</i>
American goldfinch	<i>Carduelis tristis</i>
American kestrel	<i>Falco sparverius sparverius</i>
American redstart	<i>Setophaga ruticilla</i>
American robin	<i>Turdus migratorius</i>
American white pelican	<i>Pelecanus erythrorhynchos</i>
Anhinga	<i>Anhinga anhinga</i>
Arctic peregrine falcon	<i>Falco peregrinus</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>Megasceryle alcyon</i>
Black and white warbler	<i>Mniotilta varia</i>
Black vulture	<i>Coragyps atratus</i>
Blackbellied whistling-duck	<i>Dendrocygna autumnalis</i>
Black-crowned night-heron	<i>Nycticorax nycticorax</i>
Black-necked stilt	<i>Himantopus mexicanus</i>
Black-throated blue warbler	<i>Dendroica caerulescens</i>
Black-throated green warbler	<i>Dendroica virens</i>
Blue jay	<i>Cyanocitta cristata</i>
Blue-grey gnatcatcher	<i>Polioptila caerulea</i>
Blue-headed vireo	<i>Vireo solitarius</i>
Boat-tailed grackle	<i>Quiscalus major</i>
Bobolink	<i>Dolichonyx oryzivorus</i>
Brown thrasher	<i>Toxostoma rufum</i>
Brown-headed cowbird	<i>Molothrus ater</i>
Burrowing owl	<i>Athene cunicularia</i>
Carolina wren	<i>Thryothorus ludovicianus</i>
Cattle egret	<i>Bubulcus ibis</i>
Cedar waxwing	<i>Bombycilla cedrorum</i>
Chestnut-sided warbler	<i>Dendroica pensylvanica</i>
Chuck-will' s-widow	<i>Caprimulgus carolinensis</i>
Common grackle	<i>Quiscalis quiscula</i>
Common ground dove	<i>Columbina passerina</i>
Common moorhen	<i>Gallinule chloropus</i>
Common nighthawk	<i>Chordeiles minor</i>
Common snipe	<i>Gallinago gallinago</i>
Common yellowthroat	<i>Geothlypis trichas</i>

Table 7: Bird Species Observed on OSWMA

Common Name	Scientific Name
Coopers hawk	<i>Accipiter cooperii</i>
Crested caracara	<i>Caracara cheriway</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 towhee	<i>Pipilo erythrophthalmus</i>
European starling	<i>Sturnus vulgaris</i>
Florida sandhill crane	<i>Grus canadensis</i>
Florida wild turkey	<i>Meleagris gallopavo osceola</i>
Glossy ibis	<i>Plegadis falcinellus</i>
Grasshopper sparrow	<i>Ammodramus savannarum</i>
Gray catbird	<i>Dumetella caolinensis</i>
Great blue heron	<i>Ardea herodias</i>
Great crested flycatcher	<i>Myiarchus tyrannulus</i>
Great egret	<i>Ardea alba</i>
Great horned owl	<i>Bubo virginian</i>
Greater yellowlegs	<i>Tringa melanoleuca</i>
Green heron	<i>Butorides virescens</i>
Hooded merganser	<i>Lophodytes cucullatus</i>
House wren	<i>Troglodytes aedon</i>
Killdeer	<i>Charadrius vociferus</i>
King rail	<i>Rallus elegans</i>
Least sandpiper	<i>Calidris bairdii</i>
Lesser yellowlegs	<i>Tringa flavipes</i>
Limpkin	<i>Aramus guarauna</i>
Little blue heron	<i>Egretta caerulea</i>
Loggerhead shrike	<i>Lanius ludovicianus</i>
Mottled duck	<i>Anas fulvigula</i>
Mourning dove	<i>Zenaida macroura</i>
Northern flicker	<i>Colaptes auratus</i>
Northern bobwhite	<i>Colinus virginianus</i>
Northern cardinal	<i>Cardinalis cax-dinalis</i>
Northern harrier	<i>Circus cyaneus</i>
Northern mockingbird	<i>Mimus polyglottos</i>
Northern parula	<i>Parula americana</i>
Northern waterthrush	<i>Seiurus noveboracensis</i>
Orange-crowned warbler	<i>Vermivora celata</i>
Osprey	<i>Pandion haliaetus</i>
Ovenbird	<i>Seiurus aurocapillus</i>

Table 7: Bird Species Observed on OSWMA

Common Name	Scientific Name
Painted bunting	<i>Passerina ciris</i>
Palm warbler	<i>Dendroica palmarum</i>
Pied-billed grebe	<i>Podilymbus podiceps</i>
Pileated woodpecker	<i>Dryocopus pileatus</i>
Pine warbler	<i>Dendroica pinus</i>
Prairie warbler	<i>Dendroica discolor</i>
Purple martin	<i>Progne subis</i>
Red-bellied woodpecker	<i>Melanerpes carolinus</i>
Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>
Red-shouldered hawk	<i>Buteo lineatus</i>
Red-tailed hawk	<i>Buteo jamaicensis</i>
Red-winged blackbird	<i>Agelaius phoeniceus</i>
Roseate spoonbill	<i>Ajaia ajaia</i>
Ruby-crowned kinglet	<i>Regulus calendula</i>
Ruby-throated hummingbird	<i>Archilochus colubris</i>
Savannah sparrow	<i>Passerculus sandwichensis</i>
Sedge wren	<i>Cistothorus platensis</i>
Sharp-shinned hawk	<i>Accipiter striatus</i>
Short-tailed hawk	<i>Buteo brachyurus</i>
Snail kite	<i>Rostrhamus sociabilis plumbeus</i>
Snow goose	<i>Chen caerulescens</i>
Snowy egret	<i>Egretta thula</i>
Song sparrow	<i>Melospiza melodia</i>
Sora rail	<i>Porzana carolina</i>
Spotted sandpiper	<i>Actitis macularia</i>
Swallow-tailed kite	<i>Elanoides forficatus</i>
Tree swallow	<i>Tachycineta bicolor</i>
Tricolored heron	<i>Egretta tricolor</i>
Tufted titmouse	<i>Baeolophus bicolor</i>
Turkey vulture	<i>Cathartes aura</i>
Virginia rail	<i>Rallus limicola</i>
Whip-poor-will	<i>Caprimulgus vociferus</i>
White ibis	<i>Eudocimus albus</i>
White-eyed vireo	<i>Vireo griseus</i>
White-winged dove	<i>Zenaida asiatica</i>
Wood duck	<i>Aix sponsa</i>
Wood stork	<i>Mycteria americana</i>
Yellow warbler	<i>Dendroica petechia</i>
Yellow-bellied sapsucker	<i>Sphyrapicus varius</i>
Yellow-billed cuckoo	<i>Coccyzus americanus</i>
Yellow-crowned night-heron	<i>Nycticorax violaceus</i>
Yellow-rumped warbler	<i>Dendroica coronata</i>

Table 7: Bird Species Observed on OSWMA

Common Name	Scientific Name
Yellow-throated warbler	<i>Dendroica dominica</i>

Table 8: Amphibian Species Observed on OSWMA

Common Name	Scientific Name
Barking tree frog	<i>Hyla gratiosa</i>
Cricket frog	<i>Acris gryllus</i>
Green tree frog	<i>Hyla cinerea</i>
Greenhouse frog	<i>Eleutherodactylus planirostris</i>
Little grass frog	<i>Pseudacris ocularis</i>
Narrowmouth toad	<i>Gastrophryne carolinensis</i>
Oak toad	<i>Anaxyrus quercicus</i>
Pig frog	<i>Rana grylio</i>
Pinewoods tree frog	<i>Hyla femoralis</i>
Southern leopard frog	<i>Lithobates sphenoccephalus</i>
Southern toad	<i>Anaxyrus terrestris</i>
Spadefoot toad	<i>Scaphiopus holbrooki holbrooki</i>
Squirrel tree frog	<i>Hyla squirella</i>

Table 9: Reptilian Species Observed on OSWMA

Common Name	Scientific Name
American alligator	<i>Alligator mississippiensis</i>
Green anole	<i>Anolis carolinensis</i>
Striped crayfish snake	<i>Regina alleni</i>
Banded water snake	<i>Nerodia fasciata fasciata</i>
Black racer	<i>Coluber constrictor priapus</i>
Brooks (speckled) king snake	<i>Lampropeltis getulus brooksi</i>
Garter snake	<i>Thamnophis sirtalis</i>
Pygmy rattlesnake	<i>Sistrurus miliarius barbouri</i>
Ribbon snake	<i>Thamnophis sauritus</i>
South Florida swamp snake	<i>Seminatrix pygaea cyclas</i>
Yellow rat snake	<i>Pantherophis alleghaniensis</i>
Florida red-bellied turtle	<i>Pseudemys nelsoni</i>
Gopher tortoise	<i>Gopherus polyphemus</i>

Table 10: Fish Species Observed on OSWMA

Common Name	Scientific Name
Flagfish	<i>Jordanella floridae</i>
Sailfin Molly	<i>Poecilia latipinna</i>

Table 11: Butterflies and Moths Observed on OSWMA

Common Name	Scientific Name
Banded sphinx moth	<i>Eumorpha fasciata</i>
Brazilian skipper	<i>Calpododes ethlius</i>
Carolina satyr	<i>Hermeuptychia sosybius</i>
Cloudless sulfur	<i>Phoebis sennae</i>
Common buckeye	<i>Junonia coenia</i>
Fiery skipper	<i>Hylephila phyleus</i>
Georgia saytr	<i>Neonympha areolatus</i>
Giant swallowtail	<i>Papilio cresphontes</i>
Gulf fritillary	<i>Agraulis vanillae</i>
Little metalmark	<i>Calephelis virginiensis</i>
Little yellow	<i>Pyrisitia lisa</i>
Palamedes swallowtail	<i>Papilio palamedes</i>
Pearl crescent	<i>Phyciodes tharos</i>
Pearly wood-nymph (moth)	<i>Eudryas unio</i>
Phaon crescent	<i>Phyciodes phaon</i>
Queen	<i>Danaus gilippus</i>
Red admiral	<i>Vanessa atalanta</i>
Southern skipperling	<i>Copaeodes minima</i>
Spicebush swallowtail	<i>Papilio troilus</i>
Tropical checkered skipper	<i>Pyrgus oileus</i>
Viceroy	<i>Limenitis archippus</i>
Whirlabout skipper	<i>Polites vibex</i>
White peacock	<i>Anartia jatrophae</i>
Zebra heliconian	<i>Heliconius charithonia</i>
Zebra swallowtail	<i>Eurytides marcellus</i>

Table 12: Non-Native Animals Observed at OSWMA

Common Name	Scientific Name
Brown anole	<i>Anolis sagrei</i>
Burmese python*	<i>Python bivittatus</i>
Cattle egret†	<i>Bubulcus ibis</i>
European starling	<i>Sturnus vulgaris</i>
Greenhouse frog	<i>Eleutherodactylus planirostris</i>
Nine-banded armadillo†	<i>Dasypus novemcinctus</i>
Veiled chameleon*	<i>Chaemeleo calpytratus</i>
Wild Hog	<i>Sus scrofa</i>

*Species observed at OSSF. †Status is under debate. Species may have reached South Florida on their own.

The FWC has developed a Geographic Information Systems (GIS)-based assessment tool that incorporates a wide variety of land cover and wildlife species data. This tool, the Integrated Wildlife Habitat Ranking System (IWHRS), ranks 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 OSWMA has a very high mean wildlife value of 6.7 (Figure 8).

2.3.1 Imperiled Species

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 (USFWS). At the Federal level, NOAA-Fisheries is responsible for listing most marine species and the USFWS is responsible for other species. The Federal list of animals and plants is administered by USFWS and published in Chapter 50 of the Code of Federal Regulations: animals in 50 Code of Federal Regulations 17, and plants in 50 Code of Federal Regulations 23. Additional information regarding Federal listings for NOAA-Fisheries and USFWS may be located at <http://www.nmfs.noaa.gov/pr/species/index.htm> and <http://www.fws.gov/endangered/species/us-species.html>, respectively. The Florida Department of Agriculture and Consumer Services (FDACS) has a Florida Statewide Endangered and Threatened Plant Conservation Program that maintains a list of Florida’s Federally-listed plant species. This list may be accessed at: <http://www.freshfromflorida.com/Divisions-Offices/Florida-Forest-Service/Our-Forests/Forest-Health/Florida-Statewide-Endangered-and-Threatened-Plant-Conservation-Program/Florida-s-Federally-Listed-Plant-Species>. This designation is also commonly known as “listed species.” As depicted in table 13, there have been 10 imperiled animal species observed on OSWMA. In addition to the documented species occurrences, the OSWMA provides habitat suitable for eastern indigo snake (*Drymarchon couperi*).

Table 13: Imperiled Wildlife Species Documented on the OSWMA

Common Name	Scientific Name	Status
American alligator	<i>Alligator mississippiensis</i>	FT
Audubon’s crested caracara	<i>Polyborus plancus audubonii</i>	FT
Burrowing owl	<i>Athene cunicularia</i>	ST
Everglades snail kite	<i>Rosthamus sociabilis plumbeus</i>	FE
Florida panther	<i>Felis concolor coryi</i>	FE
Florida sandhill crane	<i>Grus canadensis pratensis</i>	ST
Little blue heron	<i>Egretta caerulea</i>	ST
Roseate spoonbill	<i>Ajaia ajaia</i>	ST
Tricolored heron	<i>Egretta tricolor</i>	SSC
Wood stork	<i>Mycteria americana</i>	FE

Abbreviation	Status
FE	Federal Endangered
FT	Federal Threatened
SSC	State Species of Special Concern
ST	State Threatened

All abbreviations and status determinations were derived from the FY 2012-13 Progress Report on activities of the FWC Endangered and Threatened Species Management and Conservation Plan. The FWC maintains the state list of animals designated as Federally-designated endangered or threatened, State-designated threatened, or State-designated species of special concern, in accordance with Rules 68A-27.003, and 68A-27.005, respectively, Florida Administrative Code (F.A.C.), <https://www.flrules.org/Default.asp>.

On November 8, 2010, new threatened species rules approved by the FWC went into effect. 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.

An FWC Wildlife Conservation Prioritization and Recovery (WCPR) strategy was completed for the OSWMA in 2010. The FWC has designated a suite of 62 species of special concern statewide as focal species in order to focus statewide wildlife habitat conservation and management efforts on the State’s most important wildlife conservation priorities. Using the statewide landcover based habitat maps, models

identified 17 of the FWC’s designated suite of focal species. Of the 62 focal species, 17 focal species were modeled to have potential habitat on the OSWMA (Table 14).



Except for those species identified with an alphabetical superscript, workshop participants and expert reviewers determined that ongoing management would meet the needs of the species. In the following species list, we use an ^A to denote species for which a measurable objective is identified, a ^B for species for which some level of monitoring is recommended, a ^C for species for which a Strategic Management Area (SMA) is recommended, and

a ^D for species for which species management is recommended. For species with no alphabetical superscripts, participants and reviewers agreed there is no need for measureable objectives, monitoring, SMAs, or species-specific management. Occasionally, statewide models indicate a species has potential habitat on the area, but the local assessment indicates there is little opportunity to manage for these species. These limited opportunity species are denoted with an *.

Table 14: Focal Species Having Potential Habitat on OSWMA

Common Name	Scientific Name
American swallow-tailed kite	<i>Elanoides forficatus</i>
Bachman’s sparrow ^{A, B}	<i>Aimophila aestivalis</i> ^{A, B}
Big Cypress fox squirrel	<i>Sciurus niger avicennia</i>
Burrowing owl	<i>Speotyto cunicularia floridiana</i>
Cooper’s hawk	<i>Accipiter cooperii</i>
Crested caracara	<i>Caracara cheriway</i>
Florida black bear	<i>Ursus americanus floridanus</i>
Florida grasshopper sparrow ^{A, B}	<i>Ammodramus savannarum floridanus</i> ^{A, B}
Florida mottled duck	<i>Anas fulvigula</i>
Florida panther	<i>Puma concolor coryi</i>
Florida sandhill crane ^B	<i>Grus canadensis pratensis</i> ^B
Gopher tortoise *	<i>Gopherus polyphemus</i> *
Limpkin	<i>Aramus guarauna</i>
Northern bobwhite	<i>Colinus virginianus</i>
Snail kite	<i>Rostrhamus sociabilis plumbeus</i>
Southern bald eagle	<i>Haliaeetus leucocephalus</i>
Wading birds ^{A, B}	Multiple spp. ^{A, B}

The OSWMA falls within a designated Strategic Habitat Conservation Area for Florida panther, American swallow-tailed kite, Florida sandhill crane, limpkin, and snail kite as established by FWC. For more detailed information regarding imperiled species management such as species profiles and management prescriptions see the OSWMA WCPR in Appendix 13.6. Additional imperiled species information is available on the FWC website: <http://www.myfwc.com/wildlifehabitats/profiles/>.

2.3.2 FWC Wildlife Observations and FNAI Element Occurrences

FNAI assigns a rank to each “element” occurrence, which is an exemplary or rare component of the natural environment. As defined by FNAI, an “element” is any exemplary or rare component of the natural environment such as a species, natural community, bird rookery, 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. 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.

Known locations of FWC wildlife occurrences and FNAI element occurrences from the most recent GIS databases of the respective agencies are displayed in Figure 9. Appendix 13.4 contains a letter from FNAI authorizing the FWC to utilize their database for the purpose of displaying known plant and animal resources.

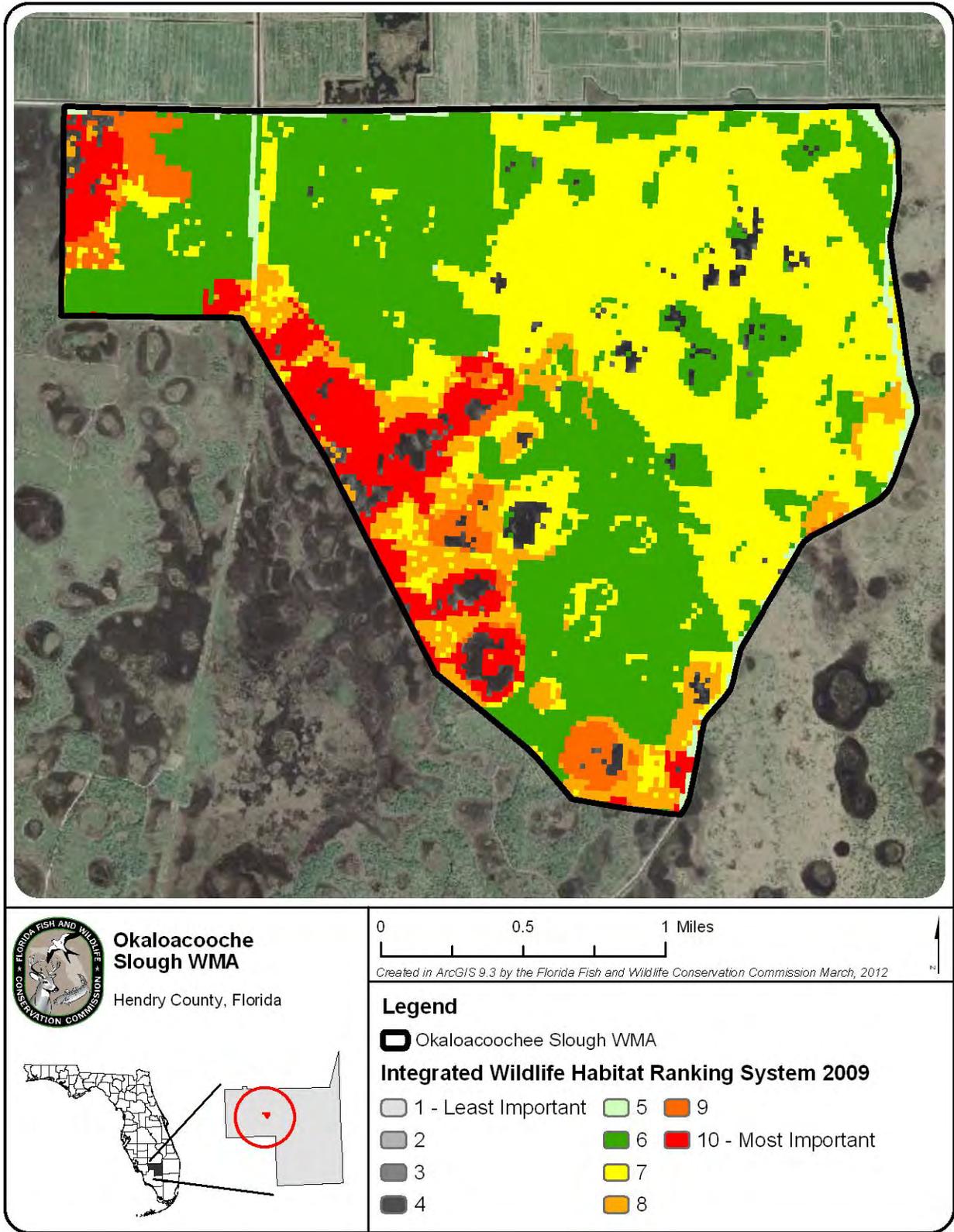


Figure 8: IWHRS

2.4 Native Landscapes

The most unique native landscape on the area is the Okaloacoochee Slough system for which it is named. Some of the other native landscapes on the OSWMA include depression marsh, mesic flatwoods, slough marsh, wet flatwoods, mesic hammock, and wet prairie. These landscapes are fully described in Section 2.2 of this Management Plan.

2.5 Water Resources

There are no significant water resources at OSWMA. The main slough area itself, however, is a significant wetland / marsh system with importance to both the Fakahatchee Strand to the south, and the Caloosahatchee River to the north.

2.6 Beaches and Dunes

OSWMA does not contain any beaches or dunes.

2.7 Mineral Resources

There are no known commercial deposits of minerals at OSWMA.

2.8 Cultural Resources

The Department of State, Division of Historical Resources (DHR) provides the FWC with recent data on occurrences of Florida's cultural resources. An archaeological field survey was conducted on the OSWMA in 2002. The field survey found two cultural sites located on the OSWMA: a prehistoric midden (HN249) from the Glades cultural era (1000 BCE – 1700 CE), and a twentieth century lumber mill (HN264). The Goodno Drainage Canal (HN361) is a resource group feature that is located in the western portion of the area. Future surveys may identify additional cultural resources. All Master Site recording, assessments, and preservation strategies will be coordinated with DHR upon discovery.

2.9 Scenic Resources

Scenic resources of the OSWMA include the views of marshes and wet prairie, among others. Complete descriptions of the natural communities found on the OSWMA can be found in Section 2.2 of this Management Plan.

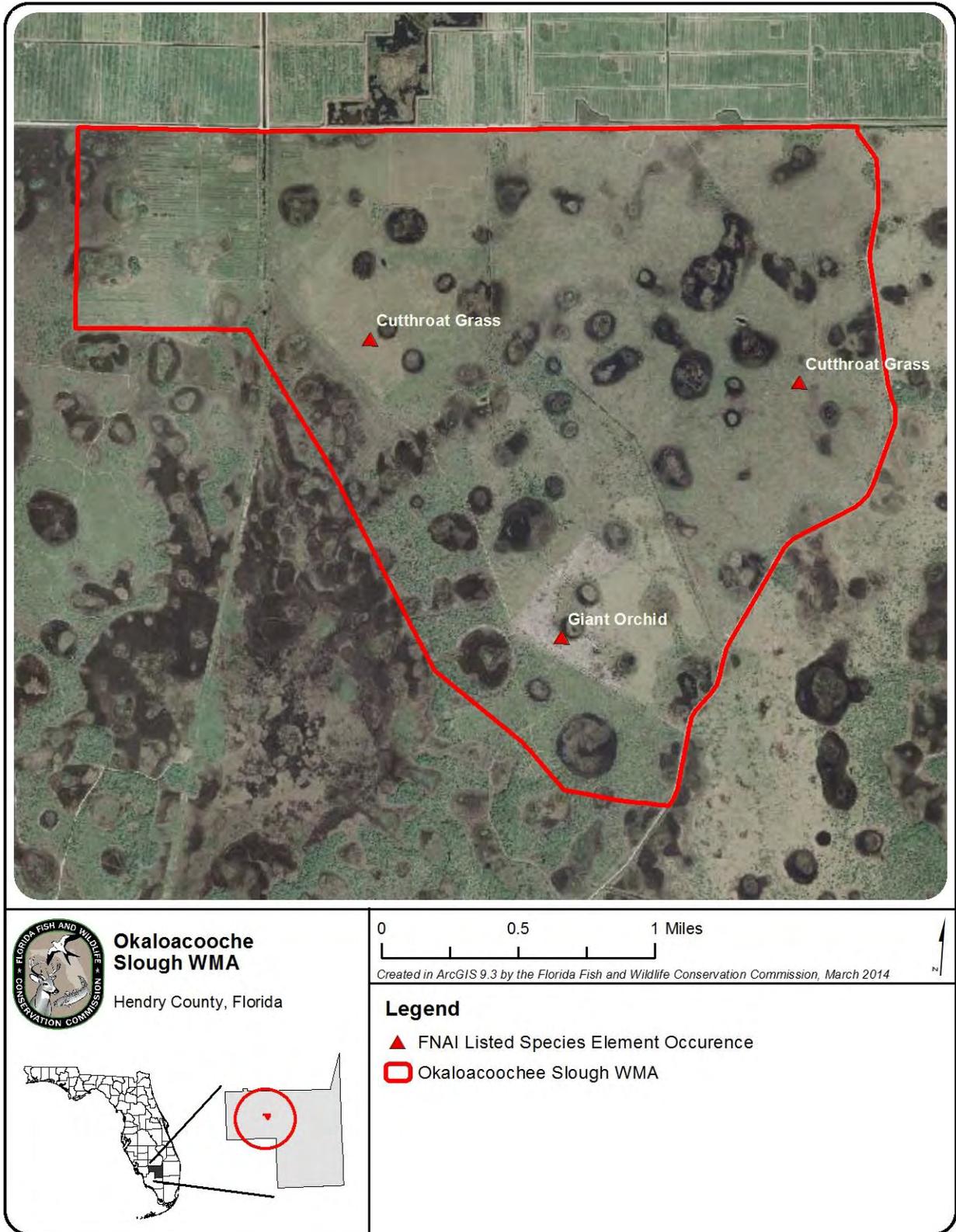


Figure 9: FWC Wildlife Occurrences and FNAI Element Occurrences

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. 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.

In the mid to late 1800s, this area of Florida was primarily used by cattle drovers and trappers. The Caloosahatchee River provided a link to the port in Punta Rassa and access to other markets. Though the OSWMA itself was historically used for rangeland cattle grazing, beginning in the early 1900s and continuing for most of the century, a large amount of land in the region was used for silviculture. Removal of virgin pine timber and pulpwood took place during this time period, with the logged material being loaded onto rail cars at the Keri Wood Yard, just east of an existing railroad right-of-way.

Most of the uplands in this region were ditched and cultivated to produce tomatoes, watermelons and cucumbers, but cultivation for these purposes had mostly ceased by the end of the twentieth century. Historic agricultural uses on land adjacent to the OSWMA, primarily to the north and east, continue to consist of row crops, improved pasture and citrus groves. Other past uses of the properties included hunting and camping. Evidence of old dog pens, bunkhouses, hog pens, and swamp buggies still exist in the vicinity of OSWMA.

3.2 Purpose for Acquisition of the Property

Okaloacoochee Slough WMA was purchased for a number of public purposes, among which was as mitigation for the loss of hunting opportunities on BFWMA in Palm Beach County. The SFWMD, in 1994, removed Brown's Farm from the wildlife management area system to be used as a part of the Everglades Restoration Project. As

a provision of the Everglades Forever Act, Chapter 94-115, there was a requirement that the loss of hunting opportunities on BFWMA be mitigated by OSWMA. The SFWMD participation in the acquisition of the portions of the OSWMA is pursuant to this provision. Since the FWC is not the lead manager for the majority of OSWMA, the agency intends to work with the FFS to provide public hunting opportunities on as much of the project acreage as is deemed appropriate by the cooperating agencies.

3.3 Current Use of the Property

Currently, the OSWMA 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 OSWMA 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; and research related activities.

Current and anticipated resource uses of the property are diverse. Hunting continues to be a popular recreational activity on OSWMA. The area also offers excellent opportunities for bird watching, especially for raptors, migratory warblers, and wading birds. The diversity of vegetation not only harbors a variety of bird species but also provides good opportunities for mammalian wildlife viewing. Other uses include hiking, photography, biking, sightseeing, and horseback riding.

Due to the proximity of population centers in neighboring Lee County, public use can be expected to increase as public awareness of opportunities increases. Annual use of OSWMA is estimated to be 365 user-days for all activities combined. The FWC administers hunts in the late summer, fall and spring for various game species including small game, deer, turkey, and wild hogs, which accounts for 91 of the user-days.



3.3.1 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 OSWMA, and contribute to the overall economy for region of Florida. In Fiscal Year 2012-13, an estimated 10,094 people visited the OSWMA. Primarily, as a result of this visitation and use of the area, FWC economic analysis estimates indicate that the OSWMA

generated an estimated annual economic impact of more than \$3.2 million for the State and the South Florida region. This estimated annual economic impact has aided in the support or creation of an estimated 20 jobs.

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

3.4 Single- or Multiple-use Management

The OSWMA will be managed under the multiple-use concept as a Wildlife Management Area. OSWMA will provide 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 cultural resources of OSWMA will be managed under the guidance of the ARC, the Conceptual State Lands Management Plan, and as outlined in the original purposes for acquisition.

3.4.1 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 OSWMA. 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 13.5). 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	✓		

	<u>Approved</u>	<u>Conditional</u>	<u>Rejected</u>
First-responder training		✓	
Fishing		✓	
Geocaching		✓	
Hiking	✓		
Horseback riding	✓		
Hunting		✓	
Linear facilities			✓
Military training		✓	
Preservation of cultural sites	✓		
Preservation of historical sites	✓		
Primitive camping		✓	
Protection of imperiled species	✓		
Off-road vehicle use			✓
Shooting sports park			✓
Soil and water conservation	✓		
Timber harvest	✓		
Wildlife observation	✓		

3.4.2 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 and with associated objectives, identified challenges, and solution strategies have been developed for OSWMA (Sections 5 -8). A detailed assessment of the benefits and potential impacts of planned uses and activities on natural and cultural resources was an integral part of the development of the management activities and intent, goals, objectives, challenges, and strategies sections of this Management Plan.

3.5 Acreage That Should Be Declared Surplus

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 this area. Also, the FWC considers recommendations for surplus lands as they relate to Florida’s “No Net Loss of Hunting Lands” legislation (Ch. 379.3001 F.S.), 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 OSWMA by the 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, the FWC has determined that no portion of the OSWMA should be considered or declared surplus.

4 Accomplished Objectives from the OSWMA Management Plan 2001 – 2011

The following Resource Management Goals and Objectives are from the OSWMA Management Plan 2001 – 2011. Planned activities for OSWMA during this period were detailed in the Objectives listed below. The degree to which FWC was able to accomplish the planned activities during this period is reflected as **Percent Accomplished** with each associated Objective.

Resource Management Goals and Objectives	Percent Accomplished
Goal 1: Improve public access	
Objective 1: In order to protect resources, including sensitive natural communities and listed plant or animal species, from damage and overuse, coordinate annually with the DOF (now FFS) to designate updated locations for motorized vehicle, hiking, horseback riding, and bicycle trails for the entire OSWMA.	100%
Objective 2: Upgrade the portion of Twin Mills Road that borders the FWC lease to all-weather public use standards, and coordinate maintenance with DOF on a continuous basis.	100%
Objective 3: By 2001, meet with DOF to coordinate and link motorized vehicle, hiking and horseback trail routes (utilizing previously-disturbed sites), with the trail system for the rest of the Okaloacoochee Slough State Forest/WMA.	100%
Objective 4: Establish directional and area identification signs by 2002.	100%
Objective 5: In cooperation with DOF, develop a public access improvement plan for the entire OSWMA by 2002.	100%

Resource Management Goals and Objectives	Percent Accomplished
Objective 6: Establish three miles of all season roads along the existing designated road/trail by 2005.	100%
Objective 7: Establish a ten-car parking area at the intersection of Twin Mills Road and the new road (see Objective 6) by 2005.	100%
Goal 2: Survey and inventory cultural and natural resources.	
Objective 1: Contract with the Florida Department of State's Division of Historical Resources to complete a cultural resources survey by 2002.	100%
Objective 2: Complete an inventory of flora and fauna, and map vegetative communities based on FNAI classifications by 2003.	100%
Objective 3: Coordinate with the Division of Fisheries to sample fish for mercury and other contaminants by 2003. <i>Comment: The FWC has determined that there is very little habitat for game fish, and testing for mercury and other contaminants is not a high priority.</i>	0%
Goal 3: Develop a management strategy to maintain and restore historic, native plant communities.	
Objective 1: Control invasive exotic plant species through the use of fire, mechanical, and chemical treatments.	100%
Objective 2: Develop and implement a prescribed fire plan by 2001.	100%
Objective 3: Complete a survey and mapping of exotic plant species and distribution by 2002.	100%

Resource Management Goals and Objectives	Percent Accomplished
Objective 4: In cooperation with DOF, determine historic plant community composition, and identify areas where restoration is appropriate and feasible by 2004.	100%
<u>Goal 4: Develop a hydrological management regime for the area.</u>	
Objective 1: Encourage all cooperating managers to join the local Chapter 298 Water Control District by 2002. <i>Comment: The FWC determined the yearly cost to be too substantial. The FWC will work with the Gerber Grove Water Control District once a water release schedule for the C-2 canal has been created.</i>	0%
Objective 2: Contract with the water quality section of the DEP to monitor the water quality of the northwest canal by 2003. <i>Comment: Since the canal begins in the OSSF before flowing north through the OSWMA, the number of potential inputs for pollution are limited, and water quality monitoring on this canal is not a high priority.</i>	0%
Objective 3: Perform a cost analysis and develop a strategy for the removal of swales and ditches in the northwest corner of the area by 2005. <i>Comment: The FWC has initiated a hydrologic monitoring program to collect the data necessary for a hydrologic assessment. The data has been collected and will be sent to a consultant for review and modeling by the end of 2014.</i>	25%
Objective 4: By 2006, develop and implement a hydrological restoration plan. <i>Comment: See Goal 4, Objective 3</i>	0%
<u>Goal 5: Provide adequate funding staffing and equipment.</u>	
Objective 1: Maintain equipment and facilities; including swamp buggy, bush hog, tractor, and a permanent visitor check station.	100%

Resource Management Goals and Objectives	Percent Accomplished
Objective 2: Propose establishing a Wildlife Technician position by 2002. <i>Comment: The Wildlife Technician position that was established at OSWMA is an OPS position.</i>	100%
Goal 6: Assure an optimum boundary for Okaloacoochee slough by continuing to identify and pursue acquisition needs.	
Objective 1: In order to solve management problems, develop a Geographic Information System shapefile, acreage estimates, and other necessary data to nominate lands for acquisition through the FWC Inholdings / Additions Program by 2003	100%
Goal 7: Create private partnerships to supplement land management activities.	
Objective 1: Contact the National Wild Turkey Federation, Quail Unlimited, Ducks Unlimited, Sunshine State Horse Council, Florida Trail Association, Everglades Coordinating Council, and other user groups to enlist assistance under the FWC volunteer program by 2002	100%
Goal 8: Provide diverse recreational opportunities which are compatible with the protection of the resources.	
Objective 1: Coordinate with DOF to maintain the existing camping area at Wild Cow Grade during established hunting seasons.	100%
Objective 2: Coordinate with DOF and FTA to provide appropriate hiking opportunities.	100%
Objective 3: Continue to develop and establish annual archery, muzzle loading gun, dove, general gun, spring turkey and special hog hunting seasons.	100%

Resource Management Goals and Objectives	Percent Accomplished
Objective 4: Continue to maintain 200 acres of dove fields on appropriate disturbed sites. <i>Comment: The dove field at OSWMA was discontinued in 2008 because of ongoing water level issues and a new dove field was established at Spirit of the Wild WMA.</i>	100%
Goal 9: Enhance wildlife habitat.	
Objective 1: Conduct prescribed burns to increase native plant diversity.	100%
Objective 2: Identify and mark the limited snag resources on the area, and protect them from fire.	100%
Objective 3: Establish 200 acres of dove fields on appropriate disturbed sites. <i>Comment: The dove field at OSWMA was discontinued in 2008 because of ongoing water level issues and a new dove field was established at Spirit of the Wild WMA.</i>	100%
Objective 4: Develop and implement a habitat restoration plan by 2002	100%
Objective 5: Assess the need for artificial nest and/or roost structures for owls, bats, kestrels, bluebirds, wood ducks, etc. by 2003.	100%
Objective 6: Using agronomic crops, plant food plots along firebreaks by 2004. <i>Comment: Firebreaks are usually underwater during non-burning parts of the year at OSWMA. The FWC has concentrated on groundcover restoration, which serves as permanent perennial food plots for wildlife. As of 2014, 344 acres have been planted in a mix of native seeds.</i>	0%

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 cultural resources. In general, the FWC management intent for the OSWMA 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 the FWC's intent to provide good fish and wildlife resource based public outdoor recreational opportunities on OSWMA. 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, the management activities described in this section are in compliance with those of the Conceptual State Lands Management Plan.

5.1 Land Management Review

A land management review was conducted in January of 2011. It was determined that the OSWMA is being managed in accordance with the purposes for acquisition and that management practices, including public access are in compliance with the management plan.

5.2 Adaptive Management

Adaptive management is "learning by doing";² 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.^{2, 3} 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.^{3, 4} 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.^{3, 4}

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 cultural resources of OSWMA.

5.2.1 Monitoring

A well-developed monitoring protocol is also one of the principal, required criteria for the management of OSWMA. 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.³

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 parameters are responding to FWC management. For imperiled and focal fish and wildlife species, monitoring protocols are established through FWC's WCPR program (Section 5.4.2). Additional select common and game fish and wildlife species may be monitored by FWC staff as 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). Cultural and historical resources (Section 5.9) are monitored with guidance from the 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 OSWMA 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 OSWMA, 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 OSWMA, FWC will focus on managing for native habitat diversity, emphasizing maintenance of high-quality natural communities, and restoration of disturbed areas. Restoration may be achieved on disturbed areas by the re-introduction of fire, restoring hydrological conditions, groundcover restoration and/or the use of mechanical or chemical forest management techniques as appropriate. The OSWMA has high-quality native communities including depression marsh, mesic flatwoods, slough marsh, and mesic hammock that FWC will continue to manage and protect. On disturbed upland sites, FWC intends to initiate ground cover and natural community restoration.

The FNAI has conducted surveys and mapped the current vegetative communities and historic vegetation communities on OSWMA. This information will be used to guide and 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. 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. 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.

At the same time, 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. 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.

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 key 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 South Florida slash pine sites follow a successional pattern through mixed pine-hardwood forests to an exclusively hardwood community rather than to the original plant community.

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, restoration of the groundcover and shrub layers, 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 OSWMA 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 trend is distinctly negative for most wildlife species. OSWMA staff has mowed wax myrtle and saltbush (leaving palmetto, gallberry, lyonia, and other forage species) on over 1200 acres of flatwoods and wet prairie, then treated regrowth with herbicide to reduce shading and encourage the grasses and forbs that are necessary to sustain prescribed fire and wildlife.

Whenever possible, existing firebreaks such as roads and trails, as well as natural breaks such as creeks and wetlands, will be used to define burning compartments. Disk harrows, rototillers, mowing, wet lines, 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 important rare species that often occur between flatwoods and wetlands. Silvicultural site

preparation and creation of firebreaks are avoided when possible in these zones. Additionally, fires are allowed to burn into 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 1-4 years, primarily during the spring and early summer months.

In addition to the general prescribed fire management guidelines described above, an area-specific Prescribed Fire Plan for the OSWMA has been developed. This plan includes delineation of burn management units, detailed descriptions of prescribed fire methodology, safety, and smoke management guidelines.

FWC began introducing prescribed fire to the OSWMA in 2003. Areas of semi-improved pasture were burned first along with areas scheduled for groundcover restoration; these areas have been burned two or three times. As shrub densities were reduced in areas with a greater pasture grass component, these areas were added to the burn regime and have all been burned at least once. One result of the WCPR analysis of the OSWMA was that the land southwest of the North Loop Trail was designated for longer fire rotation to provide suitable cover and denning areas for the Florida Panther; in fact there was a panther den with three kittens in this designated area in 2010; these units have been burned up to two times. The oldfield on the west portion of the property was not part of the prescribed burn program until 2012 since no land management activities were scheduled for this parcel; in 2012 two thirds of the field was burned. The FWC has burned over 5,700 acres at OSWMA and has averaged three prescribed burns per year since 2003.

5.3.3 Apiaries

Currently, there are no apiaries operating on OSWMA. A feasibility assessment was completed for the OSWMA in accordance with the FWC Apiary Policy (Appendix 13.7). Nearly the entire area of the OSWMA is subject to flooding during the growing season, and a large portion of the area that is more than ½ mile from the property boundary has standing water much of the year. Additionally, there are no designated roads within or bordering the area of the OSWMA that is more than ½ mile from the boundary. For these reasons, it was determined that apiaries are not feasible on OSWMA.

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

5.4.1 Fish and Wildlife

Due to the variety of natural communities, a diversity of associated wildlife, including rare and imperiled species, common game and non-game species can be found on OSWMA. In managing for wildlife species, an emphasis will be placed on conservation, protection, and management of natural communities. Natural communities important to wildlife include depression marsh, mesic flatwoods, slough marsh, and mesic hammock, among others.

Wildlife management emphasis is placed on documenting 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. The size and diversity of the OSWMA, along with the adjoining OSSF, creates a habitat mosaic for a variety of wildlife species. Resident wildlife will be managed for optimum diversity and abundance. In addition to resident wildlife, OSWMA provides resources critical to many migratory birds including waterfowl, passerines, raptors and others. Habitats important to migratory species will be protected, maintained or enhanced. The FWC will continue to update inventories for certain species, with emphasis on rare and imperiled fish and wildlife species. Monitoring of wildlife species will continue as an ongoing effort for the area.

FWC intends to manage game populations on a sustained-yield basis to assure healthy game populations and a high-quality recreational experience. In general, game wildlife populations will be managed to provide continued recreational sport hunting and wildlife viewing opportunities. Some hunting opportunities may be regulated through a limited entry hunt program to ensure the persistence of viable game species populations, as well as hunter safety and satisfaction.

Rare and imperiled species and their habitats will be protected and restored by following approved Federal and FWC recovery plans, guidelines, and other applicable scientific recommendations. Land management activities including prescribed burning, and timber stand improvements will take into account imperiled species requirements and habitat needs. Potential for negative impacts from recreational activities will also be considered and monitored. Following are more comprehensive management prescriptions for imperiled wildlife and their respective habitats.

5.4.2 Imperiled Species - Wildlife Conservation Prioritization and Recovery (WCPR)

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.

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 species management strategy (WCPR Strategy) for the area. Each WCPR 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 WCPR Strategy to ensure 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.

As noted above, the FWC completed a WCPR Strategy for the OSWMA in 2010. For more information on the imperiled species profiles and the monitoring and management prescriptions, see Appendix 13.6.

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 OSWMA. 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.

5.5 Exotic and Invasive Species Maintenance and Control

The FWC will continue efforts to control the establishment and spread of Florida Exotic Pest Plant Council (FEPPC) Category I or II plants on OSWMA. Control technologies 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. Twelve years of exotic plant control on OSWMA have substantially reduced many invasive plant species, especially cogongrass and Brazillian pepper, but continued work is necessary,

especially on torpedograss (*Panicum repens*), Caesarweed (*Urena lobata*), and Wright's nutrush (*Scleria lacustris*).

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 ADA⁵ where:

1. Compliance will cause harm to cultural or 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 OSWMA. If recreation demands and other conditions necessitate, the FWC will work with recreational stakeholders and the general public to develop a Recreation Master Plan for OSWMA 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 recreational 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 recreation opportunities. Based on an analysis of the overall approved uses and supported recreational opportunities, and the anticipated proportional visitation levels of the various user groups, FWC has determined that the OSWMA can support 74 visitors per day. This recreation carrying capacity will be periodically reevaluated, and additional capacity may be contemplated as part of the Recreational Master Plan development and implementation process.

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 cultural resources on every area and to ensure that visitors will have a high-quality visitor experience.

5.6.4 Wildlife Viewing

The OSWMA supports a wide variety of native wildlife species, both resident and seasonally migratory, that are available for visitors' enjoyment for observation and photography. The quality of habitat found on OSWMA attracts a suite of wildlife species including various bird, mammal, reptile, and amphibian wildlife throughout the OSWMA.

5.6.5 Hunting

The OSWMA currently offers hunting for several species, including deer, hog, turkey, and small game. Quotas, limits, and other regulations apply and vary by species.

5.6.6 Hiking Trails

Currently, there are approximately 1.2 miles of designated trails on the OSWMA including the Twin Mills hiking trail. The FWC will continue to periodically reevaluate the potential for trail development.

5.6.6.1 Bicycling

Bicycling is currently allowed on named or numbered roads and designated trails in OSWMA. Together with the OSSF, a large contiguous area with a comprehensive road and trail network for bicyclist usage exists.

5.6.6.2 Equestrian

Horseback riding is currently allowed on named or numbered roads and designated trails in OSWMA. Together with the OSSF, a large contiguous area with a comprehensive road and trail network for equestrian usage exists.

5.6.7 Camping

Currently, camping is not permitted on the OSWMA. Due to the limited size of the area, minimal staffing, and the lack of appropriate sites that would not interfere with other uses, it is not anticipated that camping opportunities will be provided in the

future. However, camping is permitted at designated campgrounds and primitive sites within the adjacent OSSF. Recreation opportunities will be assessed every three years.

5.6.8 Geocaching

Geocaching, also known as Geographic Positioning System (GPS) Stash Hunt or 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. Therefore, geocaching is only allowed upon a Special Permit basis by the FWC when it is determined to be compatible with the resources on the area and practically feasible.

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.

5.6.9 Astronomy

Nighttime astronomical viewing is only allowed upon a Special Permit basis by the FWC when it is determined to be compatible with the resources on the area and practically feasible. Many of the open areas of OSWMA provide for a broad view of the nighttime sky and afford a relatively low level of nighttime light pollution. These conditions are conducive to the viewing of stars, planets, comets, and other celestial bodies by amateur astronomers.

5.6.10 Environmental Education

5.6.10.1 Interpretation

Currently, a website is available for interpretation and information. FWC will cooperate with the FFS to develop interpretive materials including a trail map for the Twin Mills hiking trail, a recreational facilities/opportunities map of the OSWMA and adjacent public lands, QR code links to maps and interpretive information, and enhanced kiosks.

5.6.10.2 Programs

Currently, no environmental education programs are offered at the OSWMA.

5.7 Hydrological Preservation and Restoration

5.7.1 Hydrological Assessment

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

5.7.2 Water Resource Monitoring

The FWC intends to monitor water levels at eight sites on the area (Section 6.6). The FWC will cooperate with the SFWMD and the DEP to develop and implement any necessary surface water quality and quantity monitoring protocols for OSWMA.

5.8 Forest Resource Management

The management of timber resources was considered in the context of the overall land management goals and activities for the OSWMA. Based on discussions with FFS, it was concluded that there is currently no marketable timber on OSWMA. During the WCPR process, it was decided that the majority of the pine flatwoods on OSWMA would be managed as very open flatwoods or prairie where natural regeneration of South Florida slash pine would be the only source of pine reforestation; this management strategy was designed to promote forage for wildlife such as deer as a game species and prey for the Florida panther, sparrows, quail, and turkey. Also during the WCPR process, we decided that the area southwest of the North Loop East trail would be managed in a later stage of flatwoods succession to provide cover and denning areas for the Florida panther, and therefore logging activity would reduce the density of vegetation, so logging is not be a priority for this area.

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. Snags will be protected to benefit cavity-nesting species.

5.9 Cultural and Historical Resources

Procedures outlined by the DHR will be followed to preserve any such sites. The FWC will consult with DHR in an attempt to locate features on the area. As appropriate and necessary, FWC will contact professionals from DHR for assistance prior to any ground-disturbing activity on the area.

An archaeological field survey and assessment was conducted on the OSWMA in 2002. The survey identified two cultural sites located on the OSWMA: a prehistoric midden (HN249) from the Glades cultural era (1000 BCE – 1700 CE), and a twentieth century lumber mill (HN 264). The Goodno Drainage Canal (HN361), which is a resource group, passes through the northwestern portion of the area. Future surveys may identify additional cultural resources. FWC will coordinate with DHR to evaluate these and any other potentially significant sites for inclusion in their Master Site file. In addition, FWC will ensure management staff has DHR Archaeological Resources Monitoring training. Furthermore, 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

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 based recreation. For these reasons, planned capital facilities and infrastructure will focus on improving access, recreational potential, hydrology, or other resource and operational management objectives.

The FWC currently manages two capital facilities in conjunction with operations on the OSWMA. These include a check station and a metal pole barn, both located on land managed by the FFS (Figure 10). Culverts and other hydrological structures may be needed as determined by a hydrological assessment and restoration plan, and will be constructed as feasible.



As described in Section 5.5.1 above, any public facilities that are developed on areas managed by the FWC will 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. Increasingly, cooperative land steward partnership efforts with private landowners plays an integral role in this effort as does ongoing conservation acquisition, 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 comprehensive cooperative approach towards conservation.

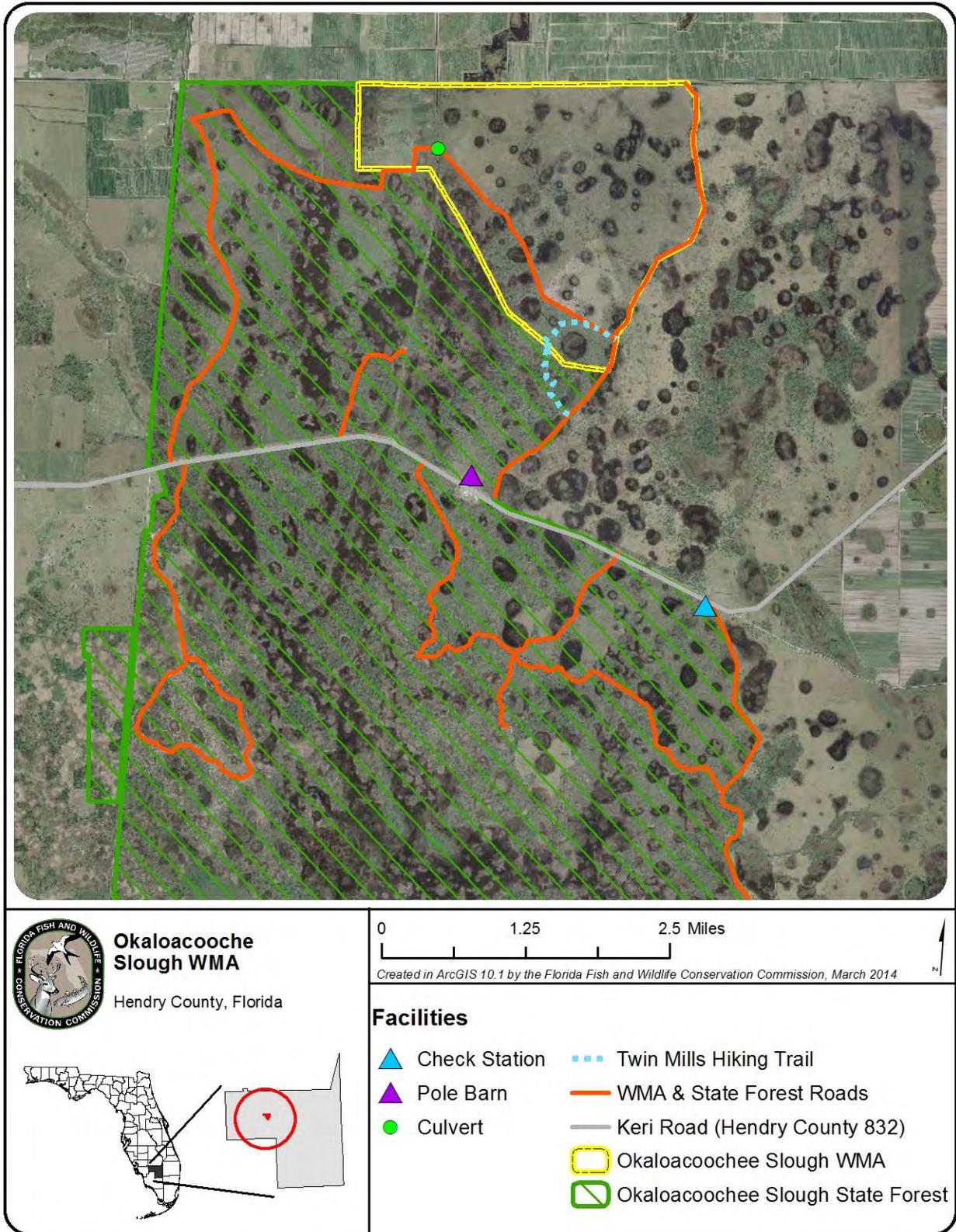


Figure 10: Facilities

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

The OCPB provides the basis for development of a broader Conservation Action Strategy (CAS) for OSWMA (Figure 11). Although the OCPB provides the basis for potential voluntary future 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.

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. FWC biologists 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, the FWC has not identified any potential additions or privately held inholdings for OSWMA. However, 82,995 acres of the Devil's Garden Florida Forever project on which the FWC is designated the lead managing agency remain to be acquired, as well as the remaining acreage to be acquired within the Half Circle L Ranch, Caloosahatchee Ecoscape, and Panther Glades Florida Forever Projects. All of the acreage within these Florida Forever projects is considered vital for the conservation of the Florida panther and other imperiled wildlife species. 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. Currently, the FWC is involved with several research projects on OSWMA. This includes Florida black bear research at the University of Kentucky and torpedo grass research at the University of Florida. Research proposals involving the use of the area are evaluated on an individual basis. All research activities conducted on the OSWMA must have prior approval by the FWC.

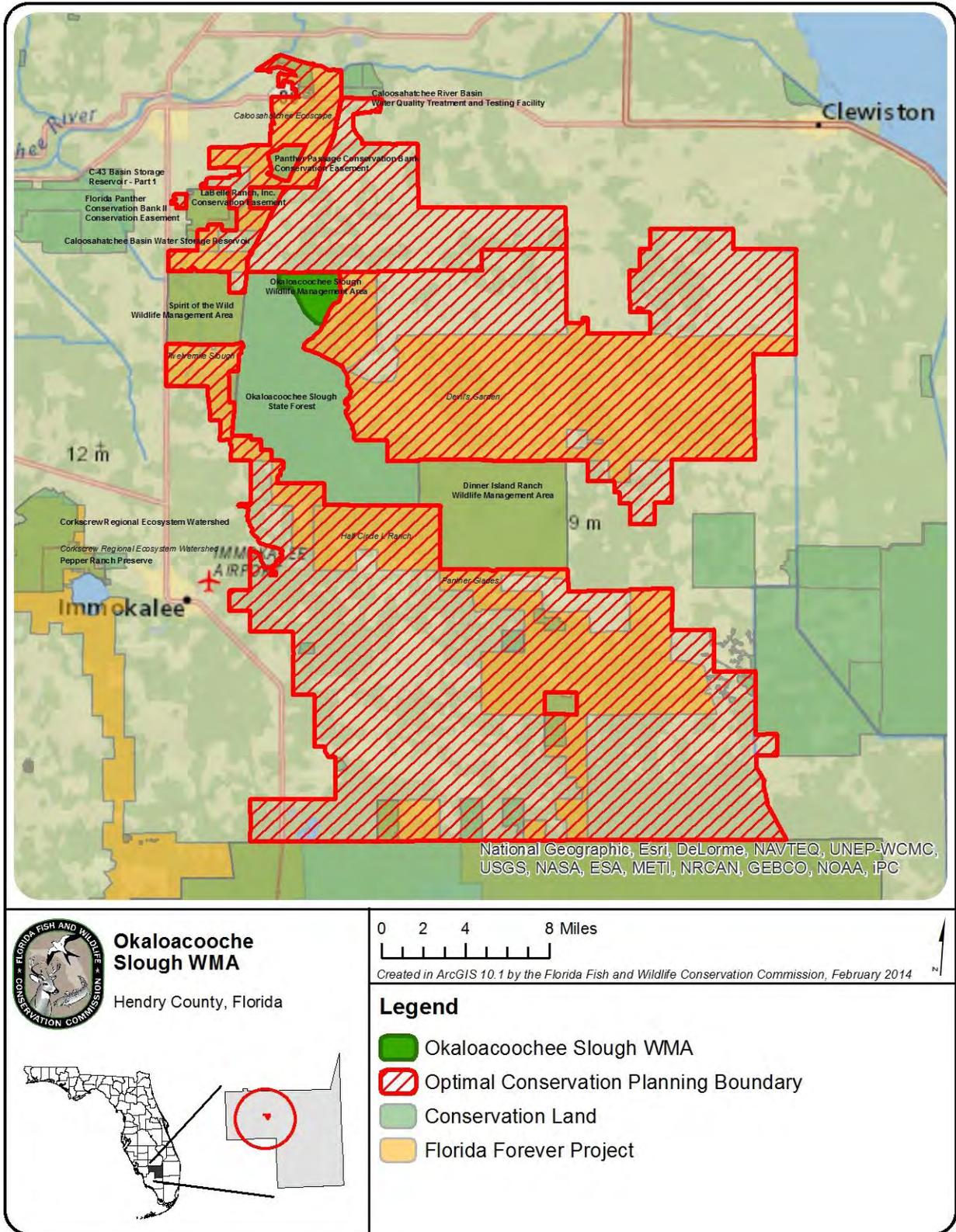


Figure 11: Optimal Conservation Planning Boundary

5.13 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.⁶

This projected 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;^{7, 8, 9} more frequent invasions and outbreaks of exotic invasive species;¹⁰ and loss of habitat in coastal areas due to sea level rise.¹¹ 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.¹² 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 Peninsular Florida 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 OSWMA include saltwater intrusion from sea level rise, more frequent and more potent storm events, alteration of vegetation reproductive cycles, and changes in the fire regime. The results of a Sea Level Affecting Marsh Model for the OSWMA show habitats that may potentially be impacted. The low-lying coastal habitats, such as salt marsh and hardwood swamp natural communities are projected to face the most direct and dramatic impacts of climate change, particularly from a projected rising sea level and from the projected increased frequency and intensity of coastal storms, though these communities are not present at OSWMA.^{13, 14, 15, 16} While OSWMA is well inland, the effects of sea level rise in the recent past have been observed in the adjacent Lee County; cabbage palms have been dying on coastal islands due to salinity increases. The potential loss of habitat may result in the loss of species using that habitat, including migrating and nesting birds. Storm events also cause considerable physical damage to native vegetation along vulnerable shorelines, impacting nesting habitat for sea life and shorebirds. The projected rise in sea levels may decrease the availability and abundance of prey for wading birds that forage in shallow waters on the expansive tidal flats of the Gulf Coast. 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.^{17, 18} Projected salt water intrusion into the subsurface freshwater lens from

potential sea level rise and saltwater inundation of surface freshwaters from storm surges may alter coastal ecosystems and freshwater marshes, possibly resulting in more salt-tolerant aquatic plant communities.

To address the potential impacts of climate change on the OSWMA, Goals and Objectives have been developed as a component of this Management Plan (Section 6.11). 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 OSWMA Management Plan in the future.

5.14 Soil and Water Conservation

Soil disturbing activities, if required, 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.

5.15 Cooperating Agencies

The FWC is responsible for the management and operation of the OSWMA as a provision in the lease agreement with the Board of Trustees. All requirements of the Management Procedures Guidelines - Management of Archaeological and Historical Resources document from the DHR are followed with regard to any ground-disturbing activities. The FFS assists FWC by providing technical assistance on forest resource management. The FWC cooperates and consults with the SFWMD for the monitoring and management of both ground and surface water resources of OSWMA.

5.15.1 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 OSWMA. Such activities are considered allowable uses only when undertaken intermittently and in a manner that does not impede the management and public use of OSWMA, or cause unreasonable impact to the natural resources of the area.

Additionally, FWC staff must be notified prior to any such training taking place on OSWMA. 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.

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 OSWMA. 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.

6.1 Habitat Restoration and Improvement

Goal: Improve extant habitat and restore disturbed areas.

Short-term

- 6.1.1** Prescribe burn 420 acres of fire adapted natural communities on the area per year.
- 6.1.2** Maintain 840 acres (40%) of fire adapted natural communities on the area per year within 4 - 5 year target fire return interval.
- 6.1.3** Update and implement a prescribed burn plan.
- 6.1.4** Record land management actions in the FWC Land Management Information System.

Long-term

- 6.1.5** Continue to prescribe burn 420 acres of fire adapted natural communities on the area per year.
- 6.1.6** Continue to maintain 2,100 acres (100%) of fire adapted natural communities on the area within 4 – 5 year target fire return interval.
- 6.1.7** Continue to maintain 370 acres (100%) of fire adapted natural communities on the area within 6 – 10 year target fire return interval to provide denning habitat for the Florida panther.
- 6.1.8** Continue implementing OBVM.
- 6.1.9** Conduct habitat/natural community restoration activities including restoring native vegetation on the former north dove field and semi-improved pasture (Figure 12).
- 6.1.10** Continue to reduce wax myrtle shrub density as needed on at least 700 acres.

- 6.1.11 Plant native shrubs including runner oak on 300 acres of groundcover restoration sites to provide additional food and cover for wildlife (Figure 12).
- 6.1.12 Pursue groundcover restoration where feasible in north and south dove fields and semi-improved pasture if funding is available (Figure 12).
- 6.1.13 Continue to participate in ongoing ground cover restoration monitoring (Figure 12).
- 6.1.14 Continue to record land management actions in the FWC Land management Information System.

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

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

Short-term

- 6.2.1 Conduct an Audubon’s crested caracara survey.
- 6.2.2 Perform a wading bird roost inventory to get a baseline population estimate by 2016.

Long-term

- 6.2.3 Continue to implement WCPR strategy by managing identified habitats and monitoring identified species including Bachman’s sparrow, Florida grasshopper sparrow, Florida sandhill crane, and multiple species of wading birds.
- 6.2.4 Participate in South Region wading bird colony survey if reconnaissance demonstrates a need.
- 6.2.5 Continue to participate in South Region panther monitoring.
- 6.2.6 Continue to collect opportunistic wildlife species occurrence data.
- 6.2.7 Conduct caracara nesting surveys on all suitable nesting habitat.

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 Conduct aerial monitoring surveys for white tailed deer and wild hogs.

- 6.3.2 Continue to collect biological harvest data at check station.
- 6.3.3 Participate in frog call counts within the district.
- 6.3.4 Participate in wading bird roost counts within the district.
- 6.3.5 Participate in North American migratory bird counts within the South Region.
- 6.3.6 Participate in mock Christmas bird counts within the South Region.
- 6.3.7 Continue to collect opportunistic wildlife occurrence data.
- 6.3.8 Continue ground cover restoration protocol for northern bobwhite habitat.
- 6.3.9 Conduct baseline fish, reptile, and amphibian surveys on OSWMA.

6.4 Exotic and Invasive Species Maintenance and Control

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

Short-term

- 6.4.1 Semi-annually treat at least 1,500 acres of torpedograss and Caesarweed.
- 6.4.2 Conduct one maintenance treatment on at least 1,500 acres of FEPPC Category I and Category II invasive exotic plant species.
- 6.4.3 Selectively treat at least 375 acres of exotic pasture grasses in semi-improved pasture (Figure 12).
- 6.4.4 Spot treat invasive exotic species including pasture grasses on the 42-acre former south dove field each year to encourage growth of native groundcover vegetation (Figure 12).
- 6.4.5 Continue to implement control measures on one exotic and nuisance animal species (Burmese python) and opportunistically monitor other exotic animal species such as brown anole, European starling, and wild hogs (Table 12).
- 6.4.6 Record exotic and invasive species management actions in the FWC Land Management Information System.

Long-term

- 6.4.7 Continue to semi-annually treat at least 1,400 acres of torpedograss and Caesarweed, until a maintenance level is reached
- 6.4.8 Conduct two maintenance treatments on at least 1,400 acres of FEPPC Category I and Category II invasive exotic plant species.

- 6.4.9** Selectively treat exotic pasture grasses on at least 750 acres in semi-improved pasture (Figure 12).
- 6.4.10** Treat 37 acres of exotic species, including pasture grasses, with herbicide treatments on the former northeast dove field so that native groundcover can be reestablished (Figure 12).
- 6.4.11** Spot treat invasive exotic species, including pasture grasses, on the current 360 acres of groundcover restoration and any future acres to encourage growth of native vegetation (Figure 12).
- 6.4.12** Continue to implement control measures on one exotic and nuisance animal species (Burmese python) and opportunistically monitor other exotic animal species such as brown anole, European starling, and wild hogs (Table 12).
- 6.4.13** Continue to record exotic and invasive species management actions in the FWC Land Management Information System

6.5 Public Access and Recreational Opportunities

Goal: Provide public access and recreational opportunities.

Short-term

- 6.5.1** Maintain public access and recreational opportunities to allow for a recreational carrying capacity of 74 visitors per day.
- 6.5.2** Continue to provide website for interpretation and education.
- 6.5.3** Cooperate with the FFS to develop a trail map for the Twin Mills hiking trail.
- 6.5.4** Cooperate with the FFS to develop a recreational facilities/opportunities map of the OSWMA and adjacent public lands.
- 6.5.5** Cooperate with the FFS to develop QR code links to maps and interpretive information.
- 6.5.6** Maintain 1.2 miles of trails.

Long-term

- 6.5.7** Develop Recreation Plan if necessary due to recreation demands and other conditions.
- 6.5.8** Cooperate with the FFS to improve and enhance the kiosks and interpretive information.
- 6.5.9** Monitor trails biannually for visitor impacts.

- 6.5.10 Reassess recreational opportunities every three years.
- 6.5.11 Continue to provide hunting opportunities for deer, turkey, small game and wild hogs.
- 6.5.12 Cooperate with the FFS, the SFWMD, Hendry County and other agencies, stakeholders, and regional landowners to investigate regional recreational opportunities including linking hiking, and multi-use trail systems between adjacent public areas.
- 6.5.13 Continue to identify partnerships that could provide for environmental educational programs and outreach.

6.6 Hydrological Preservation and Restoration

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

Short-term

- 6.6.1 Conduct or obtain a site hydrological assessment to identify potential hydrology restoration needs.
- 6.6.2 Maintain culverts as appropriate to maintain and enhance natural hydrological functions.
- 6.6.3 Continue to monitor water levels bi-weekly at the eight established locations.

Long-term

- 6.6.4 Continue to maintain culverts as appropriate to maintain and enhance natural hydrological functions.
- 6.6.5 Implement hydrological restoration plan, as feasible.
- 6.6.6 Continue to monitor water levels bi-weekly at the eight established locations until further actions are determined by the hydrological restoration plan.

6.7 Forest Resource Management

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

Short-term

- 6.7.1 Cooperate with the FFS to complete a Timber Assessment

Long-term

- 6.7.2 Continue to consult with the FFS or a professional forestry consultant regarding forest management activities as appropriate.

6.8 Cultural and Historical Resources

Goal: Protect, preserve and maintain cultural and historic resources.

Short-term

- 6.8.1 Ensure all known sites are recorded in the DHR Master Site file.
- 6.8.2 Continue to monitor, protect, and preserve two identified sites including a prehistoric midden and a twentieth century lumber mill.

Long-term

- 6.8.3 Cooperate with the DHR to manage and maintain known existing cultural resources.
- 6.8.4 Continue to monitor, protect, and preserve two identified sites.
- 6.8.5 Coordinate with the DHR for cultural resource management guideline staffing.

6.9 Capital Facilities and Infrastructure

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

Short-term

- 6.9.1 Continue to maintain two facilities including check station and metal pole barn (Figure 10).
- 6.9.2 Maintain ~5.8 miles of roads (Figure 10).
- 6.9.3 Maintain ~1.2 miles of trails existing on site (Figure 12).
- 6.9.4 Record road and trail improvements in the FWC Land Management Information System.

Long-term

- 6.9.5 Design, construct and maintain one entrance package facility including kiosk and parking area.
- 6.9.6 Continue to maintain two facilities including check station and metal pole barn (Figure 10).
- 6.9.7 Continue to maintain, improve, or repair ~5.8 miles of roads (Figure 10).

- 6.9.8 Continue to maintain, improve, or repair ~1.2 miles of trails existing on site (Figure 12).
- 6.9.9 Monitor trails and infrastructure biannually for visitor impacts.
- 6.9.10 Continue to record road and trail improvements in the FWC Land Management Information System.

6.10 Land Conservation and Stewardship Partnerships

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

Short-term

- 6.10.1 Identify potential important wildlife habitat, landscape-scale linkages, wildlife corridors, and operational/resource management that may be important to the continued viability of fish and wildlife populations in the region.
- 6.10.2 Identify and develop conservation stewardship partnerships.
- 6.10.3 Identify and pursue conservation acquisition needs.
- 6.10.4 Develop and maintain a GIS shapefile and other necessary data to facilitate nominations from the FWC OCPB and for FWC's LAP and Land Conservation Programs.
- 6.10.5 Develop a CAS.
- 6.10.6 Contact and inform adjoining landowners about the FWC LAP to pursue non-acquisition conservation stewardship partnerships, and potential conservation easements.
- 6.10.7 Determine which parcels should be added to the FWC acquisition list.
- 6.10.8 Identify potential non-governmental organization partnerships and grant program opportunities.
- 6.10.9 Determine efficacy of conducting an adjacent landowner's assistance/conservation stewardship partnership workshop.
- 6.10.10 Identify potential conservation easements donations.

Long-term

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

- 6.10.12 Continue to identify and develop conservation stewardship partnerships.
- 6.10.13 Continue to identify and pursue conservation acquisition needs.
- 6.10.14 Continue to maintain a GIS shapefile and other necessary data to facilitate nominations from the FWC OCPB and for the FWC LAP and Land Conservation Program.
- 6.10.15 Continue to propose nominations of selected properties as additions to the FWC acquisition list.
- 6.10.16 Continue to pursue acquisition of parcels added to the FWC acquisition list as acquisition work plan priorities and funding allow.
- 6.10.17 Periodically (every three to five years) continue to contact and meet with adjacent landowners to determine their willingness to participate in the CAS.
- 6.10.18 Coordinate and conduct landowner assistance/conservation stewardship partnership workshop(s) as necessary and appropriate.
- 6.10.19 Continue to identify potential conservation easements donations.
- 6.10.20 Continue to evaluate and determine if any portions of OSWMA are no longer needed for conservation purposes, and therefore may be designated as surplus lands.

6.11 Climate Change

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 OSWMA.

Long-term

- 6.11.1 Coordinate with the FWC-FWRI Climate Change Adaptation Initiative to identify potential impacts of projected climate change on fish and wildlife resources and operational management of the OSWMA.
- 6.11.2 Incorporate appropriate climate change monitoring protocols and management strategies into the OBVM program for the OSWMA.
- 6.11.3 Incorporate appropriate climate change adaptation strategies into the WCPR for OSWMA.
- 6.11.4 As appropriate, update the OSWMA Prescribed Fire Plan to incorporate new scientific information regarding projected climate change, such as increased frequency of drought, on the fire regime of OSWMA's fire-adapted habitats.

6.11.5 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 the update of the Recreation Master Plan.

6.12 Research Opportunities

Goal: Explore and pursue cooperative research opportunities.

Short-term

6.12.1 Continue to cooperate with the University of Florida on torpedo grass research.

Long-term

6.12.2 Continue to participate in South Region panther research.

6.12.3 Continue to cooperate with the University of Kentucky on Florida black bear research.

6.12.4 Explore and pursue cooperative research opportunities through universities, and the FWC FWRI, etc.

6.12.5 Continue to cooperate with researchers, universities, and others as appropriate.

6.12.6 Continue to assess the need for and pursue research partnership opportunities as 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 OSWMA graphically in a timeline format. These timelines directly reflect the short- and long-term goals and objectives presented above in Section 6.

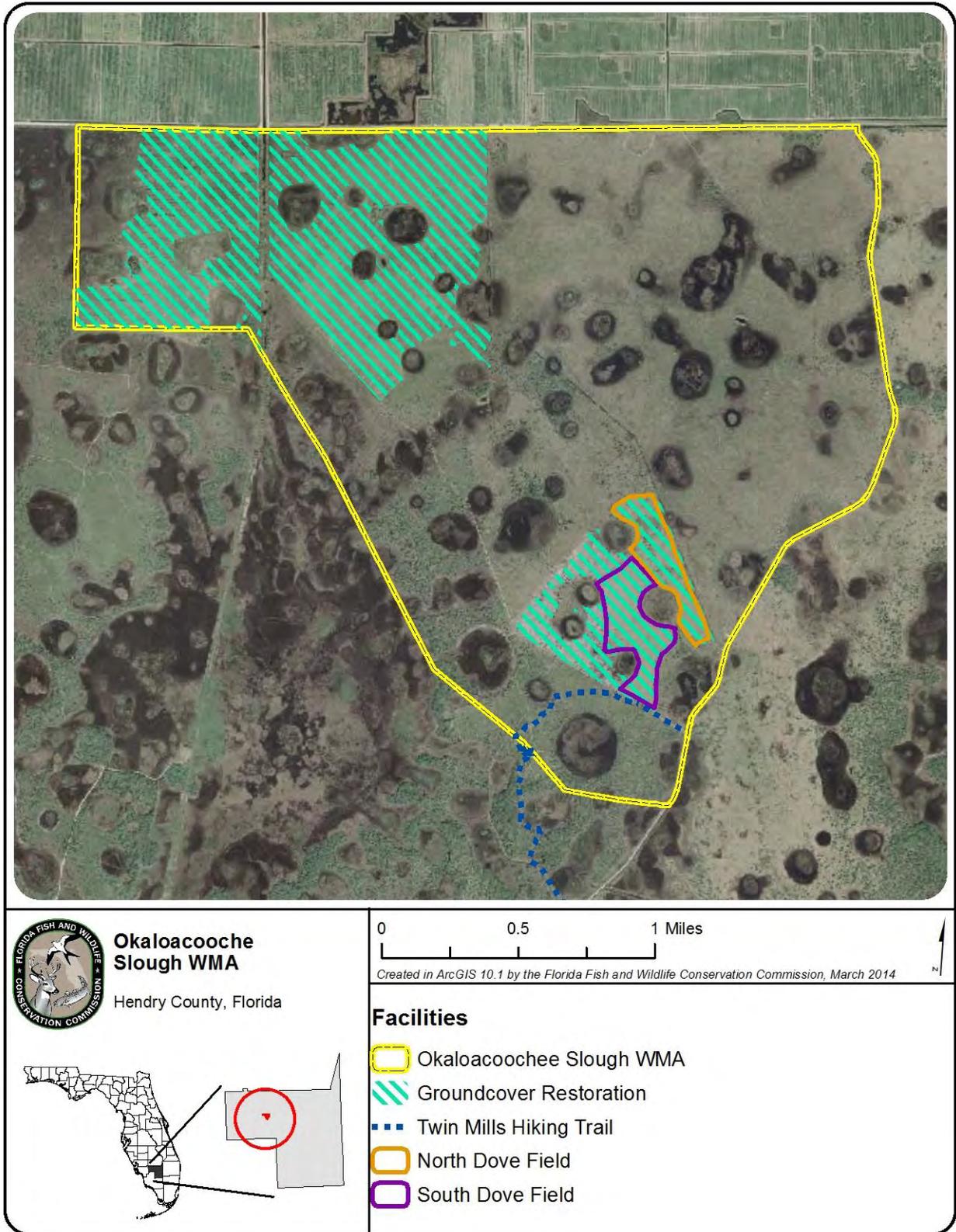
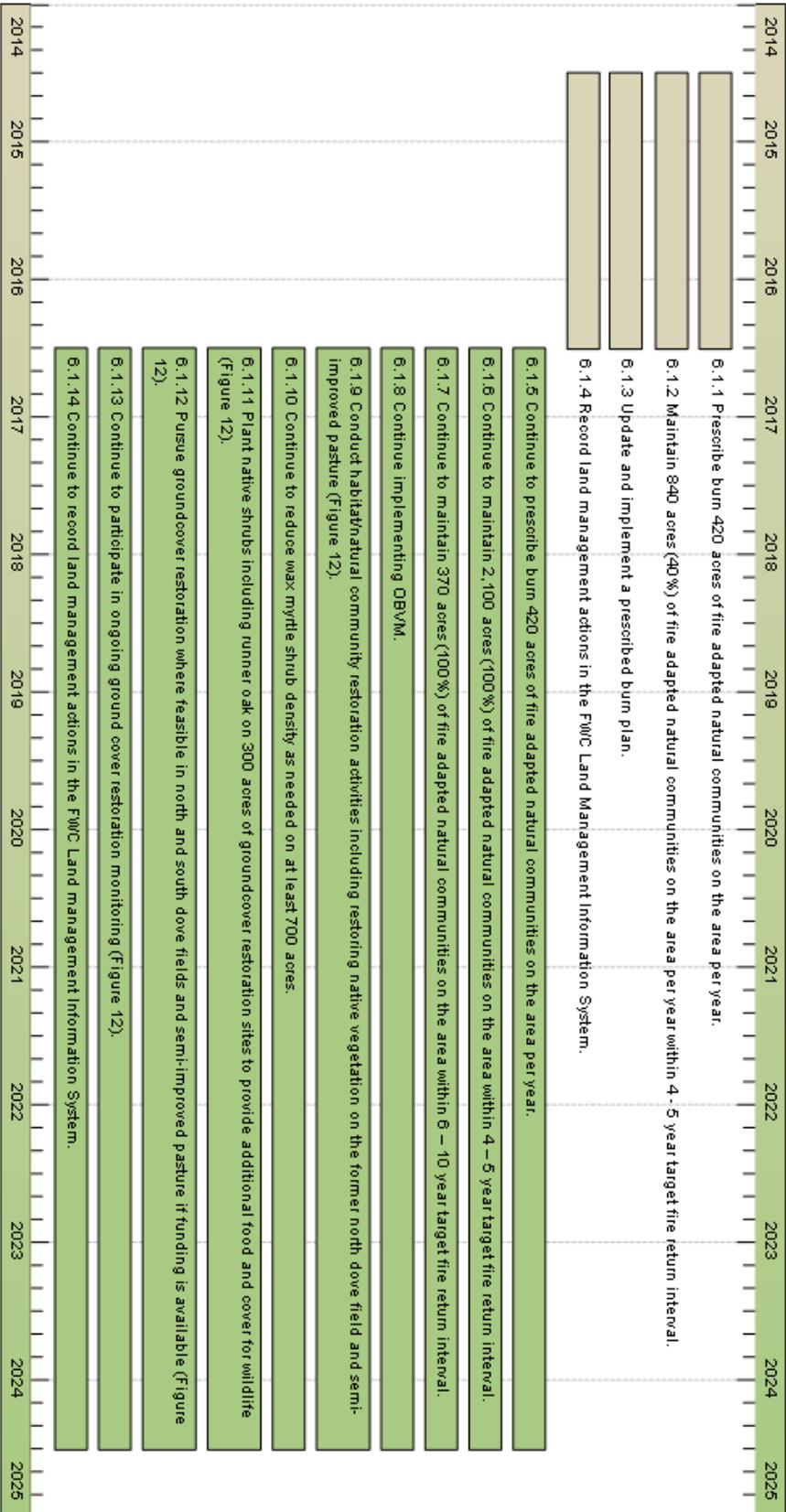


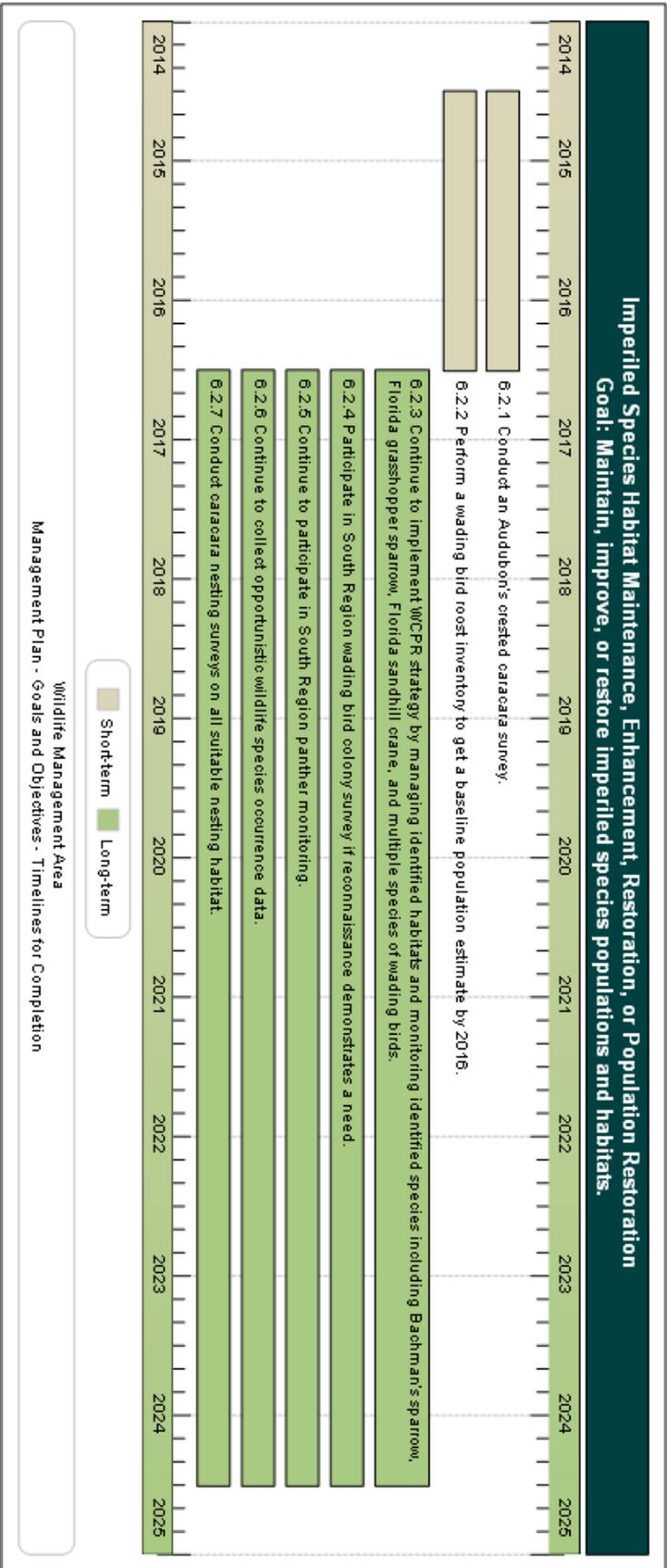
Figure 12: Project Locations

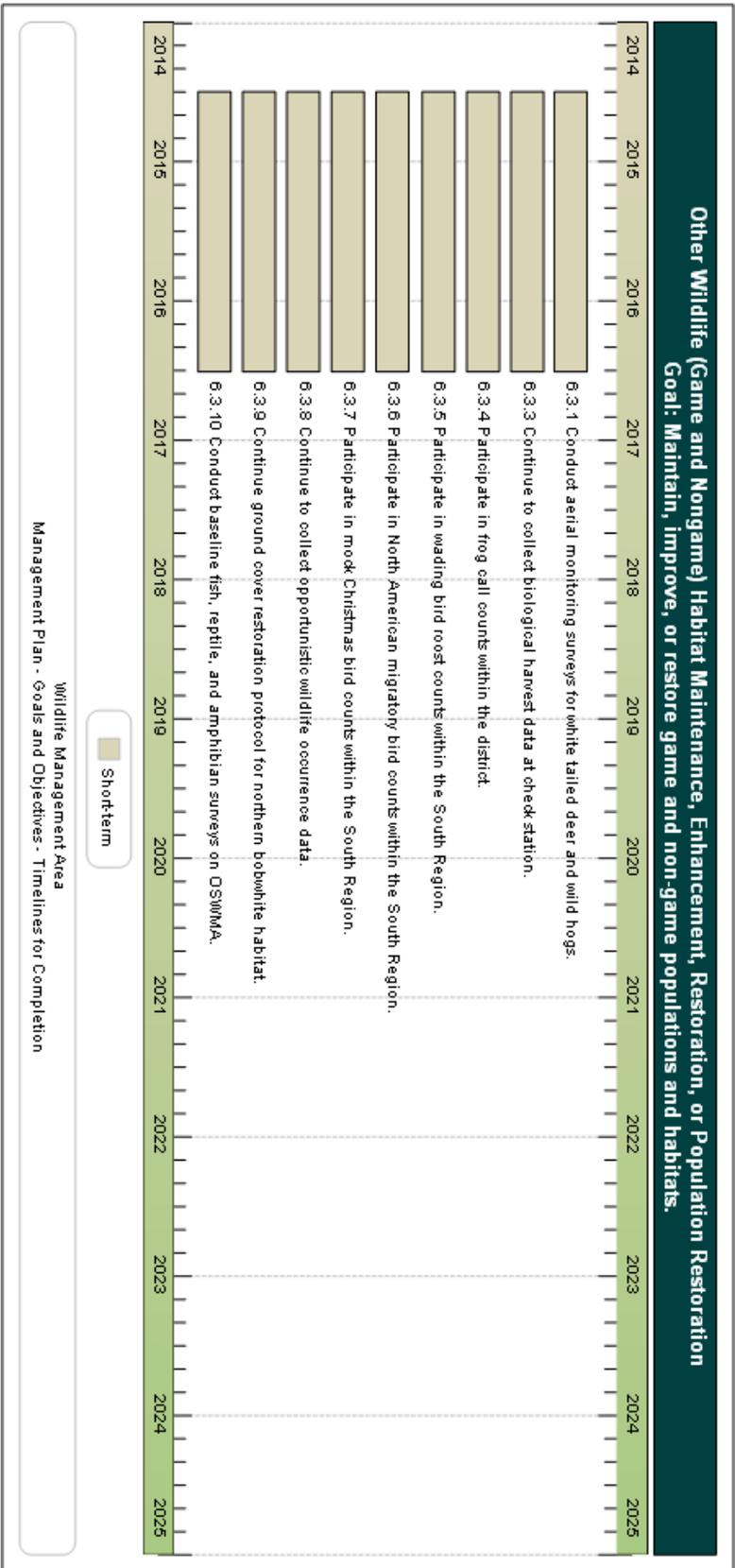
Habitat Restoration and Improvement
Goal: Improve extant habitat and restore disturbed areas.

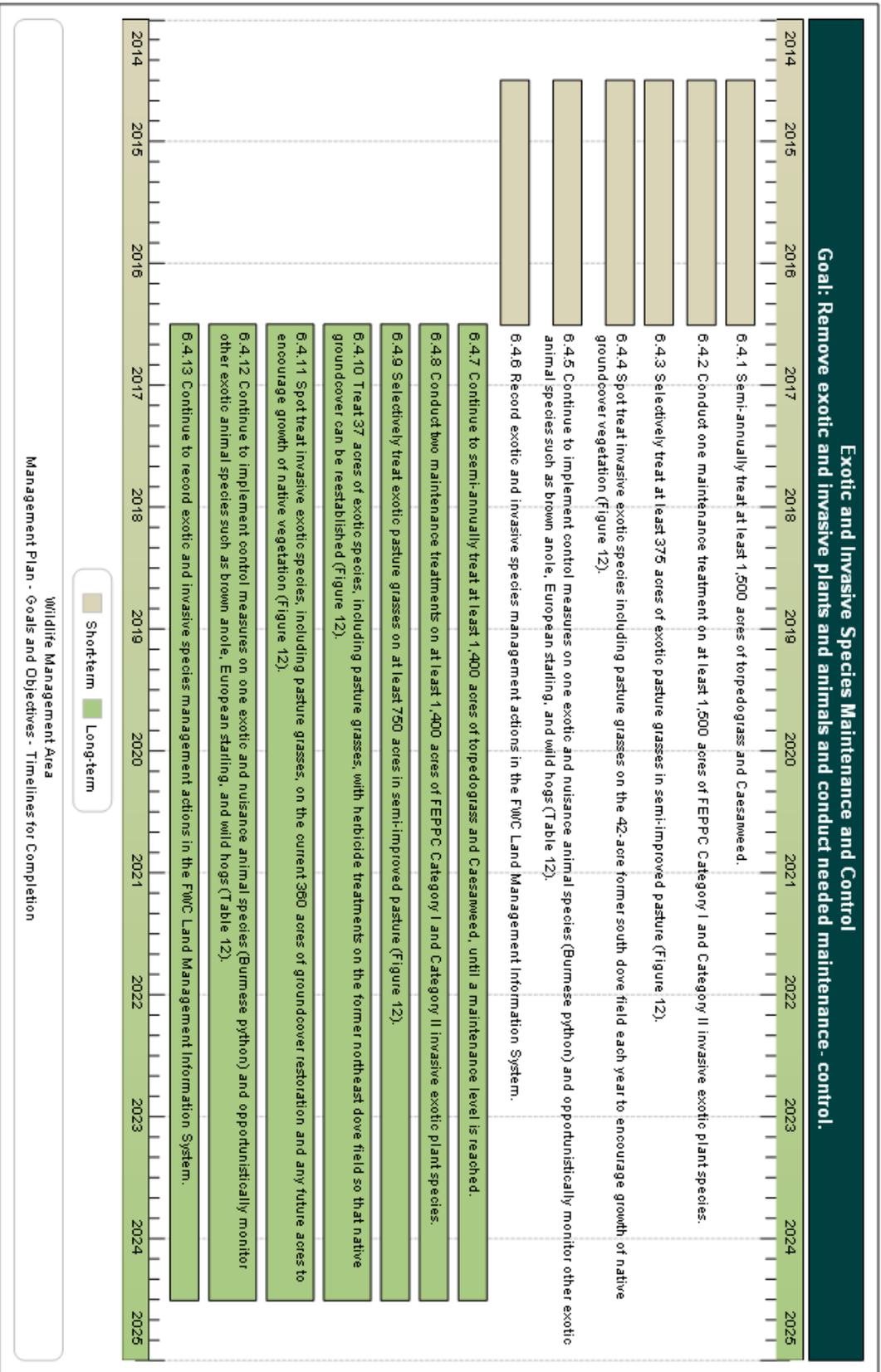


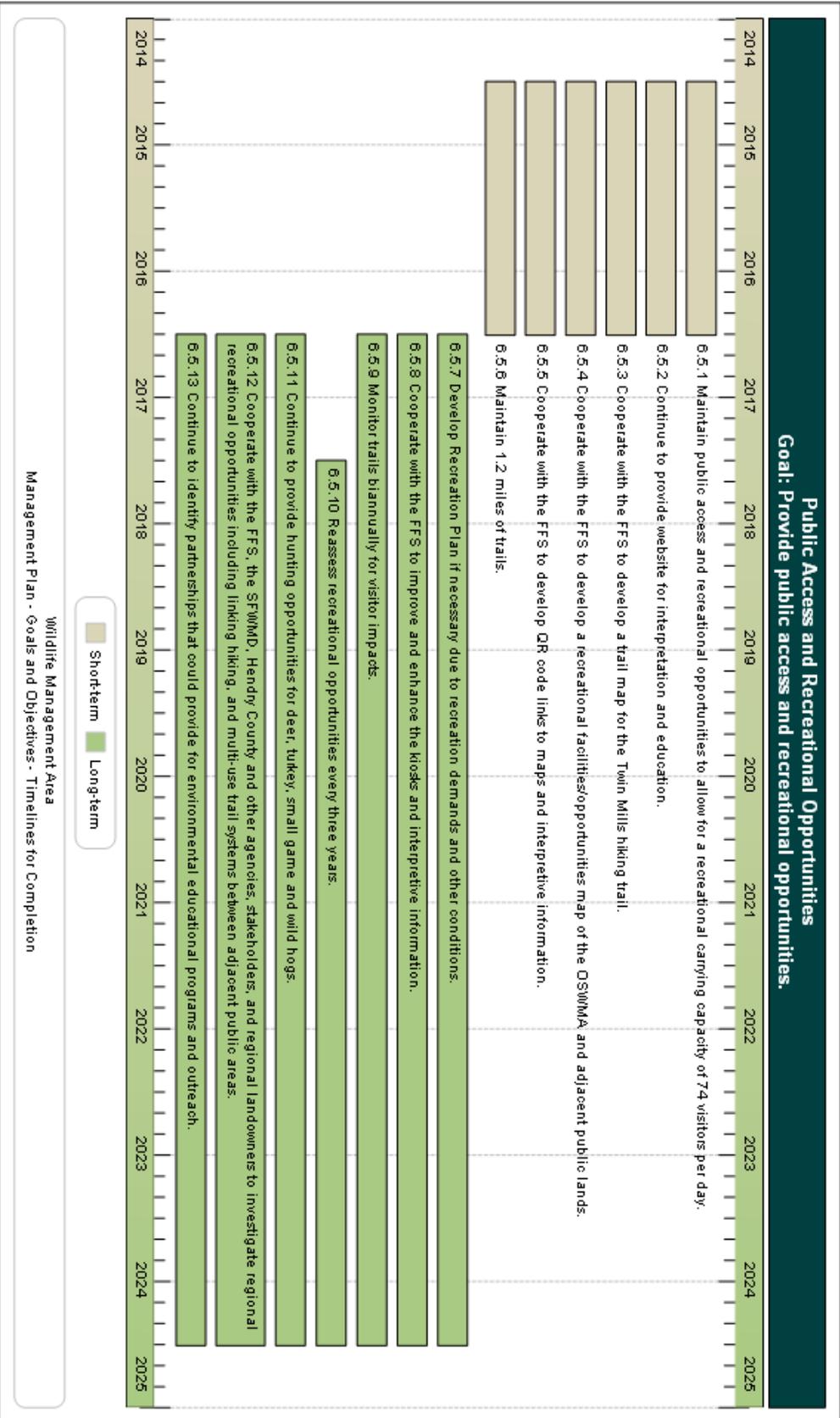
Short-term Long-term

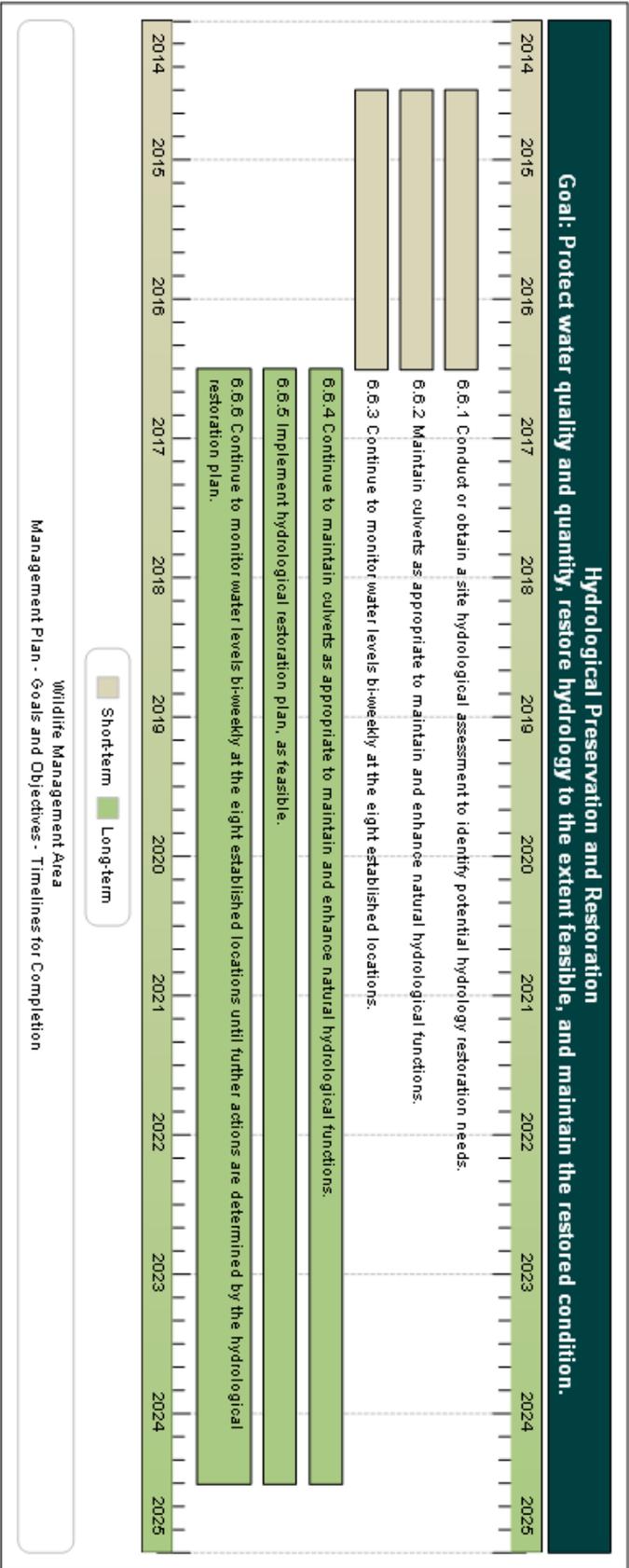
Wildlife Management Area
 Management Plan - Goals and Objectives - Timeliness for Completion





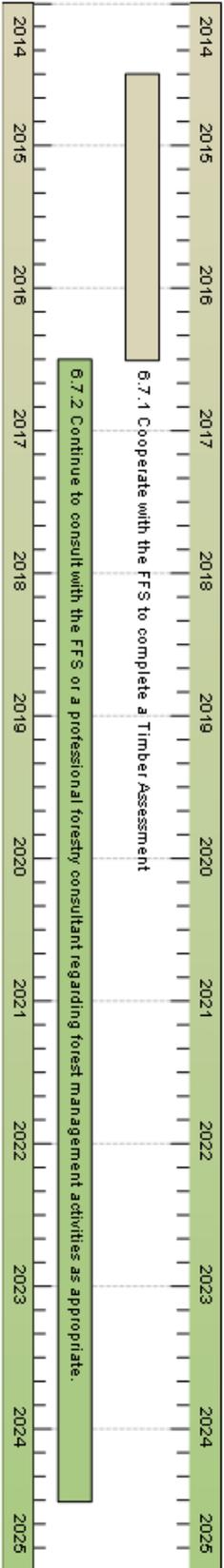






Forest Resource Management

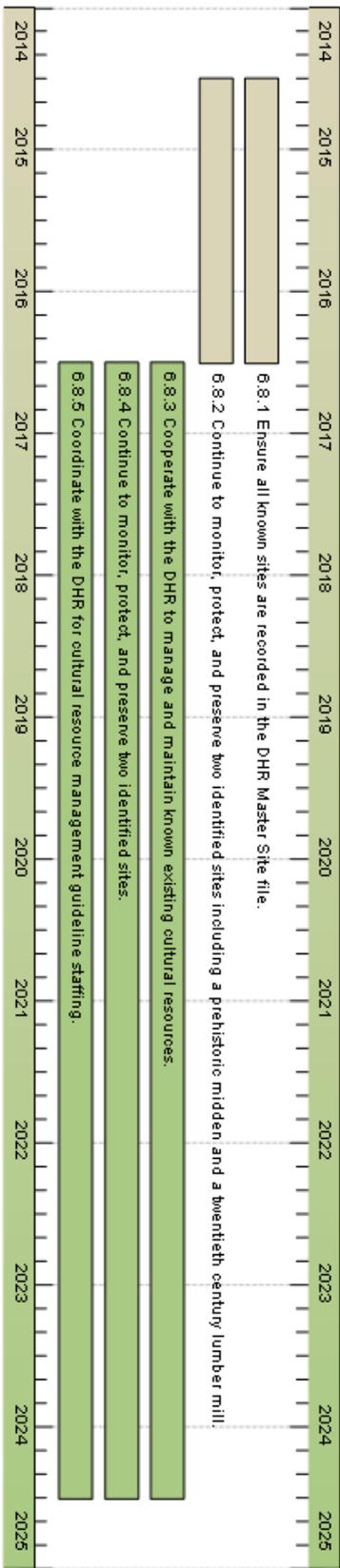
Goal: Manage timber resources to improve or restore natural communities for the benefit of wildlife.



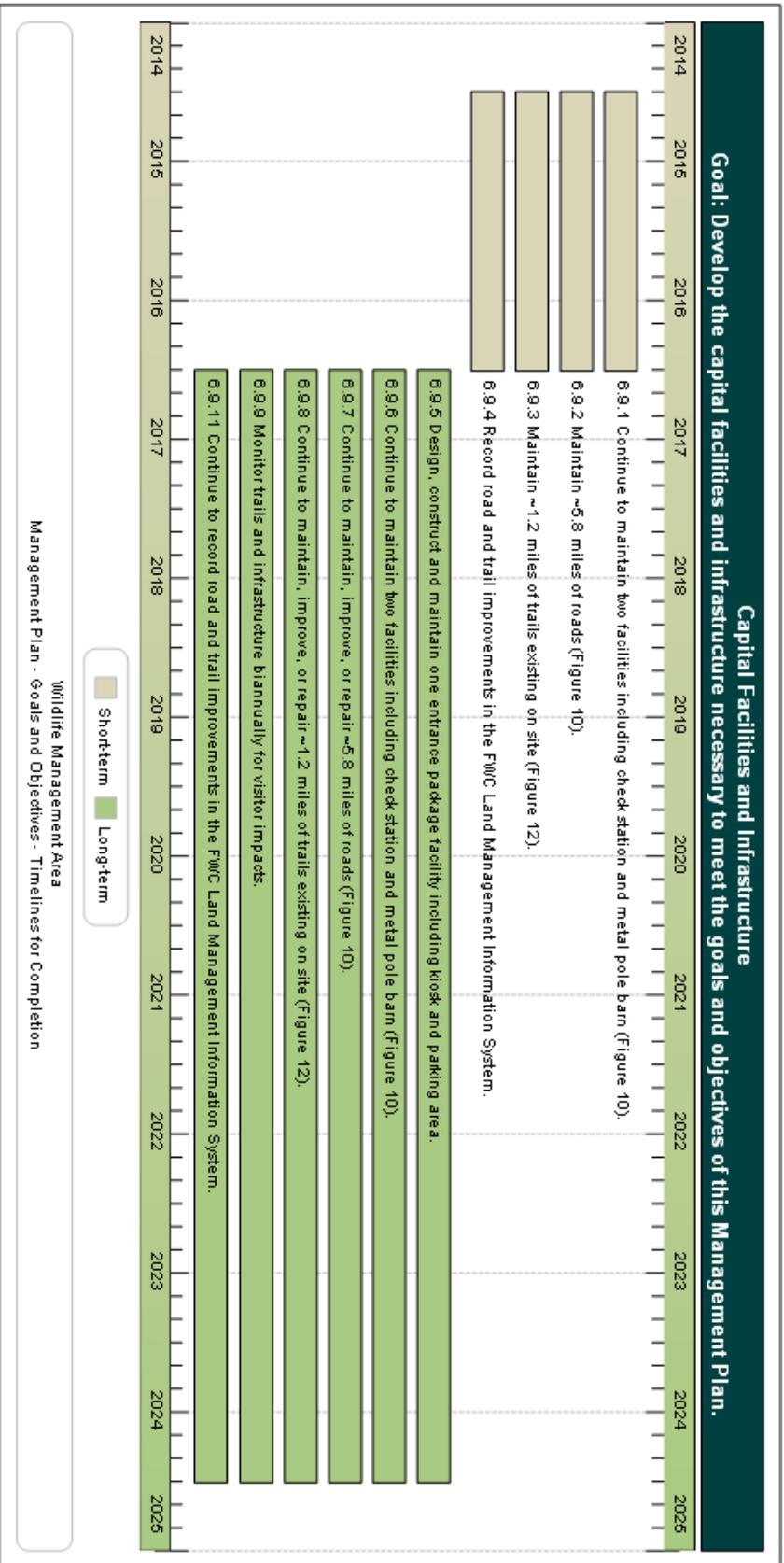
Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion

Cultural and Historical Resources

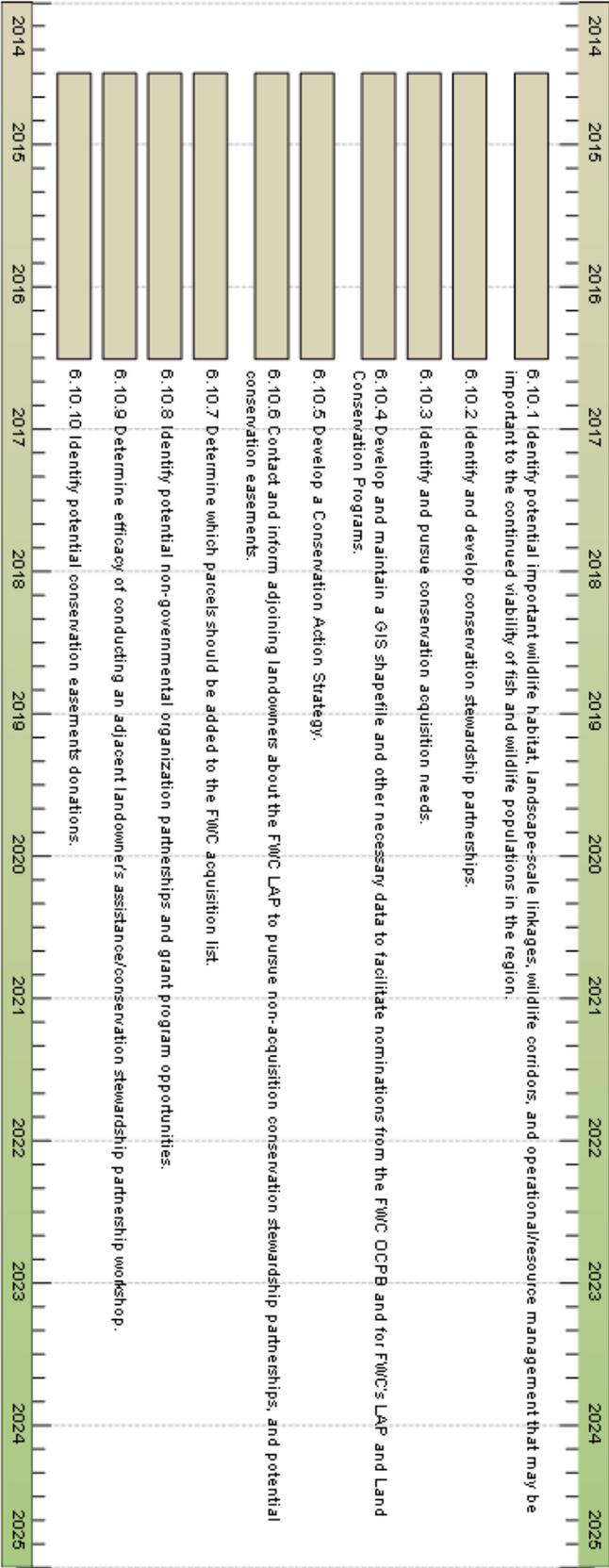
Goal: Protect, preserve and maintain cultural and historic resources.



Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion

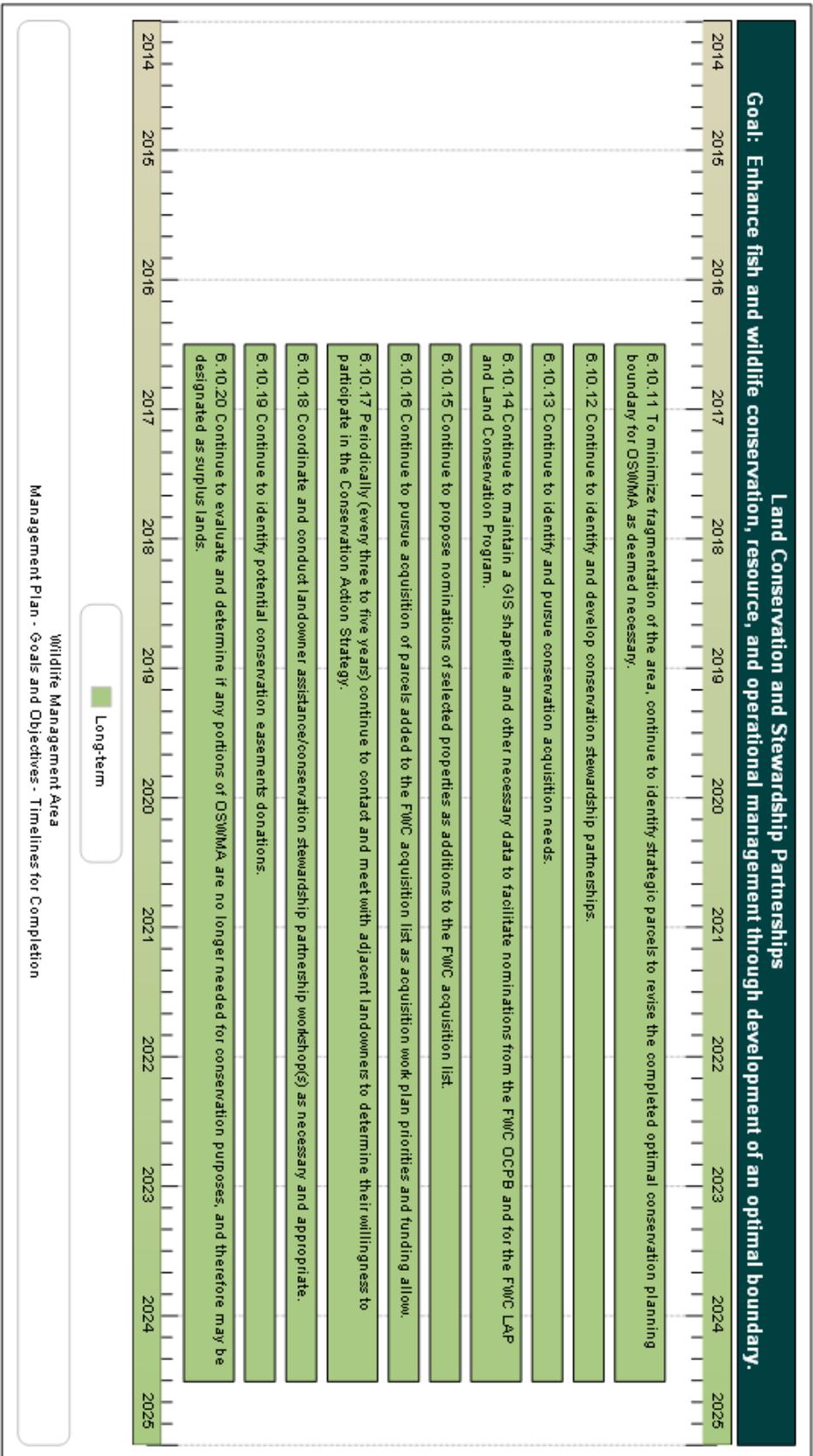


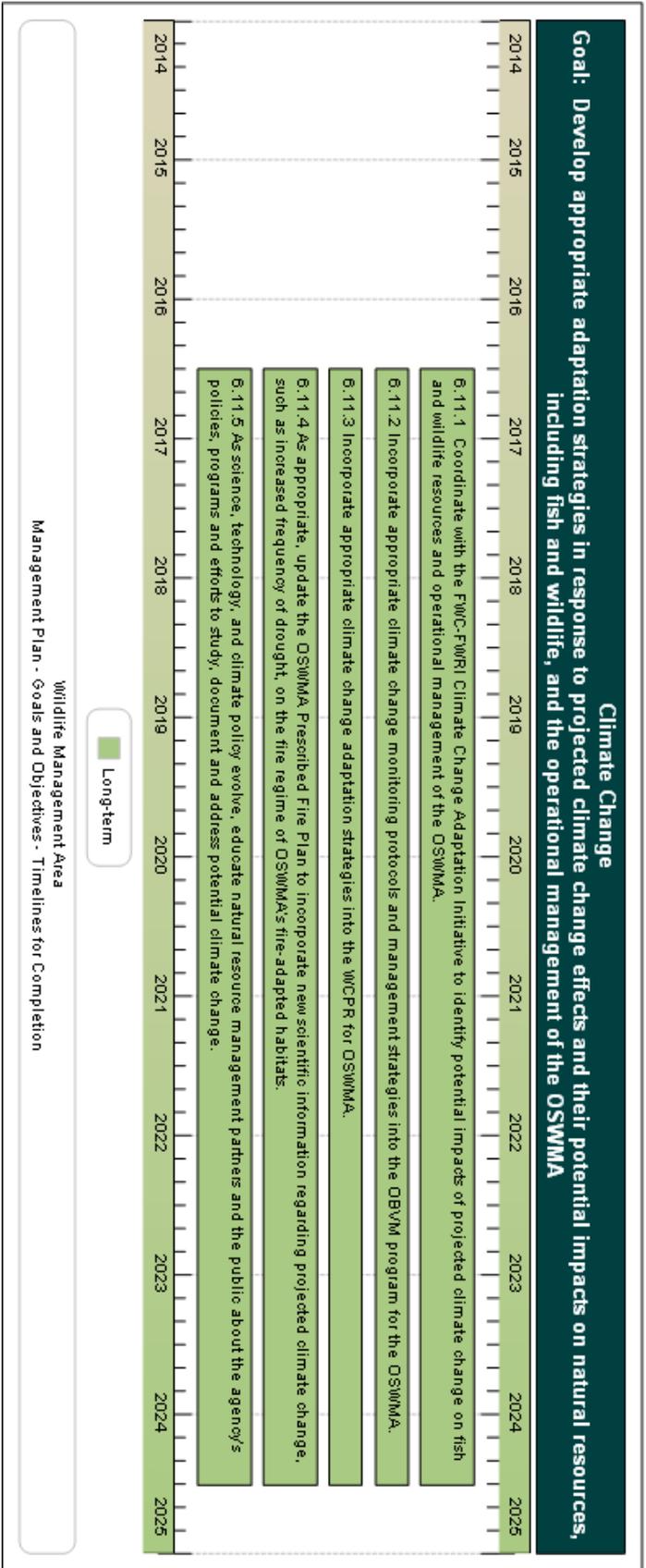
Land Conservation and Stewardship Partnerships
Goal: Enhance fish and wildlife conservation, resource, and operational management through development of an optimal boundary.

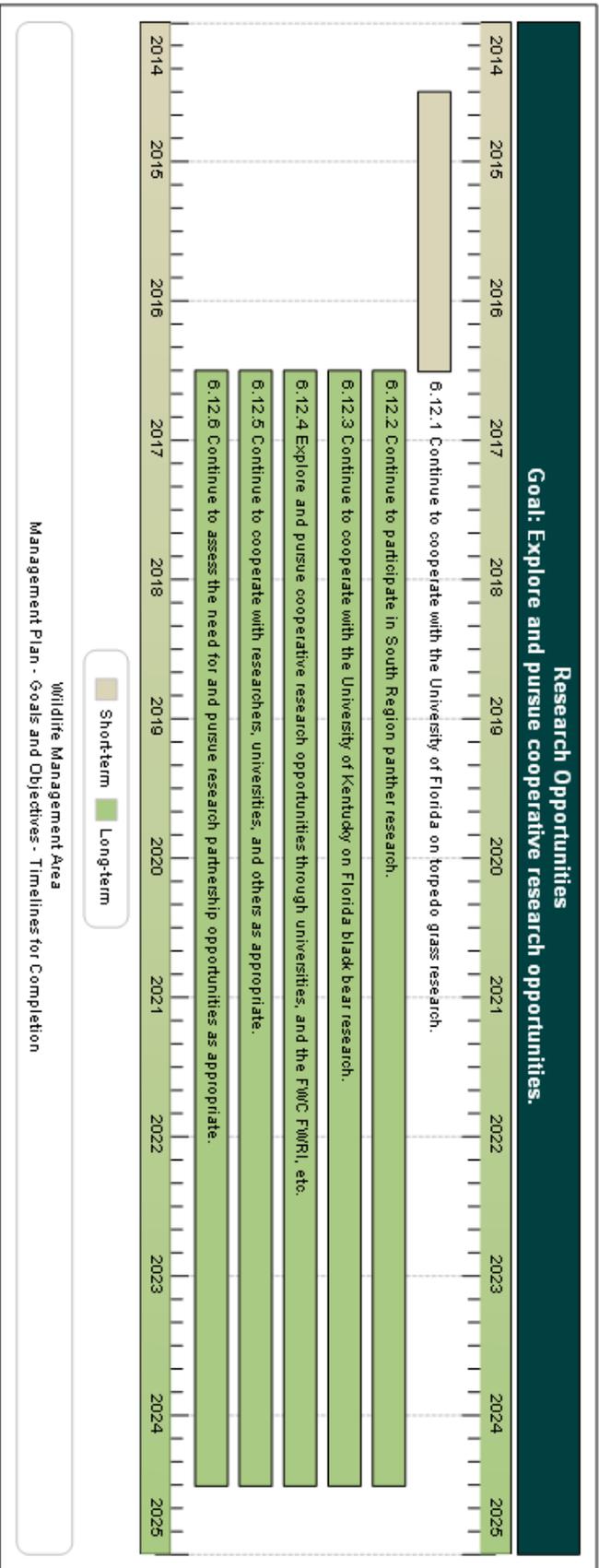


Short-term

Wildlife Management Area
 Management Plan - Goals and Objectives - Timelines for Completion







8 Resource Management Challenges and Strategies

The following section identifies and describes further management needs and challenges associated with OSWMA 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: A complete boundary survey of the OSWMA is lacking.

8.1.1 Strategy: Explore the feasibility of contracting for boundary survey.

8.2 Challenge: Currently, staffing is at insufficient levels for optimal management of OSWMA

8.2.1 Strategy: Pursue funding for increased staffing.

8.2.2 Strategy: Explore potential volunteer resources for assisting with management.

8.3 Challenge: While currently at minimal levels, unauthorized access, illegal dumping, vandalism, poaching, and unauthorized off-road vehicle (ORV) use may pose an increased threat in the future.

8.3.1 Strategy: Continue to provide area-wide security through FWC law enforcement patrols.

8.4 Challenge: It is unclear what maintenance and management responsibility FWC has over the canal along Sears Road.

8.4.1 Strategy: As part of the hydrologic assessment, determine the feasibility and efficacy of restoring and/or maintaining the canal along Sears Road.

8.4.2 Strategy: Cooperate with adjacent landowners, the FFS, the SFWMD and appropriate water control districts to address hydrologic management and restoration measures.

8.5 Challenge: Exotic invasive Burmese python from adjacent lands may spread to the OSWMA

8.5.1 Strategy: Cooperate with ongoing efforts and research to monitor and control Burmese pythons.

8.6 Challenge: Insufficient areas exist within the OSWMA for long-term conservation of far-ranging species that have been documented to exist on the OSWMA such as Florida panther.

8.6.1 Strategy: Explore conservation stewardship and acquisition opportunities to secure habitat necessary for far-ranging species such as Florida panther, especially on the adjacent 82,995 acres of the Devil's Garden Florida Forever

project on which the FWC is designated the lead managing agency remaining to be acquired within the Half Circle L ranch and Calooshatchee Ecoscape, and Panther Glades Florida Forever Projects. All of the acreage within these Florida Forever projects is considered vital for the conservation of the Florida panther and other imperiled wildlife species.

9 Cost Estimates and Funding Sources

The following represents the actual and unmet budgetary needs for managing the lands and resources of OSWMA. 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, from State Legislative appropriations, and from Federal Pittman-Robertson grants. However, private conservation organizations may be cooperators with the agency for funding of specific projects. Alternative funding sources, such as monies available through grants and mitigation, may be sought to supplement existing funding.

The cost estimates in tables 15 and 16, although exceeding what FWC typically receives through the appropriations process, are consistent with the direction taken by current operational planning for OSWMA. 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 2014-2015 operational plan showing detailed cost estimates by activity and categories of expenditures, may be found in Appendix 13.10.

Table 15: OSWMA Management Plan One Year Cost Estimate

Maximum expected one year expenditure

Resource Management

Exotic Species Control	\$181,482
Prescribed Burning	\$33,465
Cultural Resource Management	\$0
Timber Management	\$0
Hydrological Management	\$28,298
Other (Restoration, Enhancement, Surveys, Monitoring, etc.)	\$97,012

Priority Schedule: Immediate (annual) Intermediate (3-4 years) Other (5+ years)
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Subtotal **\$340,203**

Administration

General administration	\$8,528
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Support

Land Management Planning	\$13,617
Land Management Reviews	\$0
Training/Staff Development	\$600
Vehicle Purchase	\$29,575
Vehicle Operation and Maintenance	\$19,419
Other (Technical Reports, Data Management, etc.)	\$8,682

Subtotal **\$71,893**

Capital Improvements

New Facility Construction	\$0
Facility Maintenance	\$22,551

Subtotal **\$22,551**

Visitor Services/Recreation

Info./Education/Operations	\$7,810
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Law Enforcement

Resource protection	\$2,670
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Total **\$453,655**

* Based on the characteristics and requirements of this area, one (1) full time equivalent (FTE) position would be optimal to fully manage this area

Table 16: OSWMA Management Plan Ten Year Cost Estimate

Ten-year projection

Resource Management

Exotic Species Control	\$1,814,820
Prescribed Burning	\$334,6500
Cultural Resource Management	\$3,113
Timber Management	\$0
Hydrological Management	\$382,980
Other (Restoration, Enhancement, Surveys, Monitoring, etc.)	\$970,120

Priority Schedule: Immediate (annual) Intermediate (3-4 years) Other (5+ years)

Subtotal **\$3,505,683**

Administration

General administration	\$85,280
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Support

Land Management Planning	\$136,170
Land Management Reviews	\$7,927
Training/Staff Development	\$28,454
Vehicle Purchase	\$321,300
Vehicle Operation and Maintenance	\$194,190
Other (Technical Reports, Data Management, etc.)	\$86,820

Subtotal **\$774,861**

Capital Improvements

New Facility Construction	\$52,192
Facility Maintenance	\$225,510

Subtotal **\$277,702**

Visitor Services/Recreation

Info./Education/Operations	\$78,100
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Law Enforcement

Resource protection	\$26,700
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Total **\$4,748,326**

* Based on the characteristics and requirements of this area, one (1) full time equivalent (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:

Rejected	Approved	Conditional
• Dike and levee maintenance		✓
• 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 Government 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 the 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 OSWMA 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 13.5). 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 372, 253, 259, 327, 370, 403, 870, 373, 375, 378, 487, and 597 FS.

The FWC has developed and utilizes an Arthropod Management Plan for OSWMA in compliance with Chapter 388.4111 F.S. (Appendix 13.11). This plan was developed in cooperation with the local Hendry County arthropod control agency. The OSWMA Management Plan is in conformance with the Local Government Comprehensive Plan as approved and adopted for Hendry County, Florida, (Appendix 13.12).

12 Endnotes

- ¹ Soil Survey of Hendry County, Florida. 1986. United States Department of Agriculture, Soil Conservation Service; University of Florida, Institute of Food and Agricultural Sciences, Agricultural Experiment Stations and Soil Science Department; Florida Department of Transportation; Florida Department of Agriculture and Consumer Services. 1, 3, 4pp.
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- ³ Wilhere, G. F. 2002. Adaptive management in Habitat Conservation Plans. *Conservation Biology* 16:20-29.
- ⁴ Walters, C. J. and R. Hilborn. 1978. Ecological optimization and adaptive management. *Annual Review of Ecology and Systematics* 9:157–188.
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- ⁶ 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.
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- ⁹ Parmesan, C. 2006. Ecological and evolutionary responses to recent climate change. *Annual Review of Ecology, Evolution, and Systematics* 37:637-669.
- ¹⁰ 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.
- ¹¹ 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.
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- ¹³ Emanuel, K.A. 1987. The Dependence of Hurricane Intensity on Climate. *Nature* 326: 483-485.
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