

A Management Plan for
Half Moon
Wildlife Management Area
2014 - 2024



Sumter County, Florida

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

**A Management Plan
for
Half Moon Wildlife Management Area**

Sumter County, Florida

Owned by the State of Florida

Managed by the Florida Fish and Wildlife Conservation Commission



January 2014

Approved

Signature on file

Thomas Eason
Director, Division of Habitat and Species Conservation

LAND MANAGEMENT PLAN EXECUTIVE SUMMARY

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

Common Name of Property: Half Moon Wildlife Management Area

Location: Sumter County, Florida

Acreage Total: 9,554 acres

Acreage Breakdown:

Land Cover Classification	Acres	Percent of Area
Basin marsh	4.3	<0.1%
Basin swamp	529.2	5.5%
Baygall	4.1	<0.1%
Blackwater stream	169.8	1.8%
Depression marsh	1,025.90	10.7%
Dome swamp	90.7	0.9%
Floodplain forest	768.8	8.0%
Floodplain swamp	1,913.20	19.9%
Hydric hammock	567.9	5.9%
Mesic flatwoods	1,314.50	13.7%
Mesic hammock	1,443.00	15.0%
Pasture - improved	991.1	10.3%
Pasture - semi-improved	272.2	2.8%
Pine plantation	20.3	0.2%
Ruderal	7.2	0.1%
Sandhill	47.9	0.5%
Scrubby flatwoods	119	1.2%
Spring-run stream	14.3	0.1%
Wet flatwoods	116.5	1.2%
Xeric hammock	196.6	2.0%

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

Lease/Management Agreement No.: 3789 (Appendix 13.1)

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

Designated Land Use: Wildlife Management Area

Sublease (s): None

Encumbrances: Sanchez Ranch access easement, cattle grazing contract, limited mineral rights.

Type Acquisition: Conservation and Recreation Lands (CARL), Save Our Rivers (SOR)

Unique Features: Natural: Natural communities and the Withlacoochee River

Archaeological/Historical: Six documented sites.

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

Acquisition Needs/Acreage: 1,619 acres FWC Florida Forever Additions and Inholdings list.

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: _____

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	4
3	Degree of title interest held by the Board, including reservations and encumbrances such as leases.	18-2.021	6
4	The legal description and acreage of the property.	18-2.018 & 18-2.021	1, 109
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	3, 8, 67
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	48
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	68 - 70
8	Identification of adjacent land uses that conflict with the planned use of the property, if any.	18-2.021	6
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)	4
10	Proximity of property to other significant State, local or federal land or water resources.	18-2.021	7 - 10

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	46
12	A description of past and existing uses, including any unauthorized uses of the property.	18-2.018 & 18-2.021	43 - 47
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	43 - 47
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	72
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	65 – 66, 72, 301
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	72, 106

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)	45 - 47
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	107
19	Letter of compliance from the local government stating that the LMP is in compliance with the Local Government Comprehensive Plan.	BOT requirement	491
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	47, 52 - 101
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	46 - 47
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	468
23	A statement regarding incompatible use in reference to Ch. 253.034(10).	253.034(10)	4 - 5

*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	7 -10, 171

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)	171
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)	7 – 10, 171
27	Summary of comments and concerns expressed by the advisory group for parcels over 160 acres	18-2.021	
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)	7 – 10, 171
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	53, 185
30	Summary of comments and concerns expressed by the management review team, if required by Section 259.036, F.S.	18-2.021	185
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	185

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	11 – 43, 238
33	Insert FNAI based natural community maps when available.	ARC consensus	15 - 16
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	42, 11 - 43
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	11 - 43
36	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding beaches and dunes.	18-2.021	43

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	12
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	11 - 43
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	41 - 42
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	11 - 43
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)	52 - 103
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.	↓	52 - 103
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.		52 - 105
42-C.	The associated measurable objectives to achieve the goals.		72 - 85
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>		301, 305, 312, 359, 370, 424, 468
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.		103 – 105, 476
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)	11 - 43
44	Sustainable Forest Management, including implementation of prescribed fire management		
44-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).		52 - 103
44-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		64 - 65
44-C.	Measurable objectives (see requirement for #42-C).	18-2.021, 253.034(5) & 259.032(10) ↓	80
44-D.	Related activities (see requirement for #42-D).		301, 305, 312, 359, 370, 424, 468
44-E.	Budgets (see requirement for #42-E).		103 – 105, 476

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).	↓	52 - 103
45-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		52 - 103
45-C.	Measurable objectives (see requirement for #42-C).		72 - 85
45-D.	Related activities (see requirement for #42-D).		301, 305, 312, 359, 370, 424, 468
45-E.	Budgets (see requirement for #42-E).		103 – 105, 476
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)	25, 39
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	107, 486
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).	↓	61
48-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		80
48-C.	Measurable objectives (see requirement for #42-C).		80
48-D.	Related activities (see requirement for #42-D).		301, 305, 312, 359, 370, 424, 468
48-E.	Budgets (see requirement for #42-E).		103 – 105, 476

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	2
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	42 - 43
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	12 - 30

52	***Quantitative description of the land regarding an inventory of hydrological features and associated acreage. <i>See footnote.</i>	253.034(5)	42 – 43, 64
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).	↓	64, 79
53-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		79
53-C.	Measurable objectives (see requirement for #42-C).		79
53-D.	Related activities (see requirement for #42-D).		301, 305, 312, 359, 370, 424, 468
53-E.	Budgets (see requirement for #42-E).		103 – 105, 476

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	43, 301
55	***Quantitative data description of the land regarding an inventory of significant land, cultural or historical features and associated acreage.	253.034(5)	43, 301
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	65, 301
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).	↓	65
57-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		81
57-C.	Measurable objectives (see requirement for #42-C).		81
57-D.	Related activities (see requirement for #42-D).		301, 305, 312, 359, 370, 424, 468
57-E.	Budgets (see requirement for #42-E).		103 – 105, 476

**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)	66
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).	↓	61 – 64, 66
59-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		82
59-C.	Measurable objectives (see requirement for #42-C).		82
59-D.	Related activities (see requirement for #42-D).		301, 305, 312, 359, 370, 424, 468
59-E.	Budgets (see requirement for #42-E).		103 – 105, 476
60	*** Quantitative data description of the land regarding an inventory of recreational facilities and associated acreage.	253.034(5)	66
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).	↓	61
61-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		77
61-C.	Measurable objectives (see requirement for #42-C).		77
61-D.	Related activities (see requirement for #42-D).		301, 305, 312, 359, 370, 424, 468
61-E.	Budgets (see requirement for #42-E).		103 – 105, 476

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	iii
63	Place the Executive Summary at the front of the LMP. Include a physical description of the land.	ARC and 253.034(5)	ii
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	48
65	Key management activities necessary to achieve the desired outcomes regarding other appropriate resource management.	259.032(10)	52 - 103

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)	103 – 105, 476
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)	103 – 105, 476
68	A statement of gross income generated, net income and expenses.	18-2.018	46, 103 – 105, 476

*** = 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

Located in Sumter County, Florida, Half Moon Wildlife Management Area (HMWMA) is a 9,554 acre composite of wetlands, hammocks, flatwoods, and improved pasture. The Withlacoochee River borders the area to the west and the privately-owned Ventura Ranch borders HMWMA on the east. Mill Creek and Gum Slough, scenic spring-fed tributaries of the Withlacoochee River, traverse the area. The HMWMA's scrubby flatwoods are home to a small population of threatened Florida scrub-jays. The HMWMA's array of wetlands contributes significantly to floral, faunal, and habitat diversity. Portions of HMWMA are recharge areas for the Floridan aquifer, the source of most of Florida's drinking water. Here, limestone formations of the Upper Floridan aquifer are visible at the land surface. Excellent opportunities exist for a variety of recreational activities, including hunting, fishing, horseback riding, wildlife viewing, biking, and hiking.

1.1 Management Plan Purpose

This Management Plan serves as the basic statement of policy and direction for the management of HMWMA. It provides information including the past usage, conservation acquisition history, and descriptions of the natural and cultural resources found on HMWMA. 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 HMWMA management for the next ten years.

This Management Plan for the HMWMA is submitted for review to the Acquisition and Restoration Council (ARC) on behalf of the Board of Trustees of the Internal Improvement Trust Fund (Board of Trustees) of the State of Florida, through the Florida Department of Environmental Protection's (DEP) Division of State Lands (DSL), in compliance with paragraph seven of Lease No. 3789 (Appendix 13.1) and pursuant to Chapters 253 and 259, Florida Statutes (FS), and Chapters 18-2 and 18-4, Florida Administrative Code (FAC). Format and content were drafted in accordance with ARC requirements for management plans and the model plan outline provided by the staff of DSL. Terms 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's Biennial Land Management Operational Report.

1.1.1 FWC Planning Philosophy

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. FWC engages stakeholders by convening a Management Advisory Group and solicits additional input from user groups and the general public at a public hearing (Appendix 13.2). 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 HMWMA Management Plan (Sections 5 – 8).

Further management planning input is received through Land Management Reviews (LMR) conducted every five years, which includes a review of the previous Management Plan, as well as a field review of HMWMA. The LMR report (Section 5.1, Appendix 13.3) 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 HMWMA.

Furthermore, 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; Section 4), thereby ensuring agency accountability through time. Also, in an effort to remain adaptive for the duration of this Management Plan, continuous input and feedback will be collected from FWC staff, stakeholders, user groups, and other interested parties and individuals. As needed, amendments to this Management Plan will be presented to DSL and ARC for review and consideration.

1.2 Location

HMWMA is located in northwest Sumter County, Florida. The HMWMA property boundary comprises multiple sections in Townships 18 and 19 South, in Ranges 20 and 21 East (Figure 1). The entrance to HMWMA is located at the north end of CR 247, off State Road 44 between Inverness and Wildwood. It is approximately 7 miles west of I-75 and the Florida Turnpike, and 25 miles south of Ocala. HMWMA is located approximately 6 miles east of Hernando and 10 miles northwest of Lake Panasoffkee. Other cities near HMWMA include Oxford (11 miles east), Wildwood (11 miles east), Belleview (12 miles North East), Inverness (8 miles west), and Floral City (9 miles southwest). HMWMA is neither within any Area of Critical State Concern (Chapter 380.05 FS), nor within or adjacent to an aquatic preserve (Chapter 18-2.018 and 18-2.021 FAC).

The Withlacoochee River borders the area to the west and Ventura Ranch borders HMWMA on the east. Mill Creek and Gum Slough, scenic spring-fed tributaries of the Withlacoochee River, traverse the area. Areas north of HMWMA are privately owned land, primarily ranch land and some agricultural land. The Southwest Florida Water Management District (SWFWMD) monitors or directly manages conservation areas that adjoin portions of HMWMA.

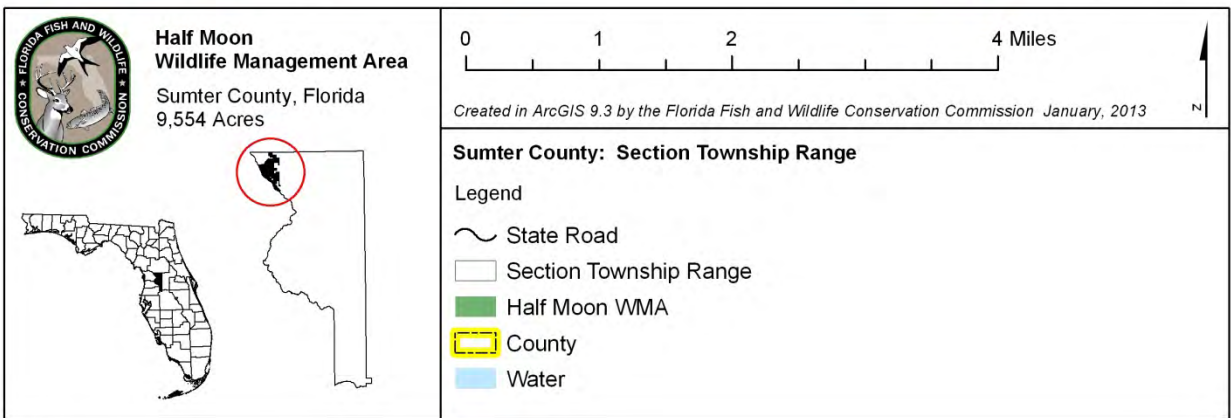
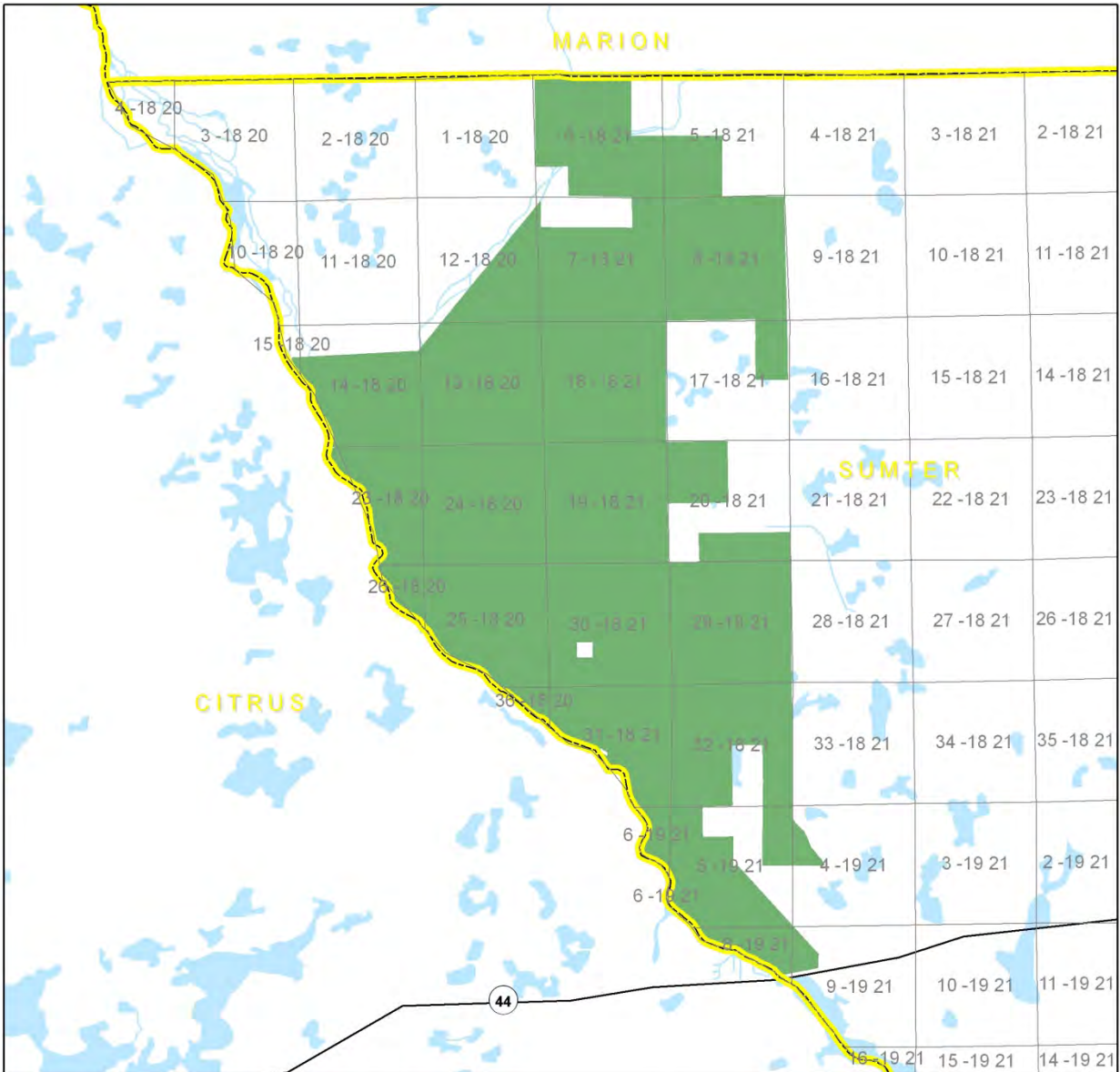


Figure 1. Sumter County – Section, Township, and Range

1.3 Acquisition

1.3.1 Purchase

The Carlton Half Moon Ranch project qualified for purchase by the State under the "other lands" criteria of the Conservation and Recreation Lands (CARL) program. On August 15, 1989, the State of Florida acquired Half Moon Ranch from W. Albert and Barbara C. Carlton.

The original 4,458 acre tract, now commonly referred to as HMWMA, was the largest single acquisition of the 11,500-acre Carlton Half Moon Ranch CARL project. An additional 878 acres (Seven Springs / Smith Tract) were purchased in 1992, followed by the Potter property (122 acres) acquired in 1996; both were purchased under the CARL Program. In 2008 the SWFWMD purchased the Phebus tract (35 acres). Currently, the entire HMWMA encompasses 9,554 acres, which includes 4,021 acres leased from the SWFWMD which was purchased under the Save Our Rivers (SOR) Program.

1.3.2 Purpose for Acquisition

The Carlton Half Moon Ranch CARL Program Acquisition Project was approved for acquisition under the following listed purposes established under Chapter 259.03(2) Florida Statutes:

1. For use and protection as natural flood plain, marsh, or estuary, if the protection and conservation of such lands is necessary to enhance or protect water quality or quantity or to protect fish or wildlife habitat which cannot otherwise be accomplished through local and state regulatory programs;
2. For use as state parks, recreation areas, public beaches, state forests, wilderness areas, or wildlife management areas;
3. For restoration of altered ecosystems to correct environmental damage that has already occurred; or
4. For preservation of significant archaeological or historical sites.

Specifically, the primary objectives of the purchase were to preserve the water quality of the Withlacoochee River, Gum Slough, and their proximal tributaries; and to establish a wildlife management area. FWC has been directed 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.”

The lands within HMWMA acquired by the SWFWMD under SOR lands must be managed and used as stated below:

Chapter 373.59(3) Florida Statutes - Lands acquired "shall be managed and maintained in an environmentally acceptable manner and, to the extent practicable, in such a way as to restore and protect their natural state and condition."

Chapter 373.59(10) Florida Statutes - Lands acquired "shall be used for general public recreational purposes. General public recreational purposes shall include, but not be limited to, fishing, hunting, horseback riding, swimming, camping, hiking, canoeing, boating, diving, birding, sailing, jogging and other related outdoor activities to the maximum extent possible considering the environmental sensitivity and suitability of those lands."

FWC's land management purpose expressed through goals and objectives of the HMWMA Management Plan are consistent with the acquisition purpose and management goals set forth under the CARL Program, SOR Program and its successor programs, as well as the Preservation 2000 Act and the Florida Forever Act which establishes the purposes for the management of Florida's state-owned public conservation lands. The purpose, goals and objectives for all of the lands acquired and managed as HMWMA are more comprehensively expressed in the HMWMA Management Plan that is reviewed and approved by the Acquisition and Restoration Council (ARC), the land acquisition and management advisory council to the Board of Trustees.

1.4 Management Authority

The FWC is the designated lead managing agency for HMWMA under the authority granted by Lease Number 3789 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 and of the FS. These constitutional provisions and laws provide FWC the authority to protect, conserve, and manage the State's fish and wildlife resources.

Also, in December 2007, FWC entered into a Management Agreement (Appendix 13.1) with the SWFWMD allowing FWC to have lead management authority and responsibility for SWFWMD-titled lands within the established HMWMA.

1.5 Management Directives

The 50-year Board of Trustees' Lease Agreement Number 3789 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."

1.6 Title Interest and Encumbrances

HMWMA is owned the State of Florida; title to the property is held by the Board of Trustees and the SWFWMD. As noted above, the current established acreage of HMWMA is 9,554 acres, with the Board of Trustees being the titleholder for 5,533 acres of land included within HMWMA and the SWFWMD holding title to 4,021 acres.

On December 18, 1989, DSL as staff to the Board of Trustees, entered into a 50-year lease agreement (Lease Agreement Number 3789) with FWC, granting management authority for the Board of Trustees-titled portions of HMWMA. Similarly, the SWFWMD-titled lands are leased to FWC for lead management responsibility.

In June, 1997, FWC and DSL entered into a 50-year access easement (Easement No. 29760, Appendix 13.4) with Mr. Robert Sanchez, an adjacent landowner, granting him and his family access to the Sanchez Ranch via portions of HMWMA.

Portions of HMWMA have oil, gas, mineral and subsurface rights and interests held by M.B. Rudman and James G. Allison. A five-year cattle grazing contract (Appendix 13.4) with Tilton & Tilton LLC., is in effect until September 27, 2017.

1.7 Zoning and Future Land Use

The majority of the existing landscape within and surrounding HMWMA is currently zoned for Conservation and Agriculture. This designation provides environmental protection, conservation, storm water management and limited public use for publicly owned lands. Within Sumter County's Conservation zone, public or private use or development is prohibited except when otherwise consistent with the Sumter County Comprehensive Plan.

HMWMA is located in the northwestern corner of Sumter County and is bordered to the north by Marion County and to the west by Citrus County. The Withlacoochee River forms the southwest border of HMWMA and State Road 44 acts as a narrow southern boundary. Most of the private lands east of HMWMA form Ventura Ranch. The ranch lands are zoned Agricultural, and within Sumter County's Land Development Code, a maximum density of one dwelling unit per ten acres is permitted. The remaining land to the east of HMWMA, not included within Ventura Ranch, is also zoned Agricultural.

A residential development to the southeast forms a small portion of the HMWMA border. According to Sumter County's Land Development Code, the development is within a Low Density Rural Residential with Optional Housing zone in which residences are allowed at a density of one unit per parcel in order to provide a buffer between Agricultural lands and higher density residential uses.

As noted above, the SWFWMD holds title to, and manages two conservation areas adjacent to HMWMA. Gum Slough is located within Sumter County along the northwest border of HMWMA, while Potts Preserve is located within Citrus County and forms a portion of HMWMA mid-western border. Both of these SWFWMD conservation areas are zoned for

Conservation within their respective counties, indicating that development is severely limited.

The southwestern border of HMWMA to the west of the Withlacoochee River is zoned for Low Intensity Coastal and Lakes (CL). Within Citrus County, CL and Coastal and Lakes Residential (CLR) are designated as areas having environmental characteristics sensitive to development. A majority of this land is restricted to a maximum residential density of one dwelling unit per 40 acres; however, within certain upland areas of CL zones, Planned Unit Developments (PUDs) are permitted at a density of one dwelling unit per acre.

Large parcels of land zoned General Agriculture (A-1) comprise the northern most boundary of HMWMA. According to Marion County's Comprehensive Plan, this area is classified with the intent of preserving agriculture as the primary use and includes provisions for a maximum density of one dwelling unit per ten acres. Marion Oaks is a Development of Regional Impact (DRI) not directly contiguous to HMWMA, but approximately 4 miles northeast of the management area. The DRI is predominately zoned for Single Family Dwellings (R-1) in order to allow for medium density residential development at a maximum of four dwelling units per acre.

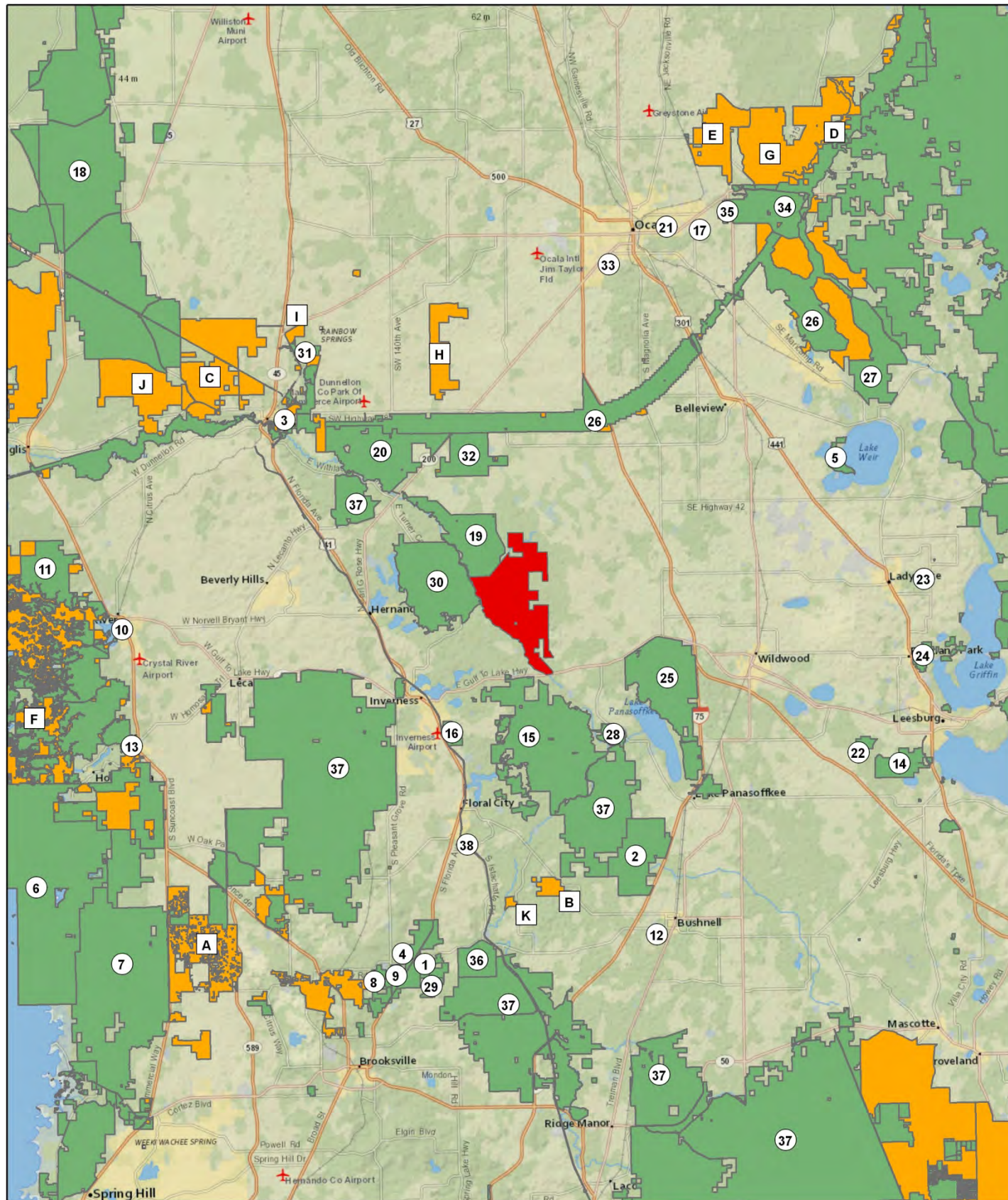
1.8 Proximity to Other Public Properties

HMWMA is in the vicinity of many publicly owned conservation areas (Figure 2, Table 1), as well as several Florida Forever projects (Table 2). As indicated above, conservation lands in immediate proximity to HMWMA include Gum Slough Conservation Easement to the north, Potts Preserve to the west and Flying Eagle Ranch to the south.

The configurations, locations, and proximities of wildlife habitats among these conservation lands are important to the conservation of the many endemic and rare species within this region of Florida. Most of the proximal conservation lands 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.

1.9 Public Involvement

The FWC conducted a Management Advisory Group (MAG) meeting in Lake Panasoffkee, Florida on June 14, 2011 to obtain input from both public and private stakeholders regarding management of HMWMA. Results of this meeting were used by FWC to develop



Conservation Lands and Florida Forever Projects within a 20-mile Radius of Half Moon WMA

- Map Symbol Conservation Land**
- 1 Ahhochee Hill Sanctuary
 - 2 Beville Ranch Conservation Easement
 - 3 Blue Run of Dunnellon Park
 - 4 Brooksville Plant Materials Center
 - 5 Carney Island Conservation and Recreation Area
 - 6 Chassahowitzka National Wildlife Refuge
 - 7 Chassahowitzka Wildlife Management Area
 - 8 Chinsegut Hill Conference Center
 - 9 Chinsegut Wildlife and Environmental Area
 - 10 Crystal River National Wildlife Refuge
 - 11 Crystal River Preserve State Park
 - 12 Dade Battlefield Historic State Park
 - 13 Ellie Schiller Homosassa Springs Wildlife State Park
 - 14 Flat Island Preserve
 - 15 Flying Eagle Ranch
 - 16 Fort Cooper State Park
 - 17 Fort King Property
 - 18 Goethe State Forest
 - 19 Gum Slough SWFWMD Conservation Easement
 - 20 Halpata Tastanaki Preserve
 - 21 Heritage Nature Conservancy
 - 22 Jack R. Welling Parcel
 - 23 Lady Lake Preserve
 - 24 Lake Griffin State Park
 - 25 Lake Panasoffkee
 - 26 Marjorie Harris Carr Cross Florida Greenway
 - 27 Ocklawaha Prairie Restoration Area
 - 28 Panasoffkee/Outlet Tract
 - 29 Perry Oldenburg Mitigation Park Wildlife and Environmental Area
 - 30 Potts Preserve
 - 31 Rainbow Springs State Park
 - 32 Ross Prairie State Forest
 - 33 Scott Spring/Celebration 2000 Community Park
 - 34 Silver River State Park
 - 35 Silver Springs Conservation Area
 - 36 Subtropical Agricultural Research Station
 - 37 Withlacoochee State Forest
 - 38 Withlacoochee State Trail
- Map Symbol Florida Forever Project**
- A Annutteliga Hammock
 - B Battle of Wahoo Swamp
 - C Bear Hammock
 - D Etoniah/Cross Florida Greenway
 - E Florida's First Magnitude Springs
 - F Florida Springs Coastal Greenway
 - G Heather Island/Ocklawaha River
 - H Longleaf Pine Ecosystem
 - I Rainbow River Corridor
 - J South Goethe
 - K Southeastern Bat Maternity Caves



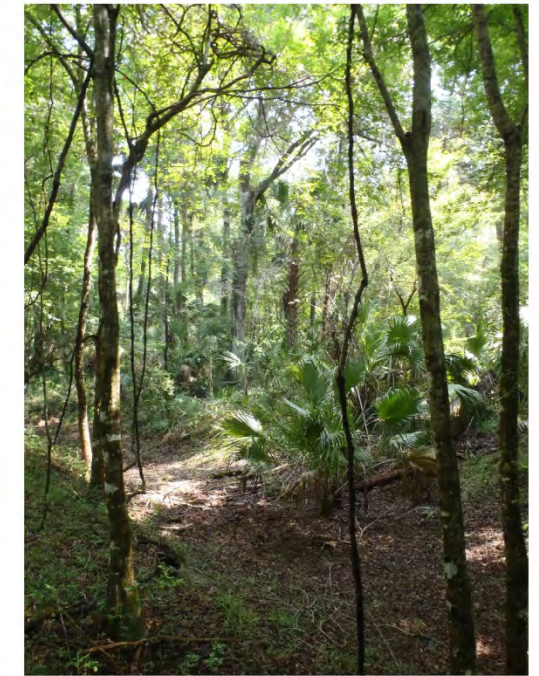
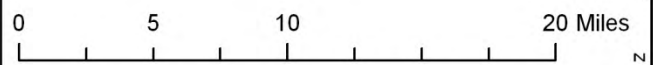
Half Moon Wildlife Management Area
Sumter County, Florida
9,554 Acres



Conservation Lands and Florida Forever Projects

Legend

- Half Moon WMA
- Conservation Land
- Florida Forever Project

Created in ArcGIS 9.3 by the Florida Fish and Wildlife Conservation Commission May, 2012

Figure 2. Conservation Lands and Florida Forever Projects

Table 1. Conservation Lands Within a 20-mile Radius of HMWMA

Conservation Lands	Manager	Acres
Ahhochee Hill Sanctuary	Florida Audubon Society, Inc.	276
Beville Ranch Conservation Easement	SWFWMD	5,511
Blue Run of Dunnellon Park	Marion County	31
Brooksville Plant Materials Center	USDA	170
Carney Island Conservation and Recreation Area	Marion County	684
Chassahowitzka National Wildlife Refuge	USFWS	36,426
Chassahowitzka Wildlife Management Area	FWC	27,521
Chinsegut Hill Conference Center	University of South Florida	115
Chinsegut Wildlife and Environmental Area	FWC	823
Crystal River National Wildlife Refuge	USFWS	137
Crystal River Preserve State Park	DEP - DRP	27,474
Dade Battlefield Historic State Park	DEP - DRP	81
Ellie Schiller Homosassa Springs Wildlife State Park	DEP - DRP	201
Flat Island Preserve	Lake County Water Authority	2,366
Flying Eagle Ranch	SWFWMD	16,441
Fort Cooper State Park	DEP - DRP	708
Fort King Property	City of Ocala	37
Goethe State Forest	FFS	53,101
Gum Slough Conservation Easement	SWFWMD	5,801
Halpata Tastanaki Preserve	SWFWMD	7,903
Heritage Nature Conservancy	City of Ocala	11
Jack R. Welling Parcel	SJRWMD	77
Lady Lake Preserve	Lake County	60
Lake Griffin State Park	DEP - DRP	621
Lake Panasoffkee	SWFWMD	10,327
Marjorie Harris Carr Cross Florida Greenway	DEP - OGT	70,812
Ocklawaha Prairie Restoration Area	SJRWMD	6,176
Panasoffkee/Outlet Tract	SWFWMD	807
Perry Oldenburg Wildlife and Environmental Area	FWC	369
Potts Preserve	SWFWMD	9,379
Rainbow Springs State Park	DEP - DRP	1,472
Ross Prairie State Forest	DEP - DRP	3,520
Scott Spring/Celebration 2000 Community Park	City of Ocala	22
Silver River State Park	DEP - DRP	4,419
Silver Springs Conservation Area	Marion County	331
Subtropical Agricultural Research Station	USDA	3,743
Withlacoochee State Forest	FFS	165,742
Withlacoochee State Trail	DEP - OGT	763

Table 1 Acronym Key:

DEP - DRP: Florida Department of Environmental Protection, Division of Recreation and Parks
DEP - OGT: Florida Department of Environmental Protection, Office of Greenways and Trails
FFS: Florida Forest Service
FWC: Florida Fish and Wildlife Conservation Commission
SJRWMD: St. Johns River Water Management District
SWFWMD: Southwest Florida Water Management District
USDA: United States Department of Agriculture
USFWS: United States Fish and Wildlife Service

Table 2. Florida Forever Projects Within a 20-mile Radius of HMWMA

Florida Forever Project	Acres
Annutteliga Hammock	24,771
Battle of Wahoo Swamp	853
Bear Hammock	4,689
Etoniah/Cross Florida Greenway	3,598
Florida Springs Coastal Greenway	61,271
Florida's First Magnitude Springs	4,936
Heather Island/Ocklawaha River	19,952
Longleaf Pine Ecosystem	12,955
Rainbow River Corridor	1,178
South Goethe	11,706
Southeastern Bat Maternity Caves	271

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 HMWMA MAG, as well as a listing of participants, was developed and consulted in drafting this Management Plan (Appendix 13.2). Also, a public hearing, as required by Chapter 259.032(10), FS, was held in Lake Panasoffkee, Florida on July 12, 2011. A report of that hearing was developed and also consulted in drafting this Management Plan (Appendix 13.2). An FWC website is also maintained for receipt of public input:

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

Further testimony and input is received at a public hearing held by ARC. Input received from all public involvement efforts has been considered in the development of this Management Plan.

2 Natural and Cultural Resources

2.1 Physiography and Topography

Straddling the north-south Tsala Apopka Plain and Western Valley physiographic provinces, the topography of HMWMA is comparatively flat. Conspicuous relief occurs only near margins of paludal depressions and crests of widely dispersed relic dunes. Land surface altitudes range from 40 to 60 feet above mean sea level and increase generally from the Tsala Apopka Plain in the west to the Western Valley in the east.

2.1.1 Climate

The Climate of Sumter County⁴ is characterized by long, warm, and relatively humid summers and mild, dry winters. In an average year, about 56 percent of the total annual precipitation falls from June through September. The other 44 percent is more or less evenly distributed throughout the rest of the year.

Most summer precipitation is from afternoon or early evening local thundershowers. From June through September, measurable rain can be expected on about 80 of the days in this period. Summer showers are sometimes heavy with 2 to 3 inches of rain falling in an hour or two. Daylong rains in summer are rare and are generally associated with a tropical cyclone. Winter and spring rains are generally associated with large-scale continental weather developments and are of longer duration. Some last for 24 hours or longer. The long duration rains are generally not as intense as the thundershowers, but occasionally release relatively large amounts of precipitation over large areas.

Extended periods of dry weather or droughts can occur in any season, but they are most common in the spring and the fall. By definition, a drought occurs when the soil does not have enough available water capacity for plants to maintain normal growth. Droughts or dry periods in April and May, although generally of shorter duration than those in the fall, tend to be intensified by higher temperatures.

During the summer months, the average day-to-day temperature is fairly uniform. Afternoon temperatures regularly reach 90 degrees Fahrenheit (F), or higher, and at night the temperatures may fall to as low as 70 degrees F.

Temperatures in winter vary considerably from day-to-day as periodic cold fronts move southward across the state. Temperatures may vary from the 70's F during midday to an early morning low in the high 30's F. Frost or freezing temperatures in colder sections of the county occur at least once every winter, and on average four times a year.

Temperatures as low as 20 degrees F are rare.

2.1.2 Geologic Conditions

The surface sediment and near surface sediment in Sumter County consist of quartz sand,

clay, peat, limestone, and dolomite⁴. These sediments range from Middle Eocene age (40 to 45 million years ago) to Holocene age (10,000 years ago to present).

2.1.3 Mineral Resources

Crushed limestone is the major mineral commodity produced in Sumter County⁴. Several companies are mining predominantly from the Late Eocene age Crystal River Formation. The quarries are located in the central part of Sumter County.

2.1.4 Soils

The Natural Resource Conservation Service (NRCS) soils maps displaying HMWMA's soil series and depth to water table are presented as Figures 3 - 4. Soils series descriptions were developed using NRCS geographic information system (GIS) data for HMWMA (Appendix 13.5).

2.2 Vegetation

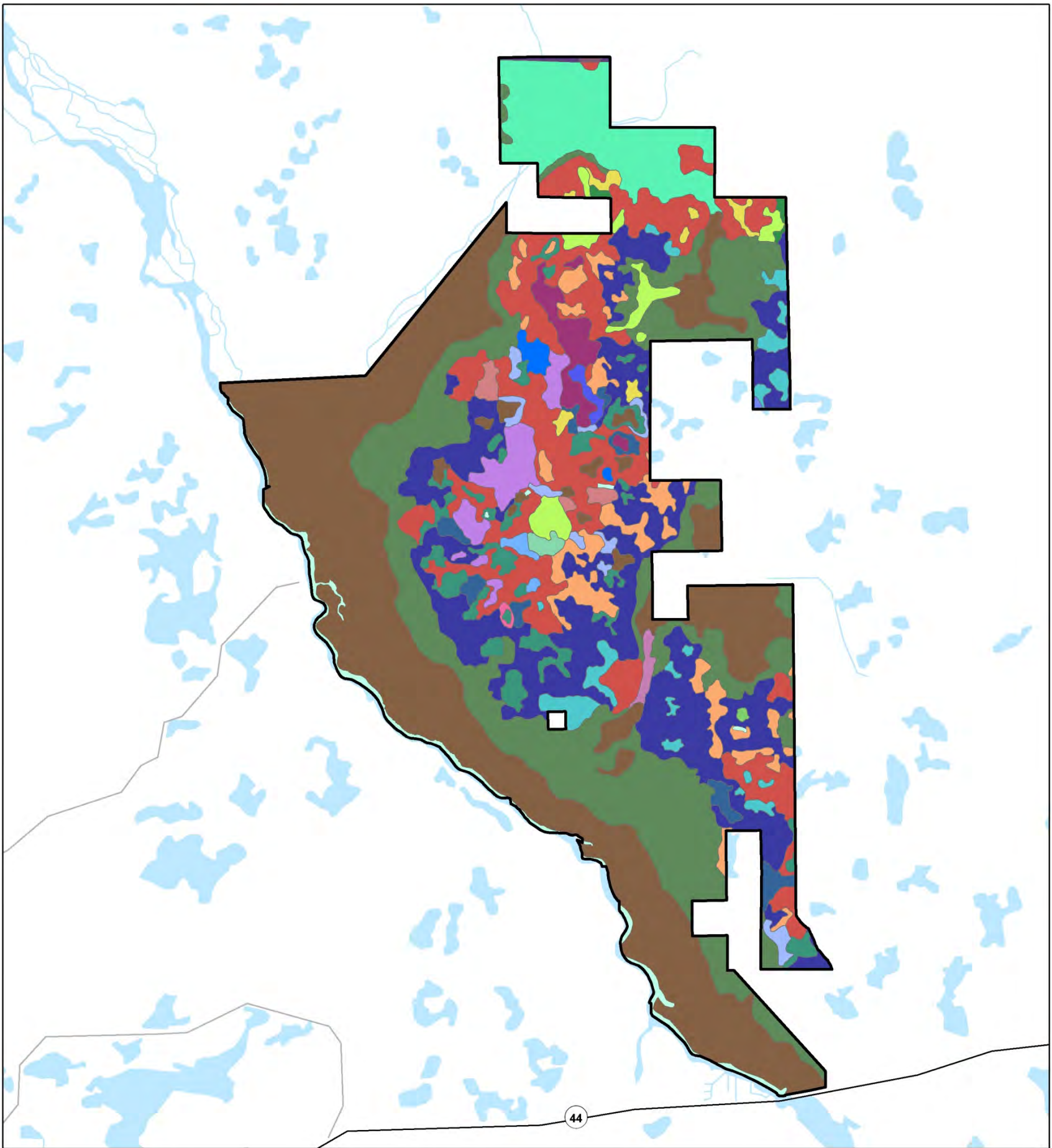
Historic and current vegetative community data for HMWMA (Figures 5 – 6, Tables 3 - 4) originated from field reviews and assessments performed by Florida Natural Areas Inventory (FNAI) in 2004. The 2004 field review encompassed the entire HMWMA with the exception of the Phebus tract (35ac) that was purchased in 2008. FNAI revised the GIS mapping of HMWMA in 2011 for the entire current configuration of HMWMA.

Natural communities represent approximately 87% of the total vegetative cover of HMWMA. The remainder of HMWMA comprises altered agricultural and ruderal vegetation. The majority of these areas of altered vegetation have a land cover of bahiagrass pasture and of pine plantation.

2.2.1 FNAI Natural and Anthropogenic Communities of HMWMA

The HMWMA is a diverse landscape with a mosaic of 16 natural and four anthropogenic communities. Floodplain swamp, floodplain forest, and hydric hammock occur in large expanses adjacent to the Withlacoochee River, Gum Slough, and Mill Creek. Extensive high quality mesic hammock occurs adjacent to these wetland communities. Other natural communities include basin marsh, basin swamp, baygall, blackwater stream, depression marsh, dome swamp, mesic flatwoods, sandhill, scrubby flatwoods, spring run stream, wet flatwoods, and xeric hammock. Wet prairie was not identified on HMWMA although it probably occurred here prior to development as a cattle ranch. Elsewhere in central Florida, wet prairie often borders the upper edges of depression marshes and, on HMWMA, may have been the matrix community in which the depression marshes and dome swamps were embedded.

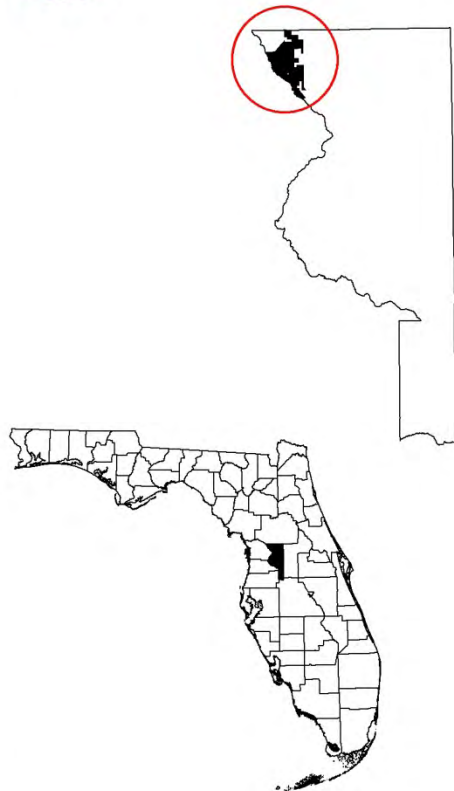
The following descriptions of the upland and wetland communities found on HMWMA were prepared by FNAI and modified by FWC.



Half Moon Wildlife Management Area
 Sumter County, Florida
 ~9,554 Acres

0 0.5 1 2 3 Miles

Created in ArcGIS 9.3 by the Florida Fish and Wildlife Conservation Commission January 2013



Soils

Legend

- State Road
- County Road
- Half Moon WMA
- Adamsville fine sand, bouldery subsurface
- Boca-Pineda, limestone substratum complex
- EauGallie fine sand, bouldery subsurface
- Electra fine sand, bouldery subsurface
- Electra sand, 0 to 5 percent slopes
- Floridana mucky fine sand, depressional
- Floridana-Basinger association, frequently flooded
- Ft. Green fine sand, bouldery subsurface
- Gator muck
- Gator muck, frequently flooded
- Holopaw sand
- Kendrick fine sand, 0 to 5 percent slopes
- Mabel fine sand, bouldery subsurface, 0 to 5 percent
- Malabar fine sand, frequently flooded
- Matlacha, limestone substratum-Urban land complex
- Millhopper sand, 0 to 5 percent slopes
- Montecocha fine sand, depressional
- Okeelanta muck
- Oldsmar fine sand, bouldery subsurface
- Paisley fine sand
- Paisley fine sand, bouldery subsurface
- Pomello fine sand, 0 to 5 percent slopes
- Pomona sand
- Seffner fine sand
- Smyrna fine sand
- Sparr fine sand, 0 to 5 percent slopes
- Sparr fine sand, bouldery subsurface, 0 to 5 percent slopes
- Sumterville fine sand, bouldery subsurface, 0 to 5 percent slopes
- Terra Ceia-Okeelanta association, very frequently flooded
- Wabasso fine sand, bouldery subsurface
- Wabasso fine sand, depressional
- Water

Figure 3. Soils of HMWMA

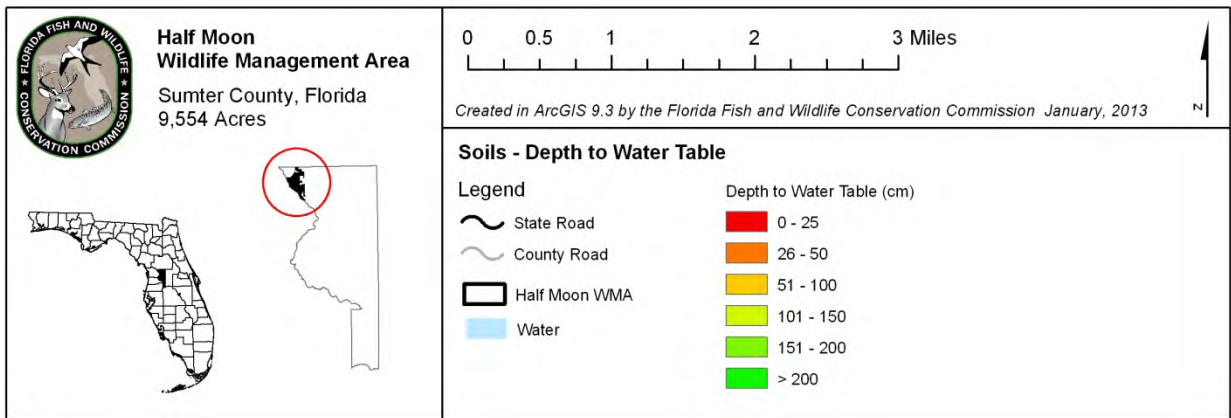
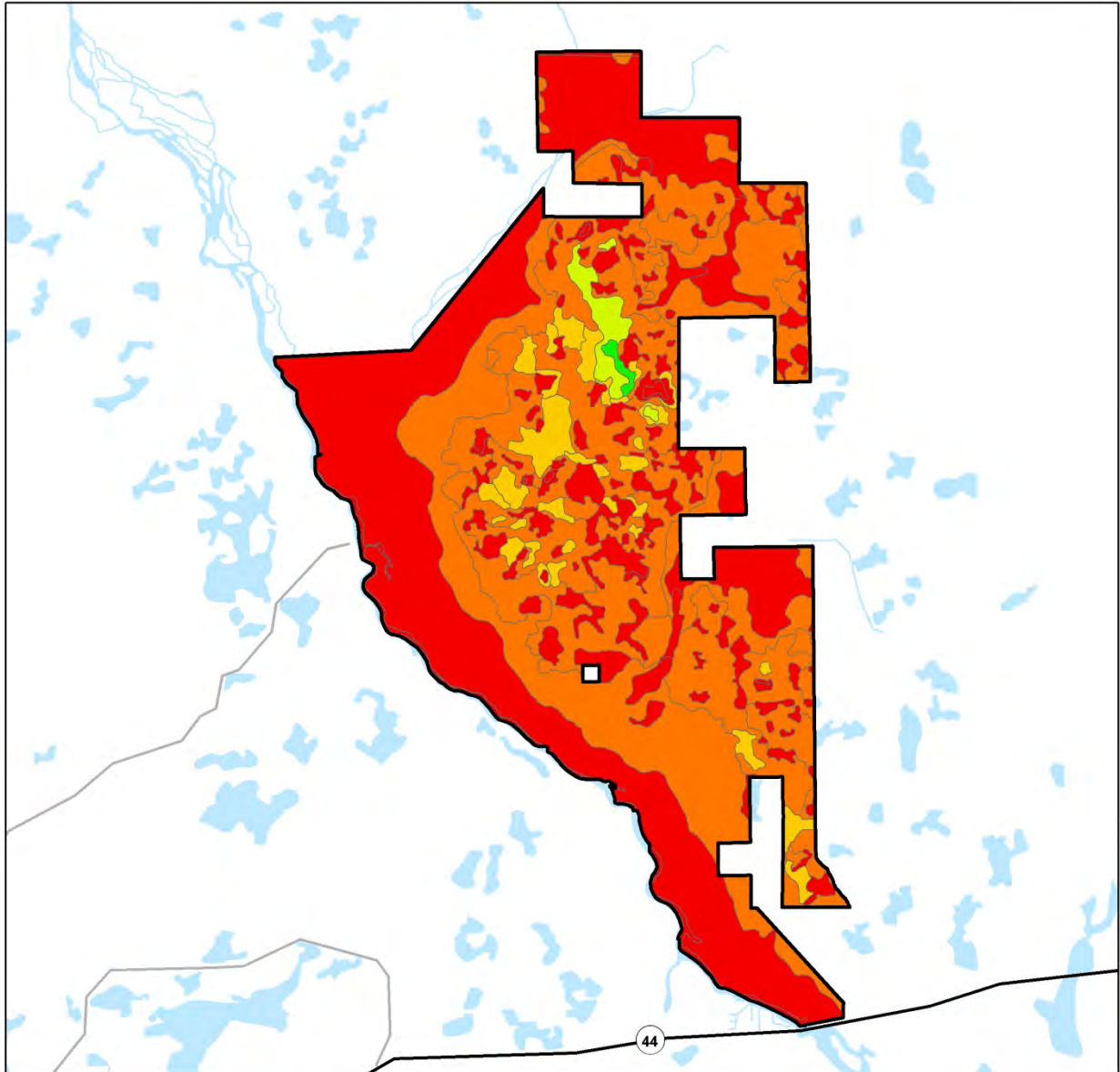


Figure 4. Soils of HMWMA - Depth to Water Table

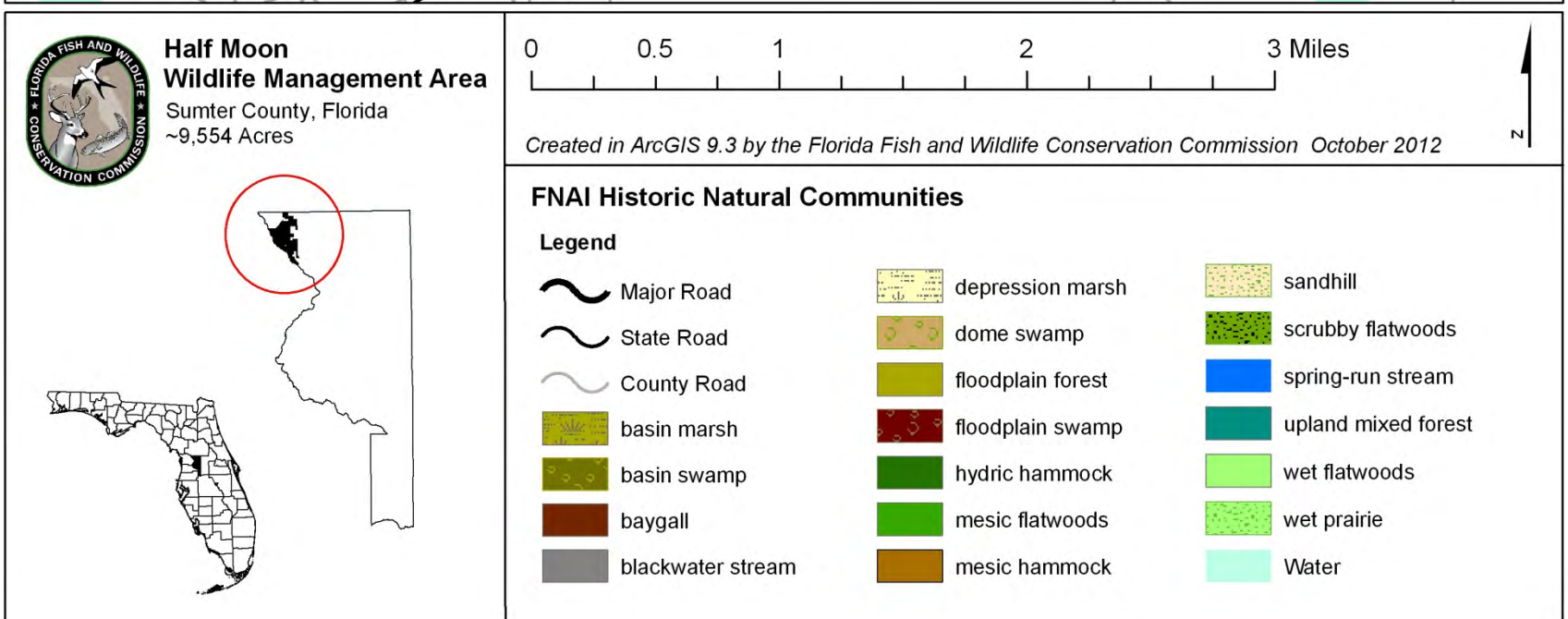
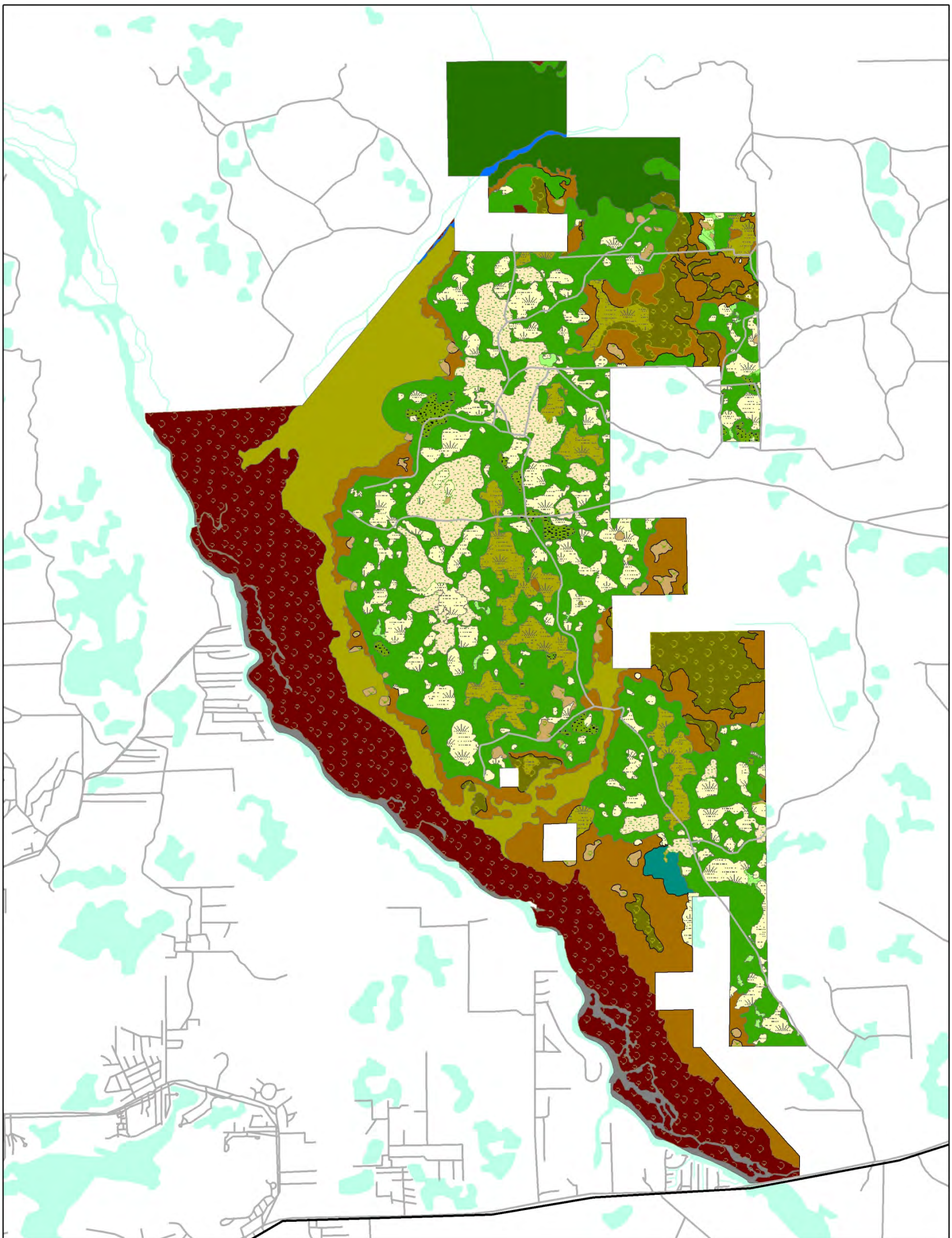


Figure 5. FNAI Historic Natural Communities

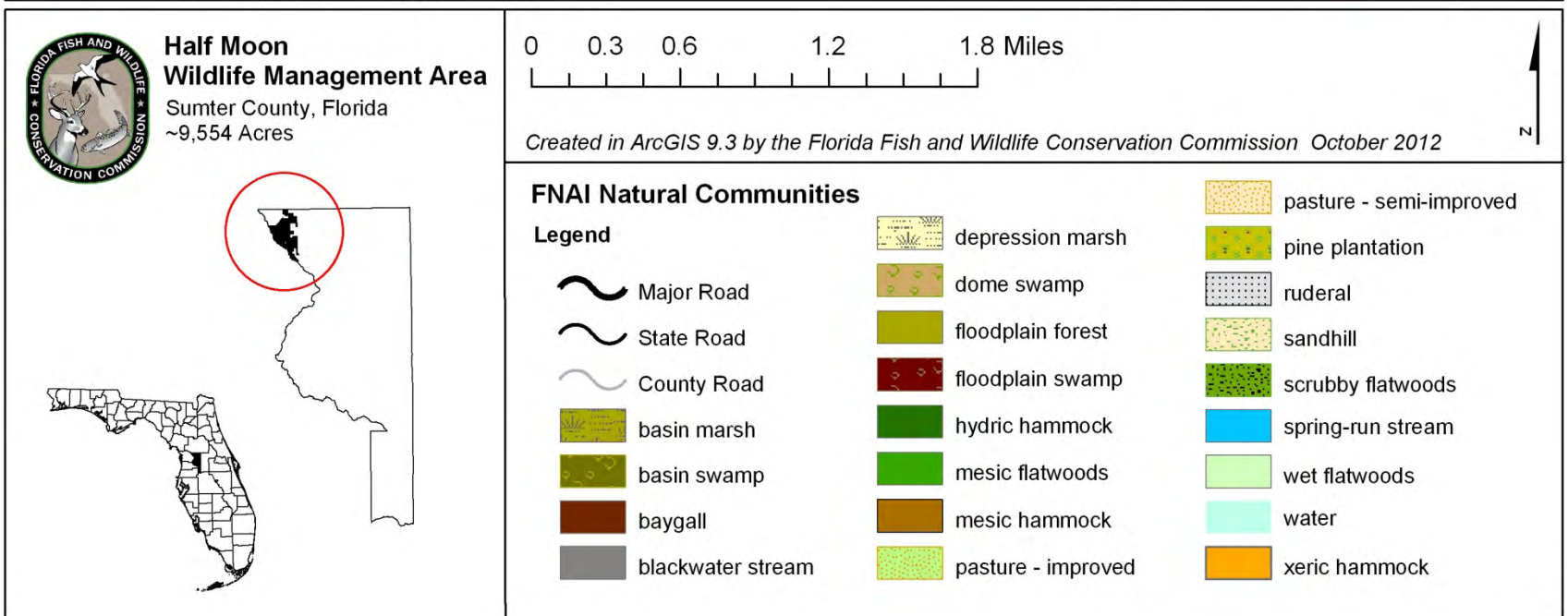
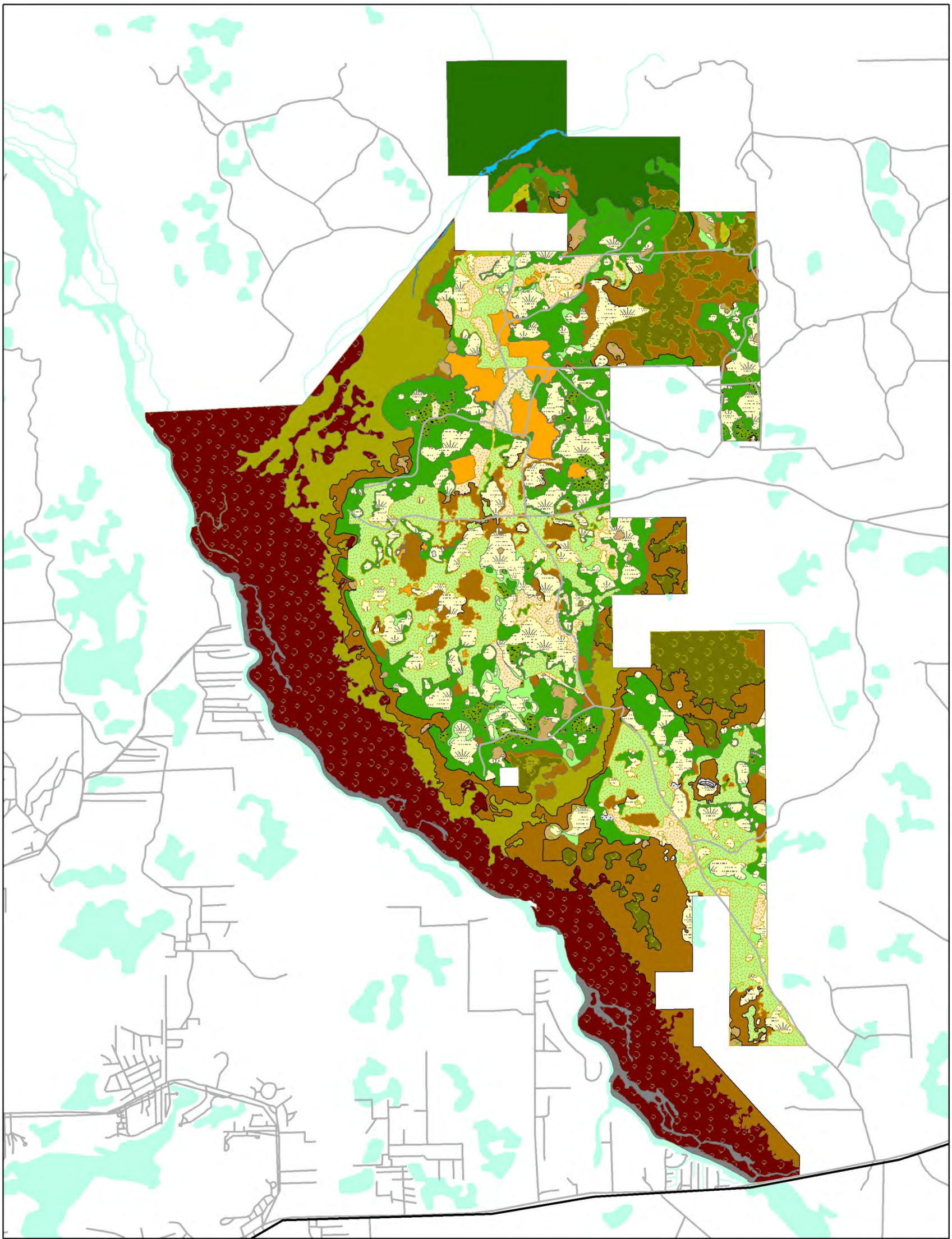


Figure 6. FNAI Natural Communities 2011

Table 3. Natural and Anthropogenic Communities of HMWMA

Community	Acres	Percent of Area
Floodplain swamp	1,913.2	19.9%
Mesic hammock	1,443.0	15.0%
Mesic flatwoods	1,314.5	13.7%
Depression marsh	1,025.9	10.7%
Pasture - improved	991.1	10.3%
Floodplain forest	768.8	8.0%
Hydric hammock	567.9	5.9%
Basin swamp	529.2	5.5%
Pasture - semi-improved	272.2	2.8%
Xeric hammock	196.6	2.0%
Blackwater stream	169.8	1.8%
Scrubby flatwoods	119.0	1.2%
Wet flatwoods	116.5	1.2%
Dome swamp	90.7	0.9%
Sandhill	47.9	0.5%
Pine plantation	20.3	0.2%
Spring-run stream	14.3	0.1%
Ruderal	7.2	0.1%
Basin marsh	4.3	<0.1%
Baygall	4.1	<0.1%

Table 4. Native Plant Species of HWWMA

Common name	Scientific name
Adam's needle	<i>Yucca filamentosa</i>
American beautyberry	<i>Callicarpa americana</i>
American elm	<i>Ulmus americana</i>
American holly	<i>Ilex opaca</i>
American hornbeam	<i>Carpinus caroliniana</i>
American spongeplant	<i>Limnobium spongia</i>
Angle pod	<i>Gonolobus suberosus</i>
Aster	<i>Aster</i> sp.
Bald cypress	<i>Taxodium distichum</i>
Baldwin's spikerush	<i>Eleocharis baldwinii</i>
Ball moss	<i>Tillandsia recurvata</i>
Bartram's airplant	<i>Tillandsia bartramii</i>

Table 4. Native Plant Species of HWWMA

Common name	Scientific name
Basswood	<i>Tilia americana</i>
Beaked panicum	<i>Panicum anceps</i>
Beaksedge	<i>Rhynchospora</i> sp.
Bedstraw	<i>Galium uniflorum</i>
Big carpetgrass	<i>Axonopus furcatus</i>
Blackroot	<i>Pterocaulon pycnostachyum</i>
Bladderwort	<i>Utricularia</i> sp.
Blaspheme vine	<i>Smilax laurifolia</i>
Bloodleaf	<i>Iresine diffusa</i>
Blue butterwort	<i>Pinguicula caerulea</i>
Blue curls	<i>Trichostema dichotomum</i>
Blue greenbrier	<i>Smilax glauca</i>
Blue huckleberry	<i>Gaylussacia frondosa</i>
Blue maidencane	<i>Amphicarpum muhlenbergianum</i>
Blue palm	<i>Sabal minor</i>
Blue waterhyssop	<i>Bacopa caroliniana</i>
Bluejack oak	<i>Quercus incana</i>
Bottlebrush threeawn	<i>Aristida spiciformis</i>
Bracken fern	<i>Pteridium aquilinum</i>
Bristly greenbrier	<i>Smilax tamnoides</i>
Broomsedge bluestem	<i>Andropogon virginicus</i>
Bushy bluestem	<i>Andropogon glomeratus</i>
Buttonbush	<i>Cephalanthus occidentalis</i>
Cabbage palm	<i>Sabal palmetto</i>
Caesarweed	<i>Urena lobata</i>
Camphorweed	<i>Heterotheca subaxillaris</i>
Cardinalflower	<i>Lobelia cardinalis</i>
Carolina elephantsfoot	<i>Elephantopus carolinianus</i>
Carolina holly	<i>Ilex ambigua</i>
Carolina indigo	<i>Indigofera caroliniana</i>
Carolina jessamine	<i>Gelsemium sempervirens</i>
Carolina laurel cherry	<i>Prunus caroliniana</i>
Carolina wild petunia	<i>Ruellia caroliniensis</i>
Carolina willow	<i>Salix caroliniana</i>
Catbrier	<i>Smilax auriculata</i>
Chalky bluestem	<i>Andropogon virginicus</i> var. <i>glaucus</i>
Chapman's oak	<i>Quercus chapmannii</i>
Cinnamon fern	<i>Osmunda cinnamomea</i>
Climbing aster	<i>Symphotrichum carolinianum</i>

Table 4. Native Plant Species of HWWMA

Common name	Scientific name
Climbing hempvine	<i>Mikania scandens</i>
Climbing hydrangea	<i>Decumaria barbara</i>
Clustered bush mint	<i>Hyptis alata</i>
Coastalplain chaffhead	<i>Carphephorus corymbosus</i>
Coastalplain honeycomb-head	<i>Balduina angustifolia</i>
Coastalplain staggerbush	<i>Lyonia fruticosa</i>
Comb polypody	<i>Pecluma ptilodon</i>
Coral greenbriar	<i>Smilax walteri</i>
Creeping primrosewillow	<i>Ludwigia repens</i>
Dahoon	<i>Ilex cassine</i>
Deerberry	<i>Vaccinium stamineum</i>
Dog fennel	<i>Eupatorium capillifolium</i>
Dropseed	<i>Sporobolus junceus</i>
Dwarf huckleberry	<i>Gaylussacia dumosa</i>
Dwarf live oak	<i>Quercus minima</i>
Dwarf pawpaw	<i>Asimina pygmaea</i>
Eastern milkpea	<i>Galactia regularis</i>
Ebony spleenwort	<i>Asplenium platyneuron</i>
Elliott's blueberry	<i>Vaccinium elliotii</i>
Elliott's milkpea	<i>Galactia elliotii</i>
Evans' reindeer lichen	<i>Cladina evansii</i>
False daisy	<i>Eclipta prostrata</i>
False nettle	<i>Boehmeria cylindrica</i>
Fetterbush	<i>Lyonia lucida</i>
Fireweed	<i>Erechtites hieraciifolius</i>
Floating hearts	<i>Nymphoides aquatica</i>
Florida Indian plantain	<i>Arnoglossum floridanum</i>
Florida scrub frostweed	<i>Helianthemum nashii</i>
Fourangle flatsedge	<i>Cyperus tetragonus</i>
Four-petal St. John's-wort	<i>Hypericum tetrapetalum</i>
Fragrant eryngo	<i>Eryngium aromaticum</i>
Free-tip star-hair fern	<i>Thelypteris tetragona</i>
Fringed nutrush	<i>Scleria ciliata</i>
Frostweed	<i>Verbesina virginica</i>
Gallberry	<i>Ilex glabra</i>
Garberia	<i>Garberia heterophylla</i>
Giant air plant	<i>Tillandsia utriculata</i>
Giant bristlegrass	<i>Setaria magna</i>
Giant orchid	<i>Pteroglossaspis ecristata</i>

Table 4. Native Plant Species of HWWMA

Common name	Scientific name
Giant sedge	<i>Carex gigantea</i>
Glade lobelia	<i>Lobelia glandulosa</i>
Golden polypody	<i>Phlebodium aureum</i>
Goldenaster	<i>Chrysopsis</i> sp.
Goldenrod	<i>Solidago fistulosa</i>
Gopher apple	<i>Licania michauxii</i>
Grassleaf / narrowleaf silkgrass	<i>Pityopsis graminifolia</i>
Grassy arrowhead	<i>Sagittaria graminea</i>
Green ash	<i>Fraxinus pennsylvanica</i>
Greeneyes	<i>Berlandiera subacaulis</i>
Greenfly orchid	<i>Epidendrum conopseum</i>
Green-white sedge	<i>Carex albolutescens</i>
Groundsel tree	<i>Baccharis halimifolia</i>
Gulf Coast spikerush	<i>Eleocharis cellulosa</i>
Hairsedge	<i>Bulbostylis ciliatifolia</i>
Hammock snakeroot	<i>Ageratina jucunda</i>
Hawkweed	<i>Hieracium megacephalon</i>
Hempvine	<i>Mikania cordifolia</i>
Highbush blueberry	<i>Vaccinium corymbosum</i>
Hophornbeam	<i>Ostrya virginiana</i>
Horned beaksedge	<i>Rhynchospora corniculata</i>
Horseweed	<i>Conyza canadensis</i>
Iris	<i>Iris hexagona</i>
Jack in the pulpit	<i>Arisaema triphyllum</i>
Kissimmeegrass	<i>Paspalidium geminatum</i>
Lanceleaf greenbriar	<i>Smilax smallii</i>
Lance-leaved arrowhead	<i>Sagittaria lancifolia</i>
Largeleaf pennywort	<i>Hydrocotyle bonariensis</i>
Laurel oak	<i>Quercus laurifolia</i>
Leafless beaked ladiestresses	<i>Sacoila lanceolata</i>
Live oak	<i>Quercus virginiana</i>
Lizard-tail	<i>Saururus cernuus</i>
Loblolly bay	<i>Gordonia lasianthus</i>
Loblolly pine	<i>Pinus taeda</i>
Longleaf pine	<i>Pinus palustris</i>
Longleaf woodoats	<i>Chasmanthium laxum</i> var. <i>sessiliflorum</i>
Lopsided Indiangrass	<i>Sorghastrum secundum</i>
Low peperomia	<i>Peperomia humilis</i>
Maidencane	<i>Panicum hemitomon</i>

Table 4. Native Plant Species of HWWMA

Common name	Scientific name
Many-flowered pennywort	<i>Hydrocotyle umbellata</i>
Marsh fern	<i>Thelypteris palustris</i>
Mermaidweed	<i>Proserpinaca pectinata</i>
Milkpea	<i>Galactia volubilis</i>
Millet beaksedge	<i>Rhynchospora miliacea</i>
Mock bishop's weed	<i>Ptilimnium capillaceum</i>
Mohr's thoroughwort	<i>Eupatorium mohrii</i>
Muscadine	<i>Vitis rotundifolia</i>
Myrtle oak	<i>Quercus myrtifolia</i>
Nnarrowfruit horned beaksedge	<i>Rhynchospora inundata</i>
Needle palm	<i>Rhapidophyllum hystrix</i>
Netted chain fern	<i>Woodwardia areolata</i>
Netted pawpaw	<i>Asimina reticulata</i>
Noseburn	<i>Tragia urens</i>
Palafox	<i>Palafoxia feayi</i>
Pale meadowbeauty	<i>Rhexia mariana</i>
Panicgrass	<i>Panicum</i> sp.
Partridge pea	<i>Chamaecrista fasciculata</i>
Partridgeberry	<i>Mitchella repens</i>
Pawpaw	<i>Asimina parviflora</i>
Persimmon	<i>Diospyros virginiana</i>
Pickernelweed	<i>Pontederia cordata</i>
Pignut hickory	<i>Carya glabra</i>
Pine barren flatsedge	<i>Cyperus retrorsus</i>
Pineland vanilla leaf	<i>Carphephorus odoratissimus</i>
Pink sundew	<i>Drosera capillaris</i>
Plume polypody	<i>Pecluma plumula</i>
Poison ivy	<i>Toxicodendron radicans</i>
Pond cypress	<i>Taxodium ascendens</i>
Pond pine	<i>Pinus serotina</i>
Post oak	<i>Quercus stellata</i>
Purple thistle	<i>Cirsium horridulum</i>
Queen's delight	<i>Stillingia sylvatica</i>
Rattan vine	<i>Berchemia scandens</i>
Red bay	<i>Persea borbonia</i>
Red cedar	<i>Juniperus virginiana</i>
Red maple	<i>Acer rubrum</i>
Red mulberry	<i>Morus rubra</i>
Redroot	<i>Lachnanthes caroliniana</i>

Table 4. Native Plant Species of HWWMA

Common name	Scientific name
Reindeer lichen	<i>Cladina subtenuis</i>
Resurrection fern	<i>Pleopeltis polypodioides</i>
Rosy camphorweed	<i>Pluchea rosea</i>
Roughleaf dogwood	<i>Cornus asperifolia</i>
Roundpod St. John's-wort	<i>Hypericum cistifolium</i>
Royal fern	<i>Osmunda regalis</i>
Runner oak	<i>Quercus pumila</i>
Rushfoil	<i>Crotonopsis linearis</i>
Salt marsh mallow	<i>Kosteletzkya virginica</i>
Sand blackberry	<i>Rubus cuneifolius</i>
Sand cordgrass	<i>Spartina bakeri</i>
Sand laurel oak	<i>Quercus hemisphaerica</i>
Sand live oak	<i>Quercus geminata</i>
Sandweed St. John's-wort	<i>Hypericum fasciculatum</i>
Sarsaparilla vine	<i>Smilax pumila</i>
Savannah panicum	<i>Phanopyrum gymnocarpon</i>
Saw greenbrier	<i>Smilax bona-nox</i>
Saw palmetto	<i>Serenoa repens</i>
Sawgrass	<i>Cladium jamaicense</i>
Sawtooth blackberry	<i>Rubus argutus</i>
Sedge	<i>Carex</i> sp.
Shiny blueberry	<i>Vaccinium myrsinites</i>
Shiny woodoats	<i>Chasmanthium nitidum</i>
Shortleaf gayfeather	<i>Liatris tenuifolia</i>
Shortleaf wild coffee	<i>Psychotria sulzneri</i>
Shortspike bluestem	<i>Andropogon brachystachyus</i>
Slash pine	<i>Pinus elliotii</i>
Slender flattop goldenrod	<i>Euthamia caroliniana</i>
Slender woodoats	<i>Chasmanthium laxum</i>
Smallflower mock buckthorn	<i>Sageretia minutiflora</i>
Snow squarestem	<i>Melanthera nivea</i>
Soapberry	<i>Sapindus saponaria</i>
Soft pipewort	<i>Eriocaulon compressum</i>
Soft rush	<i>Juncus effusus</i>
Southern dewberry	<i>Rubus trivialis</i>
Southern magnolia	<i>Magnolia grandiflora</i>
Southern rein orchid	<i>Platanthera flava</i>
Southern tubercled orchid	<i>Platanthera flava</i>
Southern umbrellasedge	<i>Fuirena scirpoidea</i>

Table 4. Native Plant Species of HWWMA

Common name	Scientific name
Southern wood fern	<i>Dryopteris ludoviciana</i>
Spadeleaf	<i>Centella asiatica</i>
Spanish moss	<i>Tillandsia usneoides</i>
Sparkleberry	<i>Vaccinium arboreum</i>
Sphagnum moss	<i>Sphagnum</i> sp.
Spotted water hemlock	<i>Cicuta maculata</i>
Sprouting spikerush	<i>Eleocharis vivipara</i>
St. Andrew's cross	<i>Hypericum hypericoides</i>
Stinging nettle	<i>Cnidoscolus stimulosus</i>
Sugarberry	<i>Celtis laevigata</i>
Sugarcane plumegrass	<i>Erianthus giganteus</i>
Summer farewell	<i>Dalea pinnata</i>
Summer grape	<i>Vitis aestivalis</i>
Swallowwort	<i>Cynanchum scoparium</i>
Swamp bay	<i>Persea palustris</i>
Swamp chestnut oak	<i>Quercus michauxii</i>
Swamp dock	<i>Rumex verticillatus</i>
Swamp dogwood	<i>Cornus foemina</i>
Swamp fern	<i>Blechnum serrulatum</i>
Swamp milkweed	<i>Asclepias perennis</i>
Swamp plume polypody	<i>Pecluma ptilodon</i> var. <i>bourgeauana</i>
Swamp smartweed	<i>Polygonum hydropiperoides</i>
Swamp tupelo	<i>Nyssa biflora</i>
Sweet bay	<i>Magnolia virginiana</i>
Sweet goldenrod	<i>Solidago odora</i>
Sweet gum	<i>Liquidambar styraciflua</i>
Sweetscent	<i>Pluchea odorata</i>
all elephant's foot	<i>Elephantopus elatus</i>
Tall gallberry	<i>Ilex coriacea</i>
Tall nutgrass	<i>Scleria triglomerata</i>
Tar-flower	<i>Bejaria racemosa</i>
Ten-angle pipewort	<i>Eriocaulon decangulare</i>
Terrestrial peperomia	<i>Peperomia humilis</i>
Thoroughwort	<i>Eupatorium compositifolium</i>
Trumpet vine	<i>Campsis radicans</i>
Turkey oak	<i>Quercus laevis</i>
Virginia buttonweed	<i>Diodia virginiana</i>
Virginia chain fern	<i>Woodwardia virginica</i>
Virginia creeper	<i>Parthenocissus quinquefolia</i>

Table 4. Native Plant Species of HWWMA

Common name	Scientific name
Virginia marsh St. John's-wort	<i>Triadenum virginicum</i>
Virginia snakeroot	<i>Aristolochia serpentaria</i>
Virginia willow	<i>Itea virginica</i>
Water hickory	<i>Carya aquatica</i>
Water horehound	<i>Lycopus rubellus</i>
Water oak	<i>Quercus nigra</i>
Wax myrtle	<i>Myrica cerifera</i>
White ash	<i>Fraxinus americana</i>
White waterlily	<i>Nymphaea odorata</i>
Whitetop aster	<i>Aster tortifolius</i>
Whorled pennywort	<i>Hydrocotyle verticillata</i>
Widespread maiden fern	<i>Thelypteris kunthii</i>
Wild buckwheat	<i>Eriogonum tomentosum</i>
Wild coffee	<i>Psychotria nervosa</i>
Wild lime	<i>Zanthoxylum fagara</i>
Wild rice	<i>Zizania aquatica</i>
Winged elm	<i>Ulmus alata</i>
Winged sumac	<i>Rhus copallinum</i>
Wiregrass	<i>Aristida stricta</i>
Witchgrass	<i>Panicum dichotomum</i>
Wood sage	<i>Teucrium canadense</i>
Woodsgrass	<i>Oplismenus hirtellus</i>
Yaupon	<i>Ilex vomitoria</i>
Yellow butterwort	<i>Pinguicula lutea</i>
Yellow hatpins	<i>Syngonanthus flavidulus</i>
Yellow-eyed grass	<i>Xyris</i> sp.

Table 5. Exotic Plant Species of HMWMA

Common name	Scientific name
Bahiagrass	<i>Paspalum notatum</i>
Caesarweed	<i>Urena lobata</i>
Camphor tree	<i>Cinnamomum camphora</i>
Chinaberry	<i>Melia azedarach</i>
Chinese tallow tree	<i>Sapium sebiferum</i>
Cogongrass	<i>Imperata cylindrica</i>
Common lespedeza	<i>Lespedeza striata</i>
Crape-myrtle	<i>Lagerstroemia indica</i>
Creeping oxeye	<i>Sphagneticola trilobata</i>
Eastern sweetshrub	<i>Calycanthus floridus</i>
Florida purslane	<i>Richardia scabra</i>
Guava	<i>Psidium guajava</i>
Hispid starburr	<i>Acanthospermum hispidum</i>
Japanese climbing fern	<i>Lygodium japonicum</i>
Limpo grass	<i>Hemarthria sp.</i>
Mexican tea	<i>Chenopodium ambrosioides</i>
Natalgrass	<i>Melinis repens</i>
Pangolagrass	<i>Digitaria decumbens</i>
Shrub-verbena	<i>Lantana camara</i>
Sicklepod	<i>Cassia obtusifolia</i>
Skunk vine	<i>Paederia foetida</i>
Smutgrass	<i>Sporobolus indicus</i>
Sour orange	<i>Citrus aurantium</i>
Spanish bayonet	<i>Yucca aloifolia</i>
Torpedo grass	<i>Panicum repens</i>
Tropical soda apple	<i>Solanum viarum</i>
Vaseygrass	<i>Paspalum urvillei</i>
Water hyacinth	<i>Eichhornia crassipes</i>
Water lettuce	<i>Pistia stratiotes</i>
White clover	<i>Trifolium repens</i>
Wild radish	<i>Raphanus raphanistrum</i>

Natural Communities

Basin marsh (4.3 acres) is a herb-dominated community usually occurring in large irregularly shaped depressions. At HMWMA, numerous examples of this community are dispersed over the entire site. Characteristic vegetation is maidencane, lance-leaved arrowhead, pickerelweed, and occasionally sawgrass. Deeper areas with open water frequently have white waterlily. Other dominant graminoids include blue maidencane, bushy bluestem, sedges, beaksedge, spikerush, sand cordgrass, big carpetgrass, and soft rush. Other herbaceous species are yellow-eyed grasses, spadeleaf, and whorled pennywort. Shrubs such as wax myrtle, buttonbush, and Carolina willow and trees like pond cypress and swamp tupelo are occasionally interspersed.

Basin swamp (529.2 acres) is a relatively large, irregularly shaped depression vegetated with trees and shrubs that can withstand an extended hydroperiod. The open to moderately dense canopy is dominated by pond cypress, red maple, swamp tupelo, laurel oak, green ash, American elm, and sweet bay. Cabbage palm may be present as trees and saplings. The shrub cover is sparse and dominated by buttonbush, fetterbush, and wax myrtle. Herbaceous cover generally includes sawgrass, maidencane, savannah panicum, sedges, beaksedge, pickerelweed, lizard-tail, Virginia chain fern, swamp fern, and pennywort. Bartram's airplant, an epiphyte, is frequently in the trees. On HMWMA basin swamp is located in the northeast corner at Gum Slough and on the east edge at the headwaters of Mill Creek. Both of these high quality swamps are similar in species composition but vary locally by the amount of pond cypress present. Old cypress stumps are evident in some locations.

Baygall (4.1 acres) is a forested wetland typically at the base of sandy slopes where water seepage maintains a saturated peat substrate. The one baygall on HMWMA is in the northwest section. The canopy has abundant young loblolly bay, a few sweetbay and slash pine, plus occasional emergent pond cypress. Red maple and dahoon are in the subcanopy. The tall shrub stratum is a thicket of fetterbush. The herbaceous groundcover includes Virginia chain fern and sphagnum moss.

Blackwater stream (169.8 acres) is a riparian feature having flowing, tannin-stained waters derived from drainage through the swamps and marshes. At HMWMA, blackwater stream is delineated in the stretch of the Withlacoochee River along the western boundary.

Depression marsh (1,025.9 acres) is a herbaceous wetland with concentric zones of vegetation found in generally circular depressions. The outer shallow zone is usually composed of bushy bluestem, blue maidencane, yellow-eyed grass, beaksedges, and yellow hatpins. An inner zone consists mainly of maidencane, with varying amounts of lance-leaved arrowhead, and pickerelweed. In some marshes, white water lily or sawgrass occupy the deeper zones.

A canopy is generally absent, but may include an occasional slash pine or swamp tupelo. The shrub layer is typically sparse, but may reach high coverage depending on fire return intervals. Buttonbush and wax myrtle are the most common shrubs. Many marshes are nearly encircled by wax myrtle. At HMWMA, numerous depression marshes range in size from approximately one-quarter to 20 acres. The marshes regularly go dry during times of drought, with water persisting only in the deepest holes. Some of the marshes are large and irregularly shaped, resulting from two or more marshes merging together. Human impacts to wetlands are apparent throughout the area. Over 2 miles of ditches were excavated to facilitate drainage of larger systems. Portions of at least 15 marshes were excavated to provide permanent water for cattle and almost all wetlands have been grazed.

Dome swamp (90.7 acres) is a forested wetland of primarily deciduous trees, often found in depressions within a flatwoods matrix. Trees in the center are generally taller than those on the edges, giving the stand a dome-shaped profile. The closed canopy consists of pond cypress, swamp tupelo, red maple, sweetgum, green ash, and sweetbay. The subcanopy usually consists of young trees of the canopy species, dahoon, and swamp bay. The shrub layer may be sparse or dense and usually consists of fetterbush and wax myrtle. The trees and shrubs often occur on hummocks with bare mucky soil between them. The herbaceous layer varies from sparse to dense and may have lizard-tail, Virginia chain fern, swamp fern, savannah panicum, sawgrass, and sedges. The branches of pond cypress often support large numbers of Bartram's airplant. Some of the dome swamps at HMWMA have few or no cypress trees. Instead, they resemble the nearby basin swamps with a mixture of hardwood species such as green ash, red maple, sweetgum, and swamp tupelo.

Floodplain forest (768.8 acres) is a forested wetland in floodplains, usually on slight elevations between the more permanently flooded swamps and the uplands. On HMWMA, floodplain forest occurs in relatively narrow strips between the floodplain swamp and higher mesic hammock. The canopy frequently has many large trees dominated by live oak and laurel oak. American hornbeam is the main subcanopy tree and abundant blue palm is the prevalent shrub. Herbaceous cover often is dominated by slender woodoats. The FNAI-tracked species, plume polypody, was observed infrequently as an epiphyte on live oak. The state-listed species, angle pod, an unusual herbaceous vine, is present. At HMWMA floodplain forest is found along the eastern edge of the Withlacoochee River floodplain at the west side of the site and along Gum Slough and Mill Creek. Almost all forested wetlands on HMWMA were logged in the early 20th century.

Floodplain swamp (1,913.2 acres) is primarily a deciduous forest occurring along rivers and larger streams and composed of trees tolerant of prolonged flooding. This forest consists of a closed canopy of tall, straight trees with little shrub or herbaceous layer present, and large areas of exposed bare mucky soil. At HMWMA, the canopy is dominated by green ash, bald cypress, swamp tupelo, and red maple. Old bald cypress stumps are regularly encountered. Less common canopy species include sweetbay, sweetgum, and laurel oak. Subcanopy trees include young trees of the canopy species, particularly green

ash and red maple, and American elm. The sparse shrub layer is characterized by buttonbush and sapling cabbage palm. Herbs are generally sparse, and may include millet beaksedge, lizard-tail and iris. Two species listed as threatened by the State were observed in Gum Slough: cardinalflower and southern rein orchid.

Hydric hammock (567.9 acres) is a forested wetland with a mixed canopy of deciduous and evergreen hardwoods occurring in the ecotone between floodplain swamp and upland communities. At HMWMA, hydric hammock is extensive along Gum Slough and sections of the Withlacoochee River floodplain. The diverse, closed canopy consists of laurel oak, sweetbay, red maple, cabbage palm, and sweetgum, plus occasional bald cypress. The subcanopy is usually dominated by cabbage palm, American hornbeam, swamp bay, dahoon, and American elm. The sparse tall shrub layer consists of sapling cabbage palms and wax myrtle. Seedling cabbage palm and blue palm often dominate the short shrub layer. Composition of the herbaceous layer is also variable, with shiny woodoats, millet beaksedge, and southern wood fern dominating. Two FNAI-tracked species, comb polypody and plume polypody, were observed in hydric hammocks on HMWMA.

Mesic flatwoods (1,314.5 acres) is an upland forest with an open pine canopy and understory composed of varying mixtures of shrubs and grasses. The HMWMA flatwoods generally have a canopy of longleaf pine and/or pond pine, a sparse to dense subcanopy of water oak, live oak, and sweetgum, and a dense shrub layer primarily of saw palmetto. Lower densities of gallberry, shiny blueberry, coastalplain staggerbush, and wax myrtle also occur in the shrub strata. The herbaceous groundcover varies from diverse to sparse depending on fire frequency. Wiry graminoids dominate, with occasional bracken fern.

Mesic hammock (1,443.0 acres) is an upland forest of evergreen broadleaved trees occurring in naturally fire-protected areas. At HMWMA, this widespread and often high quality natural community is commonly found along the perimeter of the basin and dome swamps and between mesic flatwoods and hydric hammock near the Withlacoochee River. It has a closed canopy of live oak, along with various mixtures of pignut hickory, sweetgum, sand laurel oak, laurel oak, and southern magnolia. Areas with limestone near the soil surface often have sugarberry and red cedar. Cabbage palm is typically found in all strata, often dominating the subcanopy with American hornbeam. The usually open tall shrub layer varies from one location to another but may include cabbage palm, wax myrtle, sparkleberry, and pawpaw. The short shrub stratum may have abundant to sparse saw palmetto, cabbage palm saplings, blue palm, and yaupon. The herbaceous layer may include slender woodoats, tall nutgrass, woodsgrass, and bracken fern. Areas with limestone close to the surface have an unusual variety of plant species such as free-tip star-hair fern and soapberry. Good examples of this natural community are found along Cedar Hammock Road and at the north end of Welch Road. One unique island at the north end in the Gum Slough swamp had abundant wild coffee growing as a low shrub groundcover about one foot tall. Two FNAI-tracked plant species, plume polypody fern and terrestrial

peperomia, were found in mesic hammocks on HMWMA. Angle pod, listed by the state as threatened, also occurs in this community.

Sandhill (47.9 acres) is an upland forest of scattered pines on deep well drained sands. Sandhill persists only as small, scattered remnants on low ridges at HMWMA. The canopy has scattered older mature longleaf pine over a subcanopy of bluejack oak, sand live oak, live oak, and turkey oak. The shrub layer typically consists of scattered clumps of saw palmetto and sparkleberry. The groundcover includes patches of wiregrass, gopher apple and shiny blueberry. Other herbaceous species include wild buckwheat, greeneyes, narrowleaf silkgrass, coastalplain chaffhead, Florida Indian plantain, milkpea, stinging nettle, shortleaf gayfeather, noseburn, and bluestems. The best observed example of sandhill is between Potter Bend Road and Davies Road about 0.1 miles west of Mill Creek Road.

Scrubby flatwoods (119.0 acres) is an upland community similar to mesic flatwoods in structure and species composition, but including scrub oaks. Scrubby flatwoods typically have a canopy of widely scattered longleaf pine, a subcanopy of scattered clumps of sand live oak and myrtle oak, tall shrubs of sand live oak, myrtle oak, Chapman's oak, and coastalplain staggerbush. The short shrub layer consists of the oaks mixed with saw palmetto. Ground cover is generally very sparse because of shrub density. Herbaceous species usually include wiregrass and bluestems. Scrubby flatwoods are found mixed with mesic flatwoods in the center and east side of HMWMA.

Spring-run stream (14.3 acres) is a perennial watercourse fed by springs. The Seven Springs run is located at the north end of HMWMA, and has a steady flow of clear water. Dominant species are spotted water hemlock, Kissimmeegrass, pennywort, lance-leaved arrowhead, pickerelweed, sawgrass, narrowfruit horned beaksedge, and wild rice. The state threatened species, cardinal flower, and the invasive exotic water lettuce, are abundant.

Wet flatwoods (116.5 acres) is a wetland forest with pine canopy and shrubby and/or herbaceous understory. On HMWMA, this community is characterized by a pond pine canopy over a dense shrub layer of saw palmetto, fetterbush, and gallberry with a few scattered wax myrtles. The subcanopy often consists of water oak. Herbaceous cover within the wet flatwoods is sparse to moderate and usually includes wiregrass, bluestems, blue maidencane, and cinnamon fern. Wet flatwoods are often found bordering the numerous marshes on HMWMA and grade into mesic flatwoods.

Xeric hammock (196.6 acres) is an upland forest with a canopy of scrub oaks reaching tree stature and considered to be an advanced successional stage of scrub or sandhill resulting from the long-term lack of fire. Xeric hammock is found on some of the highest ridges at HMWMA. A good example is along Mill Creek Road between Potter Bend Road and Cedar Hammock Road. Many older mature longleaf pines grow among a nearly closed canopy of sand live oak, live oak, and sand laurel oak, suggesting that this community

developed from sandhill as a result of long-term fire-suppression. Scattered clumps of saw palmetto and occasional sparkleberry dominate the shrub stratum. The groundcover is fairly sparse but does have a variety of species such as wiregrass, coastalplain chaffhead, and narrowleaf silkgrass.

Anthropogenic Communities

Improved pasture (991.1 acres) is not a natural community, but a type of agricultural alteration where most of the natural vegetation has been removed to improve cattle grazing conditions. Here the term is applied to areas with well established, bahiagrass monocultures that are maintained by cattle grazing and/or mowing and only have a few persistent native species like netted pawpaw. Loblolly pine, oak, persimmon, wax myrtle, saw palmetto and cabbage palm are colonizing the pastures. Other weedy species such as dogfennel, sand blackberry, and slender flattop goldenrod may cover a portion of the bahiagrass.

Semi-improved pasture (272.2 acres) is not a natural community, but a type of agricultural alteration where much of the natural vegetation was removed to improve cattle grazing conditions. Here the term is applied to areas with established bahiagrass that are overgrown to a high percentage by woody species such as live oak, wax myrtle, and pines. As a result, the remaining bahiagrass is not as vigorous as in areas without woody cover. Pockets of native vegetation often occur as patches of longleaf pine and saw palmetto. Semi-improved pasture areas often show affinity to their respective historic natural community. Species typical of mesic flatwoods, scrubby flatwoods, mesic hammock, and sandhill are present in greater abundance in semi-improved pasture than in improved pasture. The potential for restoration is higher in semi-improved pasture through the use of appropriate management strategies such as fire. However, the oak, grapevine, blackberry and wax myrtle that have colonized these areas will require intensive control because they do not carry fire well.

Pine plantation (20.3 acres) originally occurred on 60 acres of slash pine plantation at HMWMA. Forty acres have been restored to mesic flatwoods through two thinnings (1999 and 2010), burning, and plantings of wiregrass and longleaf pine. The remaining unthinned plantations are 2 isolated polygons of 5 and 9 acres. The slash pines were planted about 1970 and have a basal area of about 120 sq. ft. per acre. The understory resembles that of the mesic flatwoods described above.

Ruderal (7.2 acres): not a natural community, but is a term applied to altered areas where the vegetation has been disturbed to such a degree that the original natural community is no longer functioning. Examples include canal bank, roadside, cattle pond, and spoil pile.

2.2.2 Forest Resources

Forest resources include the limited pine plantations described above, and natural pine stands found within the sandhill, scrubby flatwoods, mesic flatwoods, and wet flatwoods

communities. Forested wetland communities include the dome swamp, floodplain forest, floodplain swamp, and hydric hammock communities.

2.3 Fish and Wildlife Resources

2.3.1 Occurrences

Geographic information system data maintained by FWC (Wildlife Observations) and FNAI (Element Occurrences) indicate that HMWMA has numerous documented occurrences of wildlife and a diverse assemblage of animal species (Figure 7, Tables 6 - 9).

2.3.2 Integrated Wildlife Habitat Ranking System

The FWC has developed a 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 on 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 HMWMA has a moderately high mean wildlife value of 6.9 (Figure 8).

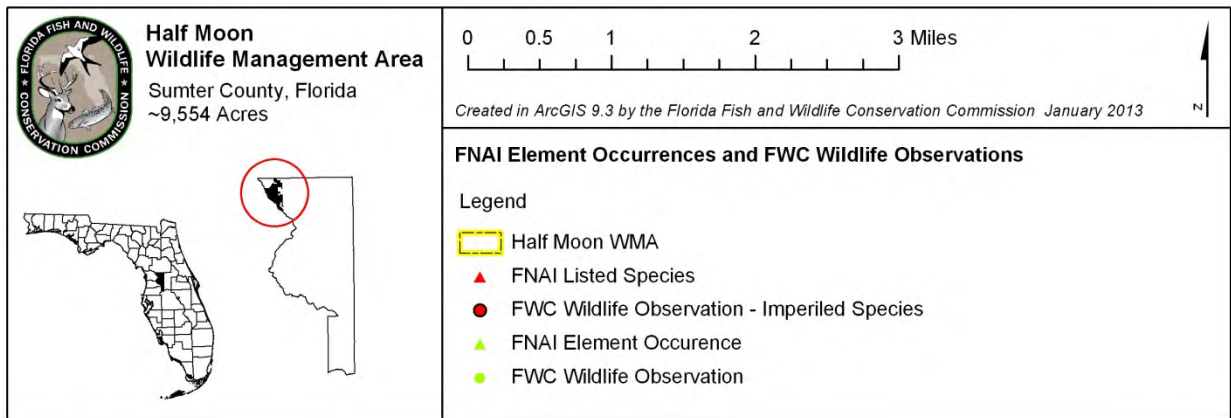
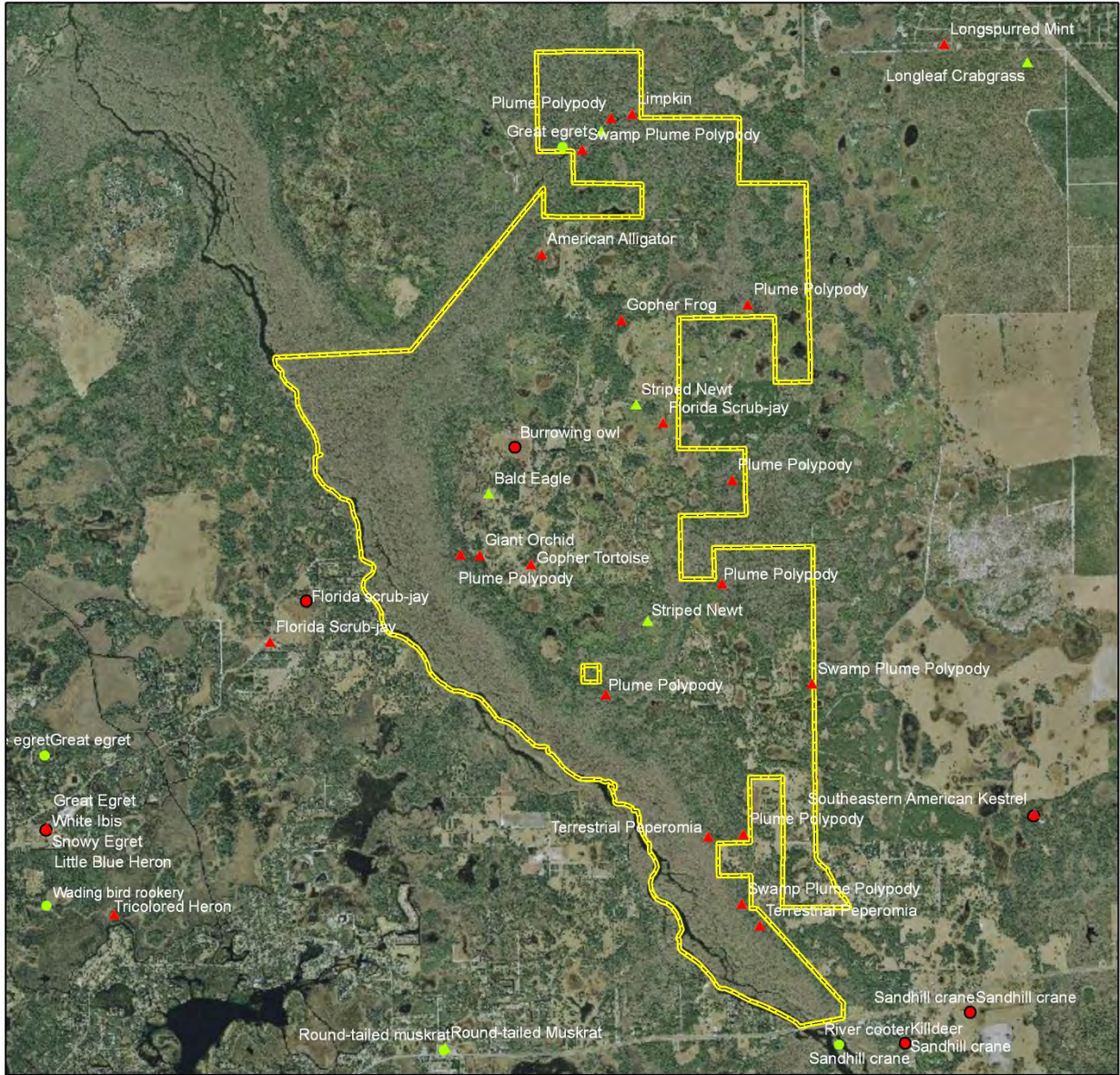


Figure 7. FNAI Element Occurrences and FWC Wildlife Observations - Aerial Image 2011

Table 6. Avian Species of HMWMA

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>Spinus tristis</i>
American robin	<i>Turdus migratorius</i>
American woodcock	<i>Scolopax minor</i>
Anhinga	<i>Anhinga anhinga</i>
Bachman's sparrow	<i>Aimophila aestivalis</i>
Bald eagle	<i>Haliaeetus leucocephalus</i>
Barn owl	<i>Tyto alba</i>
Barn swallow	<i>Hirundo rustica</i>
Barred owl	<i>Strix varia</i>
Belted kingfisher	<i>Ceryle alcyon</i>
Black vulture	<i>Coragyps atratus</i>
Black-and-white warbler	<i>Mniotilta varia</i>
Blue grosbeak	<i>Guiraca caerulea</i>
Blue jay	<i>Cyanocitta cristata</i>
Blue-gray gnatcatcher	<i>Polioptila caerulea</i>
Blue-headed vireo	<i>Vireo solitarius</i>
Blue-winged teal	<i>Anas discors</i>
Boat-tailed grackle	<i>Quiscalus major</i>
Brown thrasher	<i>Toxostoma rufum</i>
Brown-headed cowbird	<i>Molothrus ater</i>
Brown-headed nuthatch	<i>Sitta pusilla</i>
Burrowing owl	<i>Athene cunicularia</i>
Carolina chickadee	<i>Parus carolinensis</i>
Carolina wren	<i>Thryothorus ludovicianus</i>
Cattle egret	<i>Bubulcus ibis</i>
Cedar waxwing	<i>Bombycilla cedrorum</i>
Chimney swift	<i>Chaetura pelagica</i>
Chipping sparrow	<i>Spizella passerina</i>
Chuck-will's-widow	<i>Caprimulgus carolinensis</i>
Common grackle	<i>Quiscalus quiscula</i>
Common ground dove	<i>Columbina passerina</i>
Common moorhen	<i>Gallinula chloropus</i>
Common nighthawk	<i>Chordeiles minor</i>
Common snipe	<i>Gallinago gallinago</i>
Common yellowthroat	<i>Geothlypis trichas</i>
Cooper's Hawk	<i>Accipiter cooperii</i>

Table 6. Avian Species of HMWMA

Common name	Scientific name
Double-crested comorant	<i>Phalacrocorax auritus</i>
Downy woodpecker	<i>Picoides pubescens</i>
Eastern bluebird	<i>Sialia sialis</i>
Eastern kingbird	<i>Tyrannus tyrannus</i>
Eastern meadowlark	<i>Sturnella magna</i>
Eastern phoebe	<i>Sayornis phoebe</i>
Eastern screech owl	<i>Otus asio</i>
European starling	<i>Sturnus vulgaris</i>
Fish crow	<i>Corvus ossifragus</i>
Florida sandhill crane	<i>Grus canadensis pratensis</i>
Florida scrub-jay	<i>Aphelocoma coerulescens</i>
Glossy Ibis	<i>Plegadis falcinellus</i>
Gray catbird	<i>Dumetella carolinensis</i>
Gray-cheeked thrush	<i>Catharus minimus</i>
Great blue heron	<i>Ardea herodias</i>
Great crested flycatcher	<i>Myiarchus crinitus</i>
Great egret	<i>Casmerodius albus</i>
Great horned owl	<i>Bubo virginianus</i>
Green heron	<i>Butorides virescens</i>
Hairy woodpecker	<i>Picoides villosus</i>
Hermit thrush	<i>Catharus guttatus</i>
Hooded merganser	<i>Lophodytes cucullatus</i>
Hooded warbler	<i>Setophaga citrina</i>
House wren	<i>Troglodytes aedon</i>
Indigo bunting	<i>Passerina cyanea</i>
Killdeer	<i>Charadrius vociferus</i>
Least bittern	<i>Ixobrychus exilis</i>
Limpkin	<i>Aramus guarauna</i>
Little blue heron	<i>Egretta caerulea</i>
Loggerhead shrike	<i>Lanius ludovicianus</i>
Louisiana waterthrush	<i>Seiurus motacilla</i>
Mottled duck	<i>Anas fulvigula</i>
Mourning dove	<i>Zenaida macroura</i>
Northern bobwhite	<i>Colinus virginianus</i>
Northern cardinal	<i>Cardinalis cardinalis</i>
Northern flicker	<i>Colaptes auratus</i>
Northern harrier	<i>Circus cyaneus</i>
Northern mockingbird	<i>Mimus polyglottos</i>
Northern parula	<i>Setophaga americana</i>

Table 6. Avian Species of HMWMA

Common name	Scientific name
Osprey	<i>Pandion haliaetus</i>
Palm warbler	<i>Setophaga palmarum</i>
Pied-billed grebe	<i>Podilymbus podiceps</i>
Pileated woodpecker	<i>Dryocopus pileatus</i>
Pine warbler	<i>Setophaga pinus</i>
Prairie warbler	<i>Setophaga discolor</i>
Prothonotary warbler	<i>Protonotaria citrea</i>
Purple martin	<i>Progne subis</i>
Red-bellied woodpecker	<i>Melanerpes carolinus</i>
Red-eyed vireo	<i>Vireo olivaceus</i>
Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>
Red-shouldered hawk	<i>Buteo lineatus</i>
Red-tailed hawk	<i>Buteo jamaicensis</i>
Red-winged blackbird	<i>Agelaius phoeniceus</i>
Rock dove	<i>Columba livia</i>
Ruby-crowned kinglet	<i>Regulus calendula</i>
Ruby-throated hummingbird	<i>Archilochus colubris</i>
Rufous-sided towhee	<i>Pipilo erythrophthalmus</i>
Sandhill crane	<i>Grus canadensis</i>
Scarlet tanager	<i>Piranga olivacea</i>
Sharp-shinned hawk	<i>Accipiter striatus</i>
Short-tailed hawk	<i>Buteo brachyurus</i>
Snowy egret	<i>Egretta thula</i>
Sora	<i>Porzana carolina</i>
Southeastern American kestrel	<i>Falco sparverius paulus</i>
Spotted sandpiper	<i>Actitis macularius</i>
Summer tanager	<i>Piranga rubra</i>
Swallow-tailed kite	<i>Elanoides forficatus</i>
Swamp sparrow	<i>Melospiza georgiana</i>
Tree swallow	<i>Tachycineta bicolor</i>
Tufted titmouse	<i>Parus bicolor</i>
Turkey vulture	<i>Cathartes aura</i>
Veery	<i>Catharus fuscescens</i>
Vermillion flycatcher	<i>Pyrocephalus rubinus</i>
Whip-poor-will	<i>Caprimulgus vociferus</i>
White ibis	<i>Eudocimus albus</i>
White-eyed vireo	<i>Vireo griseus</i>
Wild turkey	<i>Meleagris gallopavo</i>
Wilson's Snipe	<i>Gallinago delicata</i>

Table 6. Avian Species of HMWMA

Common name	Scientific name
Wood duck	<i>Aix sponsa</i>
Wood stork	<i>Mycteria americana</i>
Wood thrush	<i>Hylocichla mustelina</i>
Yellow warbler	<i>Setophaga petechia</i>
Yellow-bellied sapsucker	<i>Sphyrapicus varius</i>
Yellow-billed cuckoo	<i>Coccyzus americanus</i>
Yellow-rumped warbler	<i>Setophaga coronata</i>
Yellow-throated vireo	<i>Vireo flavifrons</i>
Yellow-throated warbler	<i>Setophaga dominica</i>

Table 7. Mammalian Species of HMWMA

Common name	Scientific name
Bobcat	<i>Lynx rufus</i>
Brazilian freetail bat	<i>Tadarida brasiliensis</i>
Cotton mouse	<i>Peromyscus gossypinus</i>
Coyote	<i>Canis latrans</i>
Eastern cottontail	<i>Sylvilagus floridanus</i>
Eastern mole	<i>Scalopus aquaticus</i>
Eastern spotted skunk	<i>Spilogale putorius</i>
Eastern woodrat	<i>Neotoma floridana</i>
Feral hog	<i>Sus scrofa</i>
Florida black bear	<i>Ursus americanus</i>
Florida mouse	<i>Peromyscus floridanus</i>
Golden mouse	<i>Ochrotomys nuttalli</i>
Gray squirrel	<i>Sciurus carolinensis</i>
Hispid cotton rat	<i>Sigmodon hispidus</i>
Marsh rabbit	<i>Sylvilagus palustris</i>
Nine-banded armadillo	<i>Dasypus novemcinctus</i>
Old field mouse	<i>Peromyscus polionotus</i>
Opossum	<i>Didelphis virginiana</i>
Raccoon	<i>Procyon lotor</i>
River otter	<i>Lutra canadensis</i>
Round-tailed muskrat	<i>Neofiber alleni</i>
Sherman's fox squirrel	<i>Sciurus niger shermani</i>
Southeastern pocket gopher	<i>Geomys pinetis</i>

Table 7. Mammalian Species of HMWMA

Common name	Scientific name
Southern flying squirrel	<i>Glaucomys volans</i>
Southern short-tailed shrew	<i>Blarina carolinensis</i>
White-tailed deer	<i>Odocoileus virginianus</i>

Table 8. Amphibian Species of HMWMA

Common name	Scientific name
Barking treefrog	<i>Hyla gratiosa</i>
Bullfrog	<i>Rana catesbeiana</i>
Cope's gray treefrog	<i>Hyla chrysoscelis</i>
Dwarf siren	<i>Pseudobranchius striatus</i>
Eastern narrowmouth toad	<i>Gastrophryne carolinensis</i>
Eastern newt	<i>Notophthalmus viridescens</i>
Eastern spadefoot toad	<i>Scaphiopus holbrookii</i>
Gopher frog	<i>Rana capito</i>
Greater siren	<i>Siren lacertina</i>
Green treefrog	<i>Hyla cinerea</i>
Greenhouse frog	<i>Eleutherodactylus planirostris</i>
Lesser siren	<i>Siren intermedia</i>
Little grass frog	<i>Pseudacris ocularis</i>
Oak toad	<i>Bufo quercicus</i>
Pig frog	<i>Rana grylio</i>
Pinewoods treefrog	<i>Hyla. femoralis</i>
Slimy salamander	<i>Plethodon grobmani</i>
Southern chorus frog	<i>Pseudacris nigrita</i>
Southern cricket frog	<i>Acris gryllus</i>
Southern leopard frog	<i>Rana sphenoccephala</i>
Southern toad	<i>Bufo terrestris</i>
Spring peeper	<i>Hyla crucifer</i>
Squirrel treefrog	<i>Hyla squirella</i>
Striped newt	<i>Notophthalmus perstriatus</i>
Two-toed amphiuma	<i>Amphiuma means</i>

Table 9. Reptilian Species of HMWMA

Common name	Scientific name
American alligator	<i>Alligator mississippiensis</i>
Banded water snake	<i>Nerodia fasciata pictiventris</i>
Bluestripe garter snake	<i>Thamnophis sirtalis similis</i>
Broadhead skink	<i>Eumeces laticeps</i>
Brown anole	<i>Anolis sagrei</i>
Chicken turtle	<i>Deirochelys reticularia</i>
Corn snake	<i>Elaphe guttata</i>
Dusky pygmy rattlesnake	<i>Sistrurus miliarius barbouri</i>
Eastern coachwhip	<i>Masticophis flagellum</i>
Eastern coral snake	<i>Micrurus fulvius</i>
Eastern diamondback rattlesnake	<i>Crotalus adamanteus</i>
Eastern garter snake	<i>Thamnophis sirtalis sirtalis</i>
Eastern glass lizard	<i>Ophisaurus ventralis</i>
Eastern indigo snake	<i>Drymarchon couperi</i>
Eastern mud snake	<i>Farancia abacura abacura</i>
Eastern mud turtle	<i>Kinosternon subrubrum</i>
Eastern slender glass lizard	<i>Ophisaurus attenuatus longicaudus</i>
Florida box turtle	<i>Terrapene carolina bauri</i>
Florida brown snake	<i>Storeria dekayi victa</i>
Florida cottonmouth	<i>Agkistrodon piscivorus conanti</i>
Florida crowned snake	<i>Tantilla relicta</i>
Florida green water snake	<i>Nerodia floridana</i>
Florida redbelly snake	<i>Storeria occipitomaculata</i>
Florida redbelly turtle	<i>Pseudemys nelsoni</i>
Florida scarlet snake	<i>Cemophora coccinea</i>
Florida softshell	<i>Apalone ferox</i>
Florida worm lizard	<i>Rhineura floridana</i>
Gopher tortoise	<i>Gopherus polyphemus</i>
Green anole	<i>Anolis carolinensis</i>
Ground skink	<i>Scincella lateralis</i>
North Florida swamp snake	<i>Seminatrix pygaea</i>
Peninsula cooter	<i>Pseudemys floridana peninsularis</i>
Peninsula ribbon snake	<i>Thamnophis sauritus sackenii</i>
Rough green snake	<i>Opheodrys aestivus</i>
Scarlet kingsnake	<i>Lampropeltis triangulum elapsoides</i>
Six-lined racerunner	<i>Cnemidophorus sexlineatus</i>
Southeastern five-lined skink	<i>Eumeces inexpectatus</i>
Southern black racer	<i>Coluber constrictor priapus</i>
Southern fence lizard	<i>Sceloporus undulatus</i>
Southern ringneck snake	<i>Diadophis punctatus</i>

Table 9. Reptilian Species of HMWMA

Common name	Scientific name
Striped crayfish snake	<i>Regina alleni</i>
Striped mud turtle	<i>Kinosternon baurii</i>
Yellow rat snake	<i>Elaphe obsoleta quadrivittata</i>

Table 10. Fish Species of HMWMA

Common name	Scientific name
Bluefin killifish	<i>Lucania goodei</i>
Bluegill	<i>Lepomis macrochirus</i>
Bowfin	<i>Amia calva</i>
Brook silverside	<i>Labidesthes sicculus</i>
Brown bullhead	<i>Ictalurus nebulosus</i>
Dollar sunfish	<i>Lepomis marginatus</i>
Florida gar	<i>Lepisosteus platyrhincus</i>
Golden shiner	<i>Notemigonus crysoleucas</i>
Inland silverside	<i>Menidia beryllina</i>
Lake chubsucker	<i>Erimyzon sucetta</i>
Largemouth bass	<i>Micropterus salmoides</i>
Mosquitofish	<i>Gambusia affinis</i>
Redear sunfish	<i>Lepomis microlophus</i>
Swamp darter	<i>Etheostoma fusiforme</i>
Warmouth	<i>Lepomis gulosus</i>

Table 11. Exotic Animal Species of HMWMA

Common name	Scientific name
Brown anole	<i>Anolis sagrei</i>
Brown hoplo	<i>Hoplosternum littorale</i>
Greenhouse frog	<i>Eleutherodactylus planirostris</i>
Wild hog	<i>Sus scrofa</i>

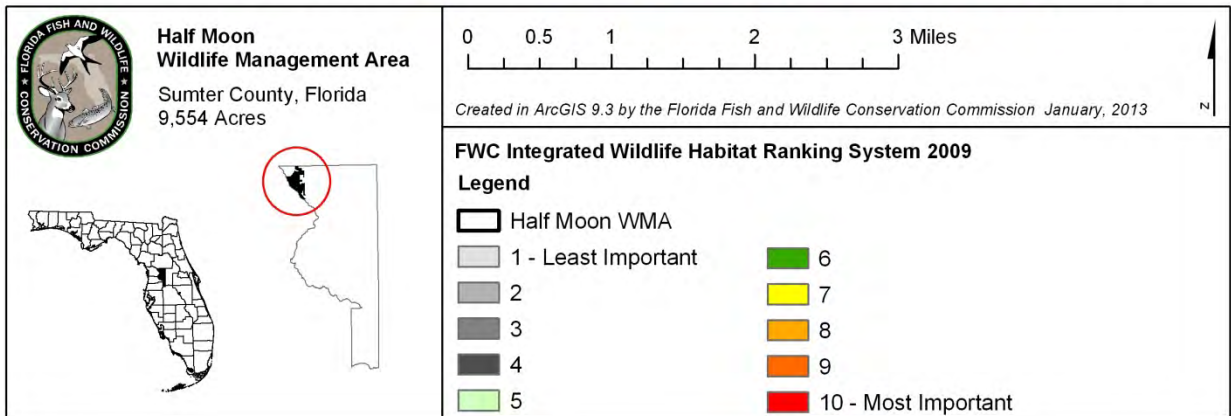
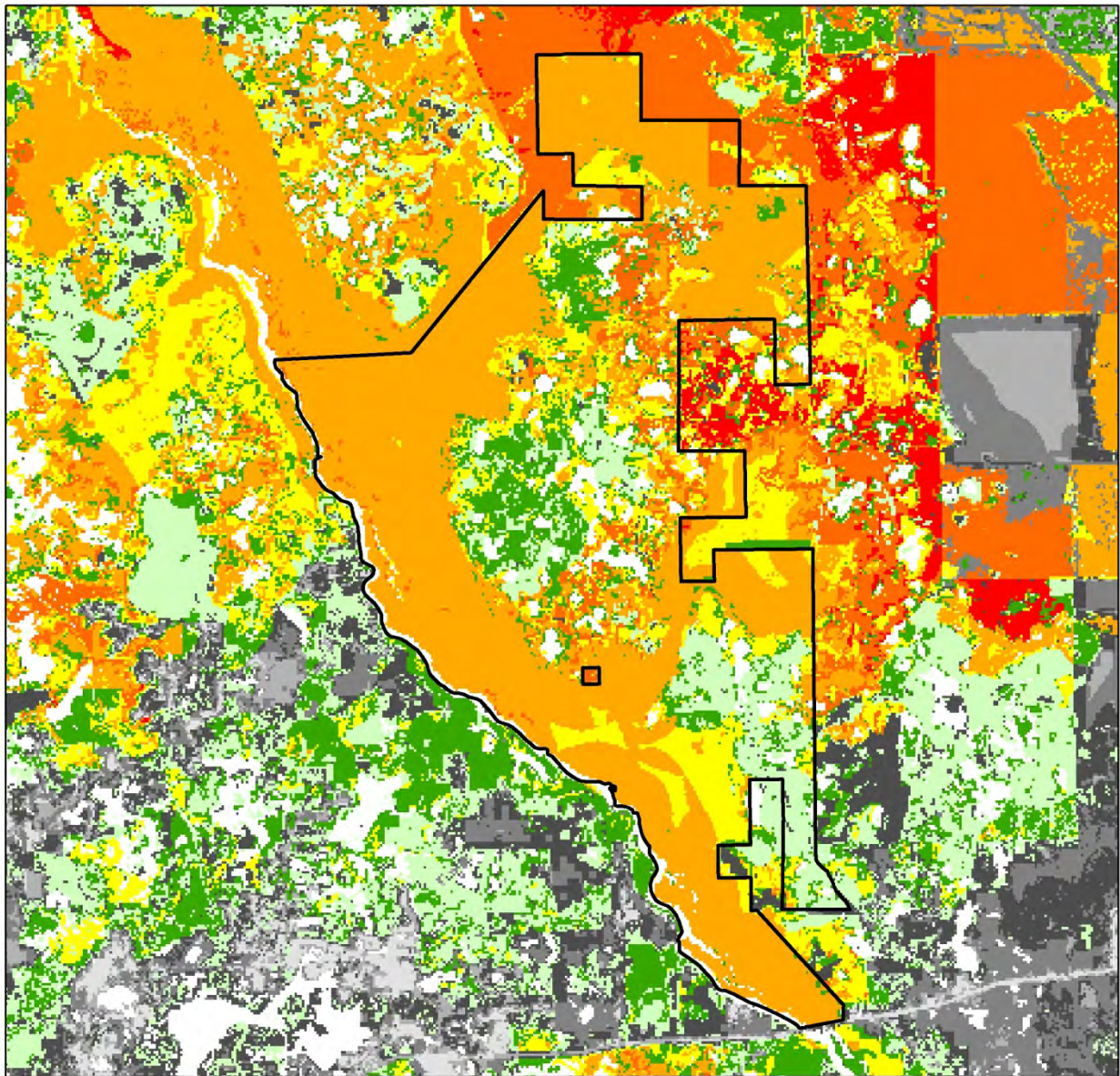


Figure 8. FWC Integrated Wildlife Habitat Ranking System 2009

2.3.3 Imperiled Species

For the purposes of this Management Plan, the term “Imperiled Species” (Table 12) refers to plant and animal species that are designated as Endangered, Threatened, or a Species of Special Concern by FWC, or that are designated as Endangered or Threatened by the U.S. Fish and Wildlife Service. This designation is also commonly known as “listed species.”

On November 8, 2010 new threatened species rules approved by the FWC went into effect. All federally listed species that occur in Florida are now 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 are now called state-designated Threatened. All previous state-designated imperiled species were grandfathered on to 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.

Table 12. Imperiled Species of HMWMA

Common name	Scientific name	Status
Birds		
Burrowing owl	<i>Athene cunicularia</i>	SSC
Florida sandhill crane	<i>Grus canadensis pratensis</i>	ST
Florida scrub-jay	<i>Aphelocoma coerulescens</i>	FT
Limpkin	<i>Aramus guarana</i>	SSC
Little blue heron	<i>Egretta caerulea</i>	SSC
Snowy egret	<i>Egretta thula</i>	SSC
Southeastern American kestrel	<i>Falco sparverius paulus</i>	ST
White ibis	<i>Eudocimus albus</i>	SSC
Wood stork	<i>Mycteria americana</i>	FE
Mammals		
Florida mouse	<i>Podomys floridanus</i>	SSC
Sherman’s fox squirrel	<i>Sciurus niger shermani</i>	SSC
Amphibians		
Gopher frog	<i>Rana capito</i>	SSC
Reptiles		
American alligator	<i>Alligator mississippiensis</i>	FT(S/A)
Eastern indigo snake	<i>Drymarchon couperi</i>	FT
Florida pine snake	<i>Pituophis melanoleucus mugitus</i>	SSC

Table 12. Imperiled Species of HMWMA

Common name	Scientific name	Status
Gopher tortoise	<i>Gopherus polyphemus</i>	ST
Plants		
Angle pod	<i>Gonolobus suberosus</i>	ST
Blueflower butterwort	<i>Pinguicula caerulea</i>	ST
Cardinal flower	<i>Lobelia cardinalis</i>	ST
Garberia	<i>Garberia heterophylla</i>	ST
Giant air plant	<i>Tillandsia utriculata</i>	SE
Giant orchid	<i>Pteroglossaspis ecristata</i>	ST
Leafless beaked ladiestresses	<i>Sacoila lanceolata</i>	ST
Low peperomia	<i>Peperomia humilis</i>	SE
Plume polypody	<i>Pecluma plumula</i>	SE
Southern tubercled orchid	<i>Platanthera flava</i>	ST
Swamp plume polypody	<i>Pecluma ptilodon</i> var. <i>bourgeauana</i>	SE
Yellow butterwort	<i>Pinguicula lutea</i>	ST

Table 12 Acronym Key: Listed by the State of Florida as Federally-designated Endangered (FE), Federally-designated Threatened (FT), Federally-designated Threatened because of similarity of appearance [(FT(S/A)], State-designated Endangered (SE), State-designated Threatened (ST), or State-designated Species of Special Concern (SSC).

2.4 Native Landscapes and Scenic Resources

Scenic resources of the native landscapes on HMWMA include nineteen identified natural communities within this central Florida landscape. Most predominant are the floodplain swamp, mesic hammock and mesic flatwoods. Other native landscapes include forested wetlands, comprising of floodplain forest, dome swamp, hydric hammock, and wet flatwoods. The Withlacoochee River borders the area to the west, and offers a scenic riverine perspective of the landscape. Complete descriptions of the natural communities found on HMWMA may be found in Section 2.2.1 of this Management Plan.

2.5 Water Resources

HMWMA lies within the Northern West-Central Florida Ground-Water Basin, a 4,500-square-mile basin delineated by the axis of the Pasco, Green Swamp, Keystone, and Bronson potentiometric highs (SWFWMD, 1987). The Floridan Aquifer is the primary aquifer system and major source of water for human consumption. Limestone of the Upper Floridan Aquifer may be seen at the surface on the area. Here, both direct discharge and/or recharge via rainfall may occur. A small net recharge to the aquifer system occurs in the vicinity of HMWMA, averaging two to ten inches per year.

HMWMA is encompassed by the Withlacoochee River surface-water drainage basin with a drainage area of approximately 1,980 square miles. Surface drainage is not evident on the area, with the exception of Mill Creek, which derives flow from aquifer discharge, direct runoff, and several man-made ditches.

In addition to Mill Creek, surface water bodies include paludal systems with widely varying hydro-periods and total area coverage. Although no significant recharge derives from these areas, these systems provide flood water conveyance, allow ground-water discharge, and generally, improve water quality.

2.6 Beaches and Dunes

There are no beaches or dunes located on HMWMA.

2.7 Cultural Resources

The Florida Department of State's Division of Historical Resources (DHR) provides FWC with data for occurrences of Florida's cultural resources. DHR lists six historic sites: four former homestead sites, one logging tramway, and one cemetery in the Florida Master Site File for HMWMA (Appendix 13.6).

The McKinney house was one of the last homesteads on the area and was settled around 1916. Open pastures, which the McKinneys cleared for raising cattle, can still be found to the northwest of the old homestead.

No prehistoric archaeological sites are recorded for the area. Although no systematic survey has been conducted on the area, the probability of site discovery is low. Despite the density of sites nearby, especially west across the Withlacoochee River, an apparent void exists east of the river in the immediate vicinity of HMWMA. The area may have been part of a cultural buffer zone and largely lacked the physiographic juxtaposition and environmental conditions preferred by aboriginal peoples. Nevertheless, small prehistoric sites may exist on the area; Master Site File recordings, assessments, and preservation strategies will be coordinated with DHR immediately upon their discovery.

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, to Florida. This began an era of broad use of the landscape for agriculture.

Rangeland cattle grazing and other agricultural practices began to be used in a more systematic way and occurred through much of the central Florida peninsula throughout most of the European settlement era from the 16th through the 20th century. Use of these agricultural practices began an era of increased alteration of the natural landscape. However, it wasn't until the 19th and 20th centuries that major settlement and more extensive alteration of the landscape in the area began with the widespread use of agriculture and associated development.

Historical accounts of early American settlement in the vicinity of HMWMA can be traced back to 1857, when the A. W. Rutland family emigrated from North Carolina and settled in what is now known as Rutland, Florida. Although not documented, the Rutlands likely secured a land grant from the federal government and moved to the area to take advantage of the abundant game and rich palmetto flats, the latter being particularly suited to agricultural purposes.

The settlement of lands included within the HMWMA boundaries increased during the late 1800's as a small town named Alto was established around 1870 near the intersection of Mill Creek and Oxford Roads. The town and its one-room schoolhouse no longer exist.

Small homesteads continued to be established on HMWMA in the early 1900s. The McKinneys settled just west of Alto around 1916. One of their houses and a horse stable were removed during the interim between acquisition and the onset of management by FWC. Lamond McKinney, now residing near Wildwood, recalls the family's primary use of the land was raising cattle. A 60-acre palmetto scrub pasture was cleared by hand to provide forage for their cattle. They also raised hogs of the guinea variety and cultivated peanuts, tobacco, and corn in small fields. Additionally, they planted and maintained a 50-acre plantation of pines for future harvest.

The McKinneys were not the only homesteaders on HMWMA in the early 1900s. Lamond McKinney stated that the Pendarvis family settled near Mill Creek on the west side of the present property. He also added that the Graham and Davies families settled within the vicinity. Their primary land-uses are believed to have been cattle grazing and cultivation of small plots of corn and other grains. It is likely they, as early as the 1880s, grew crops found elsewhere in the county such as Indian corn, sugarcane, oats, sweet potatoes, rice, chufas, peas, and long staple cotton. A map of these early homesteads and roads was developed from a personal interview with Lamond McKinney in 1991.

Legal descriptions of the small homesteads from 1840 - 1940 do not exist, but the McKinneys continued to extend their land boundaries in the area of what is now HMWMA. According to Lamond McKinney, the property was sold to Roland A. Wilson III around 1945 because the male members of the McKinney family were no longer able to participate in the family cattle business because they were obligated to war efforts. After purchasing the property, Mr. Wilson cleared much of the palmetto scrub using a roller chopping drum. His

intentions were to open up the brush for cattle and watermelon production. Many acres south of Mill Creek are now in bahia-grass pasture due to these efforts.

In 1962, the property was purchased by the Roxby and Lambert families. No land-use activities were recorded during their ownership since they only held interest in the deed for about 14 months, after which they sold the property to Rex Farrior. This transaction took place in 1963 and is believed to be the purchase that established the property boundary configuration that exists today. Cattle production was likely still the primary land use. Mr. Farrior held title to the land until 1965, when he sold the deed to Audrey and Major Bellamy. Open pastures still existed, and the Bellamy's took advantage of them for cattle production. Some of the land was reportedly used by the family for growing watermelons. The southernmost area of the current HMWMA was one such watermelon field. In addition to the above activities, a small hunt club, believed to be comprised of less than ten members, was allowed to harvest deer and hogs during the Bellamy ownership period.

The Bellamys sold the property in July of 1969 to Mr. Albert and Dr. Barbara Carlton, the owners who eventually negotiated the sale of the original acquisition for HMWMA to the State of Florida. Like owners preceding them, the Carlton's raised cattle on existing fields and converted more acres from palmetto scrub to improved pasture. The grasses most prominent in the improved pastures are bahia, pangola, and some hemarthia grass. Herd size reached as many as 600 head at times. In order to maintain the vitality of the cattle forage, the Carlton's used prescribed fire and fertilized the fields.

Other land-use activities were implemented by the Carltons as additional sources of income. Bahia-grass sod was harvested in alternating strips in some pastures to supplement the income from cattle. This sod stripping activity continued for several years, even after the Carltons had transferred their grazing rights.

Beginning in the early 1980s a hunt club leased the tract for deer hunting. A cattle lease was initiated in the last six years of the Carlton's ownership. Lease holder Greg Bingham reportedly ran about 300 head of cattle. HMWMA was grazed by Mr. Bingham until February 1990.

3.2 Current Use of the Property

Currently, HMWMA 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 HMWMA 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 HMWMA. The area also offers excellent opportunities for bird watching, especially for Florida scrub-jay 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.

3.2.1 Visitation and Economic Benefits

Due to the proximity of population centers in Sumter, Citrus, and Marion counties, public use can be expected to increase as public awareness of opportunities increases. FWC administers hunts in the fall and spring for various game species including small game, deer, turkey, and feral hogs, which account for a little more than half of the user-days.

Visitation and public use of the area for fish and wildlife based public outdoor recreational opportunities is the primary source of economic benefits from HMWMA, and contribute to the overall economy for this region of Florida. In Fiscal Year 2012-13, an estimated 2,887 people visited the HMWMA. Primarily, as a result of this visitation and use of the area, an FWC economic analysis indicates that the HMWMA generated an estimated annual economic benefit of \$564,091 for the State and the HMWMA region. This estimated annual economic benefit has aided in the creation of an estimated 5.7 jobs.

Further revenue generating potential of the HMWMA will depend upon future uses described in this Management Plan. Additional revenue from environmental lands such as the HMWMA 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. Additionally, 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.

3.3 Single- or Multiple-use Management

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

3.3.1 Analysis of Multiple-use Potential

The following actions or activities have been considered under the multiple-use concept as possible uses to be allowed on HMWMA. 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 13.7). 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>
Amateur astronomy	✓		
Apiaries		✓	
Bicycling	✓		
Cattle grazing		✓	
Citrus or other agriculture			✓
Ecosystem services and maintenance	✓		
Ecotourism		✓	
Environmental Education	✓		
Fishing		✓	
Geocaching		✓	
Hiking	✓		
Horseback riding	✓		
Hunting		✓	
Linear facilities			✓
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 for habitat improvement	✓		
Wildlife observation	✓		

3.3.2 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 with associated objectives, identified challenges and solution strategies, have been developed for HMWMA (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.

3.4 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, and review of resource and operational management needs. Also, 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 HMWMA by FWC has determined that all portions of the area are being managed and operated for the original purposes of acquisition, and remain integral to the continued conservation of important fish and wildlife resources, protection of the water quality of Gum Slough and the Withlacoochee River, and continue to provide good fish and wildlife resource-based public outdoor recreational opportunities. For these reasons, none of the lands currently located within HMWMA meet the FWC criteria for a potential surplus designation.

4 Accomplished Objectives from the HMWMA Management Plan 2001 – 2011

The following Resource Management Goals and Objectives are from the HMWMA Management Plan 2001 – 2011. Planned activities for HMWMA 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: Preserve naturally-occurring habitats, restore selected man-modified habitats, and protect natural and cultural resources.	
Objective 1. By 2001, investigate the feasibility of regulations to restrict motorized boats on Gum Slough. <i>Comment: It was determined that lands may be sovereign submerged, and navigability is ambiguous. Therefore, restricting motorized boats from Gum Slough was not feasible.</i>	100%

Resource Management Goals and Objectives	Percent Accomplished
Objective 2: By 2001, coordinate with the Department of State’s Division of Historical Resources to schedule additional cultural resource surveys for the portions of HMWMA not previously surveyed. <i>Comment: DHR determined that the likelihood of additional cultural resources is low and therefore no additional cultural resource survey was conducted.</i>	100%
Objective 3: By 2002, meet with SWFWMD to pursue management authority for sovereignty submerged lands. <i>Comment: FWC coordinated with SWFWMD, has received a lease, and currently has management responsibility for the lands titled to SWFWMD. FWC will continue to evaluate this issue.</i>	100%
Objective 4: In order to enhance or restore native wildlife habitats, by 2003 implement selective timber removal, based on recommendations from the Division of Forestry’s Forest Management Plan for HMWMA.	100%
Objective 5: Contract with FNAI for a botanical survey by 2004.	100%
Objective 6: Fill four man-made ditches by 2004.	100%
Objective 7: Complete a comprehensive bird survey by 2005.	100%
Objective 8: Continue to implement an all-season prescribed burning program for maintenance of native plant communities (ongoing).	100%
Objective 9: Continue to establish native vegetation on selected ruderal sites (ongoing).	100%
Objective 10: Accommodate research to determine the most effective methods for restoring and sustaining native plant and animal communities (ongoing).	100%
Objective 11: Continue to use chemical and mechanical means to restore plant communities and control exotic plants (ongoing).	100%

Resource Management Goals and Objectives	Percent Accomplished
Objective 12: Continue to identify, monitor, and protect cultural resources (ongoing).	100%
Goal 2: Manage plant and wildlife species composition for diversity and productivity.	
Objective 1: Update the Florida scrub-jay management plan (Appendix XIV) by 2001.	100%
Objective 2: Begin implementation of the updated Florida scrub-jay management plan by 2001.	100%
Objective 3: Monitor gopher tortoise density through systematic burrow surveys (establish transects by 2001).	100%
Objective 4: Update the prescribed burn plan by 2001.	100%
Objective 5: Continue to use prescribed fire, mechanical and chemical treatments, and cattle grazing to manage understory plant succession (ongoing).	100%
Objective 6: Manage the land to promote native plant communities (ongoing).	100%
Objective 7: In order to supplement natural nesting substrate, continue providing artificial nest cavities for species such as wood ducks, bluebirds and Southeastern American kestrels (ongoing).	100%
Objective 8: Continue to monitor the effects of cattle grazing on native plant communities (ongoing).	100%
Goal 3: Manage game wildlife species on a sustained-yield basis to provide a high quality hunting experience.	

Resource Management Goals and Objectives	Percent Accomplished
Objective 1: By 2001, evaluate the need for additional hog hunts. <i>Comment: additional hog hunts were added.</i>	100%
Objective 2: By 2001, determine the efficacy of extending the small game hunting season. <i>Comment: FWC determined that extension of small game hunting season was not optimal to maintaining a sustainable small game population.</i>	100%
Objective 3: Establish additional food plots and dove fields on select, previously disturbed sites by 2004. <i>Comment: After initially establishing pilot food plot/dove field, it was determined that this type of wildlife management was cost prohibitive and therefore not effective.</i>	90%
Objective 4: Maintain current wildlife openings (ongoing).	100%
Goal 4: Provide multiple nature-based recreational opportunities for users, while limiting adverse impacts on resources.	
Objective 1: Design, publish, and distribute a multi-purpose trail and interpretive brochure by 2002.	100%
Objective 2: Design and build a wildlife viewing structure by 2005.	100%
Objective 3: Evaluate the feasibility of increasing public access by the issuance of special day-use permits by 2005. <i>Comment: FWC continues to issue special use permits.</i>	100%
Objective 4: Continue to provide hiking, bicycling and equestrian opportunities (ongoing).	100%
Objective 5: Continue to monitor game populations of whitetail deer, bobwhite quail, and feral hog to help guide game management decisions (ongoing).	100%
Goal 5: Increase public education programs.	

Resource Management Goals and Objectives	Percent Accomplished
Objective 1: By 2001, provide four interpretive signs to educate the public regarding projects which monitor both cattle grazing and native ground cover restoration.	100%
Goal 6: Pursue acquisition of additions, inholdings, and title encumbrances.	
Objective 1: By 2001, develop a GIS shape file, acreage, and other necessary data to nominate parcels for the FWC Inholdings and Additions Program.	100%
Objective 2: By 2005, seek funding for the purchase of oil, gas, mineral, and subsurface rights and interests held by M.B. Rudman and James G. Allison. <i>Comment: FWC investigated the feasibility and determined it was not economically feasible or warranted to acquire the oil, gas, mineral, and subsurface rights.</i>	0%
Objective 3: Annually review the nomination status of prospective HMWMA acquisition(s) under the FWC inholdings and additions program (ongoing). <i>Comment: Since 2003, FWC has implemented a new process for evaluating, selecting, and approving additions to the FWC land acquisition list. Through that process, HMWMA will continue to be evaluated for potential acquisition projects.</i>	100%
Goal 7: Facilitate better management by improving the infrastructure of HMWMA.	
Objective 1: Construct an equipment storage facility by 2005.	100%

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 HMWMA is to restore and maintain natural communities in a condition that sustains ecological processes and conserves biological diversity, especially fish and wildlife resources. In conjunction with this primary emphasis, it is FWC's intent to provide good fish and wildlife resource based public outdoor recreational opportunities on HMWMA. 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

The 2010 Land Management Review of HMWMA (Appendix 13.3) found that FWC was managing the area in accordance with the purpose(s) of acquisition. The recommendations the Land Management Review were considered and addressed in the development of this Management Plan, including development of management intent language, goals and objectives, and identification of management challenges and development of solution strategies (Sections 5 - 8).

5.2 Adaptive Management

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

An adaptive management process produces the strongest inference and most reliable results when experimental design components are incorporated into the monitoring process. Adaptive management is most rigorously applied in an active format when components of experimental design (i.e., controls, replication, and randomization) are included in the monitoring process.^{2, 3} Incorporating valid statistical analyses of results will further enhance the value of the adaptive management process. However, in some situations, rigorous experimental design procedures can be relaxed without invalidating monitoring results. In a passive format,^{2, 3} adaptive management can involve applying a conservation action at a site, observing the results and adjusting the action in the future if warranted.

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. FWC will monitor conservation actions, species, habitats, and major threats to the conservation of the natural and cultural resources of HMWMA.

5.2.1 Monitoring

A well-developed monitoring protocol is also one of the principal, required criteria for the management of HMWMA. 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.⁵

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 Wildlife Conservation Prioritization and Recovery (WCPR, Section 5.4.2) program. 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 Florida Department of State's Division of Historical Resources (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 HMWMA 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 HMWMA, 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 HMWMA, 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 historic hydrological conditions and/or the use of mechanical or chemical forest management techniques as appropriate. Retention of the native old growth component of forests, while also providing for natural regeneration, remains an important consideration. HMWMA has high-quality native communities including basin marsh, basin swamp, baygall, depression marsh, dome swamp, floodplain forest, floodplain swamp, hydric hammock, mesic flatwoods, mesic hammock, sandhill, scrubby flatwoods, wet flatwoods, and xeric hammock that FWC will continue to manage and protect. On disturbed upland sites, FWC intends to continue ground cover and natural community restoration.

FNAI has conducted surveys and mapped the current vegetative communities and historic vegetation communities on HMWMA. This information will be used to guide and prioritize management and restoration efforts on the area.

** For the purposes of this Management Plan, habitat restoration and improvement is also referred to as natural community restoration and improvement.*

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 parameters are responding to FWC management. OBVM includes the delineation of management units and quantification of the desired future condition for the natural community.

The first step in implementing OBVM is to map the current and historic natural communities on the managed area using the FNAI Natural Community Classification. FWC contracts with FNAI to provide these mapping services. 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 predominate natural communities identified for management units. Desired future conditions are defined by desirable ranges for vegetation structural attributes such as canopy cover, shrub height and cover, and ground cover.

Vegetation monitoring samples the selected parameters with the results being compared to the established desired future conditions. All monitoring performed under OBVM is completed using the program's Vegetation Monitoring Standard Operating Procedures (May 2007).

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 management unit'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.

5.3.2 Prescribed Fire and Fire Management

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

Timber removal, site preparation, drainage, exotic sod grass establishment, and lack of fire have all combined to alter the plant species composition of the area resulting in a loss of fuel and inhibiting the return to a more "natural" fire management regime. Site-specific combinations of prescribed fire, mechanical and chemical vegetation control, reforestation, and restoration of natural water regimes are likely 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 HMWMA 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 creates 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. Mechanical control of brush on upland sites by roller chopping, or incidentally by logging equipment during commercial thinning operations, can reduce shading and encourage the grasses and forbs that are necessary to sustain prescribed fire.

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

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

In addition to the general prescribed fire management guidelines described above, an area-specific Prescribed Burning Plan (Appendix 13.8) has been developed and implemented for HMWMA. This plan includes, but not be limited to, delineation of burn management units, detailed descriptions of prescribed fire methodology, safety, and smoke management guidelines.

5.3.3 Habitat Restoration

Intensive ground cover restoration began in 2004 using agricultural techniques of mechanical and chemical vegetation control, cultivation (plowing), and planting of native flatwoods seed mixes. An initial 23-acre site was undertaken, followed by smaller portions of a 60-acre site on the Gum Slough tract. Maintenance through spot spraying of sod grasses and other exotics is ongoing in these areas, which remain excluded from cattle grazing.

Ongoing restoration activities will include removal of off-site species, planting of native groundcover species including wiregrass, longleaf pine reforestation, and planting of other appropriate native mid-story and canopy tree species. Upon successful restoration of these altered areas, they will be monitored and maintained.

Restoration activities will take place primarily on old pastures, pine plantations, and scrubby and mesic flatwoods. Various mechanical and chemical treatments will be used to control encroaching oak trees in old pastures. Most of the 60 acres of slash pine plantation has been restored to a more natural state by thinning in 1999 and 2009, burning and planting of wiregrass and longleaf pine. Historic sandhills and flatwoods, as determined by FNAI's 2006 classification, are being restored on a small scale in approximately ten acre units at a time. These areas became xeric and mesic hammocks through ecological succession and lack of fire. In total, from 50 to 100 acres of encroaching oak, wax myrtle and sweet gum will be treated annually. Ongoing climate conditions such as drought are

also contributing to shorter hydroperiods, which lead to woody encroachment in marshes. Prescribed fire, and in some cases mowing, will be used to control this encroachment in the many basin and depression marshes on the area.

5.3.4 Cattle Grazing

A five-year cattle grazing contract (Appendix 13.4) with Tilton & Tilton LLC., is in effect until September 27, 2017. Cattle grazing on HMWMA is used as a management tool to supplement and enhance vegetation management using prescribed fire, mechanical, and chemical treatments. Cattle grazing is primarily conducted on improved and semi-improved pasture areas, and is excluded from the floodplain forest and floodplain swamp. To preclude over-grazing, and thus the need to feed hay, which may be a source of exotic and invasive noxious weeds, cattle are stocked at no more than one-half the rate recommended by NRCS or the University of Florida's Extension Service. As established in the cattle grazing contract, stocking rates shall not exceed 72 animal grazing units on HMWMA. In addition, FWC reserves the right to reduce this rate upon 60 days written notice to the contractor if grazing is excessive for optimum wildlife management.

5.3.5 Apiaries

Currently, there are no apiaries operating on HMWMA. However, use of apiaries is conditionally approved for HMWMA, and is deemed to be consistent with purposes for acquisition, is in compliance with the Conceptual State Lands Management Plan, and is consistent with the FWC agency mission, goals, and objectives as expressed in the FWC Agency Strategic Plan and priorities document (Appendix 13.7). Location, management, and administration of apiaries on HMWMA will be guided by the FWC Apiary Policy (Appendix 13.9).

5.4 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 HMWMA. In managing for wildlife species, an emphasis will be placed on conservation, protection, and management of natural communities. Natural communities important to wildlife include basin marsh, basin swamp, baygall, depression marsh, dome swamp, floodplain forest, floodplain swamp, hydric hammock, mesic flatwoods, mesic hammock, sandhill, scubby flatwoods, wet flatwoods, and xeric hammock (see Section 2.2.1).

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 HMWMA 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, HMWMA provides resources critical to many migratory birds including waterfowl, passerines, raptors, shorebirds and others. Habitats important to migratory species will be protected, maintained or enhanced. FWC will continue to update inventories for selected species, including limpkin, Florida scrub-jay, Bachman's sparrow, Florida mouse, gopher frog, striped newt and gopher tortoise. Monitoring of wildlife species such as white-tailed deer, Northern bobwhite, and other breeding birds, will continue as an ongoing effort for the area.

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.

Management techniques for select imperiled species such as Southeastern American kestrel, Florida scrub-jay, and wetland-dependent species such as gopher frog and striped newt. Nest boxes for kestrels were installed in 1997 and again in 2010, with maintenance ongoing, but only wintering kestrels have been observed on the area. Nest boxes for wood ducks, bluebirds and warblers are also maintained.

Specific attention is focused on Florida scrub-jay habitat management (Appendix 13.10). Longer fire return intervals will be used in areas occupied by scrub-jays so that oaks of appropriate size remain a dominant feature. Mechanical control of oversized oaks is used to maintain and expand the areas of scrubby flatwoods suitable for scrub-jays. With only 500 acres of potential scrub-jay habitat on the area, management specific to their needs is emphasized.

To improve conditions for amphibians, an effort is made to burn marshes during all prescribed burns. In some cases, if wetlands are inundated during a prescribed burn, the marshes are subsequently burned separately, once they dry out later in the year. Ditch-plugging and mowing are used to restore wetlands conditions to a more natural state.

A bat house was installed in 2005 and now houses over 500 Brazilian free-tailed bats. Although a few dissolution holes form caves on HMWMA, no Southeastern bats (*Myotis austroriparius*) are known to occur.

Longleaf pine planting and cattle grazing have improved conditions for the Sherman's fox squirrel, which often occurs in old pasture areas. Trees planted from 1992-1997 are now cone-bearing. Longleaf planting in pastures was discontinued in 2005, and now occurs subsequent to ground cover restoration.

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. However, some of hunting opportunities are regulated through a limited entry hunt program to ensure the persistence of viable game species populations, as well as hunter safety and satisfaction.

5.4.2 Imperiled Species - Wildlife Conservation Prioritization and Recovery

The FWC has identified the need to: 1) demonstrate optimal wildlife habitat conservation on FWC-managed lands; 2) develop science-based performance measures to evaluate management; 3) recover imperiled species; and 4) prevent future imperilment of declining wildlife species. To help meet these needs, the FWC uses a comprehensive resource management approach to managing FWC-managed areas. Restoring the form and function of Florida's natural communities is the foundation of this management philosophy. As noted above, FWC uses OBVM to monitor how specific vegetative parameters are responding to FWC management. Similarly, FWC uses the WCPR program to ensure management is having the desired outcome for 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 combine the assessments with area-specific management considerations to develop a wildlife management strategy for the area. Each strategy contains area-specific measurable objectives for managing priority species and their habitat, prescribes management actions to achieve these objectives, and establishes monitoring protocols to verify progress towards meeting the objectives. By providing FWC managers with information on actions they should undertake, the FWC intends for the strategy to assure the presence and persistence of Florida's endangered and threatened fish and wildlife species (see http://myfwc.com/media/1515251/Threatened_Endangered_Species.pdf), as well as select focal species found on the area.

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

As identified in the WCPR Species Management Strategy (WCPR Strategy) for HMWMA (Appendix 13.11), 20 focal species are surveyed or monitored annually. They include American swallow-tailed kite, Bachman's sparrow, brown-headed nuthatch, Cooper's hawk, Florida black bear, Florida mottled duck, Florida mouse, Florida pine snake, Florida sandhill crane, Florida scrub-jay, gopher frog, gopher tortoise, limpkin, Northern bobwhite, Sherman's fox squirrel, Southeastern American kestrel, Southeastern bat, Southern bald eagle, striped newt, and wading birds (multiple species). As part of the WCPR Strategy monitoring protocols, gopher tortoise surveys are conducted every five years.

5.5 Exotic and Invasive Species Maintenance and Control

The FWC will continue efforts to control the establishment and spread of Florida Exotic Pest Plant Council (FLEPPC) Category I or II plants on HMWMA. Control technologies may include mechanical, chemical, biological, and other appropriate treatments.

Treatments using herbicides will comply with instructions found on the herbicide label and employ the Best Management Practices for their application.

Due to ongoing control and eradication efforts, only small quantities of Category I invasive plant species (Table 5) currently occur on HMWMA, and are treated annually with herbicides. With the exception of skunk vine, none comprise more than an acre of occurrence. Category II species such as Caesars weed and Chinaberry are also treated. In addition, other invasive exotic plant species such as hairy indigo (*Indigofera hirsuta*) and Mexican tea (*Chenopodium ambrosioides*), known to occur in the region, but not currently occurring on HMWMA, will be treated if they are located.

Although few exotic animal species are currently known to occur on HMWMA (Table 11), new species occurrences are possible in the future. The Withlacoochee River may serve as a source of exotic fish and invertebrates such as the island apple snail (*Pomacea insularum*) and the Asian clam (*Corbicula fluminea*). FWC will continue to monitor for new exotic species occurrences. Wild hogs will continue to be controlled by providing public hunting opportunities for this species.

5.6 Public Access and Recreational Opportunities

5.6.1 Americans with Disabilities Act

When public facilities are developed on FWC-managed areas, FWC complies with the Americans with Disabilities Act (ADA, 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 Recreational 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 HMWMA. To accomplish this, FWC worked with recreational stakeholders and the general public to develop a Recreation Master Plan for HMWMA (Appendix 13.12) that is used to further guide design and development of appropriate infrastructure that will support the recreational use of the area by the general public. The HMWMA Recreation Master Plan includes planning for parking, trail design, and area resource interpretation.

5.6.3 Public Access Carrying Capacity

Baseline carrying capacities for users on FWC-managed lands are established by conducting a site specific sensitivity analysis using available data for the site. The intent of the carrying capacity analysis is to minimize wildlife and habitat disturbance and provide the experience of being “immersed in nature” that visitors to FWC-managed areas desire. Carrying capacities are just a first step; managing recreational use requires a means of monitoring visitor impacts. Responding to these impacts may require adjusting the carrying capacities. Carrying capacities generated through this process are used as a tool to help plan and develop public access, wildlife viewing, and fish and wildlife resource based public outdoor recreation opportunities. Based on an analysis of the overall approved uses, supported public access user opportunities, and the anticipated proportional visitation levels of the various user groups, FWC has determined that HMWMA can currently support 309 visitors per day. However, a short-term objective to develop additional facilities and infrastructure to support an increase of the carrying capacity to 361 visitors per day has been proposed in Section 6.4.2 of this Management Plan. As part of the Recreation Master Plan development and implementation process, this public access carrying capacity will be periodically reevaluated, and adjustments to the public access carrying capacity may be contemplated.

5.6.4 Wildlife Viewing

The HMWMA offers a wide variety of native wildlife species, both resident and seasonally migratory, that are available for visitors' enjoyment for observation and photography. The quality and diversity of habitats found on HMWMA attract an equally diverse suite of wildlife species including waterfowl and wading bird species in the wetlands, passerine birds in the uplands, and various mammalian, reptile, and amphibian wildlife throughout HMWMA.

5.6.5 Hunting

The HMWMA currently offers limited access (quota) archery, muzzleloading gun, general gun, wild hog, and spring turkey hunting seasons. Additional seasons include small game and migratory bird. An evaluation of the hunting opportunities offered on HMWMA is performed annually.

5.6.6 Fishing

Fishing opportunities exist on HMWMA at several locations, including Gum Slough and 12 ponds, one of which has a dedicated fishing platform (Figure 9). Game species of fish commonly caught include catfish, bream, and largemouth bass.

5.6.7 Trails

Currently, there are 10.5 miles of multi-use trails on HMWMA. The FWC anticipates developing an additional 2.5 miles of trails for the Cedar Hammock Loop. The FWC will continue to periodically reevaluate the potential for trail connectivity to other conservation areas and will monitor trails for user impacts to natural communities.

5.6.7.1 Equestrian

Horseback riding continues to be a popular activity on HMWMA. The FWC will continue to work with outfitters and horse trail ride operations to provide a destination for commercial nature-based recreation.

5.6.8 Camping

Currently, camping is prohibited on HMWMA. However, the FWC will explore partnerships to provide camping opportunities on surrounding conservation or private property for the purpose of connecting campers to paddling opportunities at Gum Slough.

5.6.9 Geocaching

Geocaching, also known as Geographic Positioning System (GPS) Stash Hunt or GeoStash, is a contemporary combination of orienteering and scavenger hunting using a GPS receiver unit. Geocache websites routinely promote good stewardship. However, the potential exists for resource damage, user conflicts, or safety issues caused by inappropriately placed caches and/or links that do not provide adequate information about the area. It is the policy of the FWC to allow placement of geocaches only in those locations that do not present the potential for resource damage, user conflicts, or threats to the safety of the activity

participants. The placement of geocaches on FWC-managed lands is governed by specific guidelines. These guidelines may be found on the following FWC website:

http://myfwc.com/media/1074886/FWC_Geocache_Guidelines.pdf.

5.6.10 Amateur Astronomy

Many of the open upland areas of HMWMA 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.

5.6.10.1 Interpretation

Interpretive signage, resource interpretation materials, trail guides, and area regulation information are provided at the main entrance. Additional interpretive materials including a Recreation Guide for HMWMA will be developed.

5.7 Hydrological Preservation and Restoration

5.7.1 Hydrological Assessment

A hydrological assessment for HMWMA has been completed. Pursuant to the recommendations of the hydrological assessment, FWC will implement hydrological restoration as feasible and appropriate. In addition, to enhance natural hydrological functions, the FWC will continue to install, repair, and maintain low-water crossings and culverts as appropriate.

Hydrological restoration will also be conducted by plugging ditches and filling artificial ponds. These ditches and ponds were created decades ago to improve conditions for cattle. Most of the ditches have since filled through erosion and are currently less evident and likely have little impact on the hydrology of HMWMA.

5.7.2 Water Resource Monitoring

The FWC will continue to coordinate and cooperate with the SWFWMD in their continuing monitoring responsibility of three water quality and quantity monitoring stations located on HMWMA. As appropriate, the FWC will cooperate with the SWFWMD and the DEP to develop and implement any necessary surface water quality and quantity monitoring protocols for HMWMA. In this capacity FWC will primarily rely on the expertise and staff support of the SWFWMD and DEP to conduct these monitoring activities.

5.8 Forest Resource Management

An update to the 2000 Timber Assessment (Appendix 13.13), describing the forest resources of HMWMA, will be conducted by the FFS, or a contracted professional forester. The management of timber resources will be considered in the context of the Timber Assessment and the overall land management goals and activities.

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

Pursuant to OBVM management goals, FWC will continue to manage timber resources for wildlife benefits and natural community restoration. Management activities include timber thinning and harvesting. 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 will increase the rate of reforestation and ensure diversity. Forested wetlands are managed for stands with old growth characteristics. Snags will be protected to benefit cavity-nesting species.

5.9 Cultural and Historical Resources

There are six known historic sites within HMWMA (Appendix 13.6). They include four homestead sites, a logging tramway, and the Alto Cemetery. The McKinney house was one of the last homesteads on the area and was settled around 1916. Some open pastures that the McKinneys cleared for raising cattle can still be found to the northwest of the old homestead.

No prehistoric archaeological sites are recorded for HMWMA. Although no systematic survey has been conducted on the area, DHR indicates the probability of site discovery is low. Despite the density of sites nearby, especially west across the Withlacoochee River, an apparent void exists east of the river in the immediate vicinity of HMWMA. The area may have been part of a cultural buffer zone and largely lacked the physiographic juxtaposition and environmental conditions preferred by aboriginal peoples. Nevertheless, small prehistoric sites may exist on the area.

Procedures outlined by DHR will be followed to preserve such sites. The FWC will continue to consult with DHR in an attempt to locate other 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.

The FWC will monitor and maintain the known recorded sites and submit updates of additional located sites to DHR 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 managing these resources prior to any facility development and ground disturbing activities.

5.10 Capital Facilities and Infrastructure

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

Current capital facilities and infrastructure (Figure 9) on HMWMA include:

- FWC office and pole barn work area
- 2 kiosks
- 2 picnic tables
- 1 shelter
- 1 vault toilet
- 1 fishing platform

As described in Section 5.5.1 of this Management Plan, recreation facilities in semi-primitive or primitive zones will be planned and developed to be universally accessible to the degree possible except as allowed by the ADA¹.

5.11 Land Conservation and Stewardship Partnerships

The FWC utilizes a three-tiered approach to identifying, acquiring or otherwise protecting important conservation lands adjacent to or in proximity to existing FWC-managed areas. This involves development of an Optimal Resource Boundary (ORB), Optimal Conservation Planning Boundary (OCPB), and associated Conservation Action Strategy (CAS).

Increasingly, cooperative land steward partnership efforts with private landowners plays an integral role in this effort as does ongoing land conservation, either through fee-simple or less-than-fee conservation easements. In combination, this tiered model helps FWC to further the regional conservation of important fish and wildlife habitats through a proactive, comprehensive, and cooperative approach towards conservation.

5.11.1 Optimal Resource Boundary

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

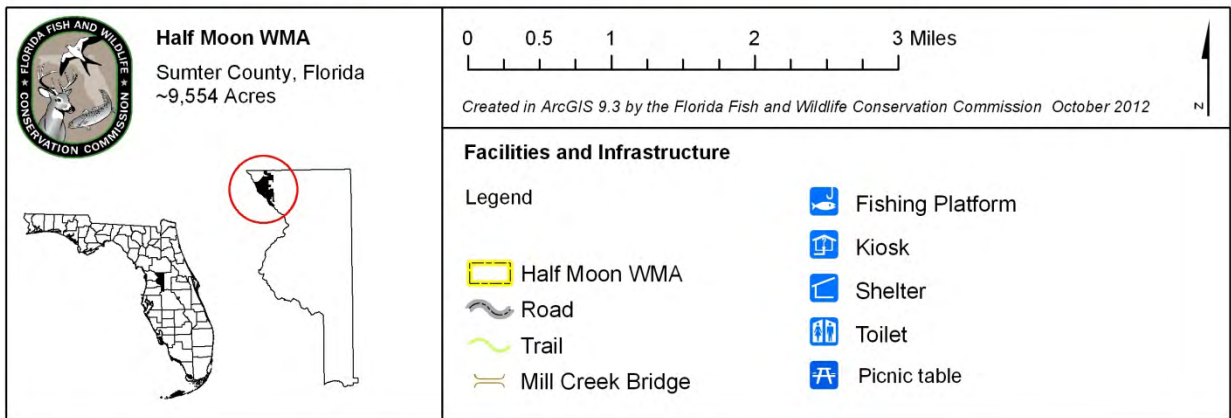
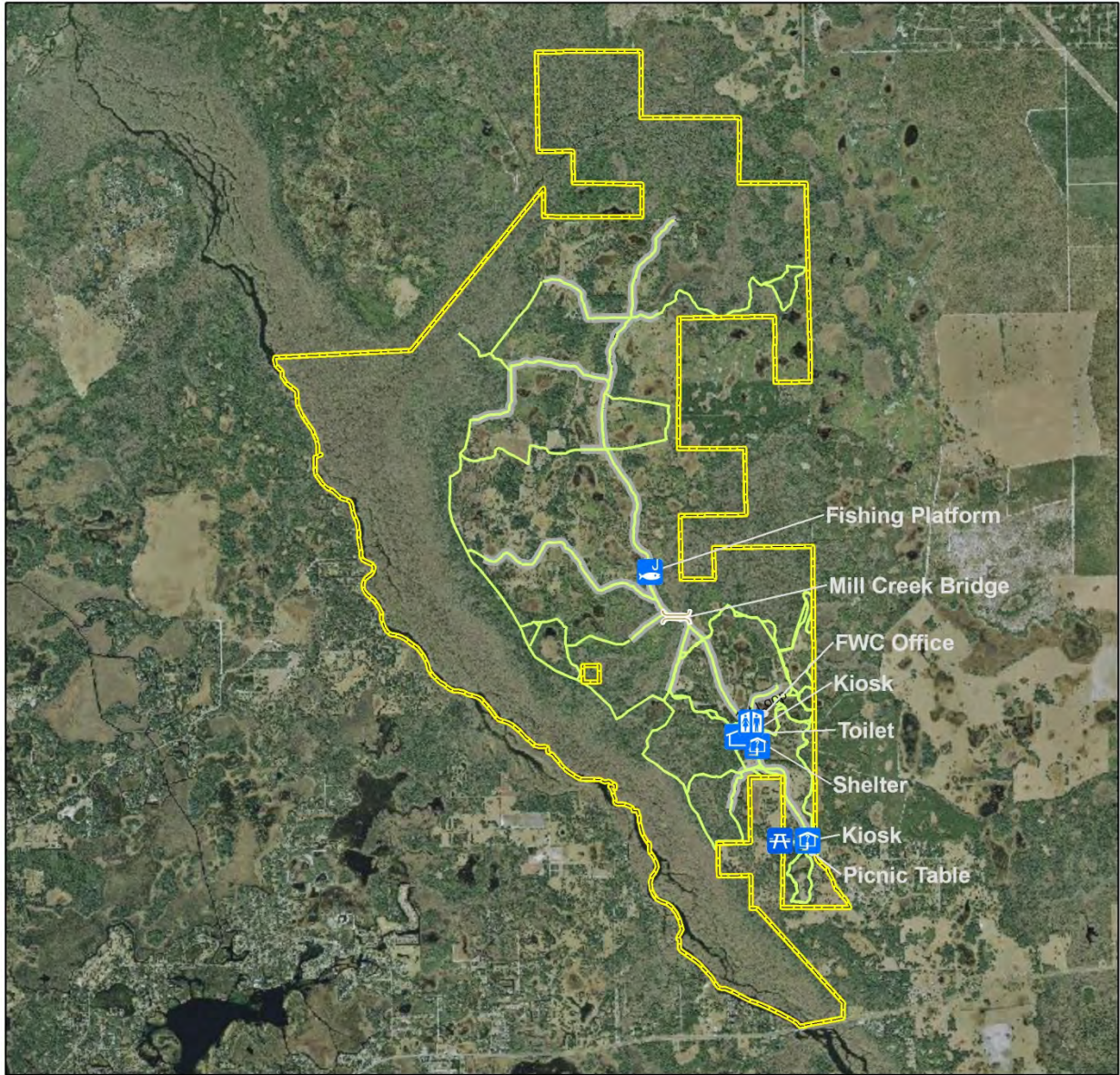


Figure 9. Facilities and Infrastructure

5.11.2 Optimal Conservation Planning Boundary

The second tier is known as the OCPB (Figure 10). 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 CAS for HMWMA. Although the OCPB provides the basis for potential future voluntary, willing-seller conservation acquisitions, it is designed to function primarily as a conservation planning boundary. The OCPB identifies surrounding lands and natural resources that may be important to the continued viability of fish and wildlife populations in the region. As they are currently managed, these lands appear to contribute to regional conservation and may support conservation landscape linkages.

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
- FWC conservation planning
- FWC Additions and Inholdings Program Land Conservation Work Plan
- Forest Stewardship Program proposals
- Florida Forever acquisition project proposals and boundary modifications
- Conservation easements
- Federal or State grant proposals
- Land, Conservation easements, or donations
- Non-FWC fee-simple and less-than-fee acquisitions (conservation easements)
- Regional or local acquisition conservation proposals
- Local, state, and federal planning proposals
- Non-governmental organization acquisition 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.

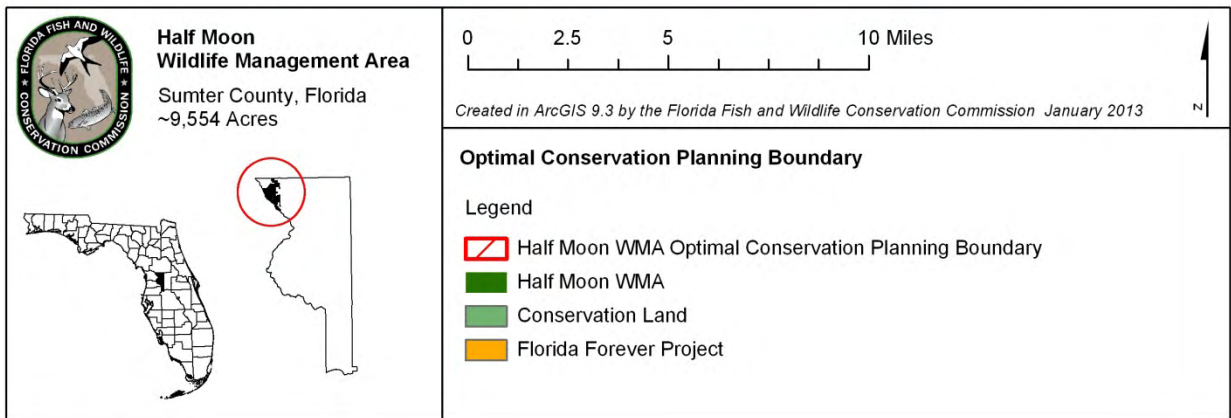
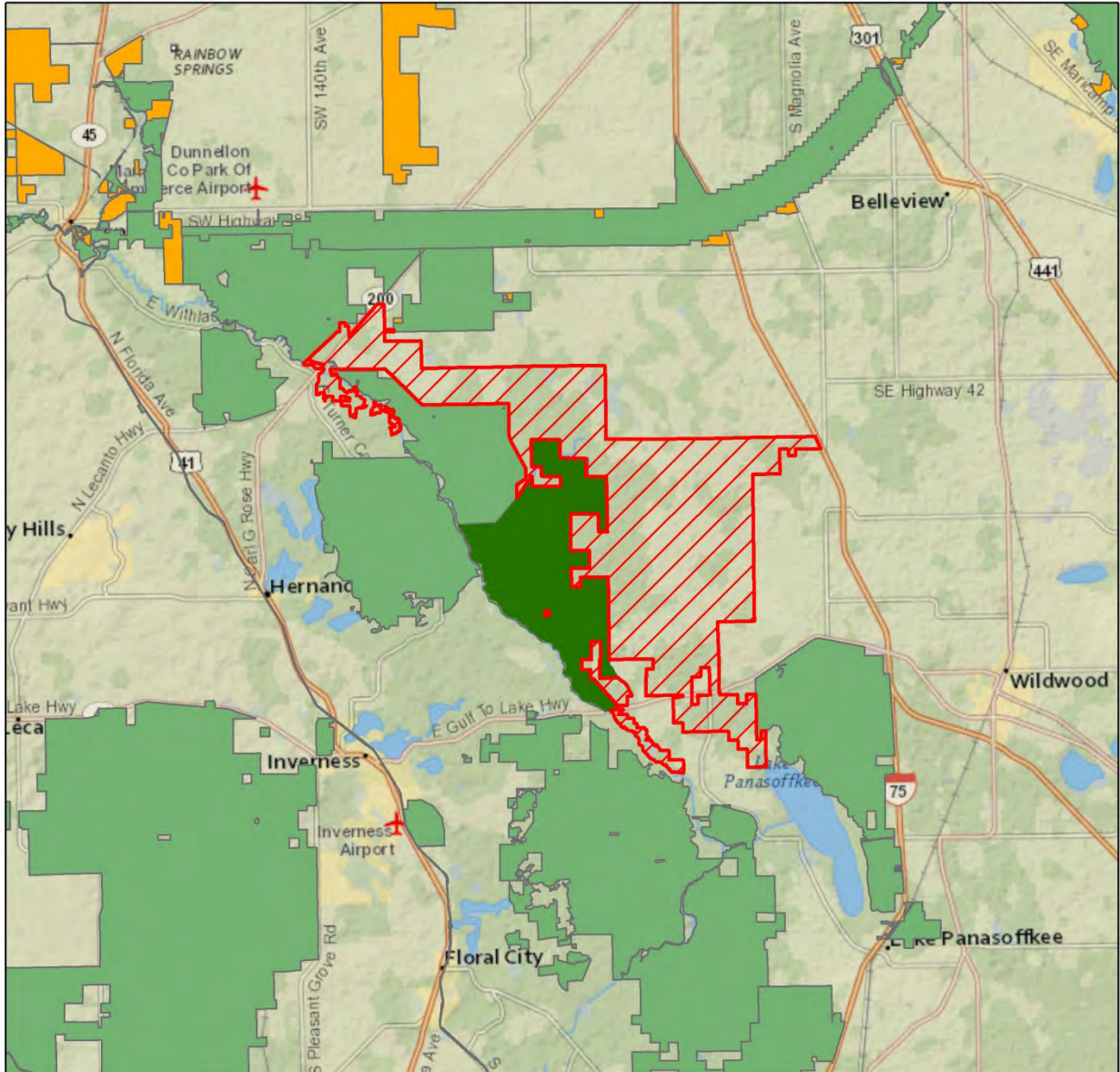


Figure 10. Optimal Conservation Planning Boundary

Private landowners seeking assistance with habitat management will likely find it offered within FWC's Landowner Assistance Program (LAP). The FWC employs biologists who are available to provide wildlife-related assistance with land-use planning and habitat management. There are many forms of assistance that include technical, financial, educational, and various forms of recognition that seek to award landowners who manage their wildlife habitat responsibly. More information on FWC's LAP program and online habitat management tools are available online at: <http://myfwc.com/conservation/special-initiatives/lap/>.

5.11.4 FWC Florida Forever Additions and Inholdings Acquisition List

Currently, FWC has identified 1,619 acres of potential additions or privately held inholdings for HMWMA. Upon completion of the CAS, additions to the FWC Florida Forever Additions and Inholdings acquisition list may be recommended.

5.12 Research Opportunities

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

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 century⁶.

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

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

Potential impacts that may be occurring as a result of climate change include: change in the timing of biological processes, such as flowering, breeding, hibernation, and migration ^{7, 8, 6}; more frequent invasions and outbreaks of exotic invasive species ⁷; and loss of habitat in coastal areas due to sea level rise ⁸. 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 ⁹. 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. Also, 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.

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. FWC will also consider participating in 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.

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

5.14 Soil and Water Conservation

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

5.15 Cooperating Agencies

The FWC is responsible for the overall management and operation of HMWMA as set forth in the lease agreement with the Board of Trustees. These include cooperating with DHR to ensure the requirements of the Management Procedures Guidelines - Management of Archaeological and Historical Resources document (Appendix 13.6) are followed with regard to any ground-disturbing activities. In addition, the FFS is a designated cooperating agency, and assists FWC by providing technical assistance on forest resource management. Also, the FWC cooperates and consults with the SWFWMD and DEP for the monitoring and management of both ground and surface water resources, as well as the overall management of HMWMA.

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 HMWMA. 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 (Figure 11). The following management plan goals and associated objectives are sorted by management activity category and by short-term (2014 – 2015) and long-term (2016 – 2024) timelines for completion. The recommendations of the 2010 Land Management Review (Appendix 13.3) were considered and addressed in the development of this section.

6.1 Habitat Restoration and Improvement

Goal: Improve extant habitat and restore disturbed areas.

Short-term

- 6.1.1 Continue to prescribe burn 1,000 acres per year of fire-adapted communities including, basin marsh, depression marsh, mesic flatwoods, pasture, pine plantation, sandhill, scrubby flatwoods, and wet flatwoods.
- 6.1.2 Maintain 4,000 acres (100%) of fire-adapted natural communities within 2 - 4 year target fire return interval per year.
- 6.1.3 Contract or otherwise obtain a historic and current natural community map for the 35 acre Phebus tract (Figure 11).
- 6.1.4 Continue to implement the HMWMA prescribed burn plan.
- 6.1.5 Conduct habitat/natural community improvement on at least 50 acres per year (Figure 11).
- 6.1.6 Initiate habitat/natural community restoration activities on 25 acres of improved pasture (Figure 11).
- 6.1.7 Maintain 100% of natural communities in a desired future condition by continuing to implement the OBVM program.
- 6.1.8 Restore one acre of former basin and depression marsh by backfilling three existing artificial ponds (Figure 11).

Long-term

- 6.1.9 Reevaluate natural community mapping approximately every five years.
- 6.1.10 Continue to prescribe burn 1,000 acres per year of fire-adapted communities including, basin marsh, depression marsh, mesic flatwoods, pasture, pine plantation, sandhill, scrubby flatwoods, and wet flatwoods.
- 6.1.11 Continue to maintain 4,000 acres (100%) of fire-adapted natural communities within 2 - 4 year target fire return interval.

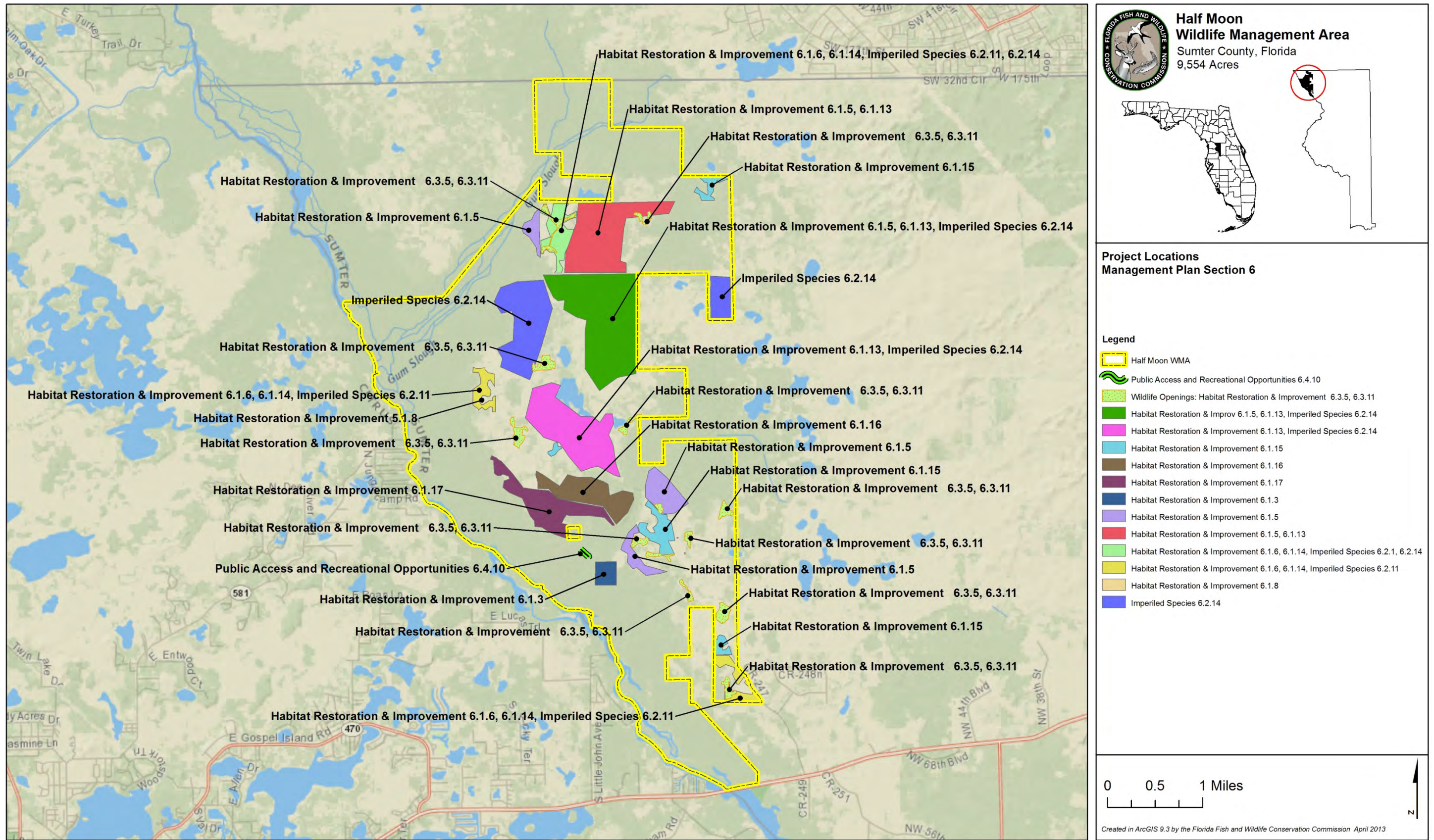


Figure 11. Project Locations

- 6.1.12 Maintain 100% of natural communities in a desired future condition by continuing to implement the OBVM program; reevaluate desired future conditions.
- 6.1.13 Continue to conduct habitat/natural community improvement of 50 acres of natural communities, including late successional mesic flatwoods, sandhill, and scrubby flatwoods, through hardwood and palmetto control (Figure 11).
- 6.1.14 Initiate habitat/natural community restoration activities on 60 acres of improved pasture (Figure 11).
- 6.1.15 For the purposes of habitat improvement, conduct a 70-acre timber thin of longleaf pine on former improved pasture (Figure 11).
- 6.1.16 For the purposes of habitat improvement, conduct a 150-acre timber thin of loblolly and slash pine (Figure 11).
- 6.1.17 For the purposes of habitat improvement, conduct a 175-acre timber thin of loblolly and slash pine on the SWFWMD portion of HMWMA (Figure 11).

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 Continue to implement the WCPR strategy* and associated monitoring protocols for 20 focal and imperiled wildlife species including American swallow-tailed kite, Bachman’s sparrow, brown-headed nuthatch, Cooper’s hawk, Florida black bear, Florida mottled duck, Florida mouse, Florida pine snake, Florida sandhill crane, Florida scrub-jay, gopher frog, gopher tortoise, limpkin, Northern bobwhite, Sherman’s fox squirrel, Southeastern American kestrel, Southeastern bat, Southern bald eagle, striped newt, and wading birds (multiple species).
- 6.2.2 Continue to implement the WCPR strategy* for nine imperiled plant species.
- 6.2.3 Continue to collect opportunistic wildlife species occurrence data.
- 6.2.4 Conduct surveys to document breeding activity of gopher frog in all potential breeding ponds in all years with sufficient rainfall by 2014.

- 6.2.5 Conduct surveys to document breeding activity of striped newt in all potential breeding ponds in all years with sufficient rainfall by 2014.
- 6.2.6 Continue to collect opportunistic focal and imperiled species occurrence data for Florida pine snake, brown-headed nuthatch, Florida mottled duck, Florida sandhill crane, Florida black bear, and Sherman's fox squirrel.

Long-term

- 6.2.7 Continue to implement the WCPR strategy* and associated monitoring protocols for 20 focal and imperiled wildlife species listed in Objective 6.2.1.
- 6.2.8 Continue to conduct surveys to document breeding activity of gopher frog in all potential breeding ponds in all years with sufficient rainfall.
- 6.2.9 Continue to conduct surveys to document breeding activity of striped newt in all potential breeding ponds in all years with sufficient rainfall.
- 6.2.10 Enhance and maintain 2,550 acres of existing and potential gopher tortoise habitat; restore historic gopher tortoise habitat, including 200 acres of pasture and 50 acres of xeric hammock to sandhill (Figure 11).
- 6.2.11 Continue to increase the gopher tortoise population by an average of 1% per year (this population increase rate contributes to meeting the WCPR Strategy* objective of increasing the HMWMA gopher tortoise population 20% by 2028).
- 6.2.12 Increase the Bachman's sparrow population by 20% by 2024.
- 6.2.13 Improve identified scrubby flatwoods and mesic flatwoods that can be maintained in a scrubby flatwoods structure, within the Florida scrub-jay Strategic Management Area to suitable conditions for the Florida scrub-jay by 2018 (Figure 11).
- 6.2.14 Continue to make progress toward increasing the number of Florida scrub-jay family groups from 8-10 to 12-15 by 2022.
- 6.2.15 Increase the Northern bobwhite population 20 % by 2024.
- 6.2.16 Monitor the distribution of Florida mouse by trapping every five years within suitable habitat until the WCPR strategy is updated.
- 6.2.17 Continue to maintain nine kestrel nesting boxes.

6.2.18 Continue to collect opportunistic occurrence data for focal and imperiled species listed in Objective 6.2.1.

* For additional detailed information, please see the HMWMA WCPR Strategy (Appendix 13.11).

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

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

Short-term

6.3.1 Continue to conduct annual spotlight monitoring surveys for white-tailed deer.

6.3.2 Continue to collect biological harvest data at check station.

6.3.3 Continue to collect opportunistic wildlife occurrence data.

6.3.4 Maintain one bat house, 20 bluebird, and 11 wood duck nesting boxes annually.

6.3.5 Continue to maintain (mow) 80 acres of wildlife openings annually (Figure 11).

6.3.6 Continue to conduct biennial breeding bird point count surveys.

Long-term

6.3.7 Continue to conduct annual spotlight monitoring surveys for white-tailed deer.

6.3.8 Continue to collect biological harvest data at check station annually.

6.3.9 Continue to collect opportunistic wildlife occurrence data.

6.3.10 Maintain one bat house, 20 bluebird, and 11 wood duck nesting boxes annually.

6.3.11 Continue to maintain (mow) 80 acres of wildlife openings annually (Figure 11).

6.3.12 Continue to conduct biennial breeding bird point count surveys.

6.4 Public Access and Recreational Opportunities

Goal: Provide public access and recreational opportunities.

Short-term

- 6.4.1 Maintain public access and recreational opportunities to allow for a recreational carrying capacity of 309 visitors per day.
- 6.4.2 Develop additional public access and recreational opportunities to allow for a carrying capacity of 361 visitors per day.
- 6.4.3 Continue to provide a two-panel kiosk, entrance kiosk, trail brochure, bird list, and recreation website for interpretation and education.
- 6.4.4 Continue to implement the Recreation Master Plan.
- 6.4.5 Develop and make available a HMWMA Recreation Guide.
- 6.4.6 In cooperation with Scouts, FWC Youth Conservation Center Program, and others, investigate the feasibility of developing and providing interpretive/education programs.
- 6.4.7 Maintain 13.0 miles of designated trails (Figure 9).
- 6.4.8 Design and construct a footbridge over Mill Creek (Figure 11).
- 6.4.9 Continue to maintain one fishing dock, one restroom, five picnic tables, and trail signage (Figure 9).
- 6.4.10 Explore camping opportunities on surrounding conservation or private property and connecting to paddling opportunities at Gum Slough.
- 6.4.11 Continue to provide hunting opportunities including youth turkey, archery, muzzleloading gun, general gun, small game, wild hog still, spring turkey, and migratory bird seasons.
- 6.4.12 Continue to provide fishing opportunities on 12 area ponds (Figure 9).
- 6.4.13 Install rail-mounted interpretive panels on the fishing dock (Figure 9).
- 6.4.14 Install interpretive panels on the Gateway Loop (Figure 9).

6.4.15 Continue to work with outfitters and horse trail ride operations to provide a destination for commercial nature-based recreation.

Long-term

6.4.16 Continue to implement the Recreation Master Plan.

6.4.17 Continue to maintain 13.0 miles of designated trails (Figure 9).

6.4.18 Continue to monitor trails biannually for visitor impacts.

6.4.19 Continue to provide hunting opportunities including youth turkey, archery, muzzleloading gun, general gun, small game, wild hog still, spring turkey, and migratory bird seasons.

6.4.20 Continue to provide fishing opportunities on 12 area ponds (Figure 9).

6.4.21 Cooperate with other agencies, County, stakeholders, and regional landowners to investigate regional recreational opportunities including linking paddling, hiking, and multi-use trail systems between adjacent public areas.

6.4.22 In cooperation with Scouts, FWC Youth Conservation Center Program, and others, investigate the feasibility of developing and providing interpretive/education programs.

6.4.23 Continue to work with outfitters and horse trail ride operations to provide a destination for commercial nature-based recreation.

6.4.24 Reassess recreational opportunities every three years.

6.5 Hydrological Preservation and Restoration

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

Short-term

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

6.5.2 Continue to coordinate and cooperate with the SWFWMD with their monitoring responsibility of three water quality and quantity monitoring stations.

- 6.5.3 Continue to coordinate and cooperate with the SWFWMD to determine any adjacent or regional hydrological restoration needs that may impact HMWMA.

Long-term

- 6.5.4 To enhance natural hydrological functions, continue to install, repair, and maintain low-water crossings and culverts as appropriate.

- 6.5.5 Continue to coordinate and cooperate with the SWFWMD with their monitoring responsibility of three water quality and quantity monitoring stations on HMWMA.

6.6 Forest Resource Management

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

Short-term

- 6.6.1 Cooperate with the FFS to update the 2000 Timber Assessment.
- 6.6.2 Consult with the FFS or a professional forestry consultant regarding forest management activities as appropriate.

Long-term

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

6.7 Exotic and Invasive Species Maintenance and Control

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

Short-term

- 6.7.1 Annually treat at least five acres of EPPC Category I and Category II invasive exotic plant species including skunk vine, Japanese climbing fern, tropical soda apple, Chinese tallow, camphor tree, cogongrass, lantana, Cesarweed, vaseygrass, torpedo grass, natalgrass, and Chinaberry.

- 6.7.2 Continue to implement control measures (hunting) on wild hog and monitor impacts to evaluate if other control measures are necessary.
- 6.7.3 Continue to collect GPS data and maintain GIS shapefiles for invasive exotic plant species listed in Objective 6.7.1.
- 6.7.4 Continue to opportunistically monitor for undocumented invasive plant and animal species including Burmese python, Cuban treefrog, snakehead, etc.

Long-term

- 6.7.5 Continue to annually treat at least five acres of EPPC Category I and Category II invasive exotic plant species.
- 6.7.6 Continue to collect GPS data and maintain GIS shapefiles for invasive exotic plant species.
- 6.7.7 Continue to implement control measures (hunting) on wild hog and monitor impacts to evaluate if other control measures are necessary.
- 6.7.8 Continue to opportunistically monitor for undocumented invasive plant and animal species including Burmese python, Cuban treefrog, snakehead, etc.

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 Monitor the six known recorded sites and submit updates of additional sites to DHR for inclusion in their Master Site file.
- 6.8.3 As directed by DHR, continue to monitor, protect, and preserve the Alto Cemetery.
- 6.8.4 Follow DHR's Management Procedures for Archaeological and Historical Sites and Properties on State-Owned or Controlled Properties for managing cultural and historic resources.

6.8.5 If determined to be necessary by DHR, contract for a cultural and archaeological resources survey.

Long-term

6.8.6 Continue to monitor the six known recorded sites and submit updates of additional sites to DHR for inclusion in their Master Site file.

6.8.7 Cooperate with DHR or available DHR-trained FWC staff in designing site plans for development of infrastructure.

6.8.8 Ensure management staff has DHR Archaeological Resources Monitoring training.

6.8.9 As directed by DHR, continue to monitor, protect, and preserve the Alto Cemetery.

6.8.10 Continue to follow DHR's Management Procedures for Archaeological and Historical Sites and Properties on State-Owned or Controlled Properties for managing cultural and historic resources.

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 eight facilities including office, check station, tractor compound, storage buildings, day-use pavilion, fishing dock, and restroom (Figure 9).

6.9.2 Maintain 12 miles of designated public access roads and 14 miles of service roads (26 miles total, Figure 9).

6.9.3 Maintain 13.0 miles of designated trails (Figure 9).

Long-term

6.9.4 Continue to maintain eight facilities including office, check station, tractor compound, storage buildings, day-use pavilion, fishing dock, and restroom (Figure 9).

- 6.9.5 Continue to maintain 12 miles of designated public access roads and 14 miles of service roads (26 miles total, Figure 9).
- 6.9.6 Continue to maintain 13.0 miles of designated trails.

6.10 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 HMWMA.

Long-term

- 6.10.1 Coordinate with FWC-FWRI Climate Change Adaptation Initiative to identify potential impacts of projected climate change on fish and wildlife resources and operational management of the HMWMA.
- 6.10.2 Incorporate appropriate climate change adaptation strategies into the WCPR for the HMWMA.
- 6.10.3 As appropriate, update the HMWMA Prescribed Fire Plan to incorporate new scientific information regarding projected climate change, such as increased frequency of drought, on the fire regime of HMWMA's fire-adapted habitats.
- 6.10.4 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 HMWMA Recreation Master Plan.

6.11 Research Opportunities

Goal: Explore and pursue cooperative research opportunities.

Short-term

- 6.11.1 Continue to cooperate with USF and SWFWMD with their ongoing hydrological study of Gum Slough and adjacent properties.
- 6.11.2 Continue to cooperate with the USDA Plant Materials Center to supply plant materials for research of restoration plants.

Long-term

- 6.11.3 Continue to cooperate with USF and SWFWMD with their ongoing hydrological study of Gum Slough and adjacent properties.
- 6.11.4 Continue to cooperate with the USDA Plant Materials Center to supply plant materials for research of restoration plants.
- 6.11.5 Explore and pursue cooperative research opportunities through universities, Fish and Wildlife Research Institute, etc.
- 6.11.6 Continue to cooperate with researchers, universities, and others as appropriate.
- 6.11.7 Continue to assess the need for and pursue research and environmental education partnership opportunities as appropriate.

6.12 Conservation Acquisition and Stewardship Partnerships

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

Short-term

- 6.12.1 Identify potential important wildlife habitat, landscape-scale linkages, wildlife corridors, operational/resource management.
- 6.12.2 Continue to identify and pursue acquisition needs and conservation stewardship partnerships.
- 6.12.3 Develop and maintain a GIS shapefile and other necessary data to facilitate nominations from the FWC optimal boundary for FWC's Landowner Assistance and Land Acquisition Programs.
- 6.12.4 Develop a Conservation Action Strategy.
- 6.12.5 Contact and inform adjoining landowners about the FWC Landowners Assistance Program to pursue non-acquisition conservation stewardship partnerships.
- 6.12.6 Determine which parcels should be nominated for addition to the FWC acquisition list.

- 6.12.7 Identify potential non-governmental organization partnerships and grant program opportunities.
- 6.12.8 Determine efficacy of conducting an adjacent landowner’s assistance/conservation stewardship partnership workshop.

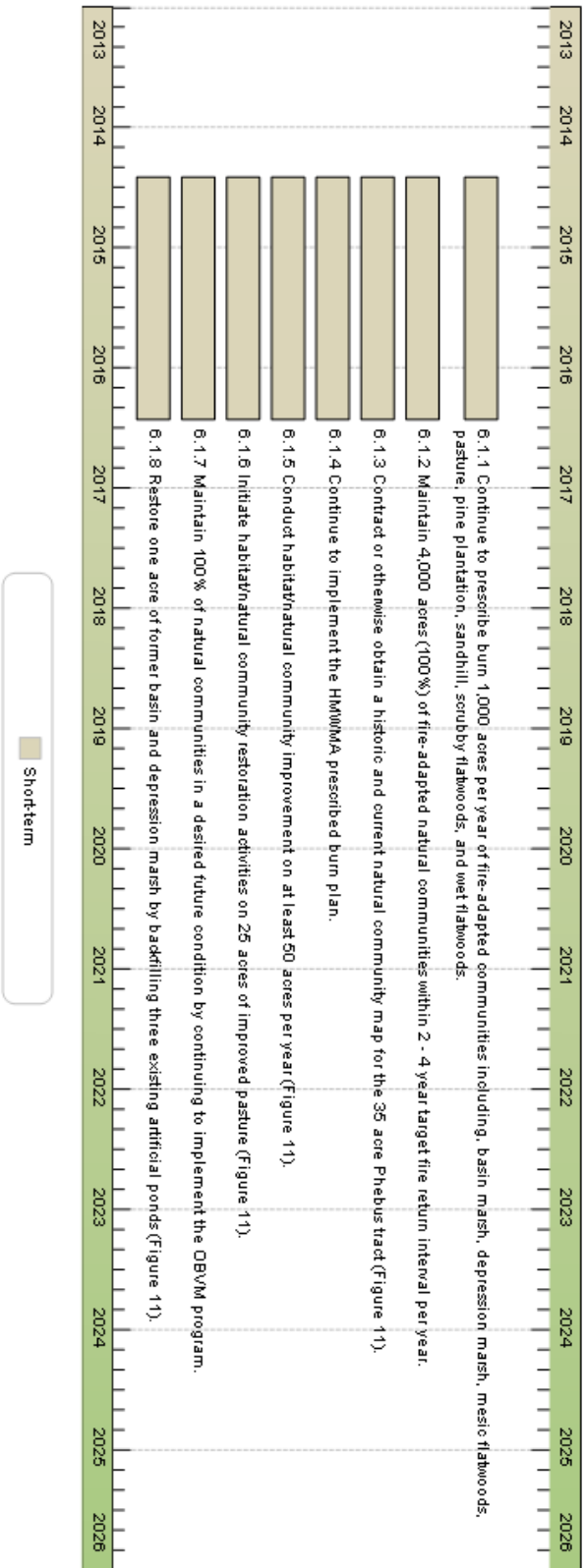
Long-term

- 6.12.9 To minimize fragmentation of the area, continue to identify strategic parcels to revise the completed optimal boundary for WMA as deemed necessary.
- 6.12.10 Continue to maintain a GIS shapefile and other necessary data to facilitate nominations from the FWC optimal boundary for the FWC Landowner Assistance Program and for the Land Acquisition Program.
- 6.12.11 Continue to determine which nominated parcels should be added to the FWC acquisition list.
- 6.12.12 Propose nominations of selected properties as additions to the FWC acquisition list.
- 6.12.13 Pursue acquisition of parcels added to the FWC acquisition list as acquisition work plan priorities and funding allow.
- 6.12.14 Periodically (at least every three to five years) continue to contact and meet with adjacent landowners for willingness to participate in the Conservation Action Strategy. Coordinate landowner assistance/ conservation stewardship partnership workshop as deemed appropriate.
- 6.12.15 Coordinate landowner assistance/ conservation stewardship partnership workshop as deemed appropriate.

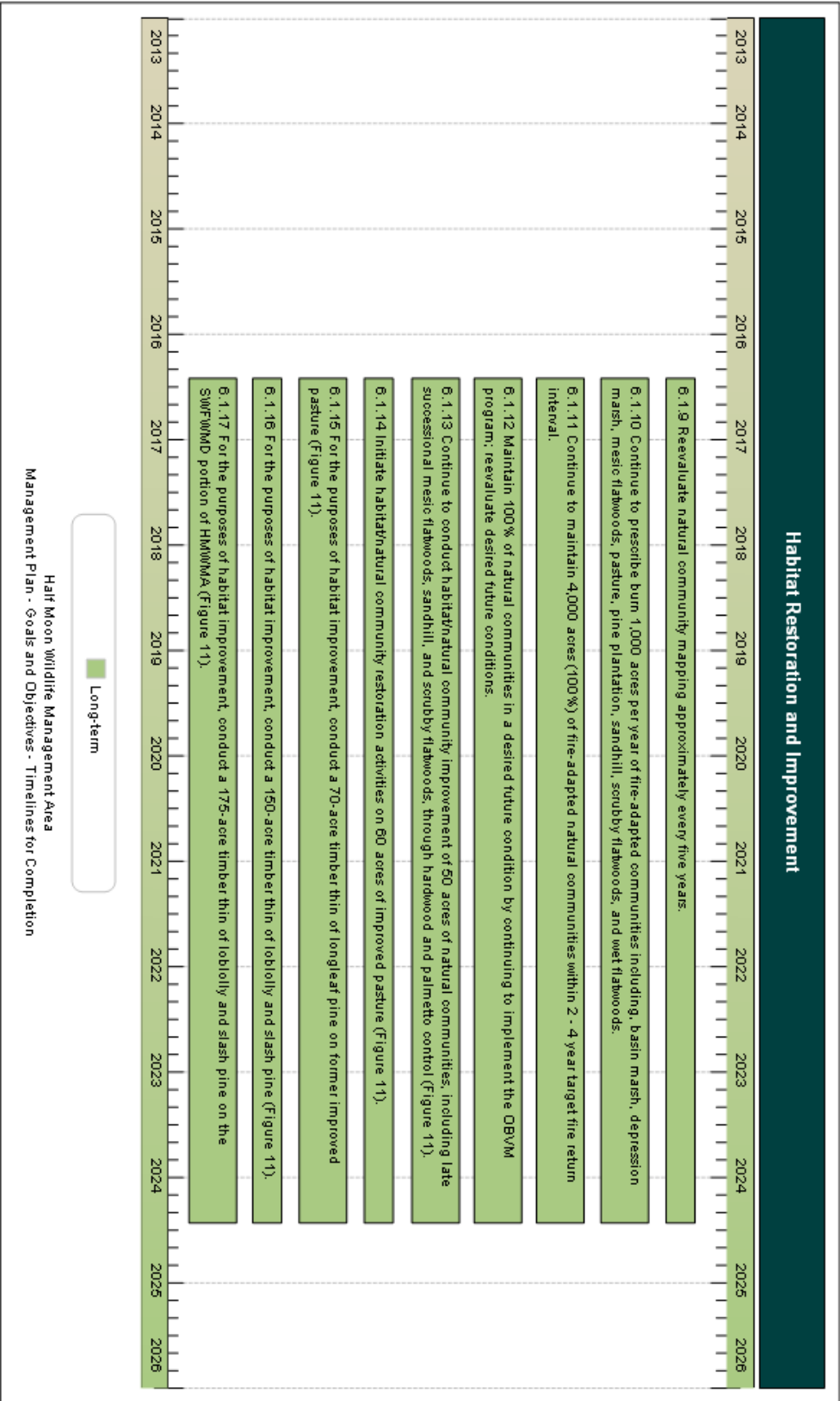
7 Schedule: Timelines for Completion of Resource Management Goals and Objectives

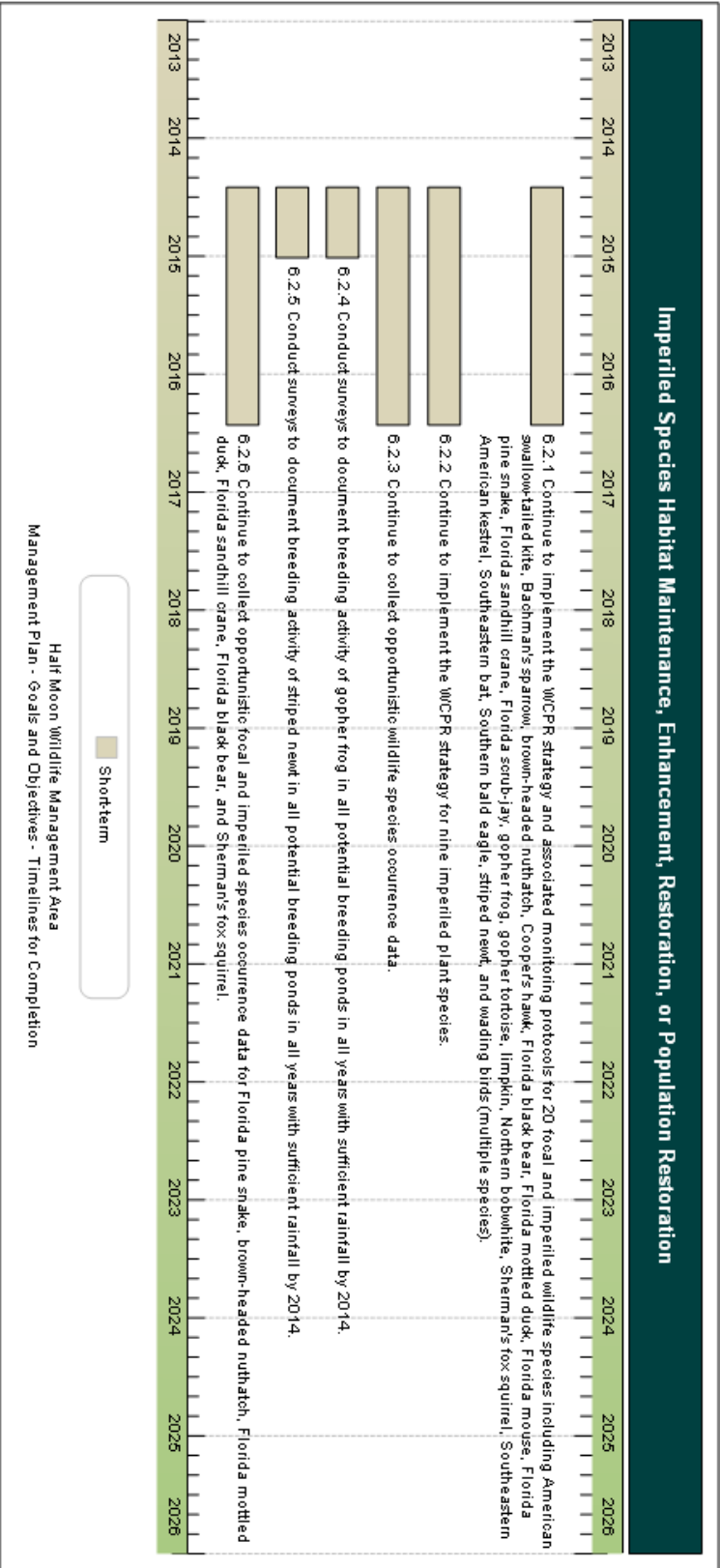
The following section presents the short- and long-term goals and objectives for the management of HMWMA graphically in a timeline format. These timelines directly reflect the short- and long-term goals and objectives presented above in Section 6.

Habitat Restoration and Improvement

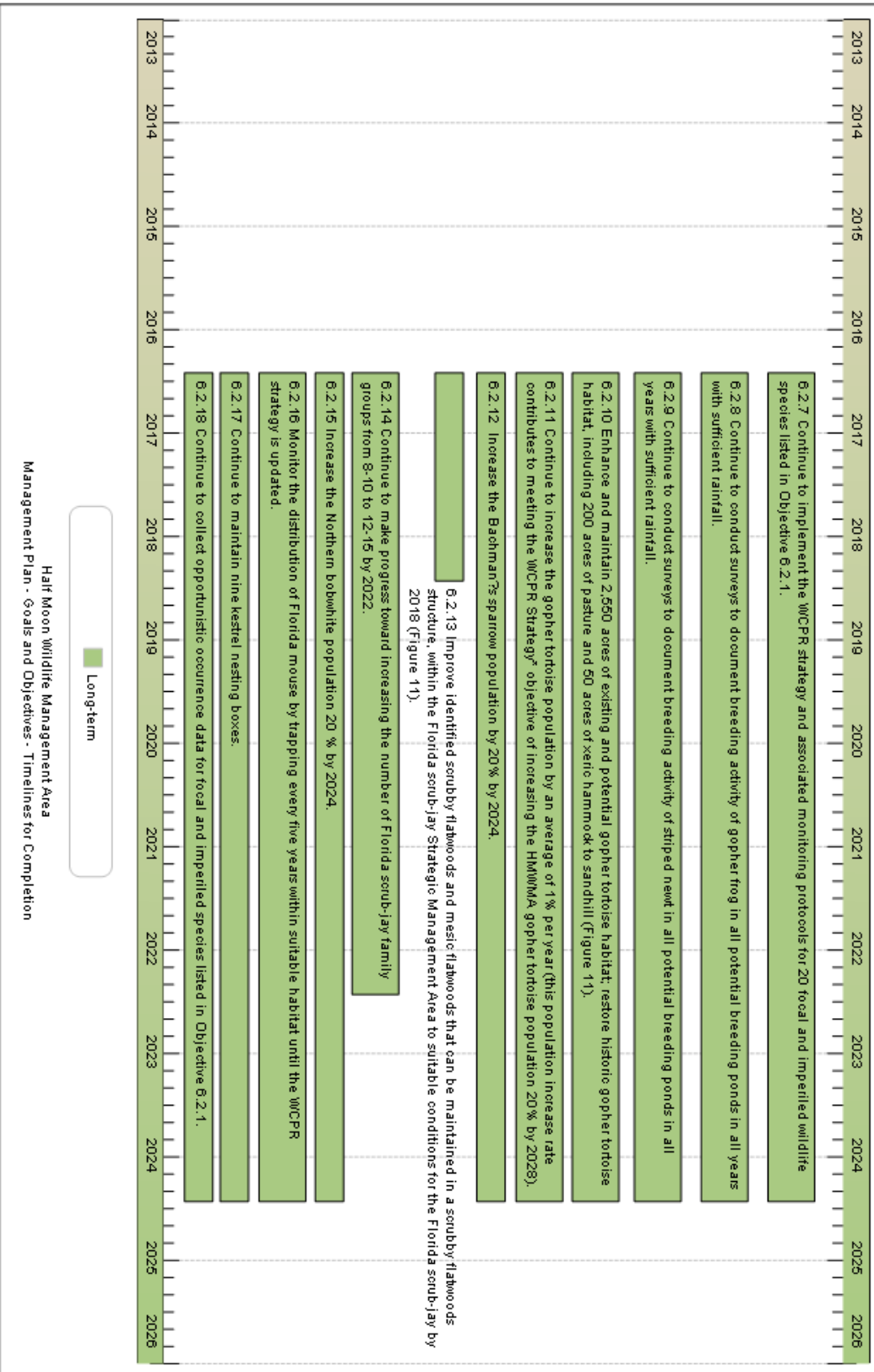


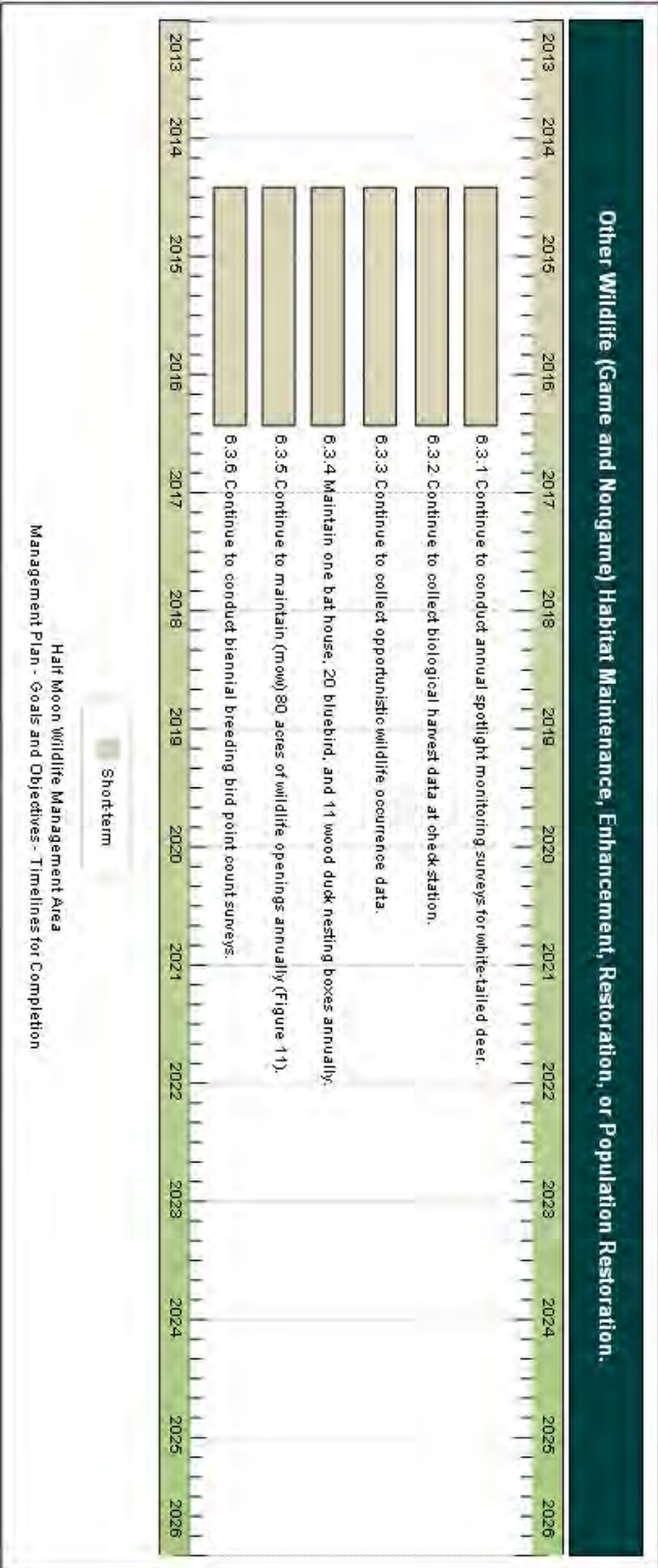
Half Moon Wildlife Management Area
 Management Plan - Goals and Objectives - Timelines for Completion

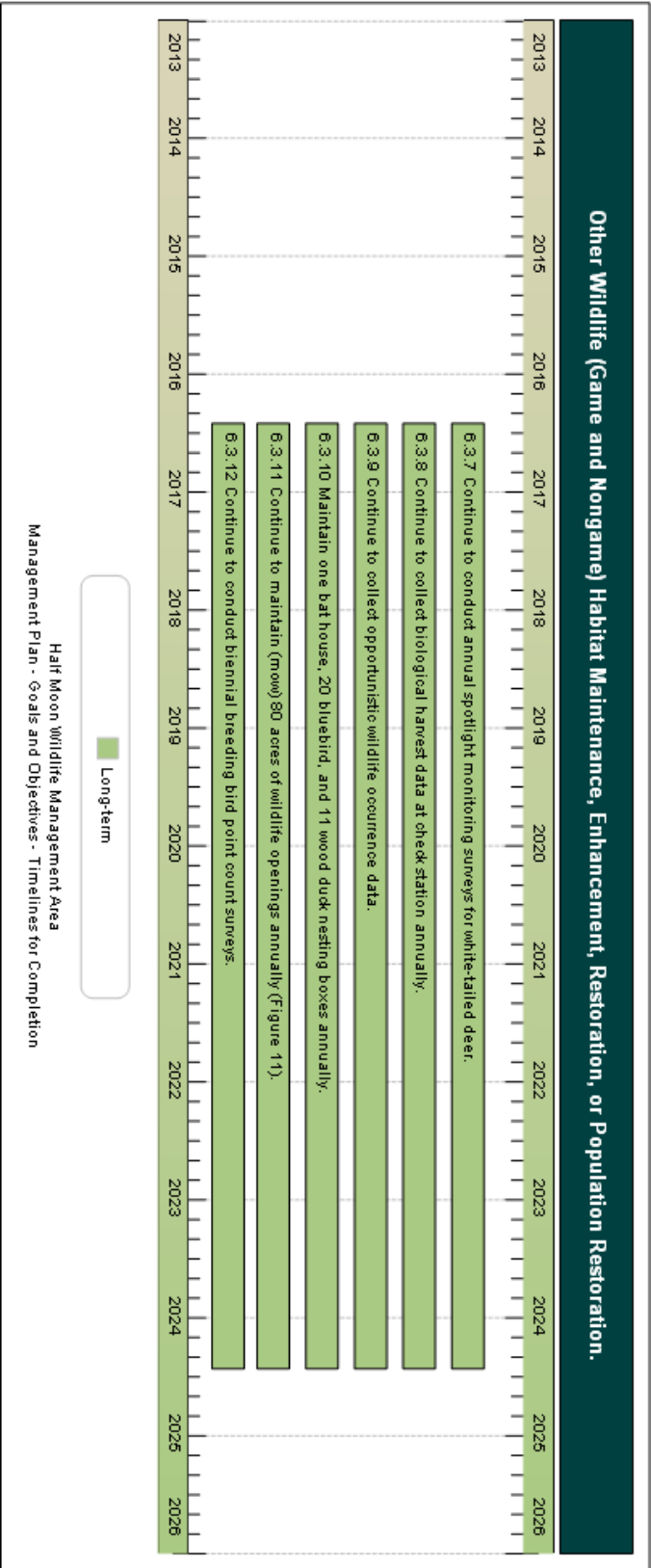




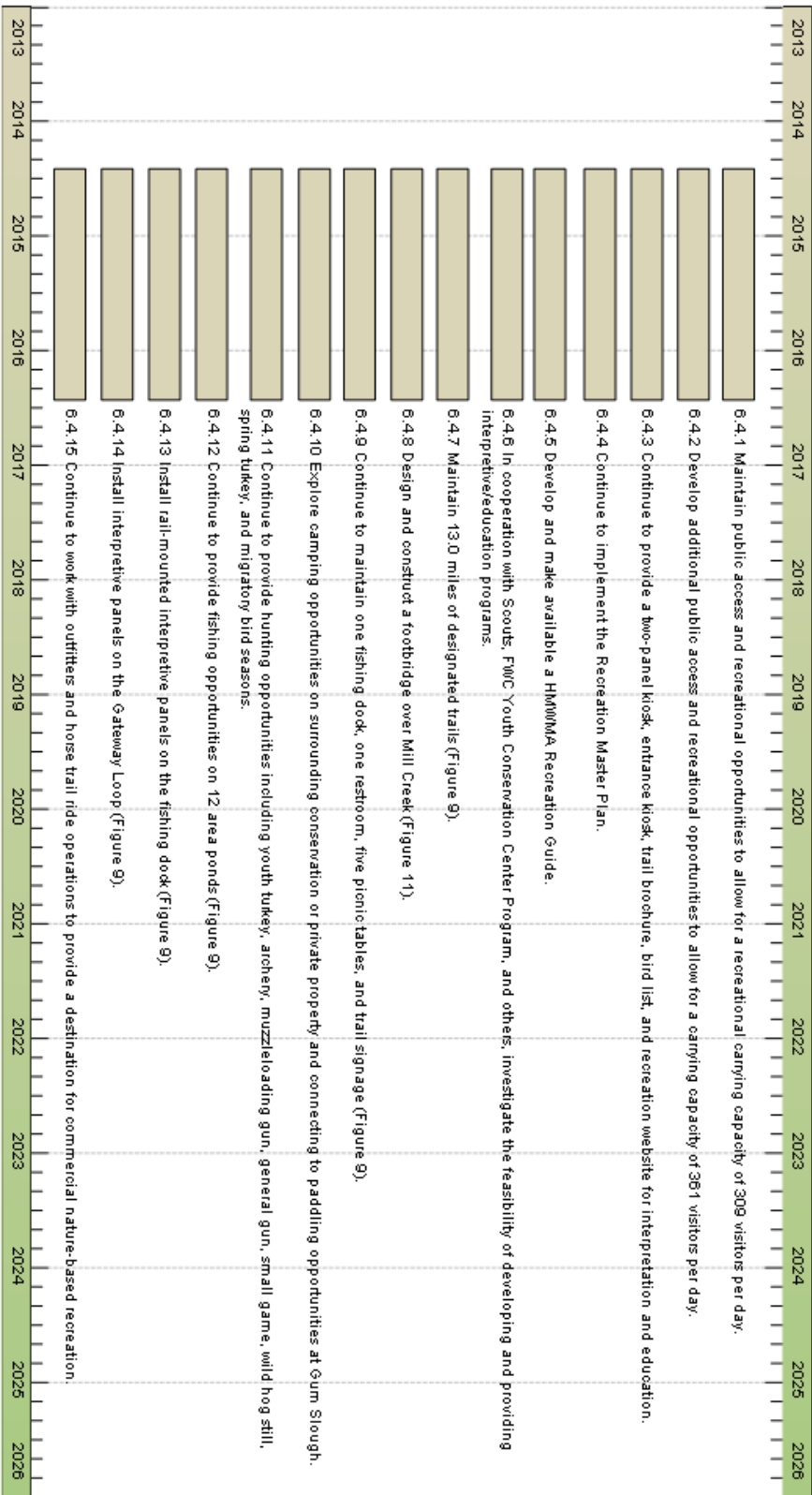
Imperiled Species Habitat Maintenance, Enhancement, Restoration, or Population Restoration





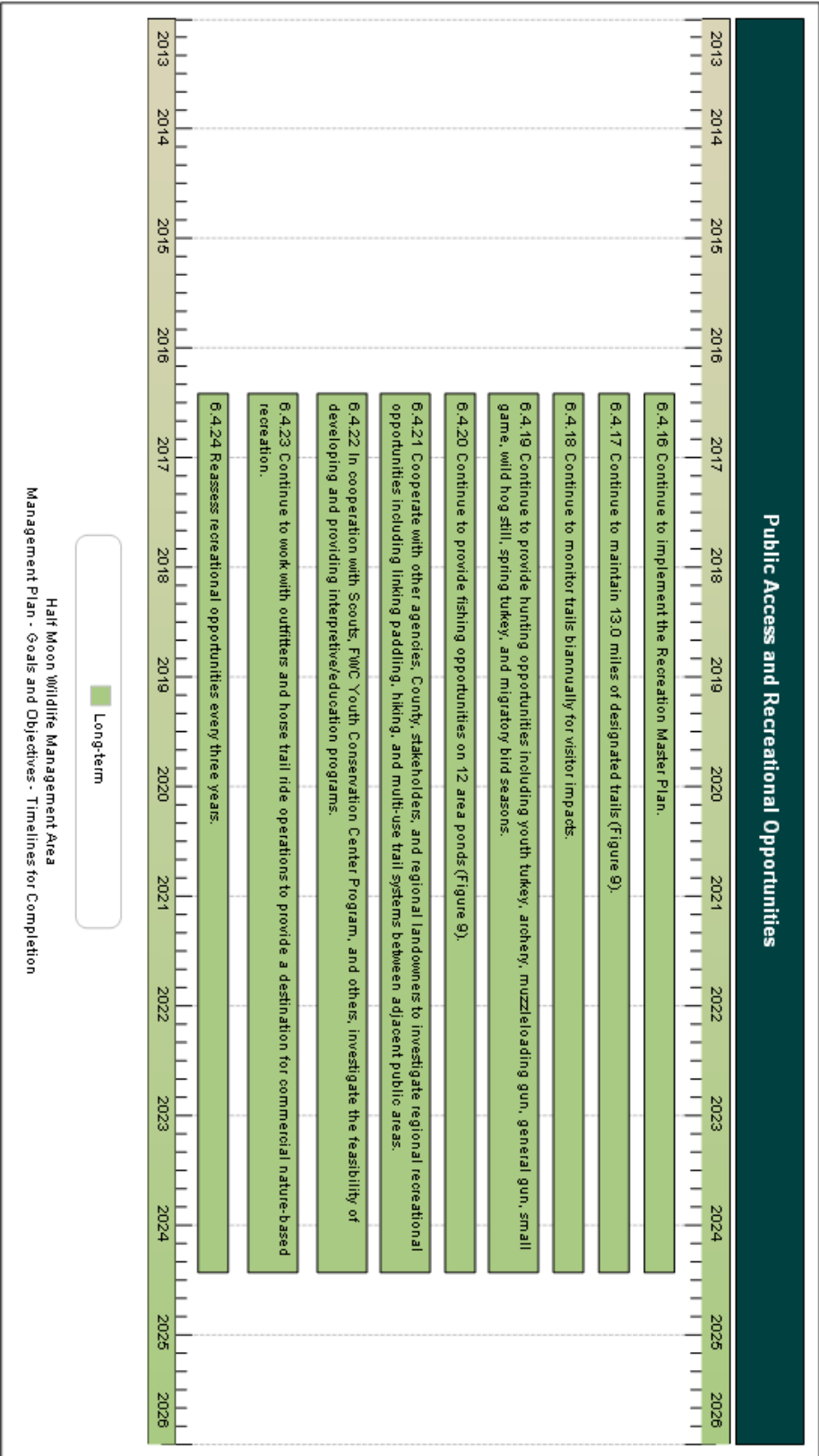


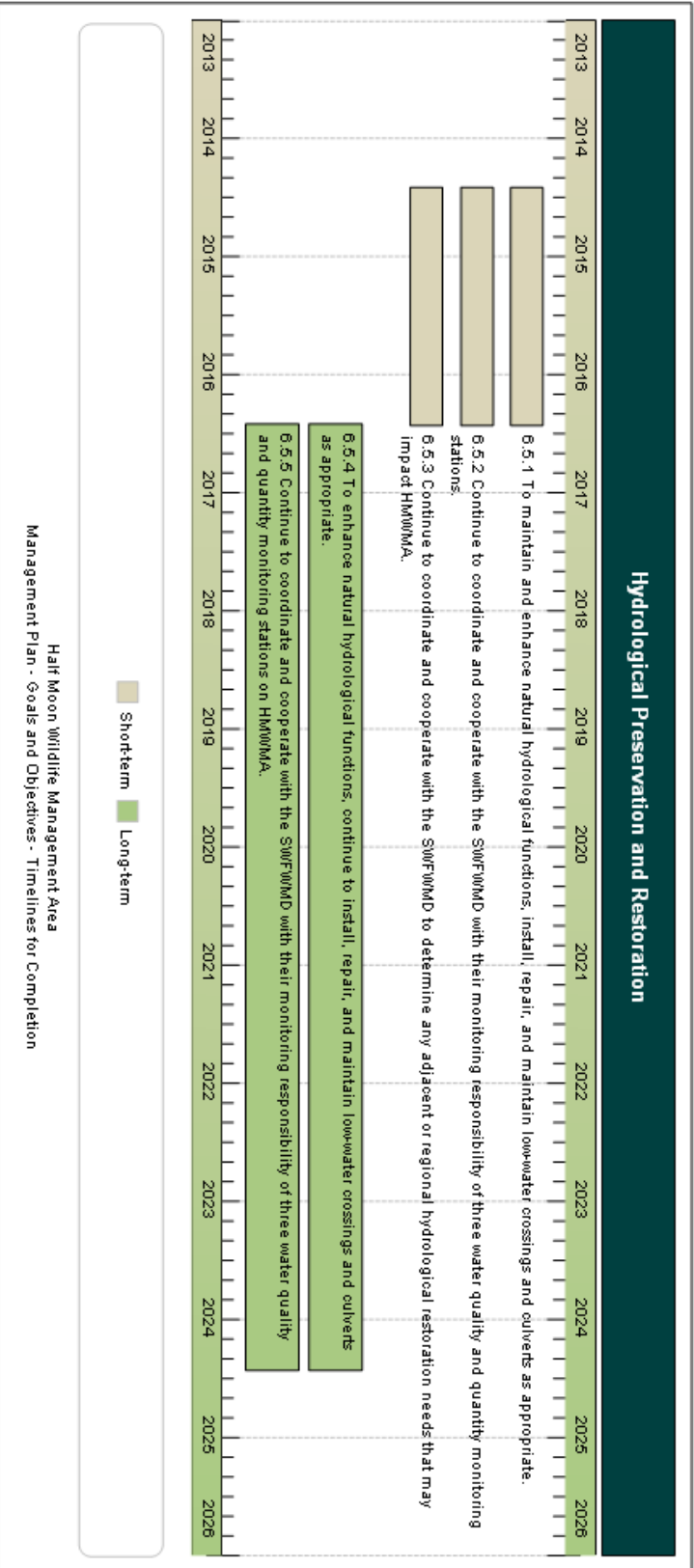
Public Access and Recreational Opportunities

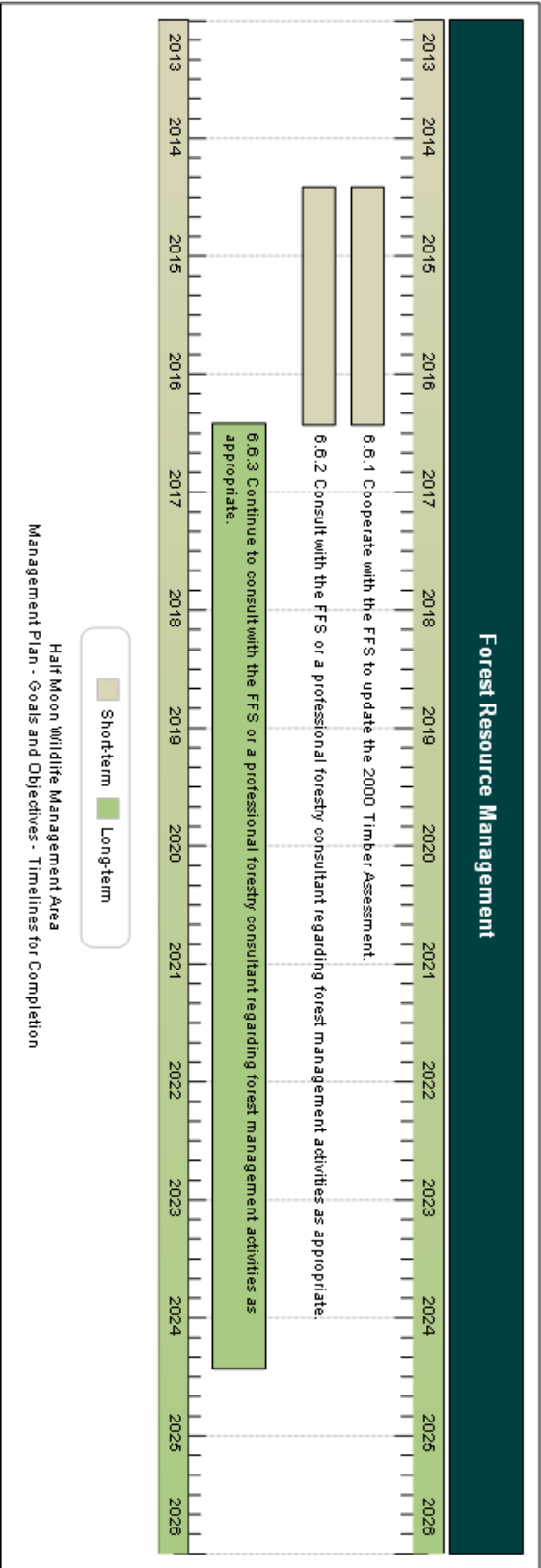


Shortterm

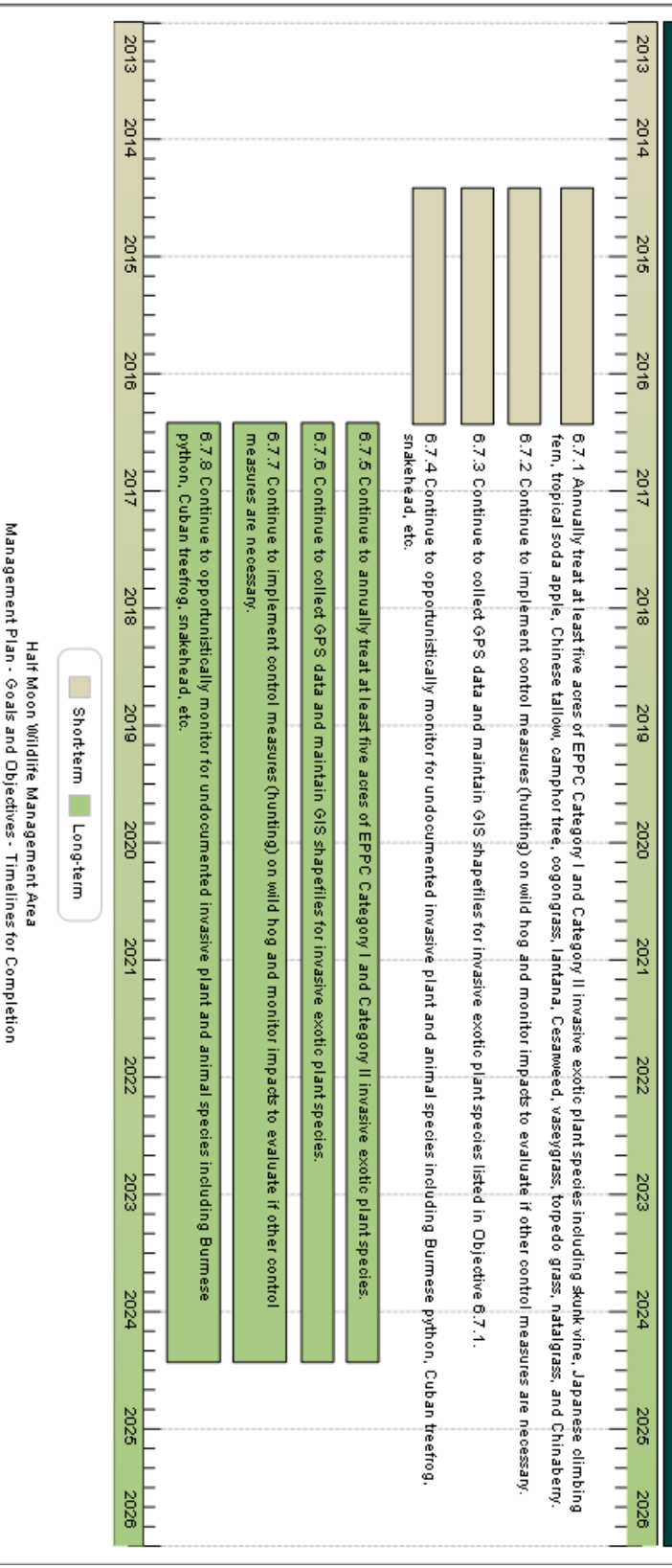
Half Moon Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion



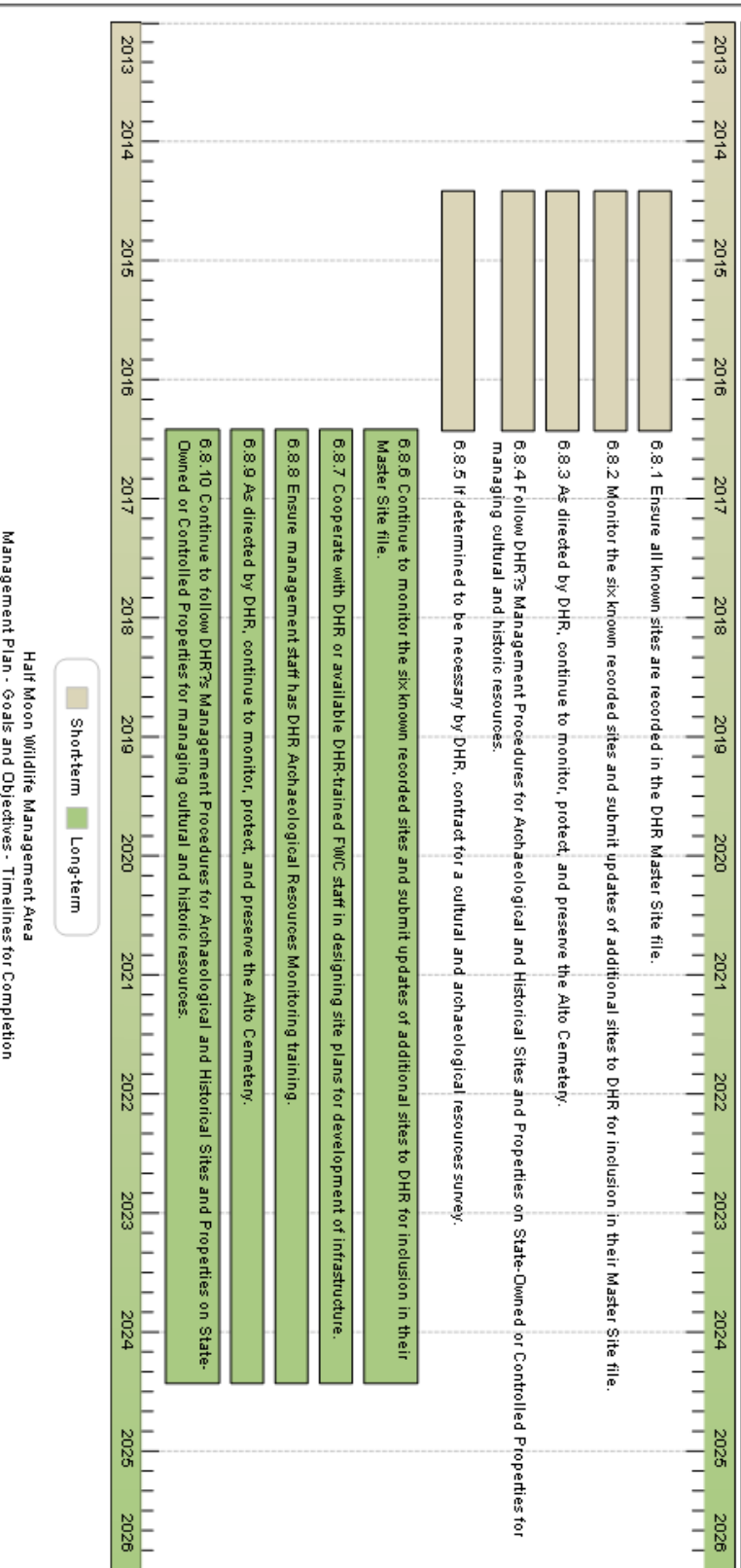


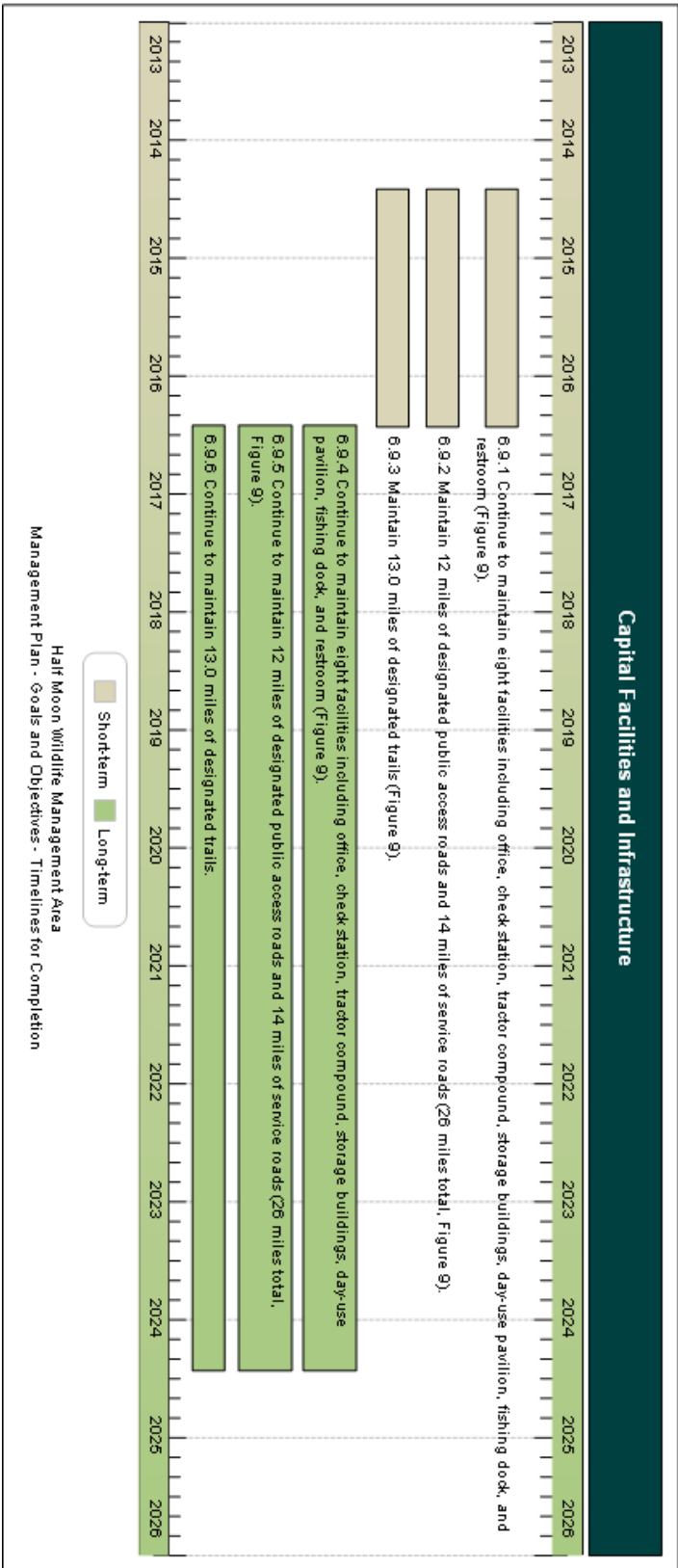


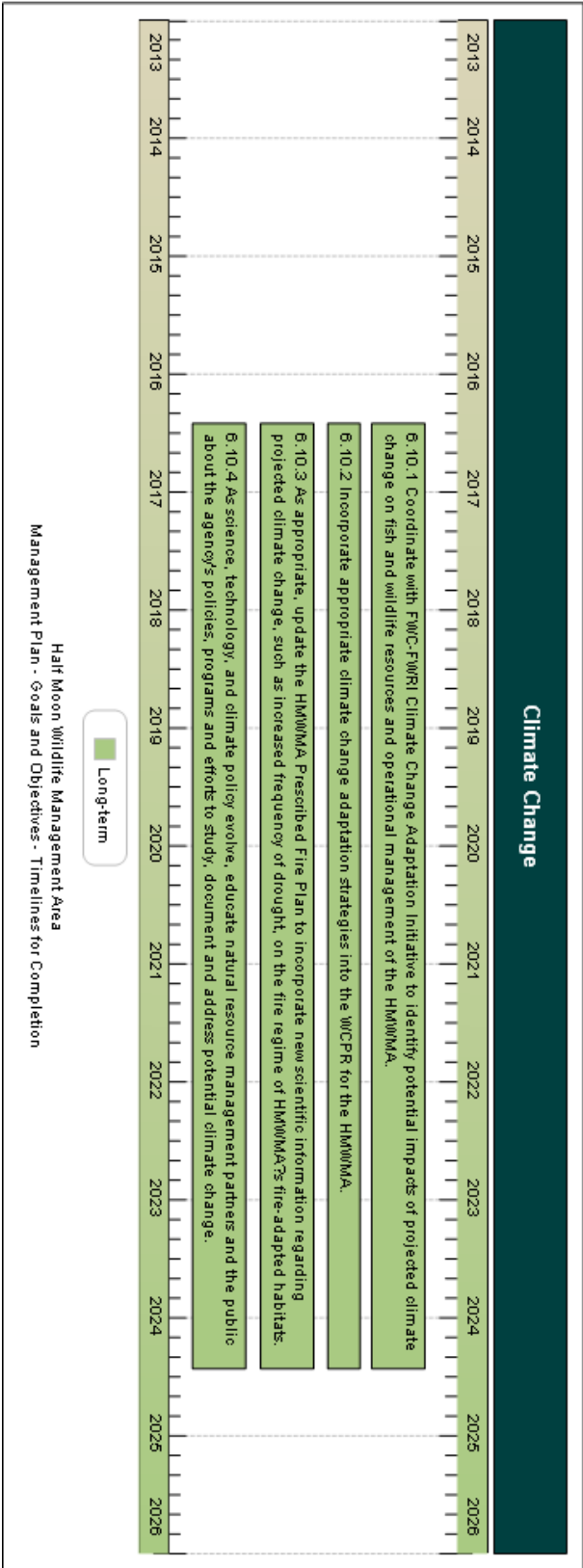
Exotic and Invasive Species Maintenance and Control

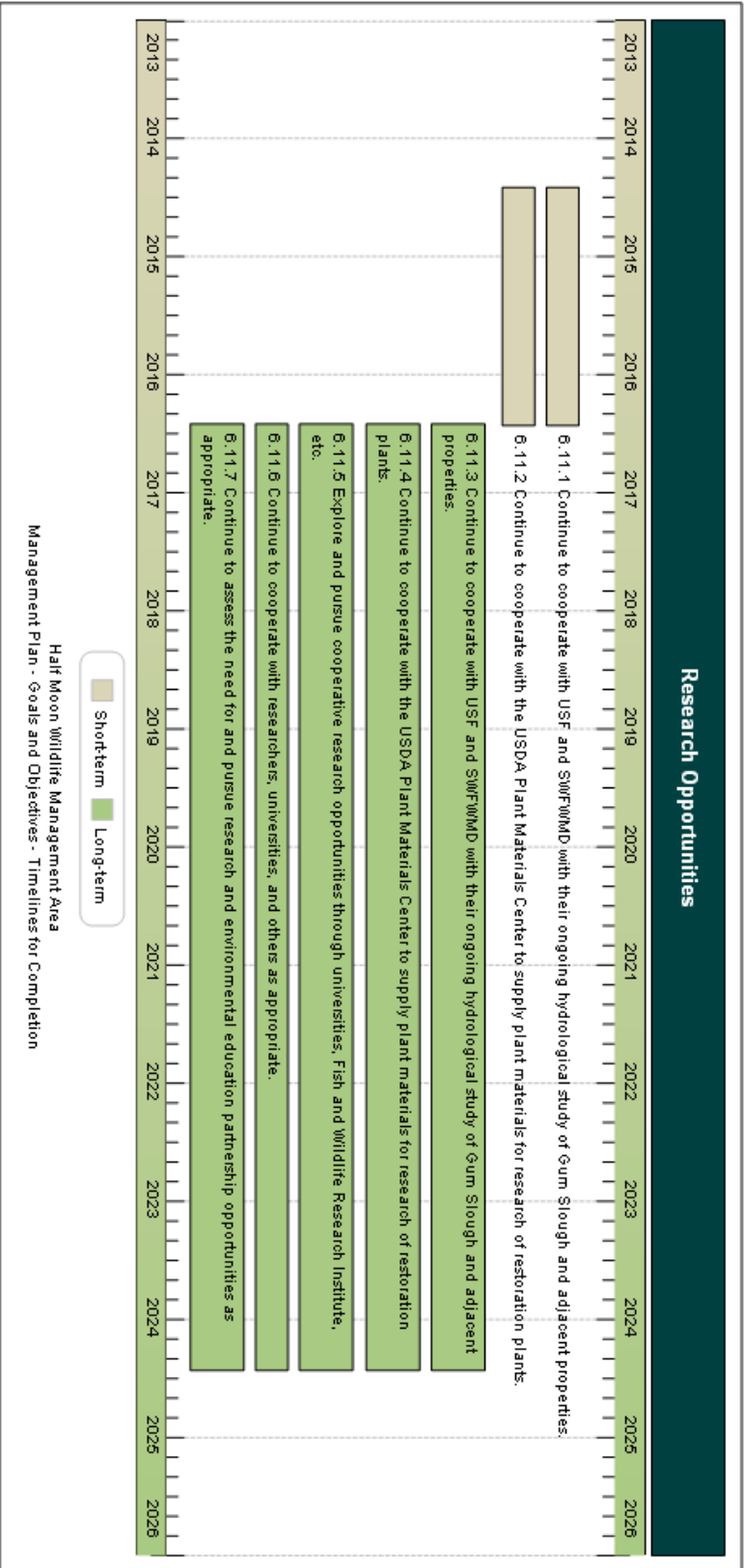


Cultural and Historical Resources

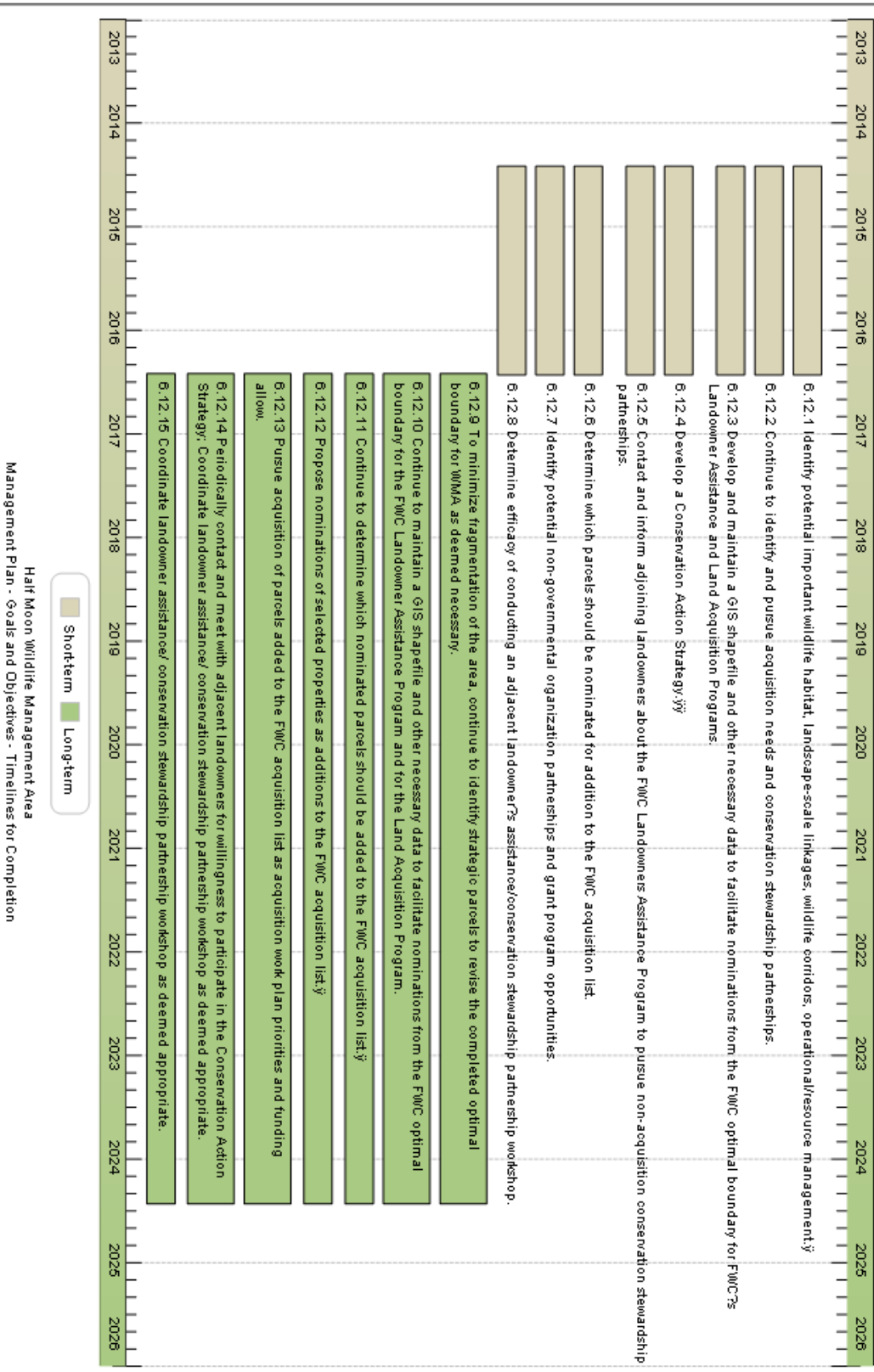








Conservation Acquisition and Stewardship Partnerships



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

Short-term
 Long-term

8 Resource Management Challenges and Strategies

The following section identifies and describes further management needs and challenges associated with HMWMA, 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 therefore provided here.

8.1 Challenge: An ambiguous ordinary high water line along the Withlacoochee River contributes to trespass and poaching enforcement issues.

8.1.1 Strategy: Continue to consult with DEP-DSL Bureau of Survey and Mapping to obtain official delineation of the ordinary high water line for HMWMA to aid in addressing ongoing impacts to the area.

8.1.2 Strategy: Investigate the feasibility of obtaining a lease for the sovereign submerged lands currently included within the established boundary of HMWMA to address ongoing impacts to the area.

8.2 Challenge: Restoring improved pasture to native ground cover is problematic and expensive.

8.2.1 Strategy: Continue small and focused ground cover and canopy restoration efforts to the extent possible.

8.3 Challenge: The Florida scrub-jay population on HMWMA is small and vulnerable, especially given neighboring land use.

8.3.1 Strategy: Work with neighboring landowners on scrub-jay habitat management.

8.3.2 Prioritize scrub-jay habitat management through land management practices and the WCPR system.

8.4 Challenge: The efforts to market the value of HMWMA to the community and as an ecotourism destination are currently insufficient.

8.4.1 Strategy: Explore opportunities and partnerships to market HMWMA as a recreation and ecotourism destination.

8.5 Challenge: FWC does not have a complete boundary survey of HMWMA..

8.5.1 Strategy: Explore the feasibility of contracting for a boundary survey to improve the overall management of the area.

8.6 Challenge: Unauthorized access, illegal dumping, vandalism, poaching, and unauthorized off-road vehicle (ORV) use may pose an increased threat in the future.

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

9 Cost Estimates and Funding Sources

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

The cost estimate below, although exceeding what FWC typically receives through the appropriations process, is consistent with the direction taken by current operational planning for HMWMA. Cost estimate categories are those currently recognized by FWC and the Land Management Uniform Accounting Council. More information on these categories, as well as the fiscal year 2013 – 2014 operational plan detailing cost estimates by activity and categories of expenditures, may be found in Appendix 13.14. Additionally, these cost estimates reflect FWC's current staff-to-acreage ratio, providing for two full-time employees on HMWMA.

Table 13. Cost Estimate: Maximum Expected One Year

Half Moon WMA Management Plan Cost Estimate

Maximum expected one year expenditure

Resource Management

Exotic Species Control	\$16,785
Prescribed Burning	\$20,571
Cultural Resource Management	\$445
Timber Management	\$445
Hydrological Management	\$2,557
Other	\$136,222
Subtotal	\$177,025

Priority schedule:

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

Administration

General administration	\$2,224
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Support

Land Management Planning	\$6,539
<i>Land Management Reviews</i>	\$1,335
<i>Training/Staff Development</i>	\$4,449
Vehicle Purchase	\$26,167
Vehicle Operation and Maintenanar	\$15,398
Other	\$25,301
Subtotal	\$79,188

Capital Improvements

New Facility Construction	\$42,669
Facility Maintenance	\$23,941
Subtotal	\$66,611

Visitor Services/Recreation

Info./Education/Operations	\$32,342
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Law Enforcement

Resource protection	\$6,635
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<u>Total</u>	\$364,026
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Table 14. Cost Estimate: 10-year Projection

Half Moon WMA Management Plan Cost Estimate

Ten-year projection

Resource Management

Exotic Species Control	\$192,426
Prescribed Burning	\$235,821
Cultural Resource Management	\$1,509
Timber Management	\$5,100
Hydrological Management	\$29,314
Other	\$1,561,635
Subtotal	\$2,025,805

Priority schedule:

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

Administration

General administration	\$25,500
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Support

Land Management Planning	\$74,957
<i>Land Management Reviews</i>	\$4,623
<i>Training/Staff Development</i>	\$15,411
Vehicle Purchase	\$120,149
Vehicle Operation and Maintenance	\$176,516
Other	\$290,049
Subtotal	\$681,705

Capital Improvements

<i>New Facility Construction</i>	\$146,368
Facility Maintenance	\$274,460
Subtotal	\$420,828

Visitor Services/Recreation

Info./Education/Operations	\$370,765
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Law Enforcement

Resource protection	\$76,066
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<u>Total</u>	\$3,600,669
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10 Analysis of Potential for Contracting Private Vendors for Restoration and Management Activities

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

Approved Conditional Rejected

- | | | |
|---|---|---|
| • 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 Governmental Requirements

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

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

impractical or where providing such access would change the fundamental character of the facility being provided).

Uses planned for HMWMA 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 13.7). 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 Control Plan for HMWMA in compliance with Chapter 388.4111 F.S. (Appendix 13.15). This plan was developed in cooperation with the local Sumter County arthropod control agency. This plan is also in conformance with the Local Government Comprehensive Plan as approved and adopted for Sumter County, Florida, (Appendix 13.16).

12 Endnotes

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- ⁴ Soil Survey of Sumter County, Florida. 1988. 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, 6pp.
- ⁵ Regulatory Negotiation Committee on Accessibility Guidelines for Outdoor Developed Areas, Final Report. 1999.
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- 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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- ¹⁴ Emanuel, K.A. 2005. Increasing Destructiveness of Tropical Cyclones Over the Past 30 Years.
- ¹⁵ Webster et al. 2005; Webster, P. J., et al. 2005. Changes in Tropical Cyclone Number, Duration, and Intensity, in a Warming Environment. *Science* 309: 1844–1846.
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- ¹⁸ Clough, J.S. 2008. Application of the Sea-Level Affecting Marshes Model (SLAMM 5.0) to Crystal River NWR. Warren Pinnacle Consulting, Inc. for U.S. Fish and Wildlife Service. 46 pp.

13 Appendices

13.1 Lease Agreement and SWFWMD Management Agreement

SAL8103

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

LEASE AGREEMENT

Lease No. 3789

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

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

NOW, THEREFORE, this lease is made and entered into this 18th day of December, 1989, between the BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND OF THE STATE OF FLORIDA, hereinafter referred to as "LESSOR", and the STATE OF FLORIDA GAME AND FRESH WATER FISH COMMISSION, hereinafter referred to as "LESSEE",

WITNESSETH:

The parties, for and in consideration of mutual covenants and agreements hereinafter contained, hereby covenant and agree as follows:

1. DELEGATIONS OF AUTHORITY: LESSOR'S responsibilities and obligations herein shall be exercised by the Division of State Lands, Department of Natural Resources.
2. DESCRIPTION OF PREMISES: The property subject to this lease, is situated in the County of Sumter, State of Florida and is more particularly described in Exhibit A attached hereto and hereinafter called the "leased premises".
3. TERM: The term of this lease shall be for a period of fifty (50) years, commencing on December 18, 1989 and ending on December 17, 2039, unless sooner terminated pursuant to the

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Lease No. 3789

provisions of this lease.

4. PURPOSE: LESSEE shall manage the leased premises only for the conservation and protection of natural and historical resources and resource based public outdoor recreation which is compatible with the conservation and protection of these public lands, as set forth in subsection 253.023(11), Florida Statutes, along with other related uses necessary for the accomplishment of this purpose as designated in the Management Plan required by paragraph 7 of this lease.

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

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

7. MANAGEMENT PLAN: LESSEE shall prepare and submit a Management Plan for the leased premises, in accordance with Section 253.034, Florida Statutes, and Chapters 18-2 and 18-4, Florida Administrative Code, within 12 months of the effective date of this lease. The Management Plan shall be submitted to LESSOR for approval through the Division of State Lands. The leased premises shall not be developed or physically altered in any way other than what is necessary for security and maintenance of the leased premises without the prior written approval of LESSOR until the Management Plan is approved. The Management Plan shall emphasize the original management concept as approved by LESSOR at the time of acquisition which established the primary public purpose for which the leased premises were acquired. The approved Management Plan shall provide the basic guidance for all management activities and shall be reviewed jointly by LESSEE and LESSOR at least every five (5) years. LESSEE shall not use or alter the leased premises except as provided for in the approved Management Plan without the prior written approval of LESSOR. The Management Plan prepared under

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this lease shall identify management strategies for exotic species, if present. The introduction of exotic species is prohibited, except when specifically authorized by the approved Management Plan.

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

9. INSURANCE REQUIREMENTS: LESSEE shall procure and maintain adequate fire and extended risk insurance coverage for any improvements or structures located on the leased premises in amounts not less than the full insurable replacement value of such improvements by preparing and delivering to the Division of Risk Management, Department of Insurance, a completed Florida Fire Insurance Trust Fund Coverage Request Form immediately upon erection of any structures as allowed by paragraph 4 of this lease. A copy of said form and immediate notification in writing of any erection or removal of structures or other improvements on the leased premises and any changes affecting the value of the improvements shall be submitted to the following: Bureau of Uplands Management, Division of State Lands, Department of Natural Resources, 3900 Commonwealth Boulevard, Tallahassee, Florida 32399.

10. LIABILITY: LESSEE shall assist in the investigation of injury or damage claims either for or against LESSOR or the State of Florida pertaining to LESSEE'S respective areas of responsibility under this lease or arising out of LESSEE'S respective management programs or activities and shall contact LESSOR regarding the legal action deemed appropriate to remedy such damage or claims.

11. ARCHAEOLOGICAL AND HISTORIC SITES: Execution of this lease in no way affects any of the parties' obligations pursuant to Chapter 267, Florida Statutes. The collection of artifacts or the disturbance of archaeological and historic sites on state-owned lands is prohibited unless prior authorization has

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been obtained from the Department of State, Division of Historical Resources. The Management Plan prepared pursuant to Section 253.034, Florida Statutes, shall be reviewed by the Division of Historical Resources to insure that adequate measures have been planned to locate, identify, protect and preserve the archaeological and historic sites and properties on the leased premises.

12. EASEMENTS: All easements including, but not limited to, utility easements are expressly prohibited without the prior written approval of LESSOR. Any easement not approved in writing by LESSOR shall be void and without legal effect.

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

14. SURRENDER OF PREMISES: Upon termination or expiration of this lease LESSEE shall surrender the leased premises to LESSOR. In the event no further use of the leased premises or any part thereof is needed, written notification shall be made to the Bureau of Uplands Management, Division of State Lands, Department of Natural Resources, 3900 Commonwealth Boulevard, Tallahassee, Florida 32399, at least six (6) months prior to the release of all or any part of the leased premises. Notification shall include a legal description, this lease number and an explanation of the release. The release shall only be valid if approved by LESSOR through execution of a release of lease instrument with the same formality as this lease. Upon release of all or any part of the leased premises or upon expiration or termination of this lease, all improvements, including both physical structures and modifications to the leased premises, shall become the property of LESSOR, unless LESSOR gives written notice to LESSEE to remove any or all such improvements at the expense of LESSEE. The decision to retain any improvements upon termination of this lease shall be at LESSOR'S sole discretion. Prior to surrender of all or any part of the leased premises, a

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representative of the Division of State Lands shall perform an on-site inspection and the keys to any buildings on the leased premises shall be turned over to the Division. If the leased premises and improvements located thereon do not meet all conditions set forth in paragraphs 18 and 21 herein, LESSEE shall pay all costs necessary to meet the prescribed conditions.

15. BEST MANAGEMENT PRACTICES: LESSEE shall implement applicable Best Management Practices for all activities conducted under this lease in compliance with paragraph 18-2.004(1)(d), Florida Administrative Code, which have been selected, developed, or approved by LESSOR, LESSEE or other land managing agencies for the protection and enhancement of the leased premises.

16. PUBLIC LANDS ARTHROPOD CONTROL PLAN: LESSEE shall identify and subsequently designate to the respective arthropod control district or districts within one year of the effective date of this lease all of the environmentally sensitive and biologically highly productive lands contained within the leased premises, in accordance with Section 388.4111, Florida Statutes and Chapter 10D-54, Florida Administrative Code, for the purpose of obtaining a public lands arthropod control plan for such lands.

17. DUPLICATE ORIGINALS: This lease is executed in duplicate originals each of which shall be considered an original for all purposes.

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

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

20. PLACEMENT AND REMOVAL OF IMPROVEMENTS: All buildings, structures, improvements, and signs shall be constructed at the

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

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

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

23. BREACH OF COVENANTS, TERMS, OR CONDITIONS: Should LESSEE breach any of the covenants, terms, or conditions of this lease, LESSOR shall give written notice to LESSEE to remedy such breach within sixty (60) days of such notice. In the event LESSEE fails to remedy the breach to the satisfaction of LESSOR within sixty (60) days of receipt of written notice, LESSOR may either terminate this lease and recover from LESSEE all damages LESSOR may incur by reason of the breach including, but not

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limited to, the cost of recovering the leased premises or maintain this lease in full force and effect and exercise all rights and remedies herein conferred upon LESSOR.

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

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

26. CONDITIONS AND COVENANTS: All of the provisions of this lease shall be deemed covenants running with the land included in the leased premises, and construed to be "conditions" as well as "covenants" as though the words specifically expressing or imparting covenants and conditions were used in each separate provision.

27. DAMAGE TO THE PREMISES: LESSEE agrees that it will not do, or suffer to be done, in, on or upon the leased premises or as affecting said leased premises, any act which may result in damage or depreciation of value to the leased premises, or any part thereof. LESSEE shall not dispose of any contaminants including, but not limited to, hazardous or toxic substances, chemicals or other agents used or produced in LESSEE'S operations, on the leased premises or on any adjacent state land or in any manner not permitted by law.

28. PAYMENT OF TAXES AND ASSESSMENTS: LESSEE shall assume full responsibility for and shall pay all liabilities that accrue

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to the leased premises or to the improvements thereon, including any and all drainage and special assessments or taxes of every kind and all mechanic's or materialism's liens which may be hereafter lawfully assessed and levied against the leased premises.

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

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

31. COMPLIANCE WITH LAWS: LESSEE agrees that this lease is contingent upon and subject to LESSEE obtaining all applicable permits and complying with all applicable permits, regulations, ordinances, rules, and laws of the State of Florida or the United States or of any political subdivision or agency of either.

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

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

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

35. SPECIAL CONDITIONS: The following special conditions shall apply to this lease.

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Lease No. 3789

The LESSEE is hereby authorized to enter into appropriate agreements with other agencies for the conservation and protection of natural and historical resources, along with other related uses as designated in the management plan required by Paragraph No. 7 of this lease.

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

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

Bonnie Deles
Witness
Kelly Jones
Witness

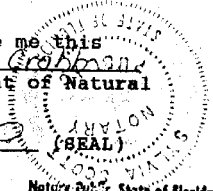
By: Daniel T. Crabtree (SEAL)
Acting CHIEF, BUREAU OF UPLANDS MANAGEMENT, DIVISION OF STATE LANDS, DEPARTMENT OF NATURAL RESOURCES

"LESSOR"

STATE OF FLORIDA
COUNTY OF LEON

The foregoing instrument was acknowledged before me this 19th day of December, 1989, by Daniel T. Crabtree as Acting Chief, Bureau of Uplands Management Department of Natural Resources.

Sylvia Scott
NOTARY PUBLIC



My Commission Expires: My Commission Expires July 25, 1993
Notary Public, State of Florida
Bonded Three Thousand Dollars - Insurance Free

Approved as to Form and Legality

By: James M. Clark
DNR Attorney

STATE OF FLORIDA GAME AND FRESH WATER FISH COMMISSION

James C. Besser
Witness
Bale J. Cook
Witness

By: Robert M. Brantly (SEAL)
Its: Executive Director

"LESSEE"

APPROVED AS FISCALLY AND BUDGETARILLY SOUND

William C. Sumner
DIRECTOR
DIVISION OF ADMINISTRATIVE SERVICES
GFWFC

STATE OF FLORIDA
COUNTY OF LEON

The foregoing instrument was acknowledged before me this
20th day of November, 1999, by Robert M. Assembly,
as Executive Director.

Rosemary Mana (SEAL)
NOTARY PUBLIC

My Commission Expires:

Notary Public, State of Florida.
My Commission Expires Oct. 20, 1991
Rounded Top Tally Fair - Insurance Inc.



APPROVED AS TO FORM
AND LEGAL SUFFICIENCY

[Signature]
Commission Attorney

The South 3/4 of Section 8, Township 18 South, Range 21 East, AND The South 3/4 of Section 7, Township 18 South, Range 21 East, AND The East 1/4 of Section 13, Township 18 South, Range 20 East, AND The South 1/4 of the West 1/2 of the Southeast 1/4 of Section 13, Township 18 South, Range 20 East, AND The South 1/4 of the East 1/2 of the Southwest 1/4 of Section 13, Township 18 South, Range 20 East, LESS that portion deeded to Southwest Florida Water Management District by corrective warranty deed recorded in Official Records Book 386, page 689, Public Records of Sumter County, Florida; AND Section 18, Township 18 South, Range 21 East, AND The East 1/2 of the Northeast 1/4 of Section 17, Township 18 South, Range 21 East, AND The Northwest 1/4 of Section 20, Township 18 South, Range 21 East, AND The South 1/4 of Section 20, Township 18 South, Range 21 East, LESS the West 1/4 thereof; AND Section 19, Township 18 South, Range 21 East, LESS the Southeast 1/4 of the Southeast 1/4 thereof; AND The East 1/2 of Section 24, Township 18 South, Range 20 East, LESS that portion deeded to Southwest Florida Water Management District by corrective warranty deed recorded in Official Records Book 386, Page 689, Public Records of Sumter County, Florida; AND That portion of the Northeast 1/4 of Section 25, Township 18 South, Range 20 East, LESS that portion deeded to Southwest Florida Water Management District by corrective warranty deed recorded in Official Records Book 386, Page 689, Public Records of Sumter County, Florida; AND Section 30, Township 18 South, Range 21 East, LESS that portion deeded to Southwest Florida Water Management District by corrective warranty deed recorded in Official Records Book 386, page 689, Public Records of Sumter County, Florida; AND Section 29, Township 18 South, Range 21 East, LESS the East 1/2 of the Northwest 1/4 thereof, AND LESS that portion deeded to Southwest Florida Water Management District by corrective warranty deed recorded in Official Records Book 386, page 689, Public Records of Sumter County, Florida; AND The North 1/2 of Section 32, Township 18 South, Range 21 East, LESS those portions deeded to Southwest Florida Water Management District by corrective warranty deed recorded in Official Records Book 386, page 689, Public Records of Sumter County, Florida AND The East 1/2 of the Southeast 1/4 of Section 32, Township 18 South, Range 21 East, AND The East 1/2 of the Northeast 1/4 of Section 5, Township 19 South, Range 21 East, AND A portion of the Northwest 1/4 of Section 4, Township 19 South, Range 21 East. All of the above being located in Sumter County, Florida, and further described as follows: Commence at the Northwest corner of Section 4, Township 19 South, Range 21 East, Sumter County, Florida for a Point of Beginning; thence run South 01 degrees 31'18" West, along the West boundary of said Section 4, 459.97 feet; thence run North 16 degrees 29'22" West, 207.60 feet; thence run North 33 degrees 42'30" West, 314.36 feet to the North boundary of Section 5, Township 19 South, Range 21 East; thence run North 89 degrees 49'19" West, along said North boundary, 72.31 feet; thence run South 33 degrees 42'30" East, 345.66 feet; thence run South 16 degrees 29'22" East, 383.027 feet; thence run North 01 degrees 31'18" East, 58.82 feet; thence run South 25 degrees 36'18" East, 170.04 feet; thence run South 40 degrees 33'54" East, 799.24 feet; thence run South 26 degrees 34'18" East, 859.30 feet; thence run South 41 degrees 07'44" East, 312.18 feet; thence run South 24 degrees 47'10" East, 312.24 feet to the South boundary of said Section 4; thence run North 89 degrees 34'14" West, along said South boundary, 1367.94 feet to the West 1/4 corner of said Section 4; thence run North 89 degrees 44'18" West, 1326.26 feet; thence run North 01 degrees 41'55" East, 2631.63 feet to the Northwest corner of the East 1/2 of the Northeast 1/4 of Section 5; thence run North 00 degrees 17'46" East, 2630.28 feet to the boundary of the property conveyed to the Southwest Florida Water Management District by corrective warranty deed recorded in Official Records Book 386, page 689, Public Records of Sumter County, Florida; thence run along said boundary for the next 12 courses: North 00 degrees 23'05" East 251.90 feet; thence run North 89 degrees 37'13" West, 1450.09 feet; thence North 27 degrees 31'03" West, 2067.03 feet; thence North 76 degrees 22'12" West, 1378.01 feet; thence North 35 degrees 51'58" West, 4003.72 feet; thence North 78 degrees 25'35" West, 2516.30 feet; thence North 44 degrees 41'38" West 639.97 feet; thence North 82 degrees 09'11" West, 1463.85 feet; thence North 35 degrees 25'32" West 1061.34 feet; thence North 45 degrees 00'12" West 1230.25 feet; thence North 00 degrees 00'06" West, 4713.27 feet to the North boundary of Section 24, Township 18 South, Range 20 East; thence

Exhibit "A"
Lease No. 3789
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run South 89 degrees 54'17" West, along said North boundary 430.08 feet; thence North 00 degrees 00'06" West, 1334.04 feet; thence North 89 degrees 42'19" East, 1650.82 feet; thence North 00 degrees 06'02" East, 4843.55 feet to the Northwest corner of the East 1/2 of the Northeast 1/4 of Section 13, Township 18 South, Range 20 East; thence run South 87 degrees 34'28" East along the North boundary of said Section 13, 1348.08 feet to the Southwest corner of Section 7, Township 18 South, Range 21 East; thence North 00 degrees 40'45" East along the West boundary of said Section 7, 3973.87 feet; thence South 89 degrees 46'30" East, 5298.18 feet to a point on the East boundary of said Section 7; thence North 89 degrees 42'22" East, 5316.91 feet to the East boundary of Section 8, Township 18 South, Range 21 East; thence South 00 degrees 24'22" East, along said East boundary 4006.02 feet to the Northeast corner of Section 17, Township 18 South, Range 21 East; thence run South 00 degrees 21'36" West along the East boundary of said Section 17, 2665.41 feet to the East 1/4 corner of said Section 17; thence North 89 degrees 41'10" West, 1324.80 feet; thence North 00 degrees 15'22" East 2664.54 feet to the North boundary of said Section 17; thence run North 89 degrees 43'24" West, along said North boundary, 3988.89 feet to the Northwest corner of said Section 17; thence South 00 degrees 03'08" West along the West boundary of said Section 17, 5323.97 feet to the Southwest corner of said Section 17; thence run South 89 degrees 25'40" East, along the South boundary of said Section 17, 2650.04 feet to the South 1/4 corner of said Section 17; thence South 00 degrees 01'22" West, 2641.28 feet; thence North 89 degrees 31'56" West 2659.22 feet to the West 1/4 corner of Section 20, Township 18 South, Range 21 East; thence run South 00 degrees 13'58" West along the West boundary of said Section 20, 1325.72 feet; thence South 89 degrees 41'26" West, 1342.87 feet; thence run South 00 degrees 29'16" West, 1326.36 feet to the South boundary of Section 19, Township 18 South, Range 21 East; thence North 89 degrees 39'59" East, along said South boundary, 1348.78 feet to the Southwest corner of Section 20, Township 18 South, Range 21 East; thence South 89 degrees 39'18" East, along said South boundary, 1334.75 feet; thence South 00 degrees 10'21" East, 2654.15 feet; thence South 89 degrees 42'18" East, 1335.27 feet; thence North 00 degrees 11'02" West, 2652.99 feet to said South boundary of Section 20; thence North 89 degrees 39'18" West along said South boundary, 1334.75 feet; thence North 00 degrees 07'17" East, 1324.31 feet; thence South 89 degrees 35'38" East, 3994.49 feet to the East boundary of said Section 20; thence run South 00 degrees 18'12" East along said East boundary, 1320.11 feet to the Northeast corner of Section 29, Township 18 South, Range 21 East; thence South 00 degrees 03'13" East, along the East boundary of said Section 29, 5301.20 feet to the Northeast corner of Section 32, Township 18 South, Range 21 East; thence South 00 degrees 13'16" West, along the East boundary of said Section 32, 5279.55 feet to the Point of Beginning.

SUBJECT to the following encumbrances;

Exhibit "A"
Lease No. 3789
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ATL8101

BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT
TRUST FUND

AMENDMENT NUMBER 1 TO LEASE NUMBER 3789

THIS LEASE AMENDMENT is entered into this 2^{5th} day of May, 1996, by and between the BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND OF THE STATE OF FLORIDA, hereinafter referred to as "LESSOR" and the STATE OF FLORIDA GAME AND FRESH WATER FISH COMMISSION, hereinafter referred to as "LESSEE";

W I T N E S S E T H

WHEREAS, LESSOR, by virtue of Section 253.03, Florida Statutes, holds title to certain lands and property for the use and benefit of the State of Florida; and

WHEREAS, on December 18, 1989, LESSOR and LESSEE entered into Lease No. 3789; and

WHEREAS, LESSOR and LESSEE desire to amend the lease to add land to the leased property; and

NOW THEREFORE, in consideration of the mutual covenants and agreements contained herein, the parties hereto agree as follows:

1. The legal description of the leased premises set forth in Exhibit "A" of Lease No. 3789 is hereby amended to include the real property described in Exhibit "A", attached hereto, and by reference made a part hereof.

2. It is understood and agreed by LESSOR and LESSEE that in each and every respect the terms of the Lease No. 3789 except as amended hereby, shall remain unchanged and in full force and effect and the same are hereby ratified, approved and confirmed by LESSOR and LESSEE.

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

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

By: [Signature] (SEAL)
DANIEL T. CRABB, CHIEF, BUREAU OF LAND MANAGEMENT SERVICES, DIVISION OF STATE LANDS, DEPARTMENT OF ENVIRONMENTAL PROTECTION

"LESSOR"

[Signature]
Witness

Niketa R. Hill
Print/Type Witness Name

[Signature]
Witness

Latoria Peoples
Print/Type Witness Name

STATE OF FLORIDA
COUNTY OF LEON

1st The foregoing instrument was acknowledged before me this day of May, 1996 by Daniel T. Crabb, as Chief, Bureau of Land Management Services, Division of State Lands, Florida Department of Environmental Protection, as agent for and on behalf of the Board of Trustees of the Internal Improvement Trust Fund of the State of Florida. He is personally known to me.

[Signature]
Notary Public, State of Florida

Gloria H. Maddox
Print/Type Notary Name

(SEAL)



Commission Number:

Commission Expires:

Approved as to Form and Legality

By: [Signature]
DEP Attorney

STATE OF FLORIDA GAME AND FRESH WATER FISH COMMISSION

By: [Signature] (SEAL)

Allan L. Egbert
Print/Type Name

Title: Executive Director

"LESSEE"

[Signature]
Witness

Rosemary Mara
Print/Type Witness Name

[Signature]
Witness

K. m. Wright
Print/Type Witness Name

[Signature]

STATE OF FLORIDA
COUNTY OF LEON

The foregoing instrument was acknowledged before me this
12th day of April, 1996 by Allan L. Esbert
as Executive Director of State of Florida Game and
Fresh Water Fish Commission. He/~~she~~ is personally known to me.

Jimmie C. Bevis
Notary Public, State of Florida

JIMMIE C. BEVIS

Print/Type Notary Name

Commission Number:

Commission Expires:

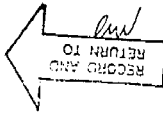


470
462
35.50
Recd

EXHIBIT "A"

REC. 454 PAGE 326

This instrument prepared by:
Jorge Diaz-Silveira, Esq.
STEEL HECTOR & DAVIS
4000 Southeast Financial Center
Miami, Florida 33131-2398



FILED AND RECORDED IN
PUBLIC RECORDS OF
SUMTER COUNTY, FLA.
RECORD VERIFIED
MAY 6 2 29 PM '92
BERNARD R. SHELNUTT, JR.
CLERK OF CIRCUIT COURT
IN
WILLIAMS

247231

WARRANTY DEED

This Warranty Deed, made this 13th day of April, 1992 by and between SEVEN SPRINGS FOUNDATION, INC., a Florida not-for-profit corporation, MCGREGOR SMITH, JR., a married man, and WILSON SMITH, a single man, as tenants in common each owning an undivided 1/3 interest ("Grantors") to the BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND OF THE STATE OF FLORIDA ("Grantee"), whose post office address is c/o Department of Natural Resources, Division of State Lands, 3900 Commonwealth Boulevard, Mail Station 115, Tallahassee, Florida 32399.

W I T N E S S E T H:

WHEREAS, Grantors for and in consideration of the sum of Ten Dollars (\$10.00) in hand paid by the Grantee and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, hereby grant, bargain and sell to the Grantee and to Grantee's successors and assigns forever, all of Grantors' right, title and interest in and to those certain parcels of land (the "Land"), all of which are located within Township 18 South, Range 21 East, in the County of Sumter, State of Florida, to wit:

All of Section 6, less the East 1/2 of the Northeast 1/4 of said Section 6 and less the Southwest 1/4 of the Southwest 1/4 of said Section 6;

The East 1/4 of the North 1/2 of the North 1/2 of Section 7;

The North 1/2 of the North 1/2 of Section 8; and

The Southwest 1/4 of Section 5.

All in Township 18 South, Range 21 East, Sumter County, Florida.

SUBJECT TO:

1. Reservation of easement for State Road Right of Way unto the State of Florida as contained in Deed No. 322, from the Trustees of the Internal Improvement Fund of the State of Florida, dated December 16, 1941 and recorded December 26, 1941, in Deed Book 114, Page 328 of the Public Records of Sumter County, Florida.

2. Oil, gas and mineral rights reserved in Deed recorded December 19, 1941 in Deed Book 113, Page 209 and subsequent conveyances in Official Records Book 289, Page 213, Official Records Book 294, Page 373, Official Records Book 294, Page 789, Official Records Book 299, Page 203, Official Records Book 312, Page 416, Official Records Book 312, Page 412 and Official Records Book 400, Page 301, all of the Public Records of Sumter County, Florida.

Documentary Stamps

Intangible Tax

PAID 6.00

BY Maitha Williams

BERNARD R. SHELNUTT, JR., CLERK

CIRCUIT COURT, SUMTER COUNTY, FLORIDA

APPROVED AS TO FORM & LEGALITY
Sandy Hester
DEPT. OF NATURAL RESOURCES

Note to Tax Examiner: This instrument shall be recorded in the Public Records of Sumter County, Florida, and the appropriate documentary stamp Page 4 of 15 this instrument shall be Amendment No. 1 to Lease No. 3789 Florida.

RECORDED
MAY 14 4 11 PM '92
BY oja
92-032213

McGregor Smith, Jr. certifies, represents and warrants that he does not reside and has not resided at any time on said land, that said land is not his homestead property as defined under Article 10, Section 4 of the Florida Constitution, and is not contiguous thereto, and that McGregor Smith, Jr. resides at 11200 S.W. 60th Avenue, Miami, Florida 33156.

Reserving, however, unto the Grantors, and Grantors' successors and assigns, as well as any employee, agent, licensee, invitee, guest or assignee of Grantors, an easement forever over, under, in, on, upon and across the lands described on Exhibit A attached hereto and by this reference expressly made a part hereof (the "Easement Area") for the purpose of vehicular and pedestrian ingress and egress over and across the Easement Area for the benefit of the owners (the "Owners") of adjacent lands more particularly described on Exhibit B attached hereto and made a part hereof (the "Adjacent Lands"), and the Owners' successors and assigns, as well as any employee, agent, licensee, invitee, guest or assignee of the Owners. The Grantors and the Owners and their respective successors and assigns are hereinafter sometimes collectively referred to as the "Benefitted Parties".

By their respective acts of delivering and accepting this Warranty Deed, the Grantors, the Owners and the Grantee, intending to bind themselves and their respective heirs, personal representatives, successors and assigns, including any and all successors in title to them, do hereby agree as follows with respect to the Easement Area and the easement rights thereto reserved by the Grantors herein, to wit:

- (i) neither the Benefitted Parties nor the Grantee shall have any duties or obligations, each to the other or to third parties, respecting the condition, maintenance, stabilization, drainage, restoration, and repair of the Easement Area;
- (ii) notwithstanding the language set forth in subparagraph (i) above, the Grantors, the Owners or the Grantee, at their or its sole cost and expense, may (but shall not be obligated to) unilaterally perform maintenance services such as soil stabilization and drainage of various portions of the Easement Area;
- (iii) the easement rights reserved herein create and establish a perpetual non-exclusive easement in favor of the Benefitted Parties and the Benefitted Parties' successors and assigns, as well as any employee, agent, licensee, invitee, guest or assignee of the Benefitted Parties, and the Benefitted Parties understand and agree that the Grantee shall have the right to (a) engage in any activities on, over, under and across the Easement Area which do not unreasonably interfere with Benefitted Parties' exercise of its rights hereunder, and (b) grant compatible uses to third parties on, over, under and across the Easement Area, provided always, however, that neither the Benefitted Parties nor the Owners, or any of the foregoing, shall have or owe any duty to the

not limited to, hazardous or toxic substances, chemicals or other agents on any portion of the Easement Area, on any adjacent state land, or in any manner not permitted by law.

- (vii) the easement rights reserved herein shall include the right of the Benefitted Parties or any of them, and their employees, agents, licensees, invitees, guests, assignees and representatives, to improve the Easement Area or various portions thereof as and when improvements thereto shall be deemed mutually necessary by the Benefitted Parties and Grantee; provided always however, that none of the Benefitted Parties undertake any duty to so improve or to otherwise maintain the Easement Area or any portion thereof;
- (viii) Grantee and its duly authorized agents, representatives or employees shall have the right at any and all times to inspect any and all portions of the Easement Area and any works and operations of Benefitted Parties or any of them thereon or therein to ensure that the same are in compliance with the provisions hereof;
- (ix) the easement rights of the Benefitted Parties reserved herein in no way affect any of the Benefitted Parties' or Grantee's obligations pursuant to Chapter 267, Florida Statutes, and the parties expressly acknowledge their understanding and agreement that the collection of artifacts or the disturbance of archaeological and historic sites on state-owned land is prohibited unless prior authorization has been obtained from the Department of State, Division of Historical Resources;
- (x) Benefitted Parties acknowledge that fee simple title to the lands comprising the Easement Area described on attached Exhibit A is vested in the Grantee. The Benefitted Parties covenant and agree with the Grantee that they shall not do, or permit anything to be done by and through them, which establishes or creates, or purports to create, a lien or encumbrance of any nature against the lands owned by the Grantee, including, but not limited to, the creation of mortgage liens or construction liens against all or any portion of the Easement Area or against the fee simple title of the Grantee thereto;
- (xi) the Benefitted Parties acknowledge their understanding and agreement that nothing provided herein or reserved hereby authorizes the Benefitted Parties to use any lands located waterward of the mean or ordinary high water line of any lake, river, stream, creek, bay, estuary, or other water body or the waters or the air space thereabove;

EXHIBIT A

- (xii) Benefitted Parties agree to and shall pay all costs, charges and expenses, including reasonable attorneys' fees for trial and appellate matters, incurred or paid by the Grantee because of the failure on the part of the Benefitted Parties (after notice of default and a reasonable period of time in which to cure such default) to comply with and abide by each and every one of the Benefitted Parties' stipulations, agreements, covenants and conditions set forth herein, or which are incurred or paid by the Grantee in seeking any remedy available to the Grantee as a result of such failure (after notice and opportunity to cure) on the part of the Benefitted Parties;
- (xiii) Benefitted Parties agree to and hereby assume full responsibility to pay for any and all assessments and taxes that may hereafter accrue or be lawfully assessed and levied against the Easement Area or any permitted improvements thereon, including any and all drainage and special assessments or taxes of every kind, and it is further agreed that the party causing to be furnished labor or materials which could give rise to any mechanic's or materialmen's liens shall discharge any and all mechanics' and materialmen's liens created or suffered thereby as liens against the Easement Area or any portion thereof; and
- (xiv) Benefitted Parties hereby covenant and agree to investigate, at their sole cost and expense, all claims which arise out of Benefitted Parties' use of the Easement Area, and to indemnify, protect, defend, hold and save harmless Grantee and the State of Florida from any and all loses, liabilities, damages, claims, actions, lawsuits and demands of any kind or nature arising out of Benefitted Parties' use of the Easement Area.
- (xv) Except as set forth in subparagraph (xiv) above, neither the Benefitted Parties nor their respective successors and assigns assumes or shall have any liability or responsibility to any party whomsoever using the Easement Area reserved hereby for any bodily injury (including death) or property damage caused by any other party's use of the Easement Area, including specifically, but not limited to, Grantee and its successors and assigns, and the agents, employees, licensees and invitees of Grantee or other persons on the Easement Area with or without the consent of Grantee.
- (xvi) The reservation of easement set forth herein shall be binding upon and inure to the benefit of the Benefitted Parties and their respective successors and assigns, as well as any employee, agent, licensee, invitee, guest or assignee of the Benefitted Parties, and the same shall be deemed to be covenants running with the Land and the Adjacent Lands. Nothing set forth herein shall be deemed or construed to preclude the termination of said covenants and easement by

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WK 1031160 / 35

an instrument or instruments in writing or in recordable form executed by both the fee simple title owner of the Land and the fee simple title owner of the Adjacent Lands. In the event that more than one person or entity holds fee simple title to the Land or the Adjacent Lands, the easement reserved herein may be modified or terminated as aforesaid by written instrument in recordable form executed by all of the then owners of fee simple title to each of such parcels of land, as applicable.

AND the Grantors do hereby fully warrant the title to the Land and will defend the same against the lawful claims of all persons whomsoever.

IN WITNESS WHEREOF the Grantors have executed this instrument this 13th day of April, 1992.

Signed, sealed and delivered in the presence of:

SEVEN SPRINGS FOUNDATION, INC., a Florida not-for-profit corporation

Martha B. Levey
Name: MARTHA B. LEVEY

By: McGregor Smith, Jr.
McGregor Smith, Jr.
Vice President

(Corporate Seal)

Jorge Diaz-Silveira
Name: Jorge Diaz-Silveira

Mailing Address:
c/o Steel Hector & Davis
4000 Southeast Financial Center
Miami, Florida 33131
Attn: Wilson Smith, P.A.

Martha B. Levey
Name: MARTHA B. LEVEY

McGregor Smith, Jr.
McGregor Smith, Jr., a married man

Jorge Diaz-Silveira
Name: Jorge Diaz-Silveira

Mailing Address:
11200 S.W. 60th Avenue
Miami, Florida 33156

Martha B. Levey
Name: MARTHA B. LEVEY

Wilson Smith
Wilson Smith, a single man

Jorge Diaz-Silveira
Name: Jorge Diaz-Silveira

Mailing Address:
12501 Pine Needle Lane
Miami, Florida 33156

STATE OF FLORIDA)
COUNTY OF DADE)

I HEREBY CERTIFY that on this day, before me, an officer duly authorized in the State aforesaid and in the County aforesaid to take acknowledgments, personally appeared MCGREGOR SMITH, JR., as Vice President of Seven Springs Foundation, Inc., a Florida not-for-profit corporation, who executed the foregoing deed on behalf of said corporation and acknowledged to and before me that he did so voluntarily and for the purposes set

forth herein, and who produced Drivers License as identification and who did take an oath.

WITNESS my hand and official seal in the County and State last aforesaid this 13th day of April, 1992.

Jose R. Silveira
Notary Public, State of Florida
Name: Jose Diaz Silveira
Commission No. CC074831

(Seal)

My commission expires:
Notary Public, State of Florida
My Commission Expires Jan. 3, 1995
Bonded thru Troy Fair - Insurance Inc.

STATE OF FLORIDA)
COUNTY OF Polk

I HEREBY CERTIFY that on this day, before me, an officer duly authorized in the State aforesaid and in the County aforesaid to take acknowledgments, personally appeared MCGREGOR SMITH, JR., a married man, who executed the foregoing deed and acknowledged to and before me that he did so voluntarily and for the purposes set forth herein, and who produced Drivers License as identification and who did take an oath.

WITNESS my hand and official seal in the County and State last aforesaid this 13th day of April, 1992.

Jose R. Silveira
Notary Public, State of Florida
Name: Jose Diaz Silveira
Commission No. CC074831

(Seal)

My commission expires:

Notary Public, State of Florida
My Commission Expires Jan. 3, 1995
Bonded thru Troy Fair - Insurance Inc.
STATE OF FLORIDA)
COUNTY OF Polk

I HEREBY CERTIFY that on this day, before me, an officer duly authorized in the State aforesaid and in the County aforesaid to take acknowledgments, personally appeared WILSON SMITH, a single man, who executed the foregoing deed and acknowledged to and before me that he did so voluntarily and for the purposes set forth herein, and who produced DRIVERS LICENSE as identification and who did take an oath.

WITNESS my hand and official seal in the County and State last aforesaid this 13th day of April, 1992.

Jose R. Silveira
Notary Public, State of Florida
Name: Jose Diaz Silveira
Commission No. CC074831

(Seal)

My commission expires:

Notary Public, State of Florida
My Commission Expires Jan. 3, 1995
Bonded thru Troy Fair - Insurance Inc.
JDS/2190

BR 133160131

ACKNOWLEDGMENT AND ACCEPTANCE BY GRANTEE

For good and valuable consideration, the receipt, sufficiency and adequacy of which is hereby acknowledged, the Grantee, for itself and its successors and assigns, does hereby agree to accept all of the burdens, as well as the benefits imposed by the delivery, acceptance and recordation of this Warranty Deed in the Public Records of Sumter and Marion Counties, Florida, including, but not limited to the easement rights reserved herein.

Signed, sealed and delivered in the presence of:

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

[Signature]
Name: ED Wood
[Signature]
Name: GAYLE H. BRETT

By: [Signature]
Percy W. Mallison, Jr.,
Director, Division of State Lands Department of Natural Resources, as agent for and on behalf of the Board of Trustees of the Internal Improvement Trust Fund of the State of Florida

OK 183 | PG 0739

STATE OF FLORIDA)
COUNTY OF Leon)

I HEREBY CERTIFY that on this day, before me, an officer duly authorized in the State aforesaid and in the County aforesaid to take acknowledgments, personally appeared Percy W. Mallison, Jr., as Director, Division of State Lands, Department of Natural Resources, as agent for the BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND OF THE STATE OF FLORIDA, who executed the foregoing instrument on behalf of the Board of Trustees of the Internal Improvement Trust Fund of the State of Florida and acknowledged to and before me that he did so voluntarily and for the purposes set forth herein, and who produced a Florida driver's license as identification and who did not take an oath.

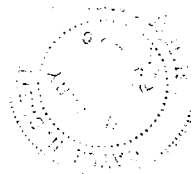
WITNESS my hand and official seal in the County and State last aforesaid this 30th day of April, 1992.

[Signature]
Notary Public, State of Florida
Name: GAYLE H. BRETT
Commission No. AA628618

(Seal)

My commission expires:

on 01/01/1992
My Commission Expires 01/01/1992
Notary Public, State of Florida



ACKNOWLEDGEMENT AND CONSENT BY OWNERS OF ADJACENT LANDS

For good and valuable and consideration, the receipt, sufficiency and adequacy of which is hereby acknowledged, Elizabeth W. Smith, McGregor Smith, Jr. and Wilson Smith for themselves and their respective successors and assigns, do hereby agree to accept all of the burdens, as well as the benefits imposed by the delivery, acceptance and recordation of this Warranty Deed in the Public Records of Sumter and Marion Counties, Florida.

Signed, sealed and delivered in the presence of:

Elizabeth F. Groot
Name: ELIZABETH F. GROOT

Elizabeth W. Smith
Elizabeth W. Smith

Joyce Hope Simms
Name: Joyce Hope Simms

Mailing Address:
c/o Steel Hector & Davis
4000 Southeast Financial Center
Miami, Florida 33131
Attn: Wilson Smith, P.A.

Martina B. Levey
Name: MARTINA B. LEVEY

McGregor Smith, Jr.
McGregor Smith, Jr., a married man

Josep Diaz-Silveira
Name: Josep Diaz-Silveira

Mailing Address:
11200 S.W. 60th Avenue
Miami, Florida 33156

Martina B. Levey
Name: MARTINA B. LEVEY

Wilson Smith
Wilson Smith, a single man

Josep Diaz-Silveira
Name: Josep Diaz-Silveira

Mailing Address:
12501 Pine Needle Lane
Miami, Florida 33156

STATE OF FLORIDA)
COUNTY OF Dade)

I HEREBY CERTIFY that on this day, before me, an officer duly authorized in the State aforesaid and in the County aforesaid to take acknowledgments, personally appeared ELIZABETH W. SMITH, who executed the foregoing instrument and acknowledged to and before me that she did so voluntarily and for the purposes set forth herein, and who produced self (K. M. S. M.) as identification and who did not take an oath.

WITNESS my hand and official seal in the County and State last aforesaid this 13 day of April, 1992.

Joyce Hope Simms
Notary Public, State of Florida
Name: Joyce Hope Simms
Commission No. AB 682687

(Seal)

My commission expires: Notary Public, State of Florida
My Commission expires July 27, 1993
Bonded thru Troy Farm Insurance Inc.

OK 1831PC0739

STATE OF FLORIDA
COUNTY OF Dade

OFF. REC. 454 PAGE 335

I HEREBY CERTIFY that on this day, before me, an officer duly authorized in the State aforesaid and in the County aforesaid to take acknowledgments, personally appeared MCGREGOR SMITH, JR., a married man, who executed the foregoing instrument and acknowledged to and before me that he did so voluntarily and for the purposes set forth herein, and who produced Drivers License as identification and who did not take an oath.

WITNESS my hand and official seal in the County and State last aforesaid this 13th day of April, 1992.

Jorge Diaz-Silveira
Notary Public, State of Florida
Name: Jorge Diaz-Silveira
Commission No. PP074931

(Seal)

My commission expires:

Notary Public, State of Florida
My Commission Expires Jan. 3, 1995
Bonded thru Troy Fain - Insurance Dept

STATE OF FLORIDA
COUNTY OF Dade

I HEREBY CERTIFY that on this day, before me, an officer duly authorized in the State aforesaid and in the County aforesaid to take acknowledgments, personally appeared WILSON SMITH, a single man, who executed the foregoing instrument and acknowledged to and before me that he did so voluntarily and for the purposes set forth herein, and who produced DRIVERS LICENSE as identification and who did not take an oath.

WITNESS my hand and official seal in the County and State last aforesaid this 13th day of April, 1992.

Jorge Diaz-Silveira
Notary Public, State of Florida
Name: Jorge Diaz-Silveira
Commission No. CC074931

(Seal)

My commission expires:

Notary Public, State of Florida
My Commission Expires Jan. 3, 1995
Bonded thru Troy Fain - Insurance Dept

BK 1831580740

Legal Description of Easement Reserved to Grantors

An easement for ingress and egress lying 10 feet on each side of and directly adjacent to the following described centerline:

Commence at the Southwest corner of the NE 1/4 of the NE 1/4 of Section 7, Township 18 South, Range 21 East, Sumter County, Florida; thence run N 00°02'10" W, along the West boundary of said NE 1/4 of the NE 1/4, 10.000 feet to the Point of Beginning; thence run S 89°45'12" E, 1318.192 feet; thence run N 89°03'27" E, 1038.840 feet; thence run N 67°33'16" E, 86.718 feet; thence run N 46°03'05" E, 568.624 feet; thence run N 57°12'16" E, 634.941 feet; thence run N 44°36'05" E, 56.249 feet; thence run N 35°07'50" E, 36.004 feet; thence run N 26°59'22" E, 507.827 feet; thence run N 27°22'03" E, 80.010 feet; thence run N 48°06'24" E, 377.162 feet to the Point of Termination. Said point being N 00°50'10" E, and 302.515 feet from the South 1/4 corner of Section 5, Township 18 South, Range 21 East, Sumter County, Florida.

BK 183 | PG 074 | 1

Legal Description for Adjacent Lands

The South 1/2 of Section 32, Township 18 South, Range 21 East, in Marion County, Florida;

The Southeast 1/4 of the Southeast 1/4 of Section 31, Township 18 South, Range 21 East, in Marion County, Florida;

All of Section 5, less the Southwest 1/4 of said Section 5, Township 18 South, Range 21 East, in Sumter County, Florida;

The Southwest 1/4 of the Southwest 1/4 of Section 6, Township 18 South, Range 21 East, in Sumter County, Florida;

The North 1/2 of the North 1/2 of Section 7, less the Northeast 1/4 of the Northeast 1/4 of said Section 7, all in Township 18 South, Range 21 East, in Sumter County, Florida; and

The East 1/2 of the Northeast 1/4 of Section 6, Township 18 South, Range 21 East, in Sumter County, Florida.

DK 1831 PG 0742

ATL1

BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT
TRUST FUND

AMENDMENT NUMBER 2 TO LEASE NUMBER 3789
CARLTON HALF-MOON RANCH

THIS LEASE AMENDMENT is entered into this 20th day of August, 1996, by and between the BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND OF THE STATE OF FLORIDA, hereinafter referred to as "LESSOR" and the STATE OF FLORIDA GAME AND FRESH WATER FISH COMMISSION hereinafter referred to as "LESSEE";

W I T N E S S E T H

WHEREAS, LESSOR, by virtue of Section 253.03, Florida Statutes, holds title to certain lands and property for the use and benefit of the State of Florida; and

WHEREAS, on December 18, 1989, LESSOR and LESSEE entered into Lease Number 3789; and

WHEREAS, LESSOR and LESSEE desire to amend the lease to add land to the leased property.

NOW THEREFORE, in consideration of the mutual covenants and agreements contained herein, the parties hereto agree as follows:

1. The legal description of the leased premises set forth in Exhibit "A" of Lease Number 3789 is hereby amended to include the real property described in Exhibit "A", attached hereto, and by reference made a part hereof.
2. It is understood and agreed by LESSOR and LESSEE that in each and every respect the terms of the Lease Number 3789 except as amended hereby, shall remain unchanged and in full force and effect and the same are hereby ratified, approved and confirmed by LESSOR and LESSEE.

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

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

Kelly Servedio
Witness

Kelly Servedio
Print/Type Witness Name

Jenna Bridges
Witness

Jenna Bridges
Print/Type Witness Name

By: Daniel T. Crabb (SEAL)
DANIEL T. CRABB, CHIEF,
BUREAU OF LAND
MANAGEMENT SERVICES, DIVISION
OF STATE LANDS, DEPARTMENT OF
ENVIRONMENTAL PROTECTION

"LESSOR"

STATE OF FLORIDA
COUNTY OF LEON

The foregoing instrument was acknowledged before me this
20th day of August, 1996, by Daniel T. Crabb, as
Chief, Bureau of Land Management Services, Division of State
Lands, Florida Department of Environmental Protection, as agent
for and on behalf of the Board of Trustees of the Internal
Improvement Trust Fund of the State of Florida. He is personally
known to me.

Patricia Toloday
Notary Public, State of Florida

Print/Type Notary Name

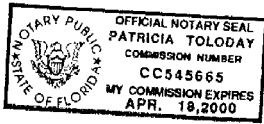
Commission Number:

Commission Expires:

Approved as to Form and Legality

By: Sally Kern
DEP Attorney

(SEAL)



THE STATE OF FLORIDA GAME AND
FRESH WATER FISH COMMISSION

Bonnie S. Holcomb
Witness

By: Victor J. Holler (SEAL)

Bonnie S. Holcomb
Print/Type Witness Name

Victor J. Holler
Print/Type Name

Carol Jean Wood
Witness

Title: Assist. Exec. Director

Carol Jean Wood
Print/Type Witness Name

"LESSEE"

STATE OF FLORIDA
COUNTY OF LEON

The foregoing instrument was acknowledged before me this
15th day of August, 1996, by Victor J. Holler
as Assistant Executive Director of the State of Florida Game and
Fresh Water Fish Commission. He/she is personally known to me.

Jimmie C. Bevis
Notary Public, State of Florida

(SEAL)

JIMMIE C. BEVIS
Print/Type Notary Name

Commission Number

Commission Expires



APPROVED AS TO FORM
AND LEGAL SUFFICIENCY
Jamett M. Butts
Commission Attorney

This Instrument Prepared by and
Please Return to:
STEVEN J. RICHEY, P.A.
Attorney & Counselor at Law
P.O. Box 492460
Leesburg, FL 34749-2460

SPACE BELOW FOR RECORDER'S USE

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

THIS INDENTURE, made this 17th day of
November, A.D. 1995, between SAMUEL G.
POTTER, a married person, as to an undivided 1/9th
interest; and MARY ELLA POTTER SINGELTARY O'GRADY, a/k/a
MARY E. O'GRADY, f/k/a MARY ELLA POTTER, f/k/a MARY ELLA
SINGELTARY, a single person, as to an undivided 1/3rd
interest; grantor, and the BOARD OF TRUSTEES OF THE
INTERNAL IMPROVEMENT TRUST FUND OF THE STATE OF FLORIDA,
whose post office address is c/o Florida Department of
Environmental Protection, Division of State Lands, 3900
Commonwealth Boulevard, Mail Station 115, Tallahassee,
FL 32399-3000, grantee,

APPROVED AS TO FORM AND LEGALITY
By: William C. Robinson
DEP Attorney
Date: 12-18-95

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

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

The Southeast 1/4 of the Southeast 1/4 of Section 19, Township 18 South, Range 21 East, Sumter County, Florida. (Parcel Account No. B19-002)

AND

The East 1/2 of the Northwest 1/4 of Section 29, Township 18 South, Range 21 East, Sumter County, Florida. (Parcel Account No. B29-002)

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

This property is not the homestead property of the grantor, nor contiguous to homestead property, as such homestead is defined under Florida law.

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

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

Signed, sealed and delivered in the presence of:

Donna D. Richey
(SIGNATURE OF FIRST WITNESS AS TO FIRST GRANTOR)

Donna D. Richey
(PRINTED, TYPED OR STAMPED NAME OF FIRST WITNESS)

Terry Neal
(SIGNATURE OF SECOND WITNESS AS TO FIRST GRANTOR)

Terry T. Neal
(PRINTED, TYPED OR STAMPED NAME OF SECOND WITNESS)

Robert G. Love
(SIGNATURE OF FIRST WITNESS AS TO SECOND GRANTOR)

Robert G. Love
(PRINTED, TYPED OR STAMPED NAME OF FIRST WITNESS)

Cindy S. Smith
(SIGNATURE OF SECOND WITNESS AS TO SECOND GRANTOR)

Cindy S. Smith
(PRINTED, TYPED OR STAMPED NAME OF SECOND WITNESS)

Samuel G. Potter
SAMUEL G. POTTER
05132 Royal Oaks Drive
Fruitland Park, Florida 34731

Mary Ella Potter Singeltary O'Grady
MARY ELLA POTTER SINGELTARY O'GRADY
4 Belview Blvd., Apt. 203
South Garden
Bellair, Florida 33516

BOOK 4 OF 9
PAGE A
AMENDMENT NO. 2 TO LEASE NO. 3789

APPROVED AS TO FORM AND LEGALITY
By: William C. Robinson
DEP Attorney
Date: 10-26-95

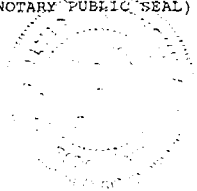
WARRANTY DEED
PAGE 2

STATE OF Florida
COUNTY OF Brevard

The foregoing instrument was acknowledged before me this 7th day of November, 1995, by SAMUEL G. POTTER. Such person (Notary Public must check applicable box):

- is personally known to me.
- produced a current driver license. 0203-595-14-7620
- produced _____ as identification.

(NOTARY PUBLIC SEAL)



Kathryn A. Oliver
Notary Public



(Printed, Typed or _____ public)
Commission No.: _____
My Commission Expires: _____

STATE OF Florida
COUNTY OF Lake

The foregoing instrument was acknowledged before me this 16th day of November, 1995, by MARY ELLA POTTER SINGELTARY O'GRADY, a/k/a MARY E. O'GRADY, f/k/a MARY ELLA POTTER, f/k/a MARY ELLA SINGELTARY. Such person (Notary Public must check applicable box):

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

(NOTARY PUBLIC SEAL)



Terrence T. Neal
Notary Public

(Printed, Typed or Stamped Name of Notary Public)
Commission No.: _____
My Commission Expires: _____

DNR 61-66(12)
WARRANTY DEED
REVISED 07/18/94

5 OF 9
A
2 TO LICENSE NO. 3789

This Instrument Prepared By
and Please Return to:
STEVEN J. RICHEY, P.A.
Attorney & Counselor At Law
P. O. Box 492460
Leesburg, Florida 34747-2460
Phone No. (904)365-2262

APPROVED AS TO FORM AND LEGALITY
By: William C. Robinson
DEP Attorney
Date: 12-18-95

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

THIS INDENTURE, made this 16 day of November, A.D. 1995, between CHARLES A. POTTER, a married person, as to an undivided 1/9th interest, and ANNE C. POTTER, formerly ANNE P. STEVENS, as to an undivided 1/9th interest, grantor, and the BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND OF THE STATE OF FLORIDA, whose post office address is c/o Florida Department of Environmental Protection, Division of State Lands, 3900 Commonwealth Boulevard, Mail Station 115, Tallahassee, FL 32399-3000, grantee,

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

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

The Southeast 1/4 of the Southeast 1/4 of Section 19, Township 18 South, Range 21 East, Sumter County, Florida. (Parcel Account No. B19-002)

AND

The East 1/2 of the Northwest 1/4 of Section 29, Township 18 South, Range 21 East, Sumter County, Florida. (Parcel Account No. B29-002)

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

This property is not the homestead property of the grantor, nor contiguous to homestead property, as such homestead is defined under Florida law.

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

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

Signed, sealed and delivered in the presence of:

Kathryn Parsons
Witness Signature
Witness Name: Kathryn Parsons
Please Print

Charles A. Potter
CHARLES A. POTTER
1400 S. Nova Road, #148
Daytona Beach, FL 32214

Martin W. Glasson
Witness Signature
Witness Name: Martin W. Glasson
Please Print
Witnesses as to Charles A. Potter

Kathryn Parsons
Witness Signature
Witness Name: Kathryn Parsons
Please Print

Anne C. Potter
ANNE C. POTTER, formerly ANNE P. STEVENS
802 Horton Street
New Smyrna, FL 32169

Jessica E. Ross
Witness Signature
Witness Name: JESSICA E. ROSS
Please Print
Witnesses as to Anne C. Potter

APPROVED AS TO FORM AND LEGALITY
By: William C. Robinson
DEP Attorney
Date: 10-20-95

6 OF 9
A
2 TO LIASE NO. 3789

This Instrument Prepared By and Please Return To:
Steven J. Richey, P.A.
Attorney & Counselor At Law
P.O. Box 492460
Leesburg, Florida 34749-2460

APPROVED AS TO FORM AND LEGALITY
By: William C. Robinson
DEP Attorney
Date: 12-18-95

SPECIAL WARRANTY DEED

THIS INDENTURE, made this 7th day of November, A.D., 1995, between HENRY RANDOLPH MORRISON, MARGARET M. RUCKER and RICHARD SINGELTARY, as Co-Trustees of the Sarah Potter Horn Trust, dated May 1, 1992, as to an undivided 1/3rd interest, 9505 Silver Lake Drive, Leesburg, of the County of Lake in the State of Florida, grantor, and the BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND OF THE STATE OF FLORIDA, whose post office address is c/o Florida Department of Environmental Protection, Division of State Lands, 3900 Commonwealth Boulevard, Mail Station 115, Tallahassee, FL 32399-3000, grantee,

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

WITNESSETH: That the said grantor, for and in consideration of the sum of \$10.00 and other good and valuable considerations to said grantor in hand paid by said grantee, the receipt whereof is hereby acknowledged, has granted, bargained and sold to the said grantee, and grantee's successors and assigns forever, the following described land situate, lying and being in Sumter County, Florida, to-wit:

The Southeast 1/4 of the Southeast 1/4 of Section 19, Township 18 South, Range 21 East, Sumter County, Florida. (Tax Identification Parcel Account No. B19-002)

AND The East 1/2 of the Northwest 1/4 of Section 29, Township 18 South, Range 21 East, Sumter County, Florida. (Tax Identification Parcel Account No. B-29-002)

This property is not the homestead property of the grantor, nor contiguous to homestead property, as such homestead is defined under Florida law.

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

TO HAVE AND TO HOLD the same unto the said grantee in fee simple forever.

AND the said grantor does hereby fully warrant the title to said land, and will defend the same against the lawful claims of all persons claiming by, through or under the said grantor, but against none other.

IN WITNESS WHEREOF the grantor has executed these presents, the day and year first written.

Signed, sealed and delivered in the presence of:

Marta O. Thompson
(SIGNATURE OF FIRST WITNESS)

✓ MARTA O. THOMPSON
(PRINTED, TYPED OR STAMPED NAME OF FIRST WITNESS)

Billie A. Grey
(SIGNATURE OF SECOND WITNESS)

✓ BILLIE A. GREY
(PRINTED, TYPED OR STAMPED NAME OF SECOND WITNESS)

Witnesses as to Henry Randolph Morrison

Henry Randolph Morrison
(SIGNATURE OF GRANTOR) HENRY RANDOLPH MORRISON, as Co-Trustee of the Sarah Potter Horn Trust, dated May 1, 1992

HENRY RANDOLPH MORRISON
(PRINTED, TYPED OR STAMPED NAME OF GRANTOR)

P.O. Box 183, Gulf Beach Dr., Eastpoint, FL 32328
(PRINTED, TYPED OR STAMPED ADDRESS OF GRANTOR)

Morningstar Rutten
(SIGNATURE OF FIRST WITNESS)

MORNINGSTAR RUTTEN
(PRINTED, TYPED OR STAMPED NAME OF FIRST WITNESS)

Anne Louise Smith
(SIGNATURE OF SECOND WITNESS)

ANNE LOUISE SMITH
(PRINTED, TYPED OR STAMPED NAME OF SECOND WITNESS)

Witnesses as to Margaret Rucker

Margaret M. Rucker
(SIGNATURE OF GRANTOR) MARGARET M. RUCKER, as Co-Trustee of the Sarah Potter Horn Trust, dated May 1, 1992

MARGARET M. RUCKER
(PRINTED, TYPED OR STAMPED NAME OF GRANTOR)

P.O. Box 490898, Leesburg, FL 34749-0898
(PRINTED, TYPED OR STAMPED ADDRESS OF GRANTOR)

APPROVED AS TO FORM AND LEGALITY
By: William C. Robinson
DEP Attorney
Date: 10-26-95

Page 8 of 9

INSTRUMENT NO. 2 TO LEASE NO. 3789
AMENDMENT NO. 1 TO LEASE NO. 3789

STATE OF Florida
COUNTY OF Alachua

The foregoing instrument was acknowledged before me this 7th day of November, 1995, by CHARLES A. POTTER. Such person (Notary Public must check applicable box):

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

(NOTARY PUBLIC SEAL)



ELAINE LOUISE GARDNER
My Comm. Exp. 7/12/99
Bonded By Service Ins
No. CC480253
 Personally Known Other I.D.

Elaine Louise Gardner
Notary Public
(Printed, Typed or Stamped Name of Notary Public)
Commission No.: _____

My Commission Expires: _____
ELAINE LOUISE GARDNER
My Comm Exp. 7/12/99
Bonded By Service Ins
No. CC480253
 Personally Known Other I.D.

STATE OF Florida
COUNTY OF Volusia

The foregoing instrument was acknowledged before me this 7th day of November, 1995, by ANNE C. POTTER, formerly ANNE P. STEVENS. She (Notary Public must check applicable box):

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

(NOTARY PUBLIC SEAL)

Elaine Louise Gardner
Notary Public
(Printed, Typed or Stamped Name of Notary Public)

Commission No.: _____
My Commission Expires: _____

WARRANTY DEED
REVISED 6/1/84



ELAINE LOUISE GARDNER
My Comm Exp. 7/12/99
Bonded By Service Ins
No. CC480253
 Personally Known Other I.D.

PAGE 7 OF 9
INSTRUMENT A
AMENDMENT NO. 2 TO LEASE NO. 3789

This Instrument Prepared By and Please Return To: Steven J. Richey, P.A. Attorney & Counselor At Law P.O. Box 492460 Leesburg, Florida 34749-2460

APPROVED AS TO FORM AND LEGALITY By: William C. Robinson DEP Attorney Date: 12-18-95

SPECIAL WARRANTY DEED

THIS INDENTURE, made this 7th day of November, A.D., 1995, between HENRY RANDOLPH MORRISON, MARGARET M. RUCKER and RICHARD SINGELTARY, as Co-Trustees of the Sarah Potter Horn Trust, dated May 1, 1992, as to an undivided 1/3rd interest, 9505 Silver Lake Drive, Leesburg, of the County of Lake in the State of Florida, grantor, and the BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND OF THE STATE OF FLORIDA, whose post office address is: c/o Florida Department of Environmental Protection, Division of State Lands, 3900 Commonwealth Boulevard, Mail Station 115, Tallahassee, FL 32399-3000, grantee,

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

WITNESSETH: That the said grantor, for and in consideration of the sum of \$10.00 and other good and valuable considerations to said grantor in hand paid by said grantee, the receipt whereof is hereby acknowledged, has granted, bargained and sold to the said grantee, and grantee's successors and assigns forever, the following described land situate, lying and being in Sumter County, Florida, to-wit:

The Southeast 1/4 of the Southeast 1/4 of Section 19, Township 18 South, Range 21 East, Sumter County, Florida. (Tax Identification Parcel Account No. B19-002)

AND The East 1/2 of the Northwest 1/4 of Section 29, Township 18 South, Range 21 East, Sumter County, Florida. (Tax Identification Parcel Account No. B-29-002)

This property is not the homestead property of the grantor, nor contiguous to homestead property, as such homestead is defined under Florida law.

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

TO HAVE AND TO HOLD the same unto the said grantee in fee simple forever.

AND the said grantor does hereby fully warrant the title to said land, and will defend the same against the lawful claims of all persons claiming by, through or under the said grantor, but against none other.

IN WITNESS WHEREOF the grantor has executed these presents, the day and year first written.

Signed, sealed and delivered in the presence of:

Marta O. Thompson (SIGNATURE OF FIRST WITNESS)

MARTA O. THOMPSON (PRINTED, TYPED OR STAMPED NAME OF FIRST WITNESS)

Billie A. Grey (SIGNATURE OF SECOND WITNESS)

BILLIE A. GREY (PRINTED, TYPED OR STAMPED NAME OF SECOND WITNESS)

Witnesses as to Henry Randolph Morrison

Henry Randolph Morrison (SIGNATURE OF GRANTOR) HENRY RANDOLPH MORRISON, as Co-Trustee of the Sarah Potter Horn Trust, dated May 1, 1992

HENRY RANDOLPH MORRISON (PRINTED, TYPED OR STAMPED NAME OF GRANTOR)

P.O. Box 183, Gulf Beach Dr., Eastpoint, Fl 32328 (PRINTED, TYPED OR STAMPED ADDRESS OF GRANTOR)

Morningstar Butler (SIGNATURE OF FIRST WITNESS)

MORNINGSTAR BUTLER (PRINTED, TYPED OR STAMPED NAME OF FIRST WITNESS)

Anne Louise Smith (SIGNATURE OF SECOND WITNESS)

ANNE LOUISE SMITH (PRINTED, TYPED OR STAMPED NAME OF SECOND WITNESS)

Witnesses as to Margaret Rucker

Margaret M. Rucker (SIGNATURE OF GRANTOR) MARGARET M. RUCKER, as Co-Trustee of the Sarah Potter Horn Trust, dated May 1, 1992

MARGARET M. RUCKER (PRINTED, TYPED OR STAMPED NAME OF GRANTOR)

P.O. Box 490898, Leesburg, Fl 34749-0898 (PRINTED, TYPED OR STAMPED ADDRESS OF GRANTOR)

APPROVED AS TO FORM AND LEGALITY By: William C. Robinson DEP Attorney Date: 10-26-95

PAGE 8 OF 9

QUALITY A ENCLOSURE NO. 1 TO LEASE NO. 3789

Donna D. Richey
(SIGNATURE OF FIRST WITNESS)

Donna D. Richey
(PRINTED, TYPED OR STAMPED
NAME OF FIRST WITNESS)

Terry I. Neal
(SIGNATURE OF SECOND WITNESS)

Terry I. Neal
(PRINTED, TYPED OR STAMPED
NAME OF SECOND WITNESS)

Witnesses as to Richard Singletary

Richard Singletary
(SIGNATURE OF GRANTOR) RICHARD SINGLETARY, as
Co-Trustee of the Sarah Potter Horn Trust,
dated May 1, 1992

RICHARD SINGLETARY
(PRINTED, TYPED OR STAMPED NAME OF GRANTOR)

P.O. Box 491443, Leesburg, FL 34749-1443
(PRINTED, STYPED OR STAMPED ADDRESS OF GRANTOR)

STATE OF FLORIDA
COUNTY OF FRANKLIN

The foregoing instrument was acknowledged before me this 17th day of November,
1995 by HENRY RANDOLPH MORRISON, as Co-Trustee of the Sarah Potter Horn Trust dated May
1, 1992. Such person (Notary Public must check applicable box:)

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



Marta O. Thompson
Notary Public Signature

MARTA O. THOMPSON
(Printed, Typed or Stamped Name of Notary Public)

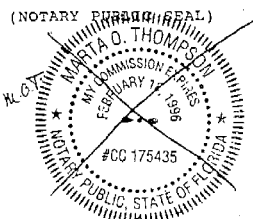
Commission No.: CC 175435

My Commission Expires: Feb. 18, 1996

STATE OF FLORIDA
COUNTY OF LAKE

The foregoing instrument was acknowledged before me this 22nd day of November,
1995, by MARGARET M. RUCKER, as Co-Trustee of the Sarah Potter Horn Trust, dated May 1,
1992. Such person (Notary Public must check applicable box:)

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

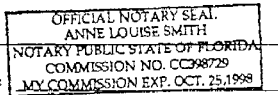


Anne Louise Smith
Notary Public

Anne Louise Smith
(Printed, Typed or Stamped Name of Notary Public)

Commission No.: _____

My Commission Expires: _____



STATE OF Florida
COUNTY OF Lake

The foregoing instrument was acknowledged before me this 21st day of November,
1991, by RICHARD SINGLETARY, as Co-Trustee of the Sarah Potter Horn Trust, dated May 1,
1992. He is personally known to me.



Terry I. Neal
Notary Public Signature

Terry I. Neal
(Printed, Typed or Stamped Name of Notary Public)

Commission No.: _____

My Commission Expires: _____

SPECIAL WARRANTY DEED
REVISED 07/18/94

PAGE 9 OF 9

EXHIBIT A
AMENDMENT NO. 2 TO LEASE NO. 3789

the event of disapproval of any such proposed rules, the District's Executive Director shall provide alternative proposed rules to the Commission. In addition, the Commission shall submit annually, on or before March 1, beginning in 1992, a map to the District proposing the uses in the Wildlife Management Area. Review and approval or disapproval of such map shall be within (60) days after submission to the District's Executive Director. The District's staff shall provide to the Commission alternate map changes in the event of disapproval. Annual amendments to the rules shall not be precluded if the proposed rule changes: (1) address significant threats to the long-term welfare of the fish and wildlife resources or their habitat; (2) address significant concerns of a Type I Wildlife Management Area landowner; (3) protect private property or public safety; (4) comply with constitutional or legislative changes in the Commission's authority; or, (5) avoid jeopardizing the effectiveness of existing or development of new Commission programs or management efforts.

5. LAW ENFORCEMENT: The Commission, to the fullest extent of its authority and within the constraints of budget and manpower, shall enforce the law in the Wildlife Management Area, including but not limited to patrolling; protecting against vandalism, fires, litter, habitat destruction, unauthorized use; and enforcing all federal and state laws and rules relating to the management, protection and taking of wild animal life and freshwater aquatic life.

6. REPORTS: The Commission shall submit a post-hunt report to the District no later than thirty (30) days after the closing date of any hunting season established in the Wildlife Management Area, including a harvest report by species, the number of users, and the number and description of the citations issued and arrests made by the Commission within the Wildlife Management Area. The Commission also shall provide to the District a copy of all reports and studies it makes or prepares concerning the Wildlife Management Area. Proposed annual work plans, and annual work accomplishment reports concerning the development and maintenance of ongoing Commission programs shall be submitted to the District in a timely fashion.

7. COSTS AND MAINTENANCE: Repairs to and maintenance of bridges, fences, roads and other improvements in the Wildlife Management Area shall be the sole responsibility of the District. The Commission shall be responsible for all costs directly attributed to the maintenance and/or replacement of any structure(s) or sign(s) erected by the Commission.

8. HABITAT, BIOLOGICAL SURVEYS AND MONITORING SITES: The Commission may plan and implement programs for wildlife habitat improvements in the Wildlife Management Area with prior written approval of the District. However, the Commission shall not unreasonably interfere with or degrade the quality of habitat or waters in the Wildlife Management Area, and the Commission, to the best of its ability and to the fullest extent of its authority, shall prevent such interference or degradation by any person. The Commission may conduct biological surveys or assessments in the Wildlife Management Area. However, no such surveys or assessments requiring or resulting in material physical alteration to the existing habitat shall be made without the prior written approval of the District. The District may maintain monitoring sites for environmental studies. The District shall notify the Commission of any plans for

such monitoring sites and of the location of such monitoring sites, and the Commission shall not do anything whereby such sites are disturbed or degraded.

9. ENDANGERED SPECIES: Nest sites known to be inhabited by bald eagles shall be posted as "RESTRICTED" by the Commission for the protection of that species and no public access shall be allowed.

10. STRUCTURES: The Commission shall obtain the prior written approval of the District before constructing or locating any structure in the Wildlife Management Area. No structure shall be constructed or located permanently. The Commission shall maintain all such structures. The Commission shall remove all structures which it has constructed or located in the Wildlife Management Area upon termination of this agreement as provided in paragraph 20. The Commission shall not install, or permit to be installed, pit or vault latrines. Any other sanitary facility, except portable toilets installed by the Commission at designated check stations, shall be prohibited.

11. SIGNS: The Commission, at its expense, shall post the public entrance to the Wildlife Management Area with the sign bearing the legend set out in Exhibit "D" attached hereto and incorporated herein by reference and shall post at reasonable places along the boundaries of the Wildlife Management Area signs bearing the legend set out in Exhibit "E" attached hereto and incorporated herein by reference.

12. MAINTENANCE AND PRESERVATION: Except as provided in paragraph 7, the Commission, shall maintain and preserve the Wildlife Management Area in a clean and natural state and shall prevent and remove all litter and debris on the Wildlife Management Area arising from the uses authorized hereby. Further, except as priorly approved in writing by the District under paragraph 8, the Commission, to the best of its ability, shall prevent the removing or cutting of live or dead trees or plants and the starting of fires by any person.

13. USE OF MOTOR VEHICLES: The use of private vehicles will be allowed on select all-weather roads, as determined by the District. Wet-weather barriers and/or "road closed" signs will be installed by the Commission on roads mutually determined by the District and the Commission, to be unsuitable for public use. Vehicular and hunter access will be controlled by the Commission at the check station located on the adjacent Half-Moon Wildlife Management Area.

14. PARKING AREAS: Parking areas will be designated at various locations, as shown in Exhibit "F", to prevent undue disturbance to existing roadways, road shoulders and adjacent habitat.

15. USE OF ADJACENT LANDS OWNED BY THE STATE OF FLORIDA BOARD OF TRUSTEES: The Commission has management responsibility and control concerning adjacent land owned by the State of Florida Board of Trustees. There are established roadways lying on this adjacent land. To the extent that the Commission has the authority and controls the use of Board of Trustees' lands, the Commission will permit the District to use those roadways for ingress and egress onto District property. The location of these roadways is shown on Exhibit "F" which is attached hereto and incorporated herein by reference.

16. SITE INSPECTION AND ACCEPTANCE: The Commission accepts the lands described in Exhibit "A" in their present condition. Failure of the Commission to acquaint itself with the present appearance, conditions and boundaries of the Wildlife Management Area shall not relieve the Commission of performance hereunder. The District may enter and inspect the Wildlife Management Area at any time to ensure compliance by the Commission hereunder or for any purpose may enter the Wildlife Management Area.

17. ADDITIONAL USES: The District may lease or otherwise make use of any part or all of the Wildlife Management Area for any lawful purpose, including but not limited to apiary sites, cattle grazing, haying, hiking and nature study.

18. HORSEBACK RIDING: Horseback riding will be prohibited on that portion of the Wildlife Management Area owned by the District and will be posted as "closed" to such activity by the Commission.

19. INDEMNIFICATION: To the extent permitted by law, the Commission shall fully defend, indemnify and hold harmless the District from any actions, causes, claims, demands, losses, judgments, recoveries and suits made against the District arising from the uses of the Wildlife Management Area authorized hereby. Nothing contained herein shall be construed as a waiver of immunity of the parties hereto under federal or state law. Nothing contained herein shall be construed as a waiver of the limitations on liability enjoyed by a landowner providing lands to the public for outdoor recreational purposes, as provided in Section 375.251, Florida Statutes.

20. DISCRIMINATION: The Commission shall comply with the Civil Rights Act of 1964, as amended, and shall not exclude any person from participating in, deny to any person the benefits of, or otherwise subject to discrimination any person utilizing the Wildlife Management Area and any Commission operation thereon, due to race, religion, color, creed, sex, or national origin.

21. FEES AND PROFITS: Except for fees established by law, the Commission shall not charge the public for uses of the Wildlife Management Area, and the uses of the Wildlife Management Area authorized hereby shall not be for profit.

22. SUSPENSION OR TERMINATION: The District may suspend this agreement or hunting conducted hereunder immediately and temporarily until the cause for suspension is completed, dissipates, or is rectified, as to all or any part of the Wildlife Management Area by giving written notice to the Commission in the event that suspension is necessary because:

a. Conditions exist that are dangerous to the safety of life or property from fire, flood, or other such causes;

b. The Wildlife Management Area is required for a District flood control or water management conservation project such that use of the lands for wildlife management or for hunting conducted under this agreement is impractical or impossible;

c. There has been a breach of the terms and conditions of this agreement by the Commission;

d. The Wildlife Management Area is required by the District for construction or any other activity; or,

e. Conditions exist that would damage the environmental or physical characteristics, or impair the function of habitat, water management, water supply, or conservation and protection of water resources within the Wildlife Management Area.

The District may immediately terminate this agreement by giving written notice to the Commission as provided in paragraph 23 in the event suspension is not adequate to address those conditions enumerated in this paragraph and terminated in lieu of suspension is required. In the event of imminent threat to the public health, safety, or welfare, the District may immediately suspend this agreement until such imminent threat no longer exists without such written notice as provided in paragraph 23. However, in the event of such imminent threat, the District shall give such notice to the Commission's regional office in Ocala, Florida, or to the Commission's headquarters in Tallahassee, Florida, as is practicable under the circumstances. In the event of such imminent threat, the District may immediately close the Wildlife Management Area to public access and, upon receiving such actual notice of such immediate suspension and closure, the Commission shall take immediate steps to assist the District in enforcing such closure.

Either party shall have the right to terminate this agreement upon ninety (90) days written notice to the other party; provided, however, that if said notice of termination is given after February 1 of any calendar year, the date of termination shall be the first January 15 after the date of said notice or ninety (90) days after the date of said notice, whichever shall be later. In the event of termination, the Commission shall remove expeditiously all structures constructed or located pursuant to paragraph 10 and all signs erected pursuant to paragraph 11. In the event of suspension or termination, the Commission shall assist the District in removal of all persons admitted to the Wildlife Management Area.

23. ADMINISTRATION; NOTICES: This agreement shall be administered for the District and the Commission by their respective executive directors.

All notices to the District shall be in writing and hand-delivered or sent by certified United States mail, return receipt requested, to the Executive Director and/or the Land Resources Director, at 2379 Broad Street, Brooksville, Florida 34609-6899. All notices to the Commission shall be in writing and hand-delivered or sent by certified United States mail, return receipt requested, to the Executive Director at the Farris Bryant Building, 620 South Meridian Street, Tallahassee, Florida 32399-1600.

24. COMPLETE AGREEMENT: This agreement contains the complete understanding between the District and the Commission and shall supersede all other agreements between the District and the Commission as to the Wildlife Management Area.

25. MODIFICATION OF AGREEMENT: No waiver or modification of this agreement or of any covenant, condition, or limitation herein contained shall be

valid unless in writing and lawfully executed by the party to be charged therewith.

26. NON-ASSIGNMENT: Any assignments or delegation of the Commission's covenants or duties hereunder, other than to employees of the Commission or agents of the Commission in the usual course of the Commission's business, shall be without any binding effect on either party and shall be null and void.

In Witness Whereof, the lawful representatives of the parties hereto have executed this agreement on the day and year above first written.

Attest:

Sally Thompson
Sally Thompson, Secretary

SOUTHWEST FLORIDA WATER
MANAGEMENT DISTRICT

By: Charles A. Black
Charles A. Black, Chairman

(Seal)

Attest:

Terry Mara

FLORIDA GAME AND FRESH
WATER FISH COMMISSION

Attest: Robert M. Brantly
Colonel Robert M. Brantly,
Executive Director

(Seal)

APPROVED AS FISCALLY
AND BUDGETARILLY SOUND

William C. Semme

DIRECTOR
DIVISION OF ADMINISTRATIVE SERVICES
GEWEC

APPROVED AS TO FORM
AND LEGAL SUFFICIENCY.

Commission Attorney
Commission Attorney

CARL.WMA
03/12/92

EXHIBIT A

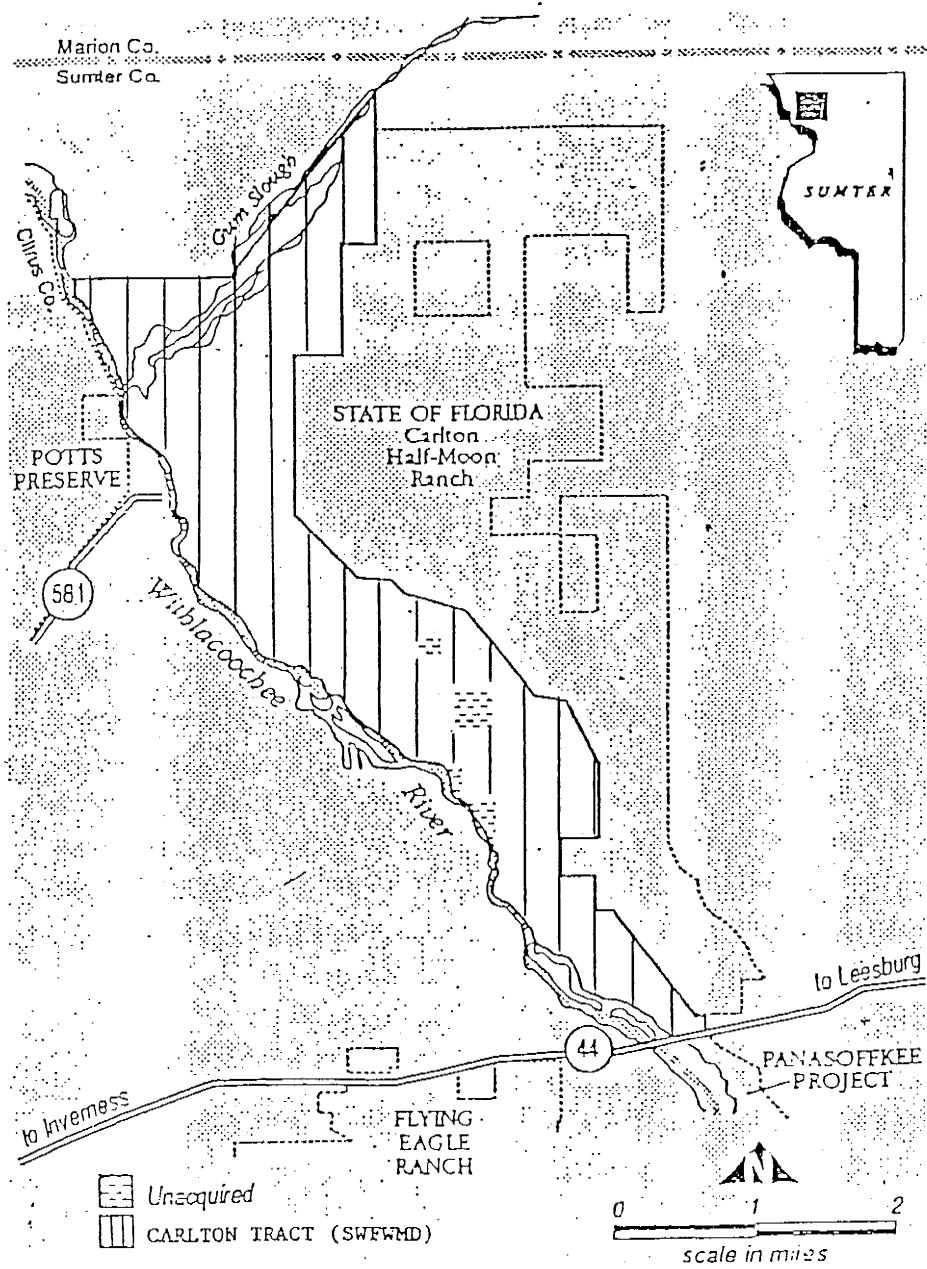


EXHIBIT A - continued

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
Withlacoochee River Basin
Wildlife Management Area

Parcel No. 19-193-102X

August 19, 1991

Commence at the NW corner of SECTION 9, TOWNSHIP 19 SOUTH,
RANGE 21 EAST;

Run thence S 02° 06' 18" W (grid bearing) along the West
line of said Section 9, a distance of 2090.06 feet to the North
right-of-way line of State Road 44, said point being the POINT OF
BEGINNING;

Thence N 79° 57' 38" E along said right-of-way line a
distance of 1171.03 feet to the West line of the East 200 feet of
the West 1/2 of the NW 1/4 of said Section 9;

Thence N 01° 37' 21" E along said West line a distance of
682.98 feet;

Thence N 41° 30' 58" W a distance of 5166.88 feet to the
North line of the SE 1/4 of SECTION 5, TOWNSHIP 19 SOUTH, RANGE
21 EAST;

Thence N 89° 59' 54" W along said North line a distance of
249.14 feet to the SE corner of the SE 1/4 of the NW 1/4 of said
Section 5;

Thence N 00° 41' 17" E along the East line of said SE 1/4 of
the NW 1/4 a distance of 1326.72 feet to the NE corner of said SE
1/4 of the NW 1/4;

Thence S 89° 48' 15" W along the North line of said SE 1/4
of the NW 1/4 a distance of 1322.46 feet to the SE corner of the
NW 1/4 of the NW 1/4 of said Section 5;

Thence N 00° 04' 28" E along the East line of said NW 1/4 of
the NW 1/4 a distance of 1323.88 feet to the SW corner of the SE
1/4 of the SW 1/4 of SECTION 32, TOWNSHIP 18 SOUTH, RANGE 21
EAST;

Thence N 89° 52' 35" E along the South line of said SE 1/4
of the SW 1/4 a distance of 1321.81 feet to the SE corner of the
SW 1/4 of said Section 32;

Thence N 00° 21' 07" E along the East line of said SW 1/4 a
distance of 2635.02 feet to the NE corner of said SW 1/4;

Thence N 27° 29' 27" W, a distance of 2351.79 feet;

Thence N 76° 22' 01" W, a distance of 1378.85 feet;

Thence N 35° 51' 14" W, a distance of 4003.63 feet;

Thence N 78° 25' 20" W a distance of 2516.20 feet;

Thence N 44° 41' 00" W, a distance of 639.94 feet;

Thence N 82° 08' 48" W, a distance of 1463.73 feet;

Thence N 35° 24' 44" W, a distance of 1061.34 feet;

Thence N 45° 00' 00" W, a distance of 1230.31 feet;

Thence North, a distance of 4713.19 feet to the North line of Section 24, Township 18 South, Range 20 East;

Thence N 89° 42' 54" W, along said North line a distance of 430.04 feet;

Thence North, a distance of 1334.10 feet;

Thence N 88° 27' 14" W a distance of 2374.52 feet to the NE corner of the S 1/2 of the SE 1/4 of SECTION 14, TOWNSHIP 18 SOUTH, RANGE 20 EAST;

Thence S 89° 37' 24" W along the North line of said S 1/2 of the SE 1/4 a distance of 2633.44 feet to the NW corner of said S 1/2 of the SE 1/4;

Thence S 00° 03' 51" W along the West line of said S 1/2 of the SE 1/4 a distance of 1350.11 feet to the NE corner of the NW 1/4 of SECTION 23, TOWNSHIP 18 SOUTH, RANGE 20 EAST;

Thence N 89° 35' 17" W along the North line of said NW 1/4 to the thread of the Withlacoochee River;

Thence Southerly and Southeasterly along the thread of the Withlacoochee River to the Northerly right-of-way line of State Road 44;

Thence N 79° 57' 38" E along said North right-of-way line to the POINT OF BEGINNING;

EXCEPT

Any portion of the following that lies easterly of the thread of the Withlacoochee River;

The Northwest 1/4 of the Northwest 1/4 of SECTION 23,
TOWNSHIP 18 SOUTH, RANGE 20 EAST;

The Southeast 1/4 of the Northeast 1/4 of SECTION 36,
TOWNSHIP 18 SOUTH, RANGE 20 EAST;

The Southwest 1/4 of SECTION 31, TOWNSHIP 18 SOUTH, RANGE 21
EAST;

The Southwest 1/4 of the Southeast 1/4 of SECTION 31,
TOWNSHIP 18 SOUTH, RANGE 21 EAST;

The West 1/2 of the Northeast 1/4 of SECTION 6, TOWNSHIP 19
SOUTH, RANGE 21 EAST;

The Southeast 1/4 of the Southeast 1/4 of SECTION 6,
TOWNSHIP 19 SOUTH, RANGE 21 EAST;

AND EXCEPT

All of the Southwest 1/4 of the Northeast 1/4 of the
Southwest 1/4 of SECTION 30, TOWNSHIP 18 SOUTH, RANGE 21 EAST;

AND EXCEPT

That portion of the Northwest 1/4 of the Northeast 1/4 of
SECTION 31, TOWNSHIP 18 SOUTH, RANGE 21 EAST not lying within the
West 2-1/2 chains of the North 20 chains.

Parcel contains 3048.5 acres, more or less, including
approximately 87.5 acres of submerged lands below the ordinary
high water line of the Withlacoochee River.

AND ALSO

That part of SECTIONS 1, 12, 13, 14 and 15, TOWNSHIP 18
SOUTH, RANGE 20 EAST, Sumter County, Florida, described as
follows:

Commence at the NE corner of said Section 13, said point
being the POINT OF BEGINNING;

Run thence N87°15'05"W along the North line of the NE 1/4 of
said Section 13 a distance of 1354.44 feet to the NE corner of
the West 1/2 of the NE 1/4 of said Section 13;

Thence S00°20'50"W along the East line of said West 1/2 of
the NE 1/4 a distance of 2685.82 feet to the SE corner thereof;

Page 3 of 5

Thence S00°14'49"W along the East line of the NW 1/4 of the SE 1/4 of said Section 13 a distance of 1342.47 feet to the SE corner thereof;

Thence N89°05'28"W along the South line of said NW 1/4 of the SE 1/4 a distance of 1341.99 feet to the SE corner of the North 1/2 of the SW 1/4 of said Section 13;

Thence continue N89°05'26"W along said South line of the North 1/2 of the SW 1/4 a distance of 312.37 feet;

Thence South a distance of 26.40 feet;

Thence N88°27'14"W a distance of 2374.54 feet to the SE corner of the North 1/2 of the SE 1/4 of said Section 14;

Thence S89°37'24"W along the South line of said North 1/2 of the SE 1/4 a distance of 2633.44 feet to the SW corner thereof;

Thence S00°03'51"W along the East line of the SW 1/4 of said Section 14 a distance of 1350.11 feet to the SE corner thereof;

Thence N89°35'17"W along the South line of said SW 1/4 a distance of 1238.81 feet more or less to the thread of the Withlacoochee River;

Thence Northwesterly along the thread of the Withlacoochee River to a point on the West line of the NW 1/4 of said Section 14;

Thence N00°16'22"E along said West line of the NW 1/4 a distance of 200.00 feet more or less to a point on the NE bank of the Withlacoochee River;

Thence Northwesterly along said NE bank of the Withlacoochee River to a point in said Section 15 lying on a Westerly extension of the North line of the South 1/2 of the NW 1/4 of said Section 14;

Thence N88°02'16"E along said Westerly extension of the North line of the South 1/2 of the NW 1/4 a distance of 286.62 feet to the NW corner of the South 1/2 of the NW 1/4 of said Section 14;

Thence N88°02'16"E along the North line of said South 1/2 of the NW 1/4 a distance of 2625.69 feet to the NE corner thereof;

Thence continue N88°02'16"E along the North line of the South 1/2 of the NE 1/4 of said Section 14 a distance of 2624.16 feet;

Thence N40°10'33"E a distance of 8465.15 feet to a point on the East line of said Section 1;

Thence S00°32'37"W along said East line of Section 1 a distance of 27.90 feet to the NE corner of said Section 12;

Thence continue S00°32'37"W along the East line of said Section 12 a distance of 5313.68 feet to the SE corner thereof, said point being the POINT OF BEGINNING;

EXCEPT

Begin at the SW corner of the North 1/2 of the SW 1/4 of SECTION 13, TOWNSHIP 18 SOUTH, RANGE 20 EAST, Sumter County, Florida;

Thence S89°05'27"E, along the south line of said North 1/2 of the SW 1/4, a distance of 2373.97 feet;

Thence South, a distance of 26.40 feet;

Thence N88°27'14"W, a distance of 2374.54 feet to the POINT OF BEGINNING.

Parcel contains 972.81 acres, more or less, including approximately 22.66 acres of area lying within the Withlacoochee River and Gum Slough.

RAH:WRB:sw
19102X.WMA

EXHIBIT B

The Florida Game And Freshwater Fish Commission's 1991-1992 Hunting Handbook Regulations Summary defines a Type I Wildlife Management Area as:

"Type I wildlife management areas are public hunting and recreation areas operated by the Commission in cooperation with private, state and federal landowners. A \$25 Wildlife Management Area Stamp is required of all hunters (except those indicated as exempt on page 6 of this handbook) to hunt in these areas. Persons who possess a gun on a Type I wildlife management area for the exclusive purpose of shooting at a Commission-authorized shooting range are exempt from wildlife management area requirements. A Quota Hunt Permit may also be required during certain time periods. Type I wildlife management area stamps and wildlife management area regulations brochures, and most quota hunt application forms are available from county tax collectors and their subagents. Type I wildlife management area brochures and quota hunt application forms are also available from any of the Commission's five regional administrative offices, listed on page 2."

EXHIBIT "C"

HALF MOON WILDLIFE MANAGEMENT AREA

A. OPEN SEASON:

1. ARCHERY -- SEPTEMBER 26-28 AND OCTOBER 2-4.
2. MUZZLELOADING GUN -- OCTOBER 30 THROUGH NOVEMBER 1.
3. GENERAL GUN -- NOVEMBER 14-16 AND 20-22.
4. SMALL GAME -- DECEMBER 4-6, 11-13, AND 18-20.
5. SPRING TURKEY -- MARCH 26-28 AND APRIL 2-4 AND 9-11.
6. FISHING AND FROGGING -- PERMITTED THROUGHOUT THE YEAR.
7. TRAPPING AND FROGGING -- PROHIBITED.

- B. LEGAL TO TAKE: ALL LEGAL GAME, FISH, AND FURBEARERS. DURING THE ARCHERY, MUZZLELOADING GUN, AND GENERAL GUN SEASONS, ANTLERLESS DEER MAY BE TAKEN BY PERMIT ONLY. DURING THE ARCHERY, MUZZLELOADING GUN, AND GENERAL GUN SEASONS THE BAG LIMIT FOR ANTLERED DEER SHALL BE ONE (1) PER QUOTA HUNT PERMIT. DURING THE SPRING TURKEY SEASON, THE BAG LIMIT FOR TURKEY SHALL BE ONE (1) GOBBLER (OR BEARDED TURKEY) PER QUOTA HUNT PERMIT.

- C. CAMPING -- PROHIBITED.

D. GENERAL REGULATIONS:

1. DURING PERIODS WHEN THE AREA IS CLOSED TO HUNTING, PUBLIC ACCESS OTHER THAN ON FOOT (PEDESTRIAN) OR HORSEBACK (EQUESTRIAN) IS PROHIBITED.
2. PUBLIC ACCESS IS PROHIBITED IN AREAS POSTED AS "RESTRICTED" FOR THE PROTECTION OF ENDANGERED SPECIES.
3. HUNTING WITH DOGS IS PROHIBITED, EXCEPT BIRD DOGS MAY BE USED DURING THE SMALL GAME SEASON AND DOGS ON LEASH MAY BE USED FOR TRAILING WOUNDED GAME.
4. VEHICLES MAY BE OPERATED ONLY ON NAMED OR NUMBERED ROADS AND MAY BE PARKED ONLY AT DESIGNATED PARKING AREAS.
5. THE USE OF TRACKED VEHICLES, AIRBOATS, MOTORCYCLES, OR ALL-TERRAIN VEHICLES IS PROHIBITED. THE USE OF HORSES IS PROHIBITED DURING THE ARCHERY, MUZZLELOADING GUN, GENERAL GUN, AND SPRING TURKEY SEASONS.
6. HUNTERS SHALL CHECK IN AND OUT AT THE CHECK STATION WHEN ENTERING OR EXITING THE AREA AND SHALL CHECK ALL GAME TAKEN.
7. NO DEER, HOG, OR TURKEY SHALL BE DISMEMBERED UNTIL CHECKED AT THE CHECK STATION.
8. A QUOTA HUNT PERMIT SHALL BE REQUIRED FOR EVERY HUNTER ENTERING THE AREA.

NOTE: OTHER GENERAL REGULATIONS RELATING TO TYPE 1 WILDLIFE MANAGEMENT AREAS MIGHT APPLY.

EXHIBIT "C" (CONTINUED)

GENERAL REGULATIONS RELATING TO TYPE 1 WILDLIFE MANAGEMENT AREAS

1. GENERAL PROHIBITIONS: HUNTING, FISHING, OR TRAPPING IS PROHIBITED ON ANY PORTION OF ANY WILDLIFE MANAGEMENT AREA POSED AS CLOSED TO HUNTING, FISHING, OR TRAPPING. HUNTING, FISHING, TRAPPING, CAMPING, OR OTHER USAGE RELATED TO SUCH ACTIVITY ON ANY WILDLIFE MANAGEMENT AREA SHALL ONLY BE AT THE TIME AND IN THE MANNER PROVIDED BY THE REGULATIONS FOR THE PARTICULAR WILDLIFE MANAGEMENT AREA. ALL LEGAL METHODS FOR TAKING FISH OR WILDLIFE WILL BE PERMITTED, UNLESS PROHIBITED UNDER THE RULES GOVERNING A PARTICULAR AREA.
2. PERMITS REQUIRED:
 - A. A WILDLIFE MANAGEMENT AREA STAMP AS PROVIDED BY S. 372.57, FLORIDA STATUTES, IN ADDITION TO ALL REGULAR LICENSE REQUIREMENTS, IS REQUIRED FOR PERSONS, EXCEPT THOSE EXEMPTED IN SUBSECTION (3) HEREOF, TO HUNT, TRAP OR BE IN POSSESSION OF A GUN, TRAP, OR OTHER DEVICE FOR TAKING WILDLIFE OR FURBEARING ANIMALS ON A WILDLIFE MANAGEMENT AREA.
 - B. A SPECIAL DAILY OR SEASONAL WILDLIFE MANAGEMENT AREA STAMP IS MANDATORY ON THOSE WILDLIFE MANAGEMENT AREAS WHERE REQUIRED BY REGULATIONS FOR THAT AREA.
 - C. A WILDLIFE MANAGEMENT AREA STAMP SHALL BE REQUIRED OF ANY PERSON, EXCEPT THOSE EXEMPTED IN SUBSECTION (3) HEREOF, WHO ENGAGES IN ANY OUTDOOR RECREATION ACTIVITY ON THE J. W. CORBETT AND CECIL M. WEBB AREAS (EXCEPT FOR ORGANIZED GROUP ACTIVITY UNDER CONTRACTUAL AGREEMENT WITH THE COMMISSION). MEMBERS OF A STAMPHOLDER'S FAMILY (INCLUDES SPOUSE AND DEPENDENT CHILDREN) TRAVELING IN THE COMPANY OF A STAMPHOLDER ARE EXEMPT FROM THESE RECREATIONAL STAMP REQUIREMENTS.
3. PERMIT EXCEPTIONS: PERSONS EXEMPTED BY S. 372.57(1) OR (6), OR THOSE PERSONS WHO POSSESS A GUN ON A WILDLIFE MANAGEMENT AREA FOR THE EXCLUSIVE PURPOSE OF SHOOTING AT A COMMISSION-AUTHORIZED SHOOTING RANGE ARE EXEMPT FROM WILDLIFE MANAGEMENT AREA STAMP REQUIREMENTS.
4. LEGAL TO HUNT:
 - A. ONLY GOBBLERS OR BEARDED TURKEYS MAY BE TAKEN DURING THE SPRING SEASON; TURKEYS MAY NOT BE TAKEN DURING ANY FALL SEASON IN WHICH FIREARMS MAY BE USED UNLESS OTHERWISE PROVIDED FOR A SPECIFIC AREA.

- B. ONLY SPECIES WHICH ARE LEGAL TO TAKE IN THE REGION WHERE THE WILDLIFE MANAGEMENT AREA LIES, UNLESS OTHERWISE PROVIDED FOR A SPECIFIC AREA, MAY BE TAKEN.
 - C. DURING THE SPRING TURKEY SEASON, THE HUNTING OR TAKING OF ANY OTHER SPECIES OF WILDLIFE IS PROHIBITED UNLESS OTHERWISE PROVIDED FOR A SPECIFIC AREA.
 - D. TURKEY OR ANTLERLESS DEER MAY BE TAKEN DURING ARCHERY SEASONS UNLESS OTHERWISE PROVIDED BY SPECIFIC AREA REGULATION.
 - E. ANTLERLESS DEER MAY BE TAKEN DURING GUN SEASONS ONLY BY HUNTERS POSSESSING VALID ANTLERLESS DEER PERMITS OR AS OTHERWISE PROVIDED BY SPECIFIC AREA REGULATION.
 - F. ON ANY WILDLIFE MANAGEMENT AREAS WHERE AN ANTLERED DEER QUOTA IS ESTABLISHED BY ORDER, NO PERSON SHALL TAKE ANTLERED DEER AFTER THE QUOTA FOR ANTLERED DEER IS ATTAINED. ON ANY WILDLIFE MANAGEMENT AREA WHERE AN ANTLERLESS DEER QUOTA IS ESTABLISHED BY ORDER, NO PERSON SHALL TAKE ANTLERLESS DEER AFTER THE QUOTA FOR ANTLERLESS DEER IS ATTAINED.
 - G. FOX SQUIRRELS MAY NOT BE TAKEN.
5. HUNTERS:
- A. AUTHORIZED HUNTING EQUIPMENT OR DOGS (IF PERMITTED BY AREA REGULATIONS) MAY BE TAKEN ON THE AREA AFTER 8:00 A.M. ONE (1) DAY BEFORE THE OPENING OF THE SEASON AND SHALL BE REMOVED FROM THE AREA BEFORE 6:00 P.M. ONE (1) DAY FOLLOWING THE CLOSE OF THE SEASON UNLESS OTHERWISE PROVIDED BY SPECIFIC AREA REGULATIONS.
 - B. DRIVING A METAL OBJECT INTO ANY TREE, OR HUNTING FROM A TREE IN WHICH A METAL OBJECT HAS BEEN DRIVEN, IS PROHIBITED.
6. GUNS:
- A. NO PERSON SHALL POSSESS ANY GUN ON ANY WILDLIFE MANAGEMENT AREA DURING ANY PERIOD IN WHICH HUNTING BY THE USE OF A GUN IS PROHIBITED UNLESS OTHERWISE AUTHORIZED BY PERMIT FROM THE EXECUTIVE DIRECTOR.
 - B. THE POSSESSION OF A FIREARM OR CROSSBOW IS PROHIBITED ON ANY WILDLIFE MANAGEMENT AREA DURING ESTABLISHED SEASONS FOR ARCHERY HUNTING UNLESS OTHERWISE STIPULATED IN A REGULATION ESTABLISHED FOR A SPECIFIC AREA. THE POSSESSION OF A GUN (EXCEPT A MUZZLELOADING GUN) IS PROHIBITED ON ANY WILDLIFE MANAGEMENT AREA DURING SEASONS FOR MUZZLELOADING GUN HUNTING. THE POSSESSION OF A GUN IS PROHIBITED ON ANY WILDLIFE MANAGEMENT AREA DURING ANY

SEASON OPEN ONLY FOR THE TAKING OF FURBEARING ANIMALS OR FROGS UNLESS OTHERWISE STIPULATED IN A REGULATION ESTABLISHED FOR A SPECIFIC AREA.

- C. NO PERSON SHALL HAVE ANY GUN UNDER HIS CONTROL WHILE UNDER THE INFLUENCE OF ALCOHOL OR DRUGS.
- D. THE POSSESSION OF CENTER-FIRE RIFLES IS PROHIBITED DURING SMALL GAME SEASON.
- E. THE POSSESSION OF ANY FIREARM CONTAINING SHELLS OR CARTRIDGES, OR ANY CAPPED OR PRIMED MUZZLELOADING GUN IS PROHIBITED ON ANY PUBLIC CAMPSITE OR CHECK STATION AREA. THE DISCHARGE OF FIREARMS IS PROHIBITED ON, FROM, OR ACROSS ANY CAMPSITE OR CHECK STATION AREAS.

7. DOGS:

- A. DOGS MAY BE USED FOR HUNTING DURING OPEN SEASONS UNLESS PROHIBITED BY REGULATIONS FOR THE PARTICULAR MANAGEMENT AREA.
- B. NO PERSON SHALL KNOWINGLY OR NEGLIGENTLY ALLOW ANY DOG TO PURSUE OR MOLEST ANY WILDLIFE DURING ANY PERIOD IN WHICH THE TAKING OF SUCH WILDLIFE BY THE USE OF DOGS IS PROHIBITED.
- C. NO PERSON SHALL POSSESS ANY DOG DURING ANY PERIOD IN WHICH THE TAKING OF WILDLIFE BY THE USE OF DOGS IS PROHIBITED PROVIDED THAT DOGS NOT NORMALLY USED FOR HUNTING AND KEPT UNDER RESTRAINT MAY BE POSSESSED.

8. CAMPING:

- A. CAMPING DURING OPEN SEASON SHALL BE LIMITED TO DESIGNATED CAMPSITES EXCEPT UNDER SPECIAL RULES FOR PARTICULAR WILDLIFE MANAGEMENT AREAS. CAMPING IS PERMITTED DURING CLOSED SEASON UNLESS PROHIBITED BY SPECIFIC AREA REGULATIONS.
- B. WHEN CAMPING IS PERMITTED ON ANY WILDLIFE MANAGEMENT AREA, AUTHORIZED CAMPING EQUIPMENT MAY BE TAKEN ON THE AREA AFTER 8:00 A.M. ONE (1) DAY BEFORE THE OPENING OF EACH SEASON AND SHALL BE REMOVED FROM THE AREA BEFORE 6:00 P.M. ONE (1) DAY FOLLOWING THE CLOSE OF EACH SEASON UNLESS OTHERWISE PROVIDED BY SPECIFIC AREA REGULATIONS.

9. VEHICLES:

- A. NO MOTOR VEHICLE SHALL BE OPERATED ON ANY PART OF ANY WILDLIFE MANAGEMENT AREA DESIGNATED BY AREA REGULATIONS AS CLOSED TO VEHICULAR TRAFFIC OR TEMPORARILY CLOSED BY ADMINISTRATIVE ACTION AND POSTING NOTICE OF SUCH ON THOSE AREAS BECAUSE OF INCLEMENT WEATHER, POOR ROAD CONDI-

TIONS, CONSTRUCTION OR MANAGEMENT ACTIVITIES, OR WILDLIFE SURVEYS. THE USE OF TWO-WHEELED MOTOR-POWERED VEHICLES OR ALL-TERRAIN VEHICLES IS PROHIBITED ON ANY ROADS OR TRAILS NOT OPEN TO OR USED BY OTHER VEHICLES UNLESS OTHERWISE PROVIDED BY SPECIFIC AREA REGULATION.

- B. NO PERSON SHALL PARK ANY VEHICLE IN A MANNER WHICH OBSTRUCTS A ROAD, GATE, OR FIRELANE.
10. GRAIN AND FOOD: NO PERSON SHALL PLACE, EXPOSE, OR DISTRIBUTE ANY GRAIN OR OTHER FOOD FOR WILDLIFE ON ANY WILDLIFE MANAGEMENT AREA EXCEPT AS AUTHORIZED BY PERMIT FROM THE EXECUTIVE DIRECTOR. NO PERSON SHALL TAKE WILDLIFE ON ANY LAND OR WATERS UPON WHICH GRAIN OR OTHER FOOD HAS BEEN DEPOSITED, PROVIDED THAT QUAIL MAY BE HUNTED IN PROXIMITY TO ESTABLISHED GAME FEEDERS.
 11. RELEASE OF WILDLIFE: NO PERSON SHALL RELEASE WILDLIFE OF ANY SPECIES ON ANY WILDLIFE MANAGEMENT AREA UNLESS AUTHORIZED BY PERMIT FROM THE EXECUTIVE DIRECTOR.
 12. PLANTS: NO PERSON SHALL CUT OR DESTROY ANY TREE ON, OR REMOVE ANY TREE, SHRUB, OR PROTECTED PLANT (AS DESIGNATED IN S. 581.185, FLORIDA STATUTES) FROM ANY WILDLIFE MANAGEMENT AREA WITHOUT WRITTEN PERMISSION FROM THE LANDOWNER OR PRIMARY LAND MANAGER.
 13. NOTWITHSTANDING ANY OTHER PROVISIONS HEREIN, THE HARVEST OF ALLIGATORS, THEIR EGGS OR HATCHLINGS MAY BE CONDUCTED ON TYPE I WILDLIFE MANAGEMENT AREAS IN ACCORDANCE WITH COMMISSION ORDER(S) AND RULES 39-25.031, 39-25.032, AND 39-25.042. A PRIVATE LANDOWNER MAKING HIS LANDS AVAILABLE FOR USE IN THE TYPE I WILDLIFE MANAGEMENT AREA SYSTEM MAY PARTICIPATE IN AN ALLIGATOR MANAGEMENT PROGRAM ON SUCH LANDS IN ACCORDANCE WITH RULE 39-25.032.

PME:bb
EXHIBIT.C
January 23, 1992

HALF-MOON WILDLIFE MANAGEMENT AREA

A FEDERAL AID PROJECT

UNAUTHORIZED GUNS, DOGS, OR TRAPPING

NOT ALLOWED

FLORIDA GAME AND FRESHWATER FISH COMMISSION,

FLORIDA DEPARTMENT OF NATURAL RESOURCES

AND

THE SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

COOPERATING

EXHIBIT "D"

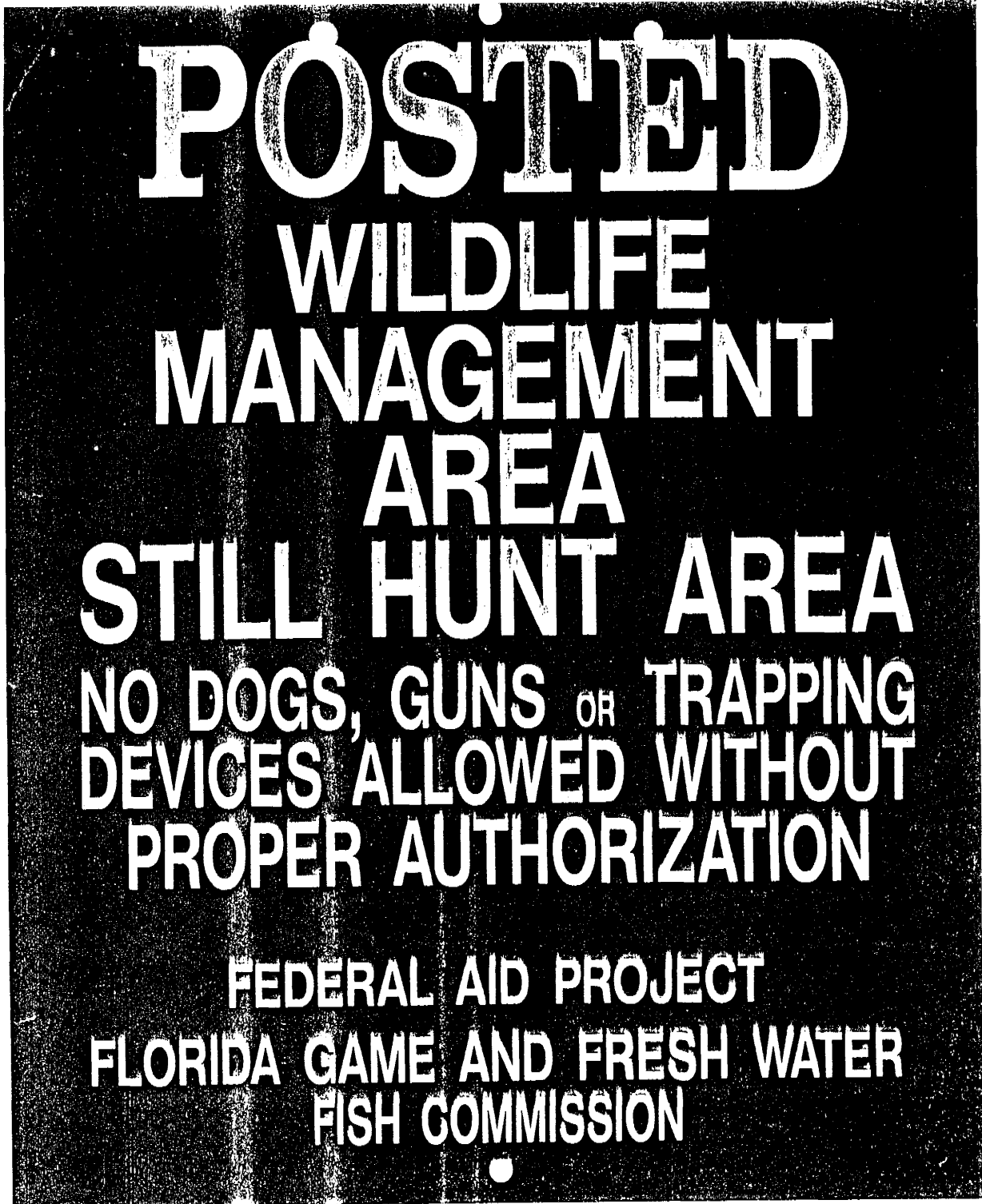
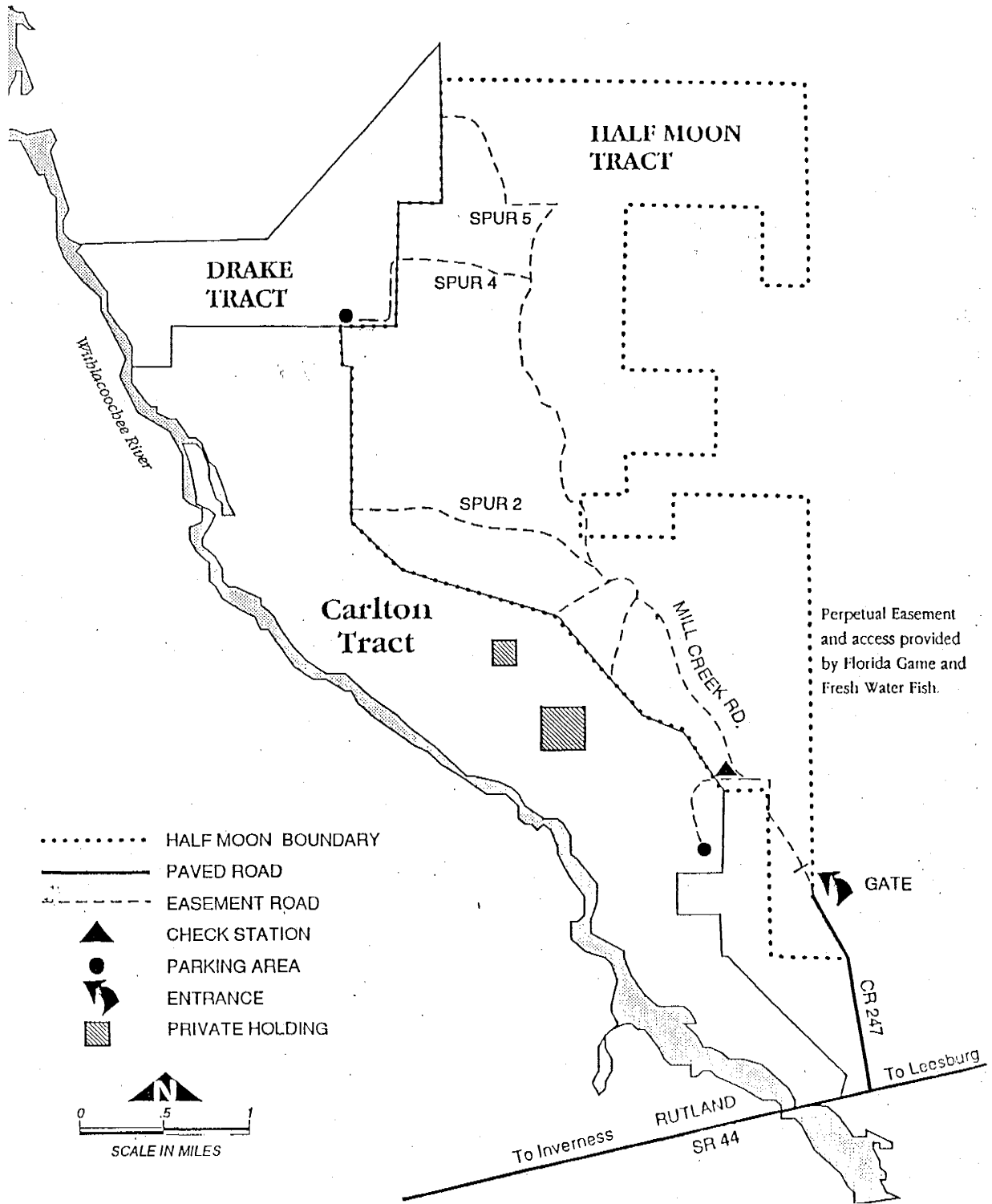


EXHIBIT "E"

EXHIBIT "F"



Gum Slough Project
SWF Parcel No. 19-193-102X
FWC Contract # 07134

**FIRST AMENDMENT TO THE HALF-MOON/CARLTON WILDLIFE MANAGEMENT AREA
AGREEMENT BETWEEN
SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT AND
FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION
FOR MANAGEMENT OF THE GUM SLOUGH PROJECT**

This First Amendment to the Half-Moon/Carlton Wildlife Management Area Agreement for the management of properties within the Southwest Florida Water Management District's Gum Slough Project by the Florida Fish and Wildlife Conservation Commission hereinafter referred to as the "Management Agreement", by and between the Southwest Florida Water Management District, a public corporation hereinafter referred to as the "District," and having a mailing address of 2379 Broad Street, Brooksville, Florida 34604-6899; and the Florida Fish and Wildlife Conservation Commission (formerly known as the Florida Game and Fresh Water Fish Commission), an agency of the state having a mailing address of Farris Bryant Building, 620 South Meridian Street, Tallahassee, Florida 32399-1600, hereinafter referred to as "the Commission."

WITNESSETH

WHEREAS, the District and the Commission entered into a Management Agreement dated May 28, 1992, by which the Commission manages the wildlife and freshwater fisheries resources on the District's Gum Slough Project, referred to as the "Project", as delineated in Exhibit "A" of the Management Agreement and known as the "Carlton Tract" therein, and

WHEREAS, the Commission then managed and still manages land adjacent to and to the east of the Project known as Half Moon Wildlife Management Area, hereinafter referred to as "Half Moon WMA", and

WHEREAS, the District and the Commission desire the Commission to be the lead managing agency and assume full management responsibilities for the Project.

NOW THEREFORE, the District and the Commission, in consideration of the mutual covenants and conditions contained herein, do mutually agree to amend the Management Agreement, dated May 28, 1992, as follows:

1. **Term:** This First Amendment will be effective from the date of its execution by the last of the parties, and shall thereafter be in force in accordance with the terms of the Management Agreement, dated May 28, 1992.

2. **Additional Management Obligations:** The District and the Commission mutually agree the Commission will accept the following management responsibilities in addition to those specified in the Management Agreement for the lands in the Project, referred to as the Wildlife Management Area in the Management Agreement:
 - a. **Public Use** – The Commission shall be responsible for all activities and costs associated with managing all public use activities and the development of public use facilities as set forth in the approved Management Plan for the Half Moon WMA.
 - b. **Land Management** – The Commission shall be responsible for all activities and costs associated with managing the natural systems in a manner consistent with the management goals of the Half Moon WMA and facilities as set forth in the approved Management Plan for the Half Moon WMA.
3. **Management Plan:** The Commission will be the lead managing agency for the Wildlife Management Area. It is understood by the District and the Commission that all management activities on the Wildlife Management Area within the Half Moon WMA shall be designed to conserve, protect and enhance the properties, and will be incorporated into a management plan. The Commission has a conceptual management plan (“CMP”) in place pursuant to Chapter 259, Florida Statutes that is in force until 2011 for the Half Moon WMA. Subsequent revisions to the CMP will include lands within the Project and at a minimum and without limitation, habitat management, mitigation and restoration, maintenance, any resource inventories or monitoring, exotic plant species removal, prescribed burning, security measures, construction of facilities or other improvements, and public access/recreational opportunities. The District will have ninety (90) days from receipt to review the Commission’s proposed revisions to the CMP. If the District fails to provide comments or otherwise respond within ninety (90) days, the proposed revisions to the CMP will be deemed acceptable by the District. If the District provides written comments or recommendations on the proposed revisions to the CMP, the Commission will respond within ninety (90) days from receipt. The Commission’s response will be in writing and include either a revised CMP that incorporates the District’s comments or recommendations or a detailed explanation of why it is not feasible to revise the proposed CMP. The District and the Commission may agree that the Commission has more time to respond to the District’s comments or recommendations if additional review, research or investigation is necessary for the response.

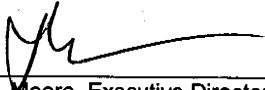
Following the aforesaid CMP internal review, for each CMP amendment and commencing with the planning to review the CMP for 2011 and for each CMP review thereafter during the existence of this Management Agreement, the Commission agrees to work with the District in accordance with the procedure set forth above

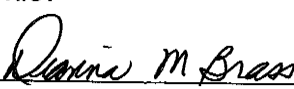
4. **Management Agreement:** Section 24 of the Management Agreement is hereby amended to add to following language: “Any alterations, variations, changes, modifications or waivers of provisions of this Management Agreement shall only be valid when they have been reduced to writing into an amendment, and duly signed by each of the parties hereto, unless otherwise provided herein.”

5. **Terms and Conditions:** The District and Commission acknowledge that all other terms and conditions of the Management Agreement, not modified herein, remain in full force and effect and apply to the Wildlife Management Area.

IN WITNESS WHEREOF, the parties or their lawful representatives, have executed this Management Agreement on the day and year set forth next to their signatures below.

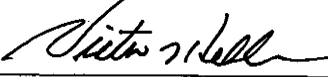
SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

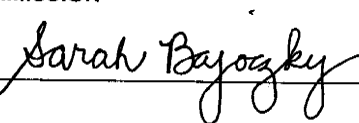
By: 
David L. Moore, Executive Director

Witness: 

Date: 12-4-07


FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

By: 
Name: Victor J. Heller

Witness: 

Title: Assist. Exec. Director

Date: 9 Nov. 2007

APPROVED AS TO FORM
AND LEGAL SUFFICIENCY

Commission Attorney

APPROVED BY:	INITIALS	DATE
ATTORNEY	<u>lw</u>	<u>2/13/07</u>
MANAGER	<u>mm</u>	<u>2-12-07</u>
DIRECTOR	<u>LD</u>	<u>12-07-07</u>
DEPUTY EXEC DIR	<u>GD</u>	<u>5-25-07</u>

13.2 Public Involvement

**Half Moon Ranch Wildlife Management Area (HMWMA)
Management Advisory Group (MAG)
Consensus Meeting Results**

June 14, 2011 in Lake Panasoffkee, Florida

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

The HMWMA consensus meeting was held on the morning of June 14, 2011 at the Sumter County Community Building in Lake Panasoffkee, Florida. The ideas found below were provided by stakeholders for consideration in the 2014 - 2024 management plan for HMWMA with priority determined by vote. These ideas represent a valuable source of information to be used by biologists, planners, administrators, and others during the development of the management plan. Upon approval by FWC, the Acquisition and Restoration Council (ARC), and the Trustees of the Internal Improvement Trust Fund (Governor and Cabinet), the HMWMA management plan will guide the activities of FWC personnel over the ten-year duration of the management plan and will help meet agency, state, and federal planning requirements.

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

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

<u>Rank</u>	<u># of Votes</u>	<u>Score</u>	<u>Idea</u>
1.	[8]	[13]	9. Restore and improve wetland function to improve native plant composition. Restore, maintain and enhance native plant communities and imperiled species habitat. Reduce invasive native plant species (e.g., wax myrtle, saw palmetto). Consider various fuel management tools to restore a more natural fire regime. This will help to restore water quality including into the Withlacoochee River and its tributaries. Rare and listed species occur at HMWMA and we want to maintain and enhance their habitat. If we take care of Florida scrub-jay it will benefit other species because it is an umbrella species. Consider other management tools such as roller chopping for fuel management.
2.	[8]	[31]	2. Utilize the assistance of local scouting troops. Provide primitive camping opportunities for scouting groups and the public. Establish partnerships with civic and professional groups to generate a local support system. Boy Scouts are willing to help the community and conduct service projects. Some scouts do not know what's available to them. Scout representatives are encouraging them to pursue careers and this would be good experience for them.

<u>Rank</u>	<u># of Votes</u>	<u>Score</u>	<u>Idea</u>
3.	[7]	[18]	4. Increase use and user diversity, provide limited vehicular access, and promote additional recreational opportunities. In our political climate, we are being tasked with identifying lands we can sell off. Unless we increase our constituency, there will be increased pressure on conservation lands. User diversity is an important part of that and we need to engage other demographics. We need support. Get people outdoors and they are much more likely to support conservation of these lands. Increase use and knowledge to a broader range of the public. Additional vehicular access will allow for disabled, elderly, physically impaired access to internal areas of HMWMA. Providing alternative recreational opportunities will provide for other opportunities to get people outdoors affordably with low environmental impact and provide additional educational opportunities.
4.	[5]	[13]	16. Expand and enhance the trail system to better serve bicyclists, pedestrians, and equestrians including providing instructional and wayfinding signage for trail users. Make trails suitable for appropriate user groups (e.g., single track trails may need to be dedicated to one user group to avoid conflicts). Additional signage will provide more information than what is currently there.
5.	[5]	[19]	10. Integrate recreation opportunities with tourism plans, the County, and the region (so people know what's available). HMWMA resources are not well reflected in County plans. We can do a better job integrating HMWMA with County and regional tourism, economic development, and planning.

Two items of equal rank:

6.	[4]	[15]	18. Expand and enhance educational and research opportunities. Self explanatory.
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<u>Rank</u>	<u># of Votes</u>	<u>Score</u>	<u>Idea</u>
6.	[4]	[15]	21. Restore pastures to appropriate natural communities. Self explanatory.
8.	[3]	[6]	8. Clearly identify the boundary of HMWMA along river's edge. Clear boundaries will aid in law enforcement and help prevent illegal taking of resources. Currently, there is no way of definitively knowing whether people are on FWC leased area or not when close to river.

Two items of equal rank:

9.	[3]	[8]	7. Develop hydrological restoration partnerships with regional agencies and groups. Connect and partner with other leaderships (e.g., The Nature Conservancy).
9.	[3]	[8]	11. Expand opportunities for youth hunting and accommodate group events (special use permits). Youth hunting allows children to be introduced to the sport. FWC could expand current turkey youth hunt to possibly include hog and deer hunting. Youth field days and special events will help promote the area.
11.	[2]	[5]	5. Provide for more non-motorized access to the area. Provide more opportunities for non-motorized, non-invasive access. More people would consider destinations if they had better access. Encouraging efforts in order to get more people on bicycles.
12.	[2]	[6]	14. Balance user groups during the prime (cool) seasons. Hunting from October through April excludes many user groups. Consider time-of-day limits for hunting to allow other users in the weekend afternoons during this cool season.
13.	[2]	[9]	25. Provide opportunities to connect recreational uses among conservation areas in the region. We need to provide connections between conservation lands in the region so people can use the different recreational opportunities at the different areas.

<u>Rank</u>	<u># of Votes</u>	<u>Score</u>	<u>Idea</u>
14.	[2]	[10]	22. Consider the feasibility of surplusings HMWMA lands that do not contribute to the area's management objectives. Self explanatory.

Two items of equal rank:

15.	[1]	[2]	6. Continue to manage timber resources to provide revenue. This should be included in the management plan. Plan ahead and be flexible with your timing. Reduce fuel loads, recapture some sites where trees or palmettos have overgrown, and assist with land management.
15.	[1]	[2]	20. Fully account for both costs and benefits of public land acquisition when considering potential changes in tax base as a result of public conservation land acquisition. Make sure to include positives associated with public land acquisition such as increased property values. Also, look at costs. If there are too many conservation lands (not the case with Sumter County), it can hurt the County.

The following item received no votes. All ideas represent valuable input, and are considered in development of the HMWMA management plan, but carry no rank with regard to the priority perceptions of the MAG.

17.			27. Provide solar-powered additional restroom facilities. Self explanatory.
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**Half Moon Ranch Wildlife Management Area
MAG Meeting Participants**

<u>Name</u>	<u>Affiliation</u>
Active Participants	
Nancy Dwyer	FWC Area Biologist
Will Millen	Southwest Florida Water Management District
Larry Rosen	Kissimmee Valley Audubon Society
Andrew Freund	Boy Scout Troop 302
Butch Mallet	Florida Division of Forestry
Brad Cornelius	Sumter County Board of County Commissioners
Jerry Brannen	Hunting Stakeholder
Judy Smith	Landowner
Tim Bustos	Florida Bicycle Association
Michael Bush	Natural Resources Conservation Service
Jeanne Corneli	Equestrian Stakeholder
Barbara Bowen	FWC Volunteer, Birding stakeholder
Lt. David Adams	FWC, Law Enforcement
Supportive Participants	
Julie Lambert	Boy Scout Troop 302
Rich Noyes	FWC, Office of Recreation Services
Tom M. Matthews	FWC, Office of Recreation Services
Allison Jones	FWC, Office of Recreation Services
Josh Cucinella	FWC, Office of Recreation Services
Jen Williams	FWC, Division of Hunting and Game Management
Travis Blunden	FWC, Area Biologist
Rick Spratt	FWC, District Biologist
Matt Pollock	FWC, Regional Biologist
Scotland Talley	FWC, Conservation Biologist
Kris Cathey	FWC, Landowner Assistance Program
Mark Asleson	FWC, Landowner Assistance Program
Invited but Unable to Attend	
Commissioner Gilpin	Sumter County
Mary Glowacki	Division of Historical Resources
Richard Owen	Department of Environmental Protection
Keith Morin	Department of Environmental Protection
Michael Barnett	Florida Trail Association, Highlands Chapter
Dan Hipes	Florida Natural Areas Inventory
Brian Zielinski	National Wild Turkey Federation

Rex Farrisior
Mike & Effie Smith
Steve Epple

Previous Cattleman Lessee
Citrus County Audubon Society
Boy Scout Director

FWC Planning Personnel

David Alden
Larame Ferry
Michael Hallock-Solomon
Gary Cochran

Meeting Facilitator/Recorder
Meeting Facilitator/Recorder
Recorder
FWC, Conservation Acquisition and Planning

NOTICE

The Florida Fish and Wildlife Conservation Commission

announces a

PUBLIC HEARING

for the

Half Moon

Wildlife Management Area

Sumter County, Florida

7:00 - 9:00 P.M. Thursday, July 21, 2011

Lake Panasoffkee Community Building

1582 CR 459

Lake Panasoffkee, FL 33583

PURPOSE: To receive public comment regarding considerations for the FWC ten-year Management Plan for the Half Moon Wildlife Management Area (WMA). This hearing is being held exclusively for discussion of the *DRAFT* Half Moon WMA Management Plan.

A Management Prospectus for the Half Moon WMA is available upon request. For a copy, please contact Laramie Ferry, Florida Fish and Wildlife Conservation Commission, Conservation Acquisition and Planning, 620 South Meridian Street, Tallahassee, Florida 32399-1600. Telephone: (850) 487-9102.

FLORIDA ADMINISTRATIVE CODE AND WEEKLY

For questions regarding the content, interpretation, or application of a specific rule, please contact the agency that regulates the rule. A directory of state agencies is available online at <http://www.myflorida.com/taxonomy/government/>

For other information related to the Florida Administrative Code, the Florida Administrative Weekly, or this website, contact:

Florida Administrative Code, Weekly and Laws
Florida Department of State
R.A. Gray Building
Mail Station 22
Tallahassee, FL 32399-0250

Tel.: 850-245-6270

Fax: 850-245-6282

Email: administrativecode@dos.state.fl.us

NOTICE:

The Florida Fish and Wildlife Conservation Commission announces a PUBLIC HEARING for the Half Moon Wildlife Management Area located in Sumter County, Florida.

7:00 P.M. Thursday, July 21, 2011
Lake Panasoffkee Community Building
1582 CR 459
Lake Panasoffkee, FL 33583

PURPOSE: To receive public comment regarding considerations for FWC's ten-year Management Plan for the Half Moon Wildlife Management Area (WMA). This hearing is designed exclusively for discussion of the draft management plan. A Management Prospectus for Half Moon WMA is available upon request from the Florida Fish and Wildlife Conservation Commission, Conservation Planning Group, 620 South Meridian Street, Tallahassee, Florida 32399-1600. Telephone: (850) 487-9588 or e-mail David.Alden@MyFWC.com.

Proof of Publication

from the
SUMTER COUNTY TIMES
Bushnell, Sumter County, Florida
PUBLISHED WEEKLY

STATE OF FLORIDA
COUNTY OF SUMTER

Before the undersigned authority personally appeared

Mary Ann Naczi

Of the Sumter County Times, a newspaper published weekly at Bushnell, in Sumter County, Florida, that the attached copy of advertisement being a public notice in the matter of the

637-0714 SCT PUBLIC NOTICE NOTICE: The Florida Fish and Wildlife Conservation Commission announces a PUBLIC HEARING for the Half Moon Wildlife Management Area located in Sumter County, Florida. 7:00 P.M. Thursday, July 21, 2011 Lake Panasoffkee Community

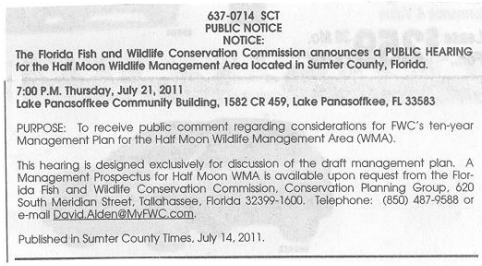
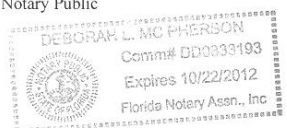
Court, was published in said newspaper in the issues of July 14th, 2011,

Affiant further says that the Sumter County Times is a Newspaper published at Bushnell in said Sumter County, Florida, and that the said newspaper has heretofore been continuously published in Sumter County, Florida, each week and has been entered as second class mail matter at the post office in Bushnell in said Sumter County, Florida, for a period of one year next preceding the first publication of the attached copy of advertisement; and affiant further says that he/she has neither paid nor promised any person, firm or corporation any discount, rebate, commission or refund for the purpose of securing this advertisement for publication in the said newspaper.

Mary Ann Naczi
The forgoing instrument was acknowledged before me

This 14th day of July 2011
By: Mary Ann Naczi

who is personally known to me and who did take an oath
Deborah L. McPherson
Notary Public



PUBLIC HEARING REPORT
FOR THE
HALF MOON WILDLIFE MANAGEMENT AREA
MANAGEMENT PLAN
HELD BY THE
HALF MOON MANAGEMENT ADVISORY GROUP
June 14, 2011 – SUMTER COUNTY, FLORIDA

Introduction: The Half Moon Wildlife Management Area (HMWMA) Management Advisory Group’s (MAG) public hearing for the update to the Management Plan for HMWMA was held on July 21, 2011. Seven members of the public signed in prior to the beginning of the hearing.

The meeting was introduced by MAG participant Ms. Barbara Bowen, representing Sumter County Birding Stakeholder Group. Ms. Bowen indicated that she was one of ten stakeholders that attended the Florida Fish and Wildlife Conservation Commission (FWC) facilitated MAG meeting held on June 14, 2011. Ms. Bowen praised the MAG participants for their attentiveness during the MAG meeting, their willingness to listen to the ideas and opinions of others, and their ability to work with FWC staff to build consensus on how to best manage HMWMA, and generate a list of priority ideas for FWC to consider in developing the update to the HMWMA ten-year Management Plan. Ms. Bowen stated that the draft Management Plan was being presented tonight by FWC staff, and that hardcopies of the draft plan and the MAG meeting report were available at the front door for the public’s review. Ms. Bowen thanked the public for their attendance, and then introduced FWC staff David Alden and Nancy Dwyer to present an overview of HMWMA, FWC’s planning process, and the draft components of the Management Plan.

FWC Draft Management Plan Presentation: Mr. David Alden thanked the public for their attendance, as well as Sumter County for the use of their administrative building to conduct the public hearing. Mr. Alden explained that the purpose of the public hearing was to solicit public input regarding the draft Management Plan for HMWMA, and not hunting and fishing regulations, indicating there is a separate public input process for FWC rule and regulation development. Mr. Alden then described the materials that were available at the door for public review, including the draft Management Plan and the MAG meeting report. Mr. Alden then presented the agenda for the public hearing. Mr. Alden also facilitated the introduction of all FWC staff in attendance to the audience. Mr. Alden then

presented an overview and orientation of HMWMA, including a description of the natural communities, wildlife species and recreational opportunities found on the area. Mr. Alden also explained FWC's planning process and asked if there were any questions regarding that process. Mr. Alden then introduced FWC biologist and HMWMA manager Nancy Dwyer to present the draft components of the HMWMA Management Plan.

Ms. Dwyer then presented the draft management intent, goals and objectives, and identified challenges and strategies for the HMWMA Management Plan (Sections 5, 6 and 8 of the HMWMA Management Plan). Mr. Alden then introduces FWC Conservation Planner, Mike Hallock-Solomon, to present the Conservation Planning Boundary Concept and Development process.

Questions, Answers and Discussion: Mr. Alden facilitated an informal question and answer session where members of the public in attendance, without necessarily identifying themselves, could ask questions of the FWC staff, and discuss the answers. Mr. Alden again emphasized that the exclusive purpose for the public hearing was to collect public input regarding the draft Management Plan for TLWMA, not to discuss area regulations. There were no questions from the audience.

Public Testimony: Two members of the public audience submitted speaker cards indicating the intention to provide formal public testimony. Mr. Alden again emphasized that the public hearing was for taking input regarding the draft Management Plan, and called the first speaker to the podium.

Mr. Peter Moeller:

Mr. Moeller wanted to commend the management of HMWMA especially with the continuous burn schedule they've maintained and how this is creating a wonderful habitat for the scrub-jays in the area. He also wanted to commend the management for the wonderful job they've done with restoration of the pasture lands.

Mr. Trustee Drake:

Mr. Drake stated that he owned both sides of Gum Slough until he started having trouble with loggers who would come up there with pontoon boats. He felt that these boats were much too large for this creek which is very shallow and narrow. He claimed that the state wouldn't let him protect it. So he went to Tallahassee and they disallowed motor boats at Gum Slough. Mr. Drake said that the state did not enforce these rules for air boaters, and that they continued to take their boats down the creek. He concluded that this is one of the few remaining natural pristine, spring-fed creeks that hasn't been disturbed by man and that it deserves conservation.

Adjournment: Mr. Alden asked if there were any other members of the public that wished to give public testimony. Having received no further requests to give public testimony, Mr. Alden declared the public hearing adjourned.

13.3 Land Management Review

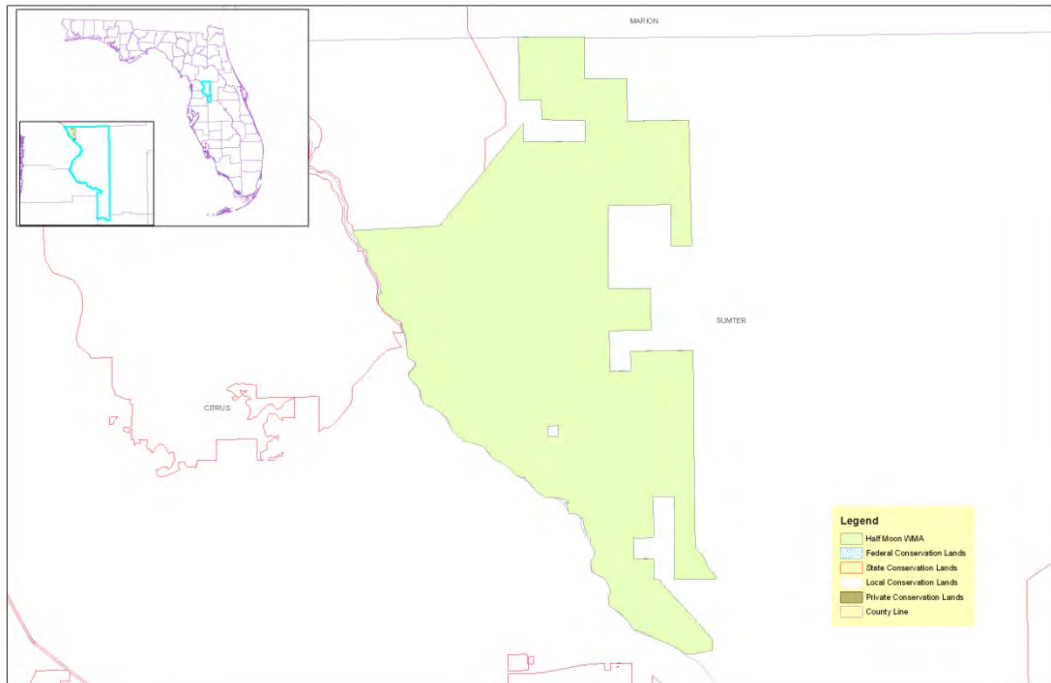
Name of Site: Half Moon WMA

County: Sumter County

Managed by: Fish and Wildlife Conservation Commission
Acres

Acres: 9,514.50

Review Date: 02/22/10



Review Team Determination

Managed in accordance with

acquisition purpose? Yes =6, No = 0



Management practices, including public access,
in compliance with the management plan? Yes =6,
No = 0



Categories	Management Plan Review	Field Review
Natural Communities	0.33	3.99
Listed Species	0.45	4.09
Natural Resource Survey	0.45	4.02
Cultural Resources	1.00	4.80
Prescribed Fire	0.69	5.00
Restoration	0.60	4.38
Exotic Species	0.08	3.57
Hydrology	0.21	3.28
Groundwater Monitoring	0.00	2.00
Surface Water Monitoring	0.00	1.75
Resource Protection	0.48	3.77
Adjacent Property Concerns	0.33	2.46
Public Access & Education	0.63	3.62
Management Resources	N/A	4.20
Managed Area Uses	0.81	N/A
Buildings, Equipment, Staff & Funding	N/A	3.86

Consensus Commendations to the Managing Agency

The following commendations resulted from discussion and vote of the review team members.

1. The team commends the FWC for their Scrub Jay Habitat Management. (VOTE: 6+, 0-)



2. The team commends the manager and staff for the ability to apply their expertise and experience in an appropriate way in the restoration of the natural communities of the area. (VOTE: 6+, 0-)



3. The team commends the manager and staff for their outstanding record of prescribed fire management. (VOTE: 6+, 0-)



4. The team commends the manager and staff for efforts to remove hardwoods from sandhills and flatwoods where densities need to be reduced. (VOTE: 6+, 0-)



5. The team commends the FWC for accomplishment of outstanding restoration of groundcover on 20 acres of ruderal oldfields. (VOTE: 6+, 0-)



Consensus Recommendations to the Managing Agency

The following recommendations resulted from a discussion and vote of review team members. The management plan must include responses to the recommendations identified below.

1. The team recommends that FWC pursue acquisition of the property that encompasses the springhead of the Gum Slough. (VOTE: 6+, 0-)



Managing Agency Response: FWC has developed an optimal boundary protocol to analyze natural resource and conservation needs and associated conservation acquisition strategies. This optimal boundary and associated Conservation Action Strategy, including the Glum Slough parcel, will be included in the management plan update.

2. The team recommends that FWC reduce the impact of cattle grazing on the wetland and ecotonal areas. (VOTE: 6+, 0-)



Managing Agency Response: FWC notes the land management review team indicated FWC's management actions regarding cattle grazing exceeded management expectations. Additionally, FWC has completed a WMA system-wide managed area evaluation of the effects of cattle grazing on native plant communities. The study determined there were no statistically significant measureable impacts on the native ground cover communities where grazing was used as a management tool under FWC grazing criteria calibrated to each specific habitat characteristics where grazing is allowed on FWC managed conservation lands. FWC will continue to evaluate and monitor effects of cattle grazing on native plant communities and make modifications in grazing practices where appropriate.

3. The team recommends that FWC coordinate with the appropriate agencies development of a surface and ground water assessment and monitoring plan. (VOTE: 6+, 0-)



Managing Agency Response: FWC will develop an objective for completion of a hydrological assessment of HMWMA in the management plan update. The results of the hydrological assessment and any subsequent restoration plan will be developed in consultation and coordination with the SWFWMD.

Checklist Findings

The following items received high scores on the review team checklist, which indicates that management actions exceeded expectations.

- Natural Communities, specifically sandhill and mesic flatwoods.
- Listed Species, specifically animal inventory, scrub jay, and gopher tortoise.
- Natural Resources, specifically listed species or habitat monitoring, and fire effects monitoring.
- Cultural Resources, specifically cultural resource survey, protection and preservation.
- Resource Management, specifically area being burned, frequency and quality.
- Restoration of Ruderal Areas, specifically pasture and slash pine plantation.
- Resource Protection, specifically gates and fencing.
- Adjacent Property Concerns, specifically inholdings/additions.
- Public Access and Education, specifically roads, parking, and recreational opportunities.
- Managed Area Uses, specifically hunting, fishing, bird watching, hiking, bicycling, wildlife viewing/nature photography, horseback riding, cattle grazing and nature based recreational opportunities.

The following items received low scores on the review team checklist, which indicates that management actions noted during the Field Review (FR) were not considered sufficient (less than 2.5 score on average), or that the text noted in the Management Plan Review (PR) does not sufficiently address this issue (less than .5 score on average.). The management plan must include responses to the checklist items identified below:

1. Discussion in the management plan regarding Natural Communities, specifically Scrubby Flatwoods, Mesic Hammock, Bottomland Forest, Basin/Depression Marsh, Dome/Basin Swamp, Wet Flatwoods, Hydric Hammock, Blackwater Stream and Spring-Run Stream. (PR)

Managing Agency Response: FWC notes that the existing HMWMA management plan describes the natural communities beginning on page 15. However, FWC recognizes those descriptions found in the current management plan should be expanded. FWC has completed natural communities survey, mapping, and descriptions for HMWMA. FWC will include those descriptions and associated maps in the scheduled management plan update.

2. Discussion in the management plan regarding Listed Species, specifically Plant Inventory and Giant Orchid. (PR)

Managing Agency Response: FWC notes that the review team concluded that both management actions and inventory of listed species at HMWMA exceeded expectations. FWC further notes that the current HMWMA management plan describes the known listed imperiled wildlife species beginning on page 33. However, FWC will expand this information in the scheduled management plan update.

FWC also notes in Appendix VI, beginning on page 128, a taxonomic list of flora on HMWMA. However during the update of the management plan, FWC will supplant the plant inventory and listed species descriptions with more complete and up to date information including management and conservation

strategies for imperiled plant species found on HMWMA. Any additional rare imperiled plant and animal species survey data and locations will be incorporated into the scheduled management plan update.

3. Discussion in the management plan regarding Natural Resource Survey, specifically Other Non-Game Species or Habitat Monitoring, Other Habitat Management Effects Monitoring and Invasive Species Survey/Monitoring. (PR)

Managing Agency Response:

FWC has completed natural communities surveying, mapping, , and associated natural community descriptions. Also, FWC will incorporate this information in the next scheduled management plan update as well as Objective-based Vegetative Management (OBVM) monitoring protocols. Further, FWC has established a Wildlife Conservation Prioritization and Recovery (WCPR) strategy for management of imperiled and select focal species. FWC will expand each of these plan elements (i.e., surveys, habitat monitoring), and will incorporate OBVM and WCPR information in the scheduled management plan update.

4. Discussion in the management plan regarding Restoration of Ruderal Areas, specifically Hardwood Control in Ecotones. (PR)

Managing Agency Response: OBVM Desired Future Conditions and monitoring protocols have been developed and are being implemented on HMWMA. OBVM desired future conditions are being used to guide the restoration and habitat improvements on HMWMA. Information on OBVM and restoration and habitat improvement needs will be incorporated in the next management plan update.

5. Discussion in the management plan regarding Non-Native, Invasive & Problem Species, specifically Prevention and Control of Plants, Animals and Pests/Pathogens. (PR)

Managing Agency Response: FWC notes that this is addressed on pages 24, 49, 52, 53 of the current HMWMA management plan. Invasive exotic species will be addressed further in the HMWMA management plan update including plants and animals known to occur on HMWMA. Natural communities that may have occurrences and densities of non-native plant species will be addressed through FWC's OBVM desired future conditions and associated monitoring protocols. This information will be included in the management plan update.

Use of the terminology "pests/pathogen" is not clear since it is not a required element of management plans. FWC will evaluate the need to address the issue of pests/pathogens in the management plan update.

6. Discussion in the management plan regarding Hydrologic/Geologic Function, specifically Roads/Culverts, Ditches, Hydro-Period Alteration, Water Level Alteration and Dams, Reservoirs, and Other Impoundments. (PR)

Managing Agency Response: FWC will develop an objective for completion of a hydrological assessment of HMWMA in the management plan update. The results of the hydrological assessment and any subsequent restoration plan will be developed in consultation and coordination with the SWFWMD.

7. Discussion in the management plan regarding Ground/Surface Water Monitoring, specifically Ground and Surface Water Quality and Quantity. (PR, FR)

Managing Agency Response: FWC will continue to coordinate and cooperate with the SWFWMD on any ground and surface water quantity and quality monitoring deemed necessary on HMWMA. As noted above, the hydrological assessment that will be planned to be completed for the HMWMA will also address this issue.

8. Discussion in the management plan regarding Resource Protection, specifically Boundary Survey, Signage and Law Enforcement Presence. (PR)

Managing Agency Response: FWC notes that the review team concluded that FWC resource protection efforts exceeded management expectations. Discussion of resource protection, boundary, signage, and law enforcement needs will be addressed in the management plan update.

9. Discussion in the management plan regarding Adjacent Property Concerns, specifically Expanding Development (FR,PR) and Water Withdrawals (PR,FR).

Managing Agency Response: FWC notes that the land management review team concluded that FWC management actions regarding adjacent property concerns exceeded expectations. FWC will include a specific section addressing adjacent land uses in the next management plan update. FWC will continue to cooperate and coordinate with SWFWMD and develop strategies for addressing any impacts on natural resources within the HMWMA due to water withdrawals. Additionally, the planned hydrological assessment to be completed for HMWMA will also address this issue.

10. Discussion in the management plan regarding Public Access & Education, specifically Wildlife, Invasive Species, Habitat Management Activities, Interpretive Facilities and Signs, and Management of Visitor Impacts. (PR)

Managing Agency Response: FWC notes that the land management review team concluded that management actions regarding public access, education, and recreational opportunities exceeded expectations. Additionally, FWC has developed a Recreation Master Plan for HMWMA that addresses public access and education, interpretive facilities, signs, and management of visitor impacts. The Recreation Master Plan will be incorporated into the next management plan update.

11. Discussion in the management plan regarding Managed Area Uses, specifically Timber Harvest. (PR)

Managing Agency Response: An analysis of multiple use potential indicating approved and rejected uses of HMWMA is found on page 43. FWC notes that this issue is addressed on pages 34, 48, 51, and 54. Also, a Timber Assessment developed by Division of Forestry is included as Appendix XIV, on page 229. In addition, FWC will include an objective to complete a comprehensive Timber Management Plan in the next management plan update.

APPENDIX A:

PLAN REVIEW		1	2	3	4	5	6	AVERAGE
Natural Communities (I.A)								
Scrubby Flatwoods	I.A.1	1	0	0	0	1		0.40
Sandhill	I.A.2	1	0	1	0	1		0.60
Mesic Hammock	I.A.4	1	0		0	1		0.50
Bottomland Forest	I.A.5	1	0	0	0	1		0.40
Mesic Flatwoods	I.A.6	1	1	1	0	1		0.80
Basin/Depression Marsh	I.A.7	1	0	0	0	1		0.40
Wet Flatwoods	I.A.8	0	0	0	0			0.00
Hydric Hammock	I.A.9	0	0	0	0			0.00
Blackwater Stream	I.A.10	0	0	0	0			0.00
Dome/Basin Swamps	I.A.11	1	0	0	0			0.25
Spring-Run Stream	I.A.12	1	0	0	0			0.25
Listed species:Protection & Preservation (I.B)								
Animal Inventory	I.B.1	1		0	1			0.67
Scrub Jay	I.B.1.a	1	0	1	1	1		0.80
Gopher Tortoise	I.B.1.b	1	0	1	1	1		0.80
Plant Inventory	I.B.2	0	0	0	0	0	0	0.00
Giant Orchid	I.B.2.a	0	0	0	0		0	0.00
Natural Resources Survey/Management Resources (I.C)								
Listed species or habitat monitoring	I.C.2	1	1	0	0	1	1	0.67
Other non-game species or habitat monitoring	I.C.3	0	0	0	0	1		0.20
Fire effects monitoring	I.C.4	1	1	1	0	1		0.80
Other habitat management effects monitoring	I.C.5	0	0	0	0	1		0.20
Invasive species survey / monitoring	I.C.6	1	0	0	0	1		0.40
Cultural Resources (Archeological & Historic sites) (II.A,II.B)								
Cultural Res. Survey	II.A	1	1	1	1	1		1.00

Protection and preservation	II.B	1	1	1	1	1		1.00
Resource Management, Prescribed Fire (III.A)								
Area Being Burned (no. acres)	III.A.1	1	0	1	0	1	1	0.67
Frequency	III.A.2	1	1	1	0	1		0.80
Quality	III.A.3	1	0	1	0	1		0.60
Restoration of Ruderal Areas (III.B)								
Pasture	III.B.1	1	0	1	1	1		0.80
Slash Pine Plantation	III.B.2	0	0	1	1	1		0.60
Hardwood Control in Ecotones	III.B.3	0	0	1	0	1		0.40
Non-Native, Invasive & Problem Species (III.E)								
Prevention								
prevention - plants	III.E.1.a	0	0	1	0			0.25
prevention - animals	III.E.1.b	0	0	0	0		0	0.00
prevention - pests/pathogens	III.E.1.c	0		0	0			0.00
Control								
control - plants	III.E.2.a	0	0	1	0			0.25
control - animals	III.E.2.b	0	0	0	0			0.00
control - pest/pathogens	III.E.2.c	0		0	0			0.00
Hydrologic/Geologic function Hydro-Alteration (III.F.1)								
Roads/culverts	III.F.1.a	1	0	0	0			0.25
Ditches	III.F.1.b	1	0	0	0		0	0.20
Hydro-period Alteration	III.F.1.c	1	0	1	0		0	0.40
Water Level Alteration	III.F.1.d	1	0	0	0		0	0.20
Dams, Reservoirs or other impoundments	III.F.1.e	0	0	0	0		0	0.00
Ground Water Monitoring (III.F.2)								
Ground water quality	III.F.2.a	0	0	0	0		0	0.00
Ground water quantity	III.F.2.b	0	0	0	0		0	0.00
Surface Water Monitoring (III.F.3)								
Surface water quality	III.F.3.a	0		0	0		0	0.00
Surface water quantity	III.F.3.b	0		0	0		0	0.00
Resource Protection (III.G)								
Boundary survey	III.G.1	1	0	0	0		1	0.40

Gates & fencing	III.G.2	1	1	0	0		1	0.60
Signage	III.G.3	1	1	0	0		0	0.40
Law enforcement presence	III.G.4	1	1	0	0			0.50
Adjacent Property Concerns (III.H)								
Land Use								
Expanding development	III.H.1.a	1	0	1	0		0	0.40
Water Withdrawals	III.H.1.b	0	0	0	0		0	0.00
Inholdings/additions	III.H.2	1	0	1	0		1	0.60
Public Access & Education								
Public Access								
Roads	IV.1.a	1	1	1	1			1.00
Parking	IV.1.b	1	1	1	1			1.00
Environmental Education & Outreach								
Wildlife	IV.2.a	0	1	1	0			0.50
Invasive Species	IV.2.b	0	0	1	0			0.25
Habitat Management Activities	IV.2.c	0	1	1	0			0.50
Interpretive facilities and signs	IV.3	0	1	1	0			0.50
Recreational Opportunities	IV.4	1	1	1	1		0	0.80
Management of Visitor Impacts	IV.5	1	0	1	0			0.50
Managed Area Uses								
Existing Uses								
Hunting	VI.A.1	1	1	1	1	1	1	1.00
Fishing	VI.A.2	1	1	1	1	1	0	0.83
Birdwatching	VI.A.3	1	1	1	1	0	0	0.67
Hiking	VI.A.4	1	1	1	1	1	1	1.00
Bicycling	VI.A.5	1	1	1	1	1	1	1.00
Wildlife Viewing/ Nature Photography	VI.A.6	1	1	1	1	0	0	0.67
Horseback Riding	VI.A.7	1	1	1	1	1	1	1.00
Timber Harvest	VI.A.8	1	0	0	0	1	1	0.50
Cattle Grazing	VI.A.9	0	1	1	1	1	0	0.67
Nature Based Recreational Opportunities	VI.A.10	1	1	1	1		0	0.80
FIELD REVIEW		1	2	3	4	5	6	AVERAGE
Natural Communities (I.A)								
Scrubby Flatwoods	I.A.1	5	4	5	5	5	X	4.80
Sandhill	I.A.2	3	1	4	2	4	X	2.80

Mesic Hammock	I.A.4	5	3	X	3		X	3.67
Bottomland Forest	I.A.5	5	4	3	4	5	X	4.20
Mesic Flatwoods	I.A.6	4	4	4	4	5	X	4.20
Basin/Depression Marsh	I.A.7	4	2	3	2	5	X	3.20
Wet Flatwoods	I.A.8	5	4	3	3	5	X	4.00
Hydric Hammock	I.A.9	5	5	X	4	5	X	4.75
Blackwater Stream	I.A.10	5	3	X	4	5	X	4.25
Dome/Basin Swamps	I.A.11	5	4	X	3	5	X	4.25
Spring-Run Stream	I.A.12	5	2	X	3	5	X	3.75
Listed species:Protection & Preservation (I.B)								
Animal Inventory	I.B.1	5		2	4		X	3.67
Scrub Jay	I.B.1.a	5	5	4	5	5	X	4.80
Gopher Tortoise	I.B.1.b		4	X	4			4.00
Plant Inventory	I.B.2	5	X	X	4			4.50
Giant Orchid	I.B.2.a	4	X	X	3			3.50
Natural Resources Survey/Management Resources (I.C)								
Listed species or habitat monitoring	I.C.2	5	4	1	4	X	X	3.50
Other non-game species or habitat monitoring	I.C.3	4	2	4	4	5	X	3.80
Fire effects monitoring	I.C.4	5	5	5	3	5	X	4.60
Other habitat management effects monitoring	I.C.5	5	3	2	4	5	X	3.80
Invasive species survey / monitoring	I.C.6	5	5	3	4	5	X	4.40
Cultural Resources (Archeological & Historic sites) (II.A,II.B)								
Cultural Res. Survey	II.A	5	5	5	4	5	X	4.80
Protection and preservation	II.B	5	5	5	4	5	X	4.80
Resource Management, Prescribed Fire (III.A)								
Area Being Burned (no. acres)	III.A1	5	5	5	5	5		5.00
Frequency	III.A.2	5	5	5	5	5	X	5.00
Quality	III.A.3	5	5	5	5	5	X	5.00
Restoration of Ruderal Areas								

(III.B)								
Pasture	III.B.1	3	4	5	2	5	X	3.80
Slash Pine Plantation	III.B.2	5		5	4	5	X	4.75
Hardwood Control in Ecotones	III.B.3	5	5	4	4	5	X	4.60
Non-Native, Invasive & Problem Species (III.E)								
Prevention								
prevention - plants	III.E.1.a	5		4	3	5	X	4.25
prevention - animals	III.E.1.b	5		1	3	X	X	3.00
prevention - pests/pathogens	III.E.1.c	5	X	1	3	X	X	3.00
Control								
control - plants	III.E.2.a	5	3	4	5	5		4.40
control - animals	III.E.2.b	5	3	3	4	X		3.75
control - pest/pathogens	III.E.2.c	5	X	1	3	X		3.00
Hydrologic/Geologic function								
Hydro-Alteration (III.E.1)								
Roads/culverts	III.F.1.a	5	3	X	4	X		4.00
Ditches	III.F.1.b	3	3	X	3	X		3.00
Hydro-period Alteration	III.F.1.c	3	2	5	3	X		3.25
Water Level Alteration	III.F.1.d	3	2	X	3	X		2.67
Dams, Reservoirs or other impoundments	III.F.1.e	4	3	X		X		3.50
Ground Water Monitoring (III.F.2)								
Ground water quality	III.F.2.a	3	X	1	3	X	1	2.00
Ground water quantity	III.F.2.b	3	X	1	3	X	1	2.00
Surface Water Monitoring (III.E.3)								
Surface water quality	III.F.3.a	3	X	1	2	X	1	1.75
Surface water quantity	III.F.3.b	3	X	1	2	X	1	1.75
Resource Protection (III.F)								
Boundary survey	III.G.1	5	4	4	4	5		4.40
Gates & fencing	III.G.2	5	3	3	4	5		4.00
Signage	III.G.3	5	3	3	3	5	3	3.67
Law enforcement presence	III.G.4	5	3	1	3	X	X	3.00
Adjacent Property Concerns (III.G)								
Land Use								
Expanding development	III.H.1.a	3	2	3	3	X	1	2.40

Water Withdrawals	III.H.1.b	3	1	1	3	X	1	1.80
Inholdings/additions	III.H.2	3	3	3	2	5	3	3.17
Public Access & Education								
Public Access								
Roads	IV.1.a	5	3	4	4	5		4.20
Parking	IV.1.b	5	3	4	4	3		3.80
Environmental Education & Outreach								
Wildlife	IV.2.a	3	4	4	3	5		3.80
Invasive Species	IV.2.b	3	3	4	3	X		3.25
Habitat Management Activities	IV.2.c	3	3	5	3	X		3.50
Interpretive facilities and signs	IV.3	2	4	4	3	X		3.25
Recreational Opportunities	IV.4	5	3	4	3	X	2	3.40
Management of Visitor Impacts	IV.5	5	3	4	3	X		3.75
Management Resources								
Maintenance								
Waste disposal	V.1.a	5	3	5	3	5	X	4.20
Sanitary facilities	V.1.b	5	3	5	3	5	X	4.20
Infrastructure								
Buildings	V.2.a	5	3	5	3	5	2	3.83
Equipment	V.2.b	5	4	5	4	4	2	4.00
Staff	V.3	4	3	5	4	5	3	4.00
Funding	V.4	4	3	5	4	X	2	3.60

APPENDIX B:

I.A. Natural Communities

- Scrub management plan needed. Update natural communities in the next plan.
- There needs to be more focus on the depression marsh areas that are impacted by cattle. These areas are far from their natural state. I recommend that species diversity data be collected and compared to un-impacted wetlands as a target community. Listed species utilization of these areas also needs attention.
- Natural communities' descriptions in the management plan are all generic and lack sufficient detail or description of current condition and management needs. Mechanical treatments and routine growing season fire have done a good job in restoring mesic and scrubby flatwoods. Currently, shrub heights and palmetto cover was within the OBVM guidelines. Some wetland margins and road shoulders still have heavy palmetto and bushy composition. In addition, some wetland margins had too high of a pine component that need either mowing or chain sawing. Cattle impacts were noticed along the marsh/upland ecotones. Burning of marshes however is a priority and is achieved

routinely, effectively minimizing woody growth internally. Marshes all seemed starved for water. An assessment of ditches and their impacts seems to be another area of focus in managing these wetlands. Several hundred acres of natural flatwoods have too high of a pine canopy density. Currently plans are underway to thin these strands across the property.

I.B. Listed Species

- More management is needed for listed wading birds (Wood Stork, Ibis, Egret, Sandhill Crane, and Little Blue Heron). The wetlands onsite are extremely important for these species (nesting and foraging). Plant management also needs attention.
- Excellent approach to monitoring and managing habitat for scrub jay populations.

I.C. Natural Resources Survey/Management Resources

- Listed plant inventory needed. Effects of grazing in wetlands used by cattle. Information on the striped newt and gopher frog are unknown and need monitoring.
- I think opportunities for fisheries management should be investigated and mentioned in the plan. Water resources (including wetlands) need more monitoring and management strategy included in the management plan. Monitoring is needed for more species rather than just scrub jays and gopher tortoises.
- Excellent work in establishing and capturing routine photos of a series of photo plots throughout the property.

II.A.B. Cultural Resources

- Add any new cultural sites to master site file that are known.
- Five listed sites exist here on the WMA. Since the last LMR the WMA area biologist is trained as an archeologist site monitor. Loggers use the old historic oxford road.
- Nice fencing around old cemetery.

III.A. Prescribed Fire

- The land managers seem to have a very good handle on fire management.
- Consider adjusting burn frequency goal in mesic flatwoods to reflect FNAI's 2-4 year guideline. Burning over 500 acres per year with approximately 60% in the growing season. This reflects 90-100% of their goal, which is excellent. Burn plan in exhibits is excellent but updates are needed.

III.B. Restoration

- The need for some xeric hammock is recognized as beneficial to wildlife but offsite climax oaks encroaching into intact upland natural communities is undesirable.

- The slash pine plantation has been thinned. Continued efforts are needed to identify priorities for pasture restoration activities to focus on areas impacting wetlands and areas with relatively intact ground cover.

III.E. Non-native, Invasive & Problem Species

- Excellent efforts to monitor and treat all known invasive plants.

III.F. Hydrologic/Geologic Function

- Hydrology assessment needed.
- Need to investigate/coordinate with appropriate agencies to understand and communicate potential problems.
- Hydrologic study needs to be done.
- FWC needs to identify and prioritize hydrological restoration (i.e. ditching impacts) needs through a hydrological assessment. Encourage contacts with SWFWMD to see what help they can be in this effort. Need to coordinate with SWFWMD and DEP on an appropriate monitoring protocol for mill creek.
- Water is a critical resource supporting other priority resource components and values in HMWMA.
- Minimal and very general water resources information is available for HMWMA. Information that is available focuses on surface water features and issues. Given the levels of existing and expected ground water withdrawals in the region, more attention should be given to ground water levels.
- Manager Nancy Dwyer reported in the Land Management Data Collection Questionnaire that water quality problems exist related to cattle, dugouts and ditching. Staff indicated that feral pigs are active in the unit including in wetland areas. Further, she reported human alterations to the hydrologic system primarily focusing on ditches. Staff has placed some plugs in the ditches to help maintain water levels. Ms. Dwyer discussed the need for more work to address ditching, but no plan has been developed. Such a plan would require an assessment and data on hydrologic characteristics which are not currently available.
- Regarding surface water quantity, Ms. Dwyer also indicates in the Questionnaire that surface water quality and quantity are not monitored. She further reported that SWFWMD routinely monitors ground water within the unit.
- Staff reported that the SWFWMD is working on Minimum Flows and Levels (MFL's) for Gum Springs. I checked the SWFWMD website, and they are scheduled to adopt a rule for Gum Springs Group MFL's in November 2010. Also, in November 2010, the MFL's for the Middle and Upper Withlacoochee River System (Green Swamp) are scheduled for rule adoption. These rules could be helpful in protecting water levels in the unit and the reports will provide useful assessments.

- The SWFWMD has not established Minimum Water Levels for Mill Creek or wetland groups in the HMWMA. Further, Minimum Levels have not been established for ground water in the HMWMA.
- Hydrologic/Geologic Function (III.E) concerns identified in the 2005 review remain today.
- In the 2005 review, the team recommended that the future [management] plan address watershed protection in more detail. This still needs to be accomplished.

III.G. Resource Protection

- Review optimal boundary including head spring at Gum Spring.

III.H. Adjacent Property Concerns

- Optimal boundary revision should include Gum Spring head spring.
- FWC/DEP should attempt to acquire the land around Gum Spring.
- More effort is needed to include purchase of property surrounding Gum Springs Run and spring site in optimum management boundary.

IV. Public Access and Education

- Possible public outreach activities could include birders and plant enthusiasts.
- Continued effort is needed to identify feasibility for increasing day use as stated in the management plan. Continued efforts are needed.
- Member of the public came to observe review and expressed concern that hunters were given preferential treatment.

V. Infrastructure/Management Resources

- Storage shed area needs enlargement to accommodate newly acquired restoration equipment.
- Funding is needed for hydrologic and watershed assessment and management.

V.I. Managed Area Uses

- Cattle grazing on the property are a problem and should be stopped if possible. This activity is having a negative impact on the resources that exist on the property, a property acquired to protect those very resources.
- Cattle usage and the grazing impacts on natural community needs further assessment as appears to have negative impacts on ecotonal areas adjacent to wetlands.
- Cattle grazing has both a positive and negative features. In the future when areas are restored, grazing would need to be discontinued.

13.4 Sanchez Access Easement and Cattle Grazing Contract

PPE1

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

EASEMENT

Easement No. 29760

THIS EASEMENT, made and entered into this 24th day of June 1997, between the BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND OF THE STATE OF FLORIDA, acting pursuant to its authority set forth in Section 253.03, Florida Statutes, hereinafter referred to as "GRANTOR", and LOUIS M. SANCHEZ, his successors and assigns, hereinafter referred to as "GRANTEE".

WHEREAS, GRANTOR is the owner of the real property herein described as Exhibit "A" , which is managed by the Florida Game and Fresh Water Fish Commission under Lease No. 3789; and

WHEREAS, GRANTEE is the owner of an adjoining property which is more particularly described in Exhibit "B" attached hereto and desires an easement across the real property hereinafter described as Exhibit "A", for ingress and egress to GRANTEE'S property described in Exhibit "B" and for the construction and maintenance of a private road crossing; and

WHEREAS, the managing agency has agreed to the proposed use of this land under this instrument.

NOW THEREFORE, GRANTOR, for good and valuable consideration and mutual covenants and agreements hereinafter contained, has granted, and by these presents does grant, a non-exclusive easement unto GRANTEE for the use and benefit of and as an appurtenance to GRANTEE'S property described in Exhibit "B" over and across the following described real property in Sumter County, Florida, to wit:

(See Exhibit "A" Attached)

subject to the following terms and conditions:

1. DELEGATIONS OF AUTHORITY: GRANTOR'S responsibilities and obligations herein shall be exercised by the Division of State Lands, Department of Environmental Protection.

2. TITLE DISCLAIMER: GRANTOR does not warrant or guarantee any title, right or interest in or to the property described in Exhibit "A" attached hereto.

3. TERM: The term of this easement shall be for a period of fifty years commencing on June 24, 1997 and ending on June 23, 2047 with no option for renewal, unless sooner terminated pursuant to the provisions of this easement.

4. USE OF PROPERTY AND UNDUE WASTE: This easement shall be limited to ingress and egress to the GRANTEE'S property described in Exhibit "B" and the construction and maintenance of a private road crossing, upon and across the property described in Exhibit "A" during the term of this easement. This easement shall be non-exclusive. GRANTOR retains the right to engage in any activities on, over, below or across the easement area which do not unreasonably interfere with GRANTEE'S exercise of this easement and further retains the right to grant compatible uses to third parties during the term of this easement.

GRANTEE shall dispose of, to the satisfaction of GRANTOR, all brush and refuse resulting from the clearing of the land for the uses authorized hereunder. If timber is removed in connection with clearing this easement, the net proceeds from the sale of such timber shall accrue to GRANTOR. GRANTEE shall take all reasonable precautions to control soil erosion and to prevent any other degradation of the real property described in Exhibit "A" during the term of this easement. GRANTEE shall not remove water from any source on this easement including, but not limited to, a watercourse, reservoir, spring, or well, without the prior written approval of GRANTOR. GRANTEE shall clear, remove and pick up all debris including, but not limited to, containers,

papers, discarded tools and trash foreign to the work locations and dispose of the same in a satisfactory manner as to leave the work locations clean and free of any such debris. GRANTEE shall not dispose of any contaminants including, but not limited to, hazardous or toxic substances, chemicals or other agents produced or used in GRANTEE'S operations, on this easement or on any adjacent state land or in any manner not permitted by law.

Upon termination or expiration of this easement GRANTEE shall restore the lands over which this easement is granted to substantially the same condition it was upon the effective date of this easement. GRANTEE agrees that upon termination of this easement all authorization granted hereunder shall cease and terminate.

If the lands described in Exhibit "A" are under lease to another agency, GRANTEE shall obtain the consent of such agency prior to engaging in any use of the real property authorized herein.

5. RIGHT OF INSPECTION: GRANTOR or its duly authorized agents, representatives or employees shall have the right at any and all times to inspect the easement and the works and operations of GRANTEE in any matter pertaining to this easement.

6. BINDING EFFECT AND INUREMENT: This easement shall be binding on and shall inure to the benefit of the heirs, executors, administrators and assigns of the parties hereto. This easement shall be for the benefit of and appurtenant to GRANTEE'S property described in Exhibit "B" shall run with the title to said lands.

7. NON-DISCRIMINATION: GRANTEE shall not discriminate against any individual because of that individual's race, color, religion, sex, national origin, age, handicaps, or marital status with respect to any activity occurring within this easement or upon lands adjacent to and used as an adjunct of this easement.

8. INDEMNITY: GRANTEE hereby covenants and agrees to investigate all claims of every nature at its own expense, and to indemnify, protect, defend, save and hold harmless GRANTOR and the State of Florida from any and all claims, actions lawsuits and demands of any kind or nature arising out of this easement.

9. COMPLIANCE WITH LAWS: GRANTEE agrees that this easement is contingent upon and subject to GRANTEE obtaining all applicable permits and complying with all applicable permits, regulations, ordinances, rules, and laws of the State of Florida or the United States or of any political subdivision or agency of either.

10. VENUE PRIVILEGES: GRANTOR and GRANTEE agree that GRANTOR has venue privilege as to any litigation arising from matters relating to this easement. Any such litigation between GRANTOR and GRANTEE shall be initiated and maintained only in Leon County, Florida.

11. ARCHAEOLOGICAL AND HISTORIC SITES: Execution of this easement in no way affects any of the parties' obligations pursuant to Chapter 267, Florida Statutes. The collection of artifacts or the disturbance of archaeological and historic sites on state-owned lands is prohibited unless prior authorization has been obtained from the Department of State, Division of Historical Resources.

12. PROHIBITIONS AGAINST LIENS OR OTHER ENCUMBRANCES: Fee title to the lands underlying this easement is held by GRANTOR. GRANTEE shall not do or permit anything to be done which purports to create a lien or encumbrance of any nature against the real property of GRANTOR including, but not limited to, mortgages or construction liens against the real property described in Exhibit A or against any interest of GRANTOR therein.

13. PARTIAL INVALIDITY: If any term, covenant, condition or provision of this easement shall be ruled by a court of competent jurisdiction to be invalid, void, or unenforceable, the remainder

shall remain in full force and effect and shall in no way be affected, impaired or invalidated.

14. SOVEREIGNTY SUBMERGED LANDS: This easement does not authorize the use of any lands located waterward of the mean or ordinary high water line of any lake, river, stream, creek, bay, estuary, or other water body or the waters or the air space thereabove.

15. ENTIRE UNDERSTANDING: This easement sets forth the entire understanding between the parties and shall only be amended with the prior written approval of GRANTOR.

16. TIME: Time is expressly declared to be of the essence of this easement.

17. CONVICTION OF FELONY: If GRANTEE or any principal thereof is convicted of a felony during the term of this easement, such conviction shall constitute, at the option of GRANTOR, grounds for termination of this easement agreement.

18. ATTORNEYS' FEES: GRANTEE shall pay all costs, charges and expenses, including attorneys' fees and appellate attorneys' fees, in connection with any dispute arising out of this easement, including without limitation, any costs and fees incurred or paid by GRANTOR because of the failure on the part of GRANTEE to comply with and abide by each and every one of the stipulations, agreements, covenants and conditions of this easement, or incurred by GRANTOR in seeking any remedy available to GRANTOR as a result of such failure by GRANTEE.

19. DEFAULT: Should GRANTEE, at any time during the term of this easement, suffer or permit to be filed against it an involuntary, or voluntary, petition in bankruptcy or institute a composition or an arrangement proceeding under Chapter X or XI of the Chandler Act; or make any assignments for the benefit of its creditor; or should a receiver or trustee be appointed for GRANTEE'S property because of GRANTEE'S insolvency, and the said

appointment not vacated within thirty days thereafter; or should GRANTEE'S easement interest be levied on and the lien thereof not discharged within thirty days after said levy has been made; or should GRANTEE fail promptly to make the necessary returns and reports required of it by state and federal law; or should GRANTEE fail promptly to comply with all governmental regulations, both state and federal; or should GRANTEE fail to comply with any of the terms and conditions of this easement and such failure shall in any manner jeopardize the rights of GRANTOR; then, in such event, and upon the happening of either or any of said events, GRANTOR shall have the right, at its discretion, to consider the same a default on the part of GRANTEE of the terms and provisions hereof, and, in the event of such default, GRANTOR shall have the option of either declaring this easement terminated, and the interest of GRANTEE forfeited, or maintaining this easement in full force and effect and exercising all rights and remedies herein conferred upon GRANTOR. The pendency of bankruptcy proceedings or arrangement proceedings to which GRANTEE shall be a party shall not preclude GRANTOR from exercising either option herein conferred upon it. In the event GRANTEE, or the trustee or receiver of GRANTEE'S property, shall seek an injunction against GRANTOR'S exercise of either option herein conferred, such action on the part of GRANTEE, his trustee or receiver, shall automatically terminate this easement as of the date of the making such application, and in the event the Court shall enjoin GRANTOR from exercising either option herein conferred, such injunction shall automatically terminate this easement.

20. RIGHT OF AUDIT: GRANTEE shall make available to GRANTOR all financial and other records relating to this easement and GRANTOR shall have the right to audit such records at any reasonable time. This right shall be continuous until this easement expires

or is terminated. This easement may be terminated by GRANTOR should GRANTEE fail to allow public access to all documents, papers, letters or other materials made or received in conjunction with this easement, pursuant to Chapter 119, Florida Statutes.

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

22. AUTOMATIC REVERSION: This easement is subject to automatic termination and reversion to GRANTOR when, in the opinion of GRANTOR, this easement is not used for the purposes outlined herein, and any costs or expenses arising out of the implementation of this clause shall be borne completely, wholly and entirely by GRANTEE.

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

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

25. SPECIAL CONDITIONS:

A. GRANTEE shall at his sole cost and expense pay for the moving of an existing side gate along County Road 247. The gate shall be moved approximately 15 feet northward, and be located entirely inside the herein easement area.

B. GRANTEE shall at his sole cost and expense replace the existing fencing on the eastern boundary of the herein described easement area, leading to and from the gate installed

in accordance paragraph 26A herein.

C. GRANTEE shall at his sole cost and expense install a gate in the fencing on the western boundary of the herein described easement which divides the GRANTEE'S property and the Carlton Half Moon Ranch Water Management Area.

D. GRANTEE shall at his sole cost and expense replace the fencing on the western boundary of the herein described easement area which leads to and from the gate installed in accordance with paragraph 26C.

E. GRANTEE shall at his sole cost and expense replace the tree-strand barbed wire fence running east to west between the two existing cable gaps, running along the northern boundary of the herein described easement area.

F. GRANTEE shall at his sole cost and expense provide and place cable at the west side of the cable gap, leaving the cable gap to the east side intact.

G. GRANTEE shall at his sole cost and expense place four inches of compacted limerock as stabilization material on the proposed roadway within the easement area. The roadway shall not exceed 15 feet in width. This material shall be located in the middle of the herein described easement area, and shall be maintained to the satisfaction of the Florida Game and Fresh Water Fish Commission or its designated representatives. The construction of ditches on either side of the roadway is prohibited.

H. GRANTEE shall at his sole cost and expense maintain the improved portions of the herein described easement area to the satisfaction of the Florida Game and Fresh Water Fish Commission or its designated representatives.

I. GRANTEE and his guests and visitors shall enter the herein described easement area through a keyed-padlocked, gated structure. Duplicate keys for the padlock will be provided to

the Florida Game and Fresh Water Fish Commission or its designated representatives.

J. GRANTEE shall provide to his guests and visitors, written documentation for permission to enter the herein described easement area. This document shall be made available upon request by the Florida Game and Fresh Water Fish Commission or its designated representatives. GRANTEE shall provide annually, on September 1 of each year, those persons having permission to use the herein described easement area.

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

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

Jana Bridges
Witness
Jana Bridges
Print/Type Witness Name
Elizabeth R. Whitman
Witness
Elizabeth R. Whitman
Print/Type Witness Name

BY: Michael Kelly (SEAL)
ASSISTANT DIRECTOR, DIVISION
OF STATE LANDS, DEPARTMENT
OF ENVIRONMENTAL PROTECTION

"GRANTOR"

STATE OF FLORIDA
COUNTY OF LEON

The foregoing instrument was acknowledged before me this 16th day of June, 1907, by Michael E. Ashe, as Assistant, Division of State Lands, Department of Environmental Protection, acting as an agent on behalf of the Board of Trustees of the Internal Improvement Trust Fund of the State of Florida. He is personally known to me.



Patricia Toleday
Notary Public, State of Florida

Print/Type Notary Name

Commission Number:

Commission Expires:

Approved as to Form and Legality

By: Luys. Klein
DEP Attorney

Craig B. Ward
Witness
CRAIG B. WARD
Print/Type Witness Name

Charles D. Miner
Witness
CHARLES D. MINER
Print/Type Witness Name

Louys M. Sanchez
LOUYS M. SANCHEZ

"GRANTEE"

STATE OF FLORIDA
COUNTY OF ORANGE

The foregoing instrument was acknowledged before me this 23rd day of December, 1996, by Louis M. Sanchez. He is personally known to me or produced _____ as identification.


Notary Public, State of Florida



CHARLES D MINER
My Commission CC412387
Expires Nov. 04, 1998
Bonded by NFNU
800-224-6368

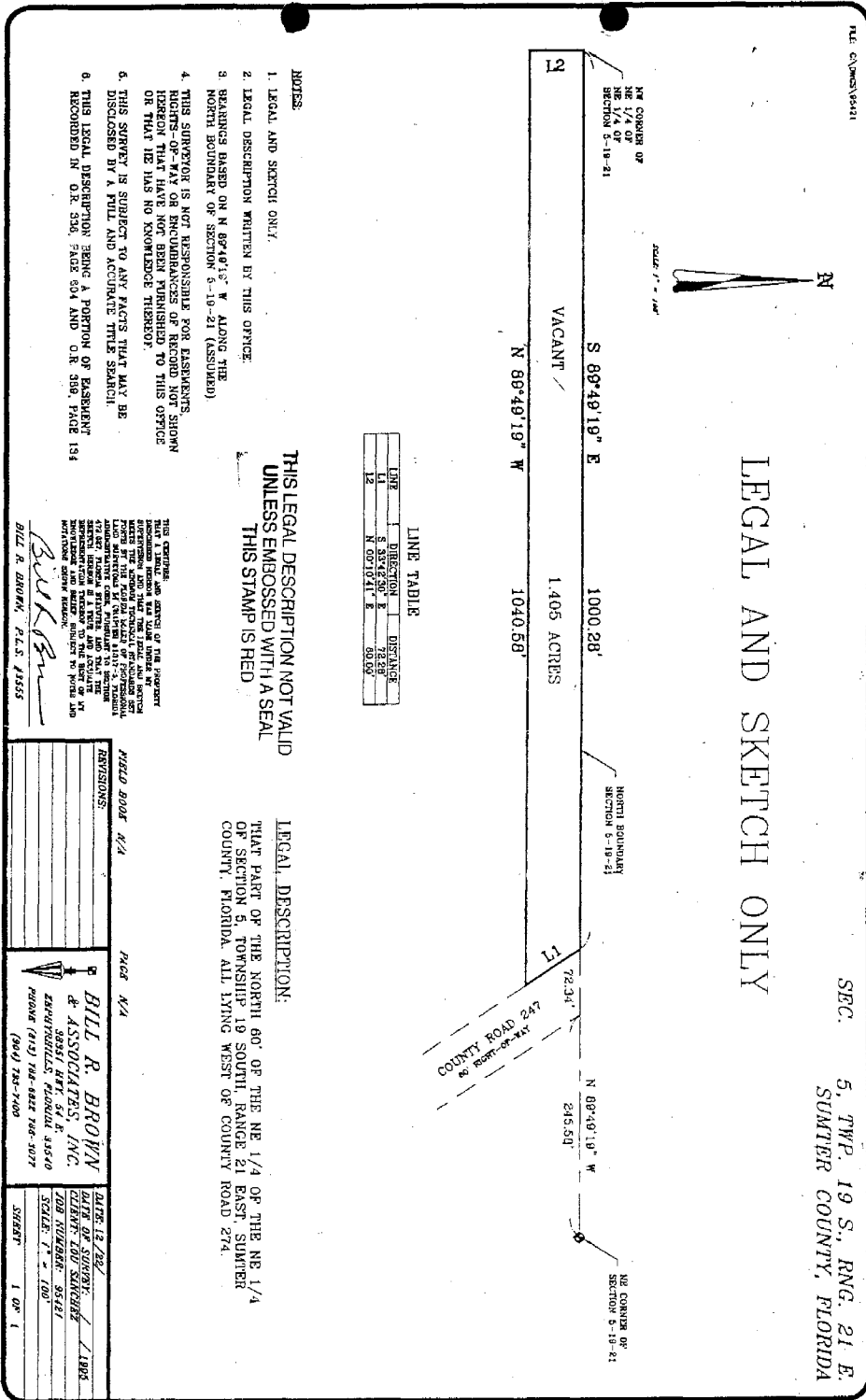
Print/Type Notary Name

Commission Number:

Commission Expires:



CHARLES D MINER
My Commission CC412387
Expires Nov. 04, 1998
Bonded by NFNU
800-224-6368



LEGAL AND SKETCH ONLY

SEC. 5, TWP. 19 S., RNG. 21 E., SUMNER COUNTY, FLORIDA

LINE TABLE

LINE	DIRECTION	DISTANCE
1	S	1000.28'
2	N 89°49'19" E	1040.56'
3	N 89°49'19" W	245.50'
4	S	80.00'

THIS LEGAL DESCRIPTION NOT VALID UNLESS EMBOSSED WITH A SEAL THIS STAMP IS RED

LEGAL DESCRIPTION: THAT PART OF THE NORTH 60' OF THE NE 1/4 OF THE NE 1/4 OF SECTION 5, TOWNSHIP 19 SOUTH, RANGE 21 EAST, SUMNER COUNTY, FLORIDA, ALL LYING WEST OF COUNTY ROAD 274.

- NOTES:
1. LEGAL AND SKETCH ONLY.
 2. LEGAL DESCRIPTION WRITTEN BY THIS OFFICE.
 3. BEARINGS BASED ON N 89°49'19" W ALONG THE NORTH BOUNDARY OF SECTION 5-19-21 (ASSUMED).
 4. THIS SURVEY IS NOT RESPONSIBLE FOR DISCREPANCIES BETWEEN THE BEARINGS AND DISTANCES SHOWN HEREON THAT HAVE NOT BEEN FURNISHED TO THIS OFFICE OR THAT HE HAS NO KNOWLEDGE THEREOF.
 5. THIS SURVEY IS SUBJECT TO ANY FACTS THAT MAY BE DISCLOSED BY A FULL AND ACCURATE TITLE SEARCH.
 6. THIS LEGAL DESCRIPTION BEING A PORTION OF EASEMENT RECORDED IN O.R. 336, PAGE 634 AND O.R. 398, PAGE 134.

THIS CERTIFICATE, IN WITNESS WHEREOF, I, the Surveyor, have hereunto set my hand and the seal of this office at Tallahassee, Florida, this 12th day of August, 2022.

Bill R. Brown
 BILL R. BROWN, P.L.S. 11555

FIELD BOOK N/A

REVISIONS:

PAGE N/A

BILL R. BROWN & ASSOCIATES, INC.
 38851 HWY. 54 E.
 ZAVAYTSEVILLS, FLORIDA 32540
 PHONE (904) 784-8822 FAX 307 (904) 784-7400

DATE 12/28/22
 CLIENT: LDU SANCHEZ
 JOB NUMBER: 95181
 SCALE: 1" = 100'

SHEET 1 OF 1

EXHIBIT "B"

The following described real property, located in Sumter County, Florida:

West half (W 1/2) of the Southeast Quarter (SE 1/4) of Section 32, Township 18 South, Range 21 East; West half (W 1/2) of the Northeast Quarter (NE 1/4) of Section 5, Township 19 South, Range 21 East; and the Northeast Quarter (NE 1/4) of the Northwest Quarter (NW 1/4) of Section 5, Township 19 South, Range 21 East.

**CONTRACT FOR
CATTLE GRAZING AT HALF MOON WILDLIFE MANAGEMENT AREA**

This CONTRACT is entered into by and between the FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION, whose address is 620 South Meridian Street, Tallahassee, Florida 32399-1600, hereinafter "COMMISSION" and Tilton & Tilton LLC., whose address is 154 Litzell Road, Interlachen, Florida 32148, hereinafter called the "CONTRACTOR".

NOW THEREFORE, the COMMISSION and the CONTRACTOR, for the consideration hereafter set forth, agree as follows:

1. PROJECT DESCRIPTION: The CONTRACTOR shall be provided access to the Half Moon WMA to perform cattle grazing activities on the property as specified herein and shall perform those specific responsibilities and obligations, as set forth in the Scope of Work attached as Attachment A and B. The term "Scope of Work" when used in this Contract shall include Attachments A and B and Exhibits 1, 2, 3, 4 and 5.

This CONTRACT is entered into pursuant to the COMMISSION's Invitation to Bid (ITB) FWC 12/13-05, the CONTRACTOR's Bid and the COMMISSION's Grazing Plan, of which all three are attached hereto and made an integral part of this CONTRACT. In the event of conflict between this CONTRACT and Attachments A or B the terms of this CONTRACT shall govern.

2. PERFORMANCE: The CONTRACTOR shall perform cattle grazing as described in the Scope of Work in a proper and satisfactory manner. Any and all equipment, products or materials necessary or appropriate to perform under this Contract shall be supplied by the CONTRACTOR. The CONTRACTOR shall be licensed as necessary to perform under this Contract as may be required by law, rule, or regulation, and shall provide evidence of such compliance to the COMMISSION upon request. The CONTRACTOR shall procure all supplies; pay all charges, fees, taxes and incidentals that may be required for the completion of this Contract. By acceptance of this Contract, the CONTRACTOR warrants that it has the capability in all respects to fully perform the contract requirements and the integrity and reliability that will assure good-faith performance as a responsible vendor. The CONTRACTOR shall comply with Chapter 287, F.S., and all other applicable laws, rules and ordinances.

3. PROPERTY: The property on which these activities described in this Contract will occur is described in Exhibit 1 of this Contract (the property). This is a Contract for the provision of cattle grazing by the CONTRACTOR, and shall not be construed to be a lease of real property.

4. TERM; RENEWAL: This Contract shall begin upon execution by both parties and end five (5) years thereafter, inclusive unless terminated earlier in accordance with its term. This Contract may be renewed for up to five (5) years, or for a total term not to exceed the original Contract period, whichever is longer. The stocking rate, number of Animal Units and acreage of the Contract during any renewal period shall be determined prior to the conclusion of the initial or subsequent terms. Reference herein to the "term" of this Contract shall include any renewal. Renewal of this Contract shall be in writing and subject

to the same terms and conditions of this Contract; provided that the parties may by mutual agreement change such terms and conditions. Renewal amendments must be executed prior to the completion date of the Contract. All renewals are contingent upon satisfactory performance by the CONTRACTOR.

5. AMENDMENT OR MODIFICATION: No waiver or modification of this CONTRACT or of any covenant, condition, or limitation herein contained shall be valid unless in writing and lawfully executed by the parties.

6. CONTRACTOR'S RESPONSIBILITIES: In addition to the general provisions of this Contract the CONTRACTOR shall have the following specific responsibilities:

6.1 CONTRACTUAL PAYMENT SCHEDULE: The CONTRACTOR shall submit the first semi-annual payment and the \$15,000 Performance Bond within ten (10) consecutive calendar days after the execution of the contract. The COMMISSION shall invoice the CONTRACTOR for subsequent semiannual payments. CONTRACTOR shall provide a Performance Bond each renewal period on or before the expiration date of the previous bond issued. All invoice payments shall be submitted to the Florida Fish and Wildlife Conservation COMMISSION, Finance & Budget Office, Post Office Box 6150, Tallahassee, FL 32314-6150.

The Performance Bond shall be submitted to the COMMISSION's Tallahassee Purchasing Office to the attention of ITB FWC 12/13-05, assigned Purchasing Agent with a copy sent to the WHM Section Leader. The bond must state on its front page: the name, principal business address, and phone number of the CONTRACTOR, the Surety, the COMMISSION's full name, the purchase order or contract number assigned to the project by the COMMISSION, and a description of the property and a general description of the project. Please note: A Notice to Proceed will not be issued until after the required bond has been received.

The Bond shall be issued from a reliable Surety Company acceptable to the COMMISSION, licensed to do business in the State of Florida and signed by a Florida Licensed Resident Agent. CONTRACTOR is to ensure the Surety Company includes in the performance bond language pertaining to payment in case the CONTRACTOR does not perform the yearly fire lane disking requirement, fence maintenance or in case of a default violation according to contract. Such a bond shall be accompanied by a duly authenticated power of attorney evidencing that the person executing the Bonds in behalf of the Surety had the authority to do so on the date of the bond. The cost of the Performance Bond shall be borne by the CONTRACTOR.

In lieu of a Performance Bond, the COMMISSION may prior approve an alternate form of security in the form of an irrevocable letter of credit. The alternative form of security shall be for the same purpose and be subject to the same conditions as those applicable to the Performance Bond.

The performance bond total value is based on the total income derived based upon 12 month period which is calculated by using the animal units allowed on the WMA times the cost of an animal unit (rate bid) plus the estimated cost of disking

fire lanes each year (@\$30.00 per mile). The performance bond number calculated will be round up to nearest \$5000 increment. Example: If the total number comes to \$17,595.00 then the annual bond requirement will be set at \$20,000.

Work shall not begin before the COMMISSION receives the Performance Bond and Power of Attorney. Failure to provide a Performance Bond and Power of Attorney may be grounds to find the Vendor in default, which could include; cancellation of the contract, and/or the Vendor's removal from the State's approved vendor list for future solicitations.

Failure of the CONTRACTOR to provide the initial Performance Bond within ten (10) consecutive calendar days after execution of the contract or provide a new bond annually within thirty (30) consecutive calendar days of the COMMISSIONS semi-annual invoice date during the term of this Contract may be grounds to find the CONTRACTOR in default, which could include; cancellation of the Contract, and/or the CONTRACTOR removal from the FWC approved vendor list for future solicitations.

The CONTRACTOR is required to submit the original of the Performance Bond and original of the Power of Attorney to the COMMISSION'S Tallahassee Purchasing Office to the attention of the COMMISSION'S, Contract Administrator, in order to secure the payment and performance of the CONTRACTOR'S obligations under this Contract. Additionally, the CONTRACTOR is required to provide a copy of the bond and power of attorney to the Wildlife and Habitat Management (WHM) Section Leader. This requirement is in effect for both the original issuance and the yearly renewals during the term of this Contract. Below are the addresses for which the CONTRACTOR shall send the originals and copies of the documents after each issuance event:

ORIGINALS MAILED TO:

Florida Fish and Wildlife Conservation COMMISSION
Attn: Purchasing Office, Contract Administrator
FWC 12/13-05
620 South Meridian Street, Room 364
Tallahassee, Florida, 32399-1600

COPY OF ORIGINALS MAILED TO:

Florida Fish and Wildlife Conservation COMMISSION
Attn: HSC/WHM, Section Leader, M/S - 10
Attn: WHM Contract Manager
620 South Meridian Street
Tallahassee, Florida, 32399-1600

6.2 STOCKING RATE: The CONTRACTOR shall semi-annually pay the COMMISSION \$142.50 per animal grazing unit for the first year of grazing (\$5,130 semi-annually for first year total of \$10,260). The grazing unit per animal will be adjusted annually as noted in Section 3.1 below. Cattle shall be stocked at a rate not to exceed 72 animal grazing units on Half Moon Wildlife Management Area as identified in Exhibit 1 attached hereto. The stocking rate may only be

increased with written permission by the COMMISSION. The stocking rate may be decreased by the COMMISSION upon written notice to the CONTRACTOR if grazing is excessive for optimum wildlife management. The CONTRACTOR shall accordingly increase or decrease such stocking rate within 60 days of written notice by the COMMISSION.

The CONTRACTOR shall provide the project manager with an Annual Forage Assessment and Maximum Stocking Rate estimate performed by either a local NRCS extension office, or a professional rangeland consultant by January 31st each year.

6.3 MARKING OWNERSHIP: The CONTRACTOR shall mark all cattle with the CONTRACTOR's brand, tag, or other owner identification before releasing the cattle for grazing on the above COMMISSION land. The CONTRACTOR shall mark all calves born in the grazing lands at the first gathering after their births, which shall be undertaken within six months of such births. All cattle grazed under this CONTRACT shall be the property of the CONTRACTOR and therefore the sole responsibility of the CONTRACTOR.

6.4 FENCE MAINTENANCE: The CONTRACTOR shall maintain all grazing lands, exterior and interior fences and cattle guards in good and operable condition. The CONTRACTOR shall perform necessary fence replacement and repair in accordance with specifications for fence construction detailed in Exhibits 3, 4 and 5, (attached). All fences, gates and cattle guards must be maintained in a manner to prevent egress of cattle to areas outside the contracted property. Replacement and/or repair of all posts, cattle guards, gates, material and labor shall be at the sole and exclusive expense of the CONTRACTOR, except as stated under "COMMISSION RESPONSIBILITIES." the CONTRACTOR shall promptly remove storm debris from fencing and make the appropriate repairs. The CONTRACTOR shall relinquish all fences, including posts, gates, and cattle guards in good working condition, to the COMMISSION upon termination of this CONTRACT. Furthermore, the CONTRACTOR shall be required to use only the COMMISSION's furnished key or combination locks for said gates.

Failure of the CONTRACTOR to properly maintain fencing shall allow the COMMISSION to make a claim on the Performance Bond. In the event of such a claim, the CONTRACTOR shall provide the monies from the Performance Bond to the COMMISSION immediately upon notification by the COMMISSION.

6.5 GRAZING ACCOUTREMENTS: The CONTRACTOR shall be required to have the COMMISSION's Project Manager's written permission to construct or make any physical alterations or improvements to the grazing lands. The CONTRACTOR shall be required to maintain all interior fences in accordance with specifications in Exhibit 3, 4, and 5 and other constructed physical alterations or improvements to the grazing lands that are necessary to the CONTRACTOR's grazing operations and which are necessary for the CONTRACTOR to fulfill the covenants to which he or she is bound. The CONTRACTOR shall not cross-fence the grazing lands without prior written approval of the COMMISSION. Hay shall not be brought onto the property for supplemental feeding. Pellets, minerals and

liquid feeds are allowed. All supplemental feeding sites shall be rotated every 90 days unless written approval is given by the COMMISSION. All approved cross fences and related constructed physical alterations or improvements constructed solely at the expense of the CONTRACTOR shall remain the property of the CONTRACTOR and the CONTRACTOR shall expeditiously remove same upon termination of this CONTRACT and shall reasonably restore such grazing lands to the condition existing prior to the construction of such physical alterations and improvements, except as otherwise approved in writing by the COMMISSION.

6.6 GROUND DISTURBING ACTIVITIES: The CONTRACTOR shall not initiate any ground disturbing activities including construction of ditches or ponds, vegetation manipulation, or application of pesticide, herbicide, or fertilization upon the grazing lands without prior written approval from the COMMISSION. These restrictions do not exempt the CONTRACTOR from the annual fire lane maintenance requirement.

6.7 FIRE LANES: No less than once every 12 months between April 15 and June 15 of each calendar year, the CONTRACTOR shall disk existing fire lanes of no less than ten foot widths. Such fire lanes shall divide established burn units and completely encircle the perimeter of the contracted area as identified in Exhibit 1; Half Moon WMA has approximately 16 miles of fire lanes. Such fire lanes shall be disked two times with a minimum disked depth of six inches, while maintaining natural topography (i.e. soil remains in firelane to avoid creating a ditch). The CONTRACTOR may request from the COMMISSION, in writing, an extension of time past June 15 of any year for such disking in the event of wet conditions which make such disking impractical.

The CONTRACTOR may request from the COMMISSION, in writing, to disk fire lanes in a different time of year. CONTRACTOR shall disk fire lanes following written acceptance of the request by the Project Manager. Such request for extension shall be made by the CONTRACTOR on or before April 30 of said calendar year. Approval for such extension must be in writing from the COMMISSION and shall specify the date upon which the extension shall expire. The granting of an extension for fire lane maintenance shall not be unreasonably withheld. Failure of the CONTRACTOR to properly disk no earlier than April 15 of each calendar year and no later than June 15 of each calendar year or such date upon which any extension shall expire if such extension is approved by the COMMISSION, shall allow the COMMISSION to make a claim on the Performance Bond. In the event of such a claim, the CONTRACTOR shall provide the monies from the Performance Bond to the COMMISSION immediately upon notification by the COMMISSION.

6.8 BURNING: The CONTRACTOR specifically agrees not to willfully set fire, or allow any agent or employee of the CONTRACTOR to set fire, to the grazing lands. Failure to comply will be cause for immediate cancellation of the CONTRACT after review by the COMMISSION. If it is determined by the COMMISSION that the CONTRACTOR was negligent, the negligence shall provide grounds for a claim against the CONTRACTOR's Performance Bond.

6.9 VEHICLES: The CONTRACTOR shall register with the PROJECT MANAGER any vehicles used by the CONTRACTOR, its agents and employees on the grazing lands and shall have a permit from the Project Manager in any such vehicle while on the grazing lands. The permit shall be displayed upon demand of the COMMISSION.

6.10 CAMPING: The CONTRACTOR shall not allow camping, except as approved in writing by the COMMISSION and at campsites designated by the COMMISSION.

6.11 GATHERING NOTICE: The CONTRACTOR shall give no fewer than seven days written notice to the COMMISSION and other CONTRACTOR's whose use or contract adjoins the grazing lands, prior to the gathering or round-up of cattle within the grazing lands.

6.12 REGULATIONS: The CONTRACTOR shall abide by all laws, rules and regulations relating to the taking of wild animal life or freshwater aquatic life, and use of the grazing lands for outdoor recreational purposes as hereinafter provided, and the CONTRACTOR shall be responsible to the COMMISSION under this CONTRACT for its agents and employees so abiding by all such laws, rules and regulations.

6.13 ASSIGNMENT: The CONTRACTOR shall not assign any or all of the rights, liabilities, duties or obligations of the CONTRACT nor subcontract any part of the grazing lands, without the prior written approval of the COMMISSION.

6.14 INDEMNITY: The CONTRACTOR shall save, hold harmless and indemnify the State of Florida and the COMMISSION against any and all liability, claims, judgments or costs of whatsoever kind and nature for injury to, or death of any person or persons and for the loss or damage to any property resulting from the use, service, operation or performance of work under the terms of this Contract, resulting from the acts or omissions of the CONTRACTOR, his subcontractor, or any of the employees, agents or representatives of the CONTRACTOR or subcontractor.

6.15 INSURANCE: The CONTRACTOR shall, throughout the term of this CONTRACT, at his own cost and expense, provide, maintain and keep in force general liability insurance (including personal injury and property damage), insuring against liability for injury to persons or property occurring in, on or about the property or arising out of CONTRACTOR's possession, use, occupancy or maintenance thereof in an amount not less than \$500,000 (Five Hundred Thousand Dollars) per occurrence and \$1,000,000 annual aggregate for bodily injury and not less than \$100,000 per occurrence and \$300,000 annual aggregate for property damage and comprehensive automobile liability coverage with limits of not less than \$300,000 combined single limit for bodily injury and property damage. The COMMISSION shall be named as an additional insured, under such insurance.

CONTRACTOR is to ensure the General Liability Insurance Company issuing the Certificate of Liability Insurance indicates the Florida Fish and Wildlife Conservation COMMISSION, 620 South Meridian Street, Tallahassee, FL 32399-1600 as Certificate Holder section of the certificate form and references the FWC Contract Number in the Description of Operations section of the form.

Failure of the CONTRACTOR to provide Insurance or to continuously maintain the insurance in effect during the term of this Contract may be grounds to find the CONTRACTOR in default, which could include; cancellation of the Contract, and/or the CONTRACTOR removal from the COMMISSION's approved vendor list for future solicitations.

6.16 RECORD KEEPING REQUIREMENTS: The CONTRACTOR shall maintain accurate books, records, documents and other evidence that sufficiently and properly reflect all direct and indirect costs of any nature expended in the performance of this contract, in accordance with generally accepted accounting principles. The CONTRACTOR shall allow the COMMISSION, the State, or other authorized representatives, access to periodically inspect, review or audit such documents as books, vouchers, records, reports, canceled checks and any and all similar material. Such audit may include examination and review of the source and application of all funds whether from the state, local or federal government, private sources or otherwise. These records shall be maintained for five (5) years following the close of this Contract. In the event any work is subcontracted, the CONTRACTOR shall require each subcontractor to similarly maintain and allow access to such records for audit purposes.

6.17 EXOTIC VEGETATION: In an effort to control exotic plants such as Tropical Soda Apple, all cattle shall be held six (6) days in a quarantine pen (Tropical Soda Apple and all other exotic plants free), outside of the state lands, before being released on the Half Moon Wildlife Management Area. During that period, the quarantine pen and grazing units will be inspected at various times by the Project Manager. If it can be determined that the CONTRACTORS' cattle are spreading the Tropical Soda Apple because cattle were not held for the full required quarantined period, then the CONTRACTOR will be responsible for the elimination of the Tropical Soda Apple.

Exotic plant elimination shall be done in accordance with Exhibit 2 attached hereto, Tropical Soda Apple Best Management Practices (BMP). Failure to remedy the situation in a timely manner shall result in cancellation of the CONTRACT, forfeiture of Performance Bond and immediate payment of remaining CONTRACT fees.

Tropical Soda Apple is listed as a state noxious weed (B-57.007 F.A.C.). Movement of this plant within the State of Florida without a permit is illegal.

7. COMMISSION ACTIVITIES AND RESPONSIBILITIES: In consideration of this Contract, COMMISSION permits CONTRACTOR to utilize the Property to

CONTRACTOR'S benefit in accordance with this Contract. The COMMISSION'S activities and responsibilities in regard to the Property will be as follows:

7.1 LAND MANAGEMENT AND PUBLIC USE: COMMISSION shall retain the right to access and utilize the Property in all ways, it being understood by the parties that the CONTRACTOR'S activities on the Property under this Contract are strictly limited to activities specifically permitted by this Contract. COMMISSION will continue to conduct public recreation and general management activities, including but not limited to public hunting and fishing, without interference from the CONTRACTOR. The COMMISSION may engage in land management, controlled burns and exotic plant control activities which include areas of the Property and immediately adjacent to the Property. All prescribed burning shall be performed by COMMISSION personnel, or under COMMISSION supervision. The CONTRACTOR shall not willfully nor negligently set fire, or allow any agent or employee of the CONTRACTOR to set fire, to the grazing lands. Failure to comply will be cause for immediate cancellation of this Contract.

7.2 WITHDRAWAL OF ACREAGE: When COMMISSION, in its sole discretion, determines that it is necessary for wildlife management or other management reasons (including but not limited to a sale or other disposition of all or part of the Property), to withdraw acreage from the Property, such acreage shall be withdrawn upon 60 days notice to CONTRACTOR. Upon such withdrawal, COMMISSION shall notify the CONTRACTOR of the reduction of payments due under this Contract. Such reduction shall be determined by COMMISSION based on the price paid by the CONTRACTOR per animal unit, times the number of animal units permitted on the reduced acreage.

8. COMMISSION'S RIGHTS AND RESPONSIBILITIES

8.1 FENCE: The COMMISSION, at its discretion, may install new fencing, and shall coordinate such activities with those of the CONTRACTOR.

8.2 BURNING: All burning prescribed and otherwise shall be conducted by the COMMISSION.

8.3 OUTDOOR RECREATION: The COMMISSION shall have the right to conduct public outdoor recreational activities on the grazing lands, including but not limited to controlled public hunting and fishing, without interference from the CONTRACTOR activities authorized under this CONTRACT.

8.4 WILDLIFE MANAGEMENT EXCLUSIVITY: The COMMISSION shall have the right to withdraw/add certain acreage from the CONTRACT and from/to the CONTRACTORS' cattle grazing use of such acreage, when reasonably necessary or expedient or the proper management of wildlife, upon written notice to the CONTRACTOR with no fewer than 90 days prior to such withdrawal of such acreage, the COMMISSION may fence such acreage so withdrawn at its sole

expense. Withdrawal/add of such acreage shall cause the CONTRACT payment to be adjusted accordingly.

8.5 MINERAL USE: The COMMISSION shall have the right to remove or cause to be removed any or all minerals, oil or gas occurring on the grazing lands. It is specifically understood that the rights of the CONTRACTOR are confined solely to the grazing of cattle.

8.6 OTHER USES: The COMMISSION shall have the right to conduct any other activity not specified that is not reasonably inconsistent with and does not unreasonably interfere with cattle grazing uses.

9. SPECIAL CONDITIONS

9.1 CONTRACT ADJUSTMENTS: The annual CONTRACT payment shall be adjusted in accordance to the difference of the previous two (2) years' annual average calf prices in the Annual Livestock Summary (ALS), published by the Florida Crop and Livestock Reporting Service in August. Such adjustment shall be made to the subsequent invoice. The initial annual CONTRACT payment to be paid by CONTRACTOR to the COMMISSION shall increase or decrease by the same percentage of increase or decrease indicated in the ALS as to annual average calf prices.

In addition, the initial annual CONTRACT payment shall be adjusted if the COMMISSION increases or decreases the stocking rate. The COMMISSION shall notify the CONTRACTOR in writing of any stocking rate adjustments.

Within thirty (30) days of date of invoice, the CONTRACTOR shall pay the COMMISSION the amount of such adjustment. The annual CONTRACT payment shall also be adjusted if the COMMISSION withdraws acreage for management purposes or if the State sells a part of the grazing lands which affects the CONTRACTOR. Within thirty (30) days of written notice by the COMMISSION, the CONTRACTOR shall adjust cattle stocking rates or remove the cattle from the acreage withdrawn or sold, accordingly. The COMMISSION shall rebate the amount of such adjustment to the CONTRACTOR.

9.2 LATE FEE: Should the CONTRACTOR fail to make the semiannual CONTRACT payment, CONTRACTOR shall be charged interest at the rate of one and one-half percent (1 ½%) per month, or fraction thereof, on the amount of the delinquent payment beginning the first day following the due date of payment until paid. Any court costs and attorney's fees required to collect past due CONTRACT payments will be at the expense of the CONTRACTOR.

9.3 TERMINATION: This CONTRACT may be terminated in the following ways:

- a. This CONTRACT shall terminate immediately upon the COMMISSION giving written notice to the CONTRACTOR in the event of fraud or willful misconduct or breach of this CONTRACT. The COMMISSION at its option

may allow up to thirty (30) calendar days to correct a breach of this CONTRACT.

b. This CONTRACT shall terminate upon the COMMISSION giving written notice to the CONTRACTOR in the event the annual CONTRACT payment is not paid when due. Such termination is at the option of the COMMISSION.

c. This CONTRACT shall terminate upon the COMMISSION giving written notice to the CONTRACTOR, in the event the CONTRACTOR, his agents or employees fail to abide by all laws, rules and regulations relating to the taking of wild animal life or freshwater aquatic life, and the use of grazing lands for outdoor recreational purposes as herein provided, or for failing to abide by other laws and rules of the State of Florida.

d. This CONTRACT shall terminate ninety (90) days following the COMMISSION giving written notice to the CONTRACTOR that the grazing lands are to be sold. Within thirty (30) days of confirmation by the COMMISSION that CONTRACTOR has to remove his cattle, the COMMISSION shall rebate the prorated share of the annual contract payment to the CONTRACTOR.

f. This CONTRACT may be terminated by the COMMISSION in its sole discretion upon thirty (30) days written notice to the CONTRACTOR in the event the continuation of cattle grazing activities on the premises are found to be incompatible with the COMMISSIONS' management plans or activities on the Half Moon WMA.

g. If the CONTRACT is terminated upon written notice, the CONTRACTOR shall have thirty (30) days after receipt of the written notice in which to remove his cattle from the grazing lands.

h. Either party may terminate this Contract, for any reason, by giving written notice to the other party specifying the termination date, at least 60 days prior to the termination date specified in the notice. In the event of termination under this provision by the COMMISSION, the CONTRACTOR may be given reasonable time, determined by the sole discretion of the COMMISSION, to remove equipment, etc. In the event of termination under this provision by the CONTRACTOR, the CONTRACTOR must ensure all provisions that impact the condition of the WMA (fencing, roads, etc) and/or payments owed must be paid in full including any partial payments due the COMMISSION for use days since last payment before contract closeout.

9.4 NOTICE: Unless a notice of change of address is given, any and all notices shall be delivered to the parties at the following addresses:

CONTRACTOR:
Payton Tilton
154 Litzell Road
Interlachen FL. 32148

COMMISSION:
Nancy Dwyer
Half Moon Field Office
8864 County Road 247
Lake Panasoffkee, FL 33538

9.5 NON-DISCRIMINATION: No person, on the grounds of race, color, religion, sex, national origin, age, handicap, or marital status, shall be excluded from participation in, be denied the proceeds or benefits of, or be otherwise subjected to discrimination in performance of this Contract.

9.6 PROHIBITION OF DISCRIMINATORY VENDORS: In accordance with Section 287.134, Florida Statutes, an entity or affiliate who has been placed on the discriminatory vendor list may not submit a bid, proposal, or reply on a contract to provide any goods or services to a public entity; may not submit a bid, proposal or reply on a contract with a public entity for the construction or repair of a public building or public work; may not submit bids, proposals, or replies on leases of real property to a public entity; may not be awarded or perform work as a CONTRACTOR, supplier, subcontractor, or consultant under a contract with any public entity; and may not transact business with any public entity.

9.7 PUBLIC ENTITY CRIMES: In accordance with Section 287.133(2)(a), F.S., a person or affiliate who has been placed on the convicted vendor list following a conviction for a public entity crime may not perform work as a grantee, contractor, supplier, subcontractor, consultant or by any other manner under a contract with any public entity, and may not transact business with any public entity in excess of the threshold amount provided in Section 287.017, F.S., for Category Two, for a period of 36 months from the date of being placed on the convicted vendor list.

9.8 PROHIBITION OF UNAUTHORIZED ALIENS: The employment of unauthorized aliens by any contractor/vendor is considered a violation of Section 274A (e) of the Immigration and Nationality Act. If the CONTRACTOR knowingly employs unauthorized aliens, such violation shall be cause for unilateral cancellation of this Contract. The CONTRACTOR shall be responsible for including this provision in all subcontracts with private organizations issued as a result of this Contract.

9.9 SEVERABILITY AND CHOICE OF VENUE: This Contract has been delivered in the State of Florida and shall be construed in accordance with the laws of Florida. Wherever possible, each provision of this Contract shall be interpreted in such manner as to be effective and valid under applicable law, but if any provision of this Contract shall be prohibited or invalid under applicable law, such provision shall be ineffective to the extent of such prohibition or invalidity, without invalidating the remainder of such provision or the remaining provisions of this Contract. Any action in connection herewith, in law or equity, shall be brought in Leon County, Florida.

9.10 NO THIRD PARTY RIGHTS: The parties hereto do not intend nor shall this contract be construed to grant any rights, privileges or interest to any third party.

9.11 JURY TRIAL WAIVER: As consideration of this Contract, the parties hereby waive trial by jury in any action or proceeding brought by any party against any other party pertaining to any matter whatsoever arising out of or in any way connected with this Contract.

9.12 RELATIONSHIP OF THE PARTIES: The CONTRACTOR shall perform as an independent contractor and not as an agent, representative, or employee of the COMMISSION.

9.13 PUBLIC RECORDS: All records in conjunction with this contract shall be public records and shall be treated in the same manner as other public records are under Chapter 119, Florida Statutes. The COMMISSION reserves the right to unilaterally cancel this GRAZING CONTRACT for refusal by the CONTRACTOR to allow public access to all documents, papers, letters or other material subject to the provisions of Chapter 119, Florida Statutes, and made or received by the CONTRACTOR in conjunction with this GRAZING CONTRACT.

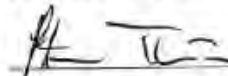
9.14 MODIFICATION OR AMENDMENT OF GRAZING CONTRACT: No waiver, or modification or amendment of this GRAZING CONTRACT or of any covenant, condition, or limitation herein contained shall be valid unless in writing and lawfully executed by the party to be charged therewith. It is the intention of the COMMISSION and the CONTRACTOR that no evidence of any waiver, or modification or amendment shall be offered or received in evidence in any proceeding or litigation between the parties arising out of or affecting this GRAZING CONTRACT unless such waiver, or modification or amendment is in writing and executed as aforesaid. The provisions of this section shall not be waived without compliance with said writing and execution requirements.

9.15 ENTIRE AGREEMENT: This GRAZING CONTRACT with all incorporated attachments and exhibits represents the entire agreement of the parties. Any alterations, variations, changes, modifications or waivers of provisions of this GRAZING CONTRACT shall only be valid when they have been reduced to writing, and duly signed by each of the parties hereto, unless otherwise provided herein. The COMMISSION and CONTRACTOR stipulate that neither of them has made any representations except such representations specifically contained within this GRAZING CONTRACT and each party acknowledges reliance on its own judgment in entering into this CONTRACT.

Remainder of Page Intentionally Left Blank

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed through their duly authorized signatories on the day and year last written below.

PAYTON TILTON



Name: Payton Tilton

Title: owner

Date: 9-27-12

**FLORIDA FISH AND WILDLIFE
CONSERVATION COMMISSION**



By: Nick Wiley
Executive Director

Date: 10-5-12

Approved as to form and legality:


COMMISSION Attorney

Attachments and Exhibits in this Contract include the following:

Attachment A	Scope of Work
Attachment B	Half Moon Natural Communities Map
Exhibit 1	Total Pasture Grazing Area Map
Exhibit 2	SS-AGR-77, Tropical Soda Apple Information Bulletin
Exhibit 3-5	Fence Specifications

Scope of Work
Half Moon Wildlife Management Area
Grazing Plan
 Sumter County, Florida
 Attachment A

General Description & Background:

Half Moon Wildlife Management Area is 9,450 acres of flatwoods, marshes, swamps, hammocks and old pastures. It lies along the Withlacoochee River in northwestern Sumter County. Half Moon's cow/calf operation is divided into two parcels: the 3,210-acre north pasture and the 1,080 south pasture. In a 1996 assessment, the Natural Resources Conservation Service (NRCS) deemed the cattle lease area capable of producing enough forage to support 410 AUs; in 2008, NRCS recommended 165 AUs. In 2011, University of Florida's Regional Livestock Agent recommended 135 cows and 7 or 8 bulls for a total of 145 AUs. The current stocking rate of 72 AUs is half of that recommendation and is currently being offered for lease.

Objectives & Definitions:

The objectives of this grazing plan are to improve or maintain an optimum level of native forages and assist in the reduction of biomass. Grazing and prescribed burning will help maintain the old pastures in an earlier stage of succession and more open state. This will benefit wildlife and future ground cover restoration efforts.

Brood cows will presumably make up most of the herd. Bulls and heifers may be included in the herd as needed as long as the overall suggested stocking rate is not exceeded. The following AU values will be used to estimate heifer and bull numbers. The suggested bull:cow ratio is 1:20.

- Cow with Calf = 1.0 AU (1,000 lbs)
- Bull (Mature) = 1.35 AU (1,200-1,500 lbs)
- Heifer (2 Yr.) = .80 AU (600-1,000 lbs)
- Heifer (4 Yr.) = 1.0 AU (1,000 lbs)

Livestock Forage Inventory & Map:

Forage will vary due to climatic conditions and management of the grazing system. The forage inventory should be evaluated weekly to ensure proper stocking rate according to the goals listed for the site and to meet the forage requirements of the livestock. Grazing will be deferred if forage supplies and quality are inadequate to meet livestock demand. Current stocking rate is 59.6 acres of improved pasture and native plant communities per AU. (See plant community map, Attachment B)

Recommended Grazing Heights and Stocking Rates:

Grazing animals can rapidly and substantially alter the productivity and amount of forage in each pasture. Overgrazing adversely affects forage growth, water and soil conservation, and may induce more use of wetland areas in some seasons. Since improving existing forages is not a goal for this project, a unique balance may be obtained to ensure a desirable stand of forage and limit grazing on the wetland areas included in the same grazing unit.

The following table lists common forages found on Half Moon along with recommended heights to maintain healthy stands of forage:

FORAGE TYPE	Min. Ht. To Begin Grazing	Min. Grazing Ht.
Bahia grass	6"	2"
Maidencane	12"	6-8"
Chalky bluestem	12"	6-8"

Grazing heights for native forage plants are dependent upon the species and the time of year the plant is grazed. For native grasses, remove no more than 50% (by weight) of the plant in any grazing event. This will provide proper use of the forage while maintaining sufficient plant material to provide wildlife habitat, protect soil, and maintain the health of the plant community. Use the forage heights shown in the previous table to determine whether the pastures are overgrazed.

Adjustments to the Grazing System:

Adjustments to grazing may be necessary during and after restoration and other management activities, such as planting, prescribed burning or pest management. The adjustments will provide a suitable period for the vegetation to recover from the management activity or as dictated by pesticide label restrictions. A deferment from grazing means the complete removal of all domestic animals for the duration of the deferment. The minimum grazing heights listed for corresponding grasses shall not be exceeded.

If herbicides are used to control common weeds and invasive species, grazing will be adjusted to meet the requirements, if any, listed on the herbicide label. Cattle will not be allowed to re-enter the area for the duration shown on the herbicide label. Temporary fences may be used to protect areas during deferment periods.

Operation and Maintenance:

The location of mineral and supplement feeders will be moved to evenly distribute grazing animals throughout the pasture. The herd will be rotated to a fresh pasture when the average stubble height falls below the recommended minimum grazing height. Supplemental feeding of hay is not allowed.

Contingency Management Plan:

- a. When the forage is not adequate, the grazing system will be adjusted. When prolonged periods of adverse climatic condition effect the supply of forage, the grazing system and/or stocking rates will be adjusted.
- b. The Lessee is required to provide the contract manager with an Annual Forage Assessment and Maximum Stocking Rate estimate performed by either a local NRCS extension office or a professional rangeland consultant.
- c. Lessees must submit and FWC must approve an annual plan for the movement and scheduled rotation of mineral vats and other supplemental feeds.
- d. Stocking rates are subject to change based on the results of the annual forage and stocking rate assessment.
- e. Lessee is required to comply with all Florida Cow Calf Best Management Practices.
- f. On improved pasture, higher stocking rates may be considered provided adequate infrastructure is in place, and range management practices such as rotational grazing are used.

ATTACHMENT B

Half Moon WMA Natural Communities

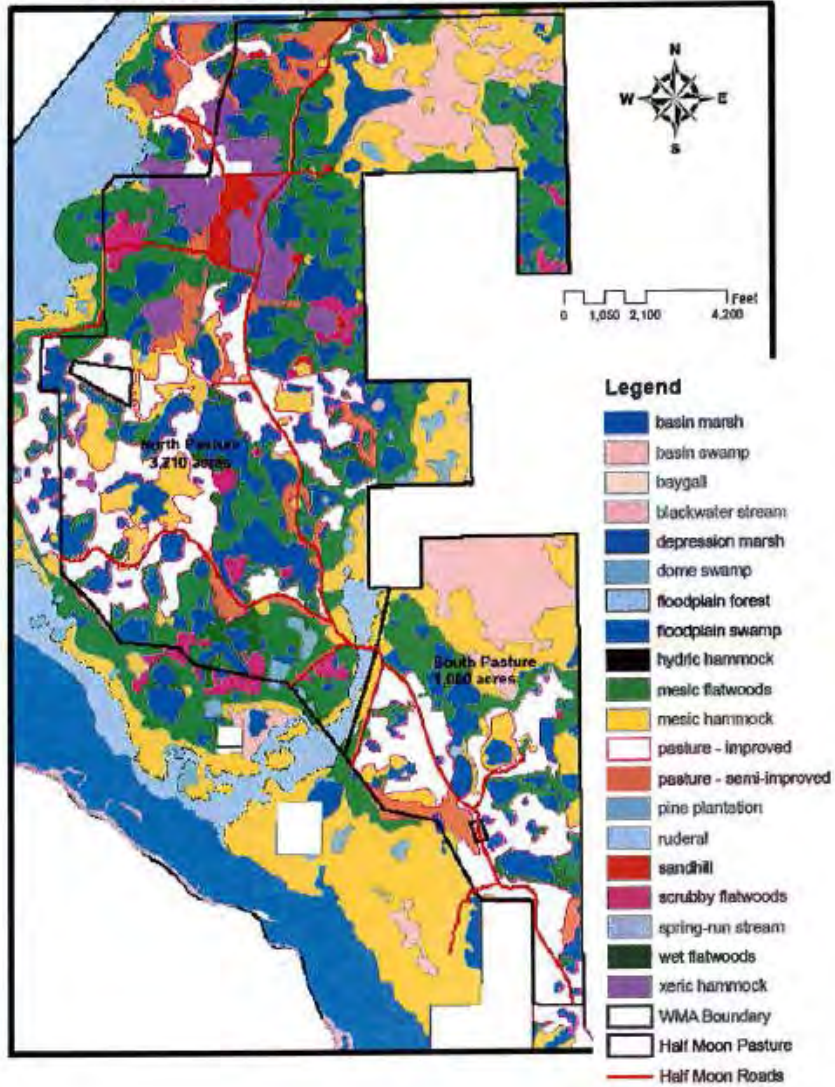


Exhibit 1: Half Moon WMA Cattle Lease Area

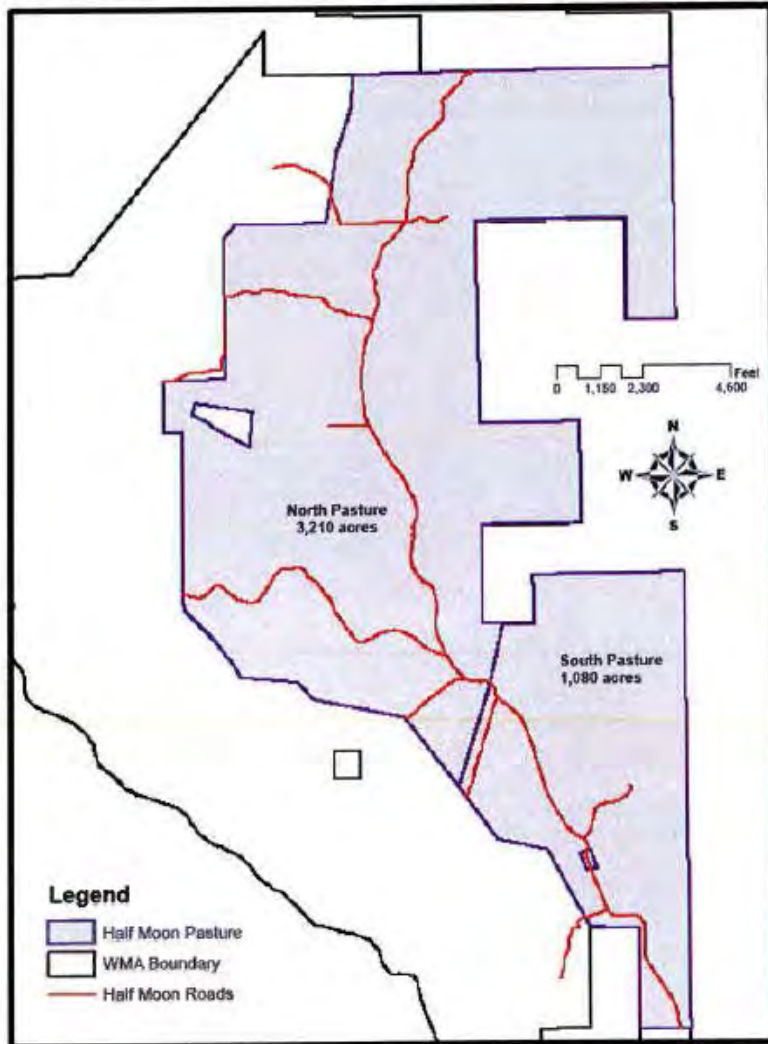


Exhibit 2 – Exotic Plant Elimination Information



SS-AGR-77

Tropical Soda Apple: A Noxious Weed in Florida¹

J. Jeffrey Mullahey, Jason Ferrell, and Brent Sellers²

Tropical soda apple (*Solanum viarum* Dunal) is a perennial weed that creates serious problems in many perennial grass pastures and native areas of Florida (Figure 1). This noxious weed, having foliage unpalatable to livestock and highly viable seed, can infest a pasture or native area within 1 to 2 years, resulting in lower stocking rates (animals per acre). The incidence of this plant has been highest in Florida, though the weed is present in Georgia, Alabama, Mississippi, South Carolina, Tennessee, Louisiana, and Pennsylvania. Within Florida, the incidence of this plant has been highest in the south, although it is now distributed throughout the entire state.

Plant Description

At maturity, TSA is 3 to 6 feet tall and the entire plant, including stems and leaves, has thorn-like prickles approximately 0.5 to 1 inch long (Figure 2). Leaves are pubescent (hairy), measure 6 to 8 inches long and 3 to 6 inches wide, and are lobed (Figure 3). The flowers are white with yellow stamens. The globular fruit, approximately 1 inch in diameter, is



Figure 1. Tropical soda apple in a typical south Florida bahiagrass pasture.

yellow when mature (Figure 4). Each mature fruit contains about 400 light red-brown seeds with diameters of approximately 0.10 inch. Seeds are only moderately flattened and are found in a mucilaginous layer containing a glycoalkaloid called solasodine. TSA fruit collected in south Florida averaged 1 inch in diameter, with an average of 413 seeds per fruit.

1. This document is SS-AGR-77, one of a series of the Agronomy Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Published October 1993 as WEC-7. Revised: August 2006. Reviewed: November 2006. Visit the EDIS Web Site at <http://edis.ifas.ufl.edu>.

2. J. Jeffrey Mullahey, professor and center director, West Florida Research and Education Center—Milton, FL; Jason Ferrell, assistant professor, Agronomy Department; Brent Sellers, assistant professor, Range Cattle Research and Education Center—Ocala, FL; Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL.

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Figure 2. Thorn-like prickles on a tropical soda apple leaf.



Figure 3. Mature tropical soda apple plant.

Weed Biology

Although TSA flowers throughout the year, flowering is concentrated from September through May. Fruit production occurs throughout the year (primarily from September through May), ensuring large numbers of viable seeds (from 40,000 to 50,000 per plant at 75% germination) for seed dispersal. Seed in the top 1 to 2 inches of the soil surface is more



Figure 4. Tropical soda apple fruit. Top row: immature fruit. Bottom row: mature fruit.

likely to germinate than seed on the soil surface or seed placed at a depth greater than 3 inches. White (immature) seed is not viable, regardless of fruit color. Livestock and wildlife such as feral hogs, deer, and raccoons eat the fruit and disperse the seed via feces, spreading the plant to other land areas.

Seedling emergence has been observed primarily during the dry season (October through May). New plants can emerge either from seeds or from roots of existing plants, whose buds regenerate new shoots. The root system can be extensive, with feeder roots a few inches below ground measuring 0.25 to 1.0 inch in diameter and extending 3 to 6 feet horizontally from the crown of the plant.

Weed Ecology

TSA has been observed as a weed in pastures, ditch banks, sod fields, citrus groves, sugar cane fields, vegetable fields, roadsides, rangeland, and nature preserves. It is a common weed in South America, India, the West Indies, Honduras, and Mexico. Native to Argentina and central Brazil, TSA has been introduced in Africa, much of India, and Nepal and can be expected to occur in other subtropical areas. How TSA was introduced into Florida is not known. In Florida, it is an obligate weed mainly associated with human activities.

Tropical soda apple is less productive, or may actually die, in the summer, when water accumulates in fields. *Solanum* spp. were first reported by ranchers in south Florida in the early 1960s. According to these initial reports, however, the fruit color was

cherry red, not yellow. Apparently, ranchers were observing *Solanum capense*, not TSA. For the past 10 years in south Florida, TSA has been the more prevalent of the two species. Although the reasons for TSA's rapid increase are not well understood, its seed is spread by animals, contaminated hay, and grass seed (e.g., that of bahiagrass).

Weed Control

Dense Infestations

Milestone and Forefront are the most effective herbicides for controlling dense stands of TSA. These herbicides possess postemergence control of existing plants and preemergence control of germinating seeds. Our research has shown that Milestone and Forefront will control germinating seedlings for over 6 months after application.

The application rate for Milestone is 5 to 7 oz/A while Forefront is 2 to 2.6 pt/A. Although the lower application rates are highly effective on existing plants, the higher rates will provide more soil activity and are suggested if large amounts of TSA seed are present in the soil. Although mowing prior to herbicide application is not required, it is important to add a non-ionic surfactant (0.25% v/v) and apply in at least 20 gallons of water per acre.

Another option is to use Remedy herbicide. When using Remedy, mow plants to a 3-inch stubble height as soon as possible to keep plants from producing fruit and seed. Repeat mowing when plants reach the flowering stage (50-60 days) through April. Fifty to 60 days after the April mowing, when plant regrowth is at the first flower stage (late May - June), spray Remedy at 1 qt/A + 0.25% nonionic surfactant in 40 gal/A of water.

Remedy does not possess soil residual and follow up applications to control escaped or new seedlings will be necessary.

Regardless which herbicide is used, regular scouting after treatment is necessary. TSA can produce fruit at almost any time during the growing season and give rise to hundreds of additional plants. It is important to monitor the fields to ensure that no plants are allowed to reestablish and produce fruit.

Sparsely Infestations

Areas with low TSA infestations should be targeted and each plant sprayed individually. Recommended herbicides for 95 to 100% control are as follows:

Spot Application

Milestone at 0.5 to 0.8 oz per 2.5 gal (15 to 20 ml per 2.5 gal.) + 0.25% nonionic surfactant + color marker. (Use a colored marker with the herbicide solution to avoid spraying the same plant twice, or not spraying a plant at all.)

Forefront or Remedy at 0.5% solution (50 ml per 2.5 gal) + 0.25% nonionic surfactant + color marker.

Cover the entire TSA plant with spray to ensure herbicide uptake and maximum control. Allow herbicides to dry on plants 3-4 hours before rainfall. Monitor sprayed areas monthly and treat new TSA seedlings. Do not allow plants to produce fruit.

TSA control can also be achieved using dicamba at 1% + 0.25% nonionic surfactant in 20 - 30 gallons of water. Dicamba (Banvel, Clarity or Vaquanti) is effective at controlling TSA, but the 2 quart rate is more expensive than other options. Be sure and follow the guidelines for spraying volatile herbicides such as dicamba and Remedy (see EDIS publication SS-AGR-12 *Florida's Organic-toxin Herbicide Rule* [<http://edis.fns.ufl.edu/WG051>] for more information).

Shipping Cattle

Ship cattle from an area that does not have TSA or is TSA fruit free. Mowing a TSA infested pasture prior to shipping will eliminate the fruit and the consumption of TSA seed by the cattle. The TSA seed can remain viable in the digestive tract for up to six days. Therefore, when you buy cattle, hold them in one area for up to six days to avoid the spread of TSA to other areas on your ranch. For more information, see EDIS publication SS-AGR-78 *Shipping Cattle, Not Tropical Soda Apple Seed* (<http://edis.fns.ufl.edu/UW187>).

IFAS is researching methods to control TSA. Efforts to identify effective methods are focused on

herbicide evaluations, herbicide rates, and biological control measures (insects and pathogens). IFAS is also conducting an aggressive TSA educational outreach program to educate ranchers and landowners. Individuals requiring additional information should contact their county Extension offices.

South Florida

(
<http://tsa.ifas.ufl.edu/00Slides/SouthFlorida/index.html>)

Further Information

EDIS publications:

SS-AGR-50 Tropical Soda Apple (*Solanum viarum*, Dunal) in Florida
(<http://edis.ifas.ufl.edu/WG201>)

SS-AGR-78 Shipping Cattle, Not Tropical Soda Apple Seed (<http://edis.ifas.ufl.edu/UW187>)

SS-AGR-129 Tropical Soda Apple Control--Sorting Through the Options
(<http://edis.ifas.ufl.edu/AG261>)

SS-AGR-130 Management Practices to Control Tropical Soda Apple
(<http://edis.ifas.ufl.edu/UW188>)

SS-AGR-131 Tropical Soda Apple Making a Comeback (<http://edis.ifas.ufl.edu/UW189>)

ENY-826 Biology of *Gratiana hirticornis*, the First Biocontrol Agent Released to Control Tropical Soda Apple in the USA
(<http://edis.ifas.ufl.edu/IN487>)

ENY-824 Classical Biological Control of Tropical Soda Apple in the USA
(<http://edis.ifas.ufl.edu/IN457>)

West Florida Research and Education Center:

Tropical Soda Apple (<http://tsa.ifas.ufl.edu/>)

Tropical Soda Apple Best Management Practices--

North Florida

(
<http://tsa.ifas.ufl.edu/00Slides/NorthFlorida/index.html>)

**Exhibit 3
Fence Specifications**

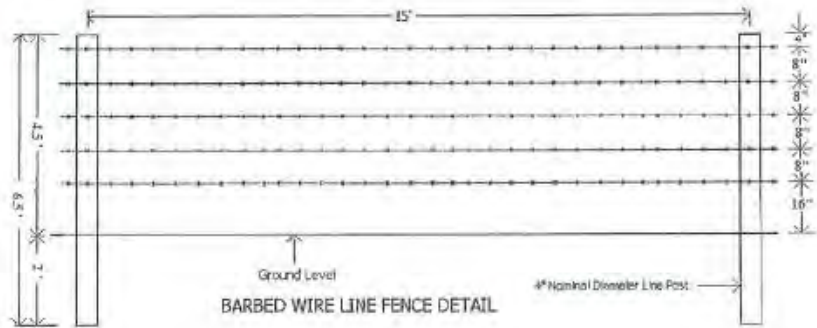
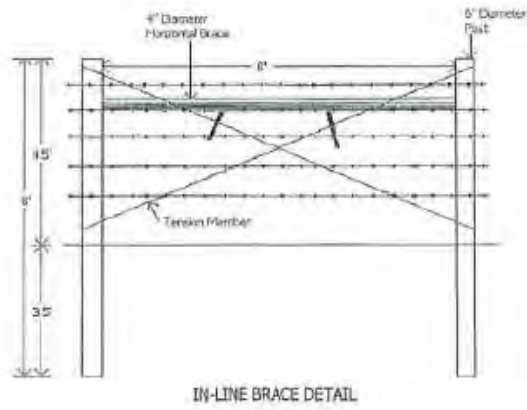
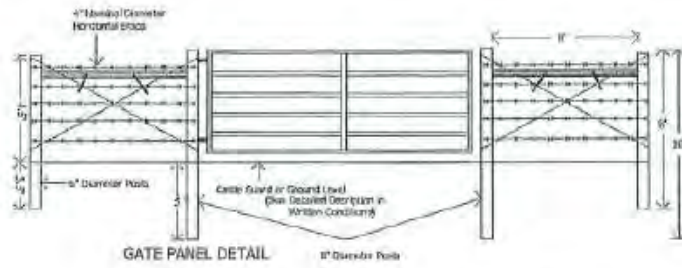
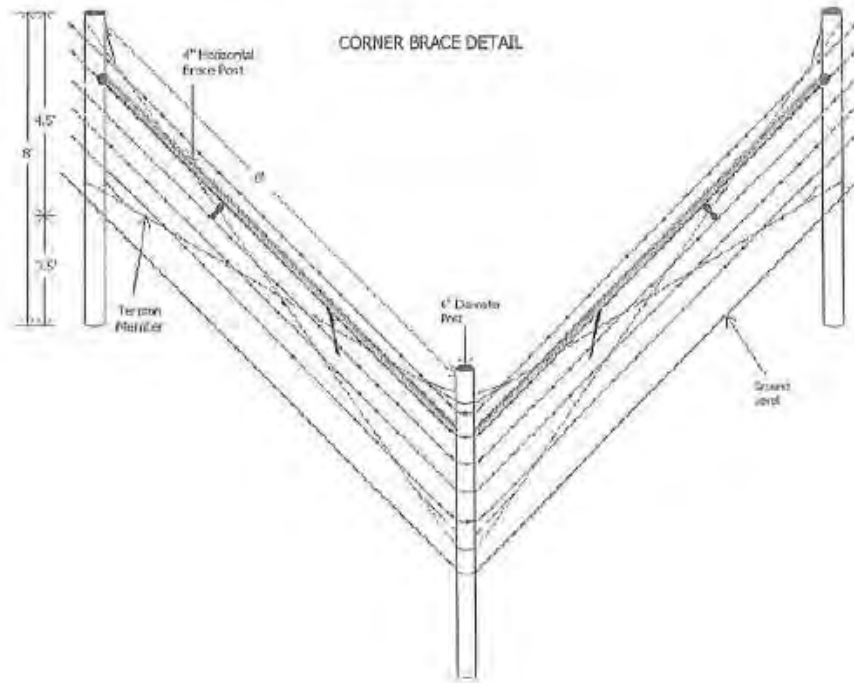


Exhibit 4 Fence Specifications



**Exhibit 5
Fence Specifications**



13.5 Soil Series Descriptions

NRCS Soil Series - Map Unit Descriptions

6—Kendrick fine sand, 0 to 5 percent slopes

Map Unit Setting

Elevation: 20 to 150 feet

Mean annual precipitation: 45 to 53 inches

Mean annual air temperature: 68 to 75 degrees F

Frost-free period: 290 to 320 days

Map Unit Composition

Kendrick and similar soils: 80 percent

Minor components: 20 percent

Description of Kendrick

Setting

Landform: Ridges on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Loamy marine deposits

Properties and qualities

Slope: 0 to 5 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water capacity: Low (about 5.5 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 2e

Hydrologic Soil Group: A

Ecological site: Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Other vegetative classification: Sandy over loamy soils on knolls and ridges of mesic uplands

(G154XB211FL)

Typical profile

0 to 8 inches: Fine sand

8 to 33 inches: Fine sand

33 to 68 inches: Fine sandy loam

68 to 80 inches: Sandy clay loam

Minor Components

Arredondo

Percent of map unit: 4 percent

Landform: Hills on marine terraces, ridges on marine terraces

Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex

Across-slope shape: Convex

Ecological site: Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Other vegetative classification: Sandy soils on ridges and dunes of xeric uplands (G154XB111FL)

Millhopper

Percent of map unit: 4 percent

Landform: Ridges on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Sandy soils on rises, knolls, and ridges of mesic uplands (G154XB121FL)

Tavares

Percent of map unit: 4 percent

Landform: Ridges on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Other vegetative classification: Sandy soils on rises, knolls, and ridges of mesic uplands (G154XB121FL)

Apopka

Percent of map unit: 4 percent

Landform: Ridges on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Other vegetative classification: Sandy soils on ridges and dunes of xeric uplands (G154XB111FL)

Sumterville, bouldery subsurface

Percent of map unit: 4 percent

Landform: Ridges on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Loamy and clayey soils on flats and rises of mesic lowlands (G154XB331FL)

9—Paisley fine sand, bouldery subsurface

Map Unit Setting

Elevation: 30 to 130 feet

Mean annual precipitation: 45 to 53 inches

Mean annual air temperature: 68 to 75 degrees F

Frost-free period: 290 to 320 days

Map Unit Composition

Paisley and similar soils: 80 percent

Minor components: 20 percent

Description of Paisley

Setting

Landform: Flats on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Clayey marine deposits

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (K_{sat}): Moderately low to high (0.06 to 1.98 in/hr)

Depth to water table: About 6 to 18 inches

Frequency of flooding: Rare

Frequency of ponding: None

Calcium carbonate, maximum content: 15 percent

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water capacity: High (about 9.5 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 3w

Hydrologic Soil Group: B/D

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Loamy and clayey soils on flats of hydric or mesic lowlands (G154XB341FL)

Typical profile

0 to 5 inches: Fine sand

5 to 16 inches: Fine sand

16 to 80 inches: Sandy clay

Minor Components

Eaugallie, non-hydric

Percent of map unit: 4 percent

Landform: Flats on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

Floridana, depressional

Percent of map unit: 4 percent

Landform: Depressions on marine terraces

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Concave

Ecological site: Freshwater Marshes and Ponds (R154XY010FL)

Other vegetative classification: Sandy over loamy soils on stream terraces, flood plains, or in depressions (G154XB245FL)

Sumterville, bouldery subsurface

Percent of map unit: 3 percent

Landform: Ridges on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Loamy and clayey soils on flats and rises of mesic lowlands (G154XB331FL)

Ft. green, non-hydric

Percent of map unit: 3 percent

Landform: Rises on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve, rise

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Sandy over loamy soils on flats of hydric or mesic lowlands (G154XB241FL)

Mabel, bouldery subsurface

Percent of map unit: 3 percent

Landform: Ridges on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex

Across-slope shape: Convex

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Loamy and clayey soils on flats and rises of mesic lowlands (G154XB331FL)

Wabasso, non-hydric

Percent of map unit: 3 percent

Landform: Flats on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

10—Sparr fine sand, 0 to 5 percent slopes

Map Unit Setting

Elevation: 40 to 150 feet

Mean annual precipitation: 45 to 53 inches

Mean annual air temperature: 68 to 75 degrees F

Frost-free period: 290 to 320 days

Map Unit Composition

Sparr and similar soils: 80 percent

Minor components: 20 percent

Description of Sparr

Setting

Landform: Rises on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve, rise

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Sandy and loamy marine deposits

Properties and qualities

Slope: 0 to 5 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)

Depth to water table: About 18 to 42 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water capacity: Low (about 5.4 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 3w

Hydrologic Soil Group: A/D

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Sandy soils on rises and knolls of mesic uplands

(G154XB131FL)

Typical profile

0 to 9 inches: Fine sand

9 to 45 inches: Fine sand

45 to 51 inches: Fine sandy loam

51 to 80 inches: Sandy clay loam

Minor Components

Millhopper

Percent of map unit: 7 percent

Landform: Ridges on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluvial

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Sandy soils on rises, knolls, and ridges of mesic uplands (G154XB121FL)

Eaughallie, non-hydric

Percent of map unit: 7 percent

Landform: Flats on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

Wabasso, non-hydric

Percent of map unit: 6 percent

Landform: Flats on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

11—Millhopper sand, 0 to 5 percent slopes

Map Unit Setting

Elevation: 20 to 150 feet

Mean annual precipitation: 45 to 53 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 290 to 320 days

Map Unit Composition

Millhopper and similar soils: 85 percent
Minor components: 15 percent

Description of Millhopper

Setting

Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: About 42 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water capacity: Low (about 5.2 inches)

Interpretive groups

Farmland classification: Not prime farmland
Land capability (nonirrigated): 3s
Hydrologic Soil Group: A
Ecological site: Upland Hardwood Hammocks (R154XY008FL)
Other vegetative classification: Sandy soils on rises, knolls, and ridges of mesic uplands (G154XB121FL)

Typical profile

0 to 5 inches: Sand
5 to 50 inches: Fine sand

50 to 80 inches: Sandy clay loam

Minor Components

Arredondo

Percent of map unit: 4 percent

Landform: Hills on marine terraces, ridges on marine terraces

Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex

Across-slope shape: Convex

Ecological site: Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Other vegetative classification: Sandy soils on ridges and dunes of xeric uplands (G154XB111FL)

Sumterville, bouldery subsurface

Percent of map unit: 4 percent

Landform: Ridges on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Loamy and clayey soils on flats and rises of mesic lowlands (G154XB331FL)

Sparr

Percent of map unit: 4 percent

Landform: Rises on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve, rise

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G154XB131FL)

Tavares

Percent of map unit: 3 percent

Landform: Ridges on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Other vegetative classification: Sandy soils on rises, knolls, and ridges of mesic uplands

(G154XB121FL)

15—Adamsville fine sand, bouldery subsurface

Map Unit Setting

Elevation: 10 to 150 feet

Mean annual precipitation: 45 to 53 inches

Mean annual air temperature: 68 to 75 degrees F

Frost-free period: 290 to 320 days

Map Unit Composition

Adamsville, bouldery subsurface, and similar soils: 85 percent

Minor components: 15 percent

Description of Adamsville, Bouldery Subsurface

Setting

Landform: Rises on marine terraces, flats on marine terraces

Landform position (three-dimensional): Interfluve, talf

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Sandy marine deposits

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)

Depth to water table: About 24 to 42 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water capacity: Low (about 3.7 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 3w

Hydrologic Soil Group: A

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Sandy soils on rises and knolls of mesic uplands

(G154XB131FL)

Typical profile

0 to 5 inches: Fine sand

5 to 80 inches: Fine sand

Minor Components

Sparr

Percent of map unit: 4 percent

Landform: Rises on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve, rise

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G154XB131FL)

Ona, non-hydric

Percent of map unit: 4 percent

Landform: Flats on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

Pompano

Percent of map unit: 4 percent

Landform: Flats on marine terraces, drainageways on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Slough (R154XY011FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

Tavares

Percent of map unit: 3 percent

Landform: Ridges on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Other vegetative classification: Sandy soils on rises, knolls, and ridges of mesic uplands (G154XB121FL)

18—Okeelanta muck

Map Unit Setting

Mean annual precipitation: 45 to 53 inches

Mean annual air temperature: 68 to 75 degrees F

Frost-free period: 290 to 320 days

Map Unit Composition

Okeelanta and similar soils: 85 percent

Minor components: 15 percent

Description of Okeelanta

Setting

Landform: Depressions on marine terraces

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Herbaceous organic material over sandy marine deposits

Properties and qualities

Slope: 0 to 1 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Very poorly drained

Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)

Depth to water table: About 0 inches

Frequency of flooding: None

Frequency of ponding: Frequent

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water capacity: Very high (about 17.0 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 7w

Hydrologic Soil Group: A/D

Ecological site: Freshwater Marshes and Ponds (R154XY010FL)

Other vegetative classification: Organic soils in depressions and on flood plains (G154XB645FL)

Typical profile

0 to 38 inches: Muck

38 to 80 inches: Fine sand

Minor Components

Gator

Percent of map unit: 4 percent

Landform: Depressions on marine terraces

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Concave

Ecological site: Freshwater Marshes and Ponds (R154XY010FL)

Other vegetative classification: Organic soils in depressions and on flood plains (G154XB645FL)

Placid

Percent of map unit: 4 percent

Landform: Depressions on marine terraces, drainageways on marine terraces

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Concave

Ecological site: Freshwater Marshes and Ponds (R154XY010FL)

Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G154XB145FL)

Pompano, depressional

Percent of map unit: 4 percent

Landform: Depressions on marine terraces

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Concave

Ecological site: Freshwater Marshes and Ponds (R154XY010FL)

Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G154XB145FL)

Terra ceia

Percent of map unit: 3 percent

Landform: Depressions on flood plains on marine terraces

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Concave

Other vegetative classification: Organic soils in depressions and on flood plains (G154XB645FL)

21—EauGallie fine sand, bouldery subsurface

Map Unit Setting

Elevation: 30 to 100 feet

Mean annual precipitation: 45 to 53 inches

Mean annual air temperature: 68 to 75 degrees F

Frost-free period: 290 to 320 days

Map Unit Composition

Eaugallie, non-hydric, and similar soils: 60 percent

Eaugallie, hydric, and similar soils: 20 percent

Minor components: 20 percent

Description of EauGallie, Non-hydric

Setting

Landform: Flatwoods on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Sandy and loamy marine deposits

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)

Depth to water table: About 6 to 18 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water capacity: Low (about 4.8 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 4w

Hydrologic Soil Group: A/D

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

Typical profile

0 to 8 inches: Fine sand

8 to 25 inches: Fine sand

25 to 36 inches: Fine sand

36 to 57 inches: Fine sand

57 to 80 inches: Sandy clay loam

Description of Eaugallie, Hydric

Setting

Landform: Flats on marine terraces

Landform position (three-dimensional): Dip

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Sandy and loamy marine deposits

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)

Depth to water table: About 0 to 6 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water capacity: Low (about 4.8 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 4w

Hydrologic Soil Group: A/D

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

Typical profile

0 to 8 inches: Fine sand

8 to 25 inches: Fine sand
25 to 36 inches: Fine sand
36 to 57 inches: Fine sand
57 to 80 inches: Sandy clay loam

Minor Components

Paisley

Percent of map unit: 5 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Upland Hardwood Hammocks (R154XY008FL)
Other vegetative classification: Loamy and clayey soils on flats of hydric or mesic lowlands (G154XB341FL)

Mabel, bouldery subsurface

Percent of map unit: 5 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: Upland Hardwood Hammocks (R154XY008FL)
Other vegetative classification: Loamy and clayey soils on flats and rises of mesic lowlands (G154XB331FL)

Wabasso, non-hydric

Percent of map unit: 5 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: South Florida Flatwoods (R154XY003FL)
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

Myakka, non-hydric

Percent of map unit: 5 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

22—Smyrna fine sand

Map Unit Setting

Mean annual precipitation: 45 to 53 inches

Mean annual air temperature: 68 to 75 degrees F

Frost-free period: 290 to 320 days

Map Unit Composition

Smyrna, non-hydric, and similar soils: 60 percent

Smyrna, hydric, and similar soils: 25 percent

Minor components: 15 percent

Description of Smyrna, Non-hydric

Setting

Landform: Flats on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Sandy marine deposits

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)

Depth to water table: About 6 to 18 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water capacity: Low (about 4.3 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 4w

Hydrologic Soil Group: A/D

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

Typical profile

0 to 3 inches: Fine sand

3 to 15 inches: Fine sand

15 to 28 inches: Fine sand

28 to 80 inches: Fine sand

Description of Smyrna, Hydric

Setting

Landform: Flats on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Sandy marine deposits

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)

Depth to water table: About 0 to 6 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water capacity: Low (about 4.3 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 4w

Hydrologic Soil Group: A/D

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

Typical profile

0 to 3 inches: Fine sand

3 to 15 inches: Fine sand

15 to 28 inches: Fine sand

28 to 80 inches: Fine sand

Minor Components

Ona, non-hydric

Percent of map unit: 5 percent

Landform: Flats on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

Eaugallie, hydric

Percent of map unit: 5 percent

Landform: Flats on marine terraces

Landform position (three-dimensional): Dip

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

Myakka, non-hydric

Percent of map unit: 5 percent

Landform: Flatwoods on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

26—Wabasso fine sand, bouldery subsurface

Map Unit Setting

Elevation: 30 to 100 feet

Mean annual precipitation: 45 to 53 inches

Mean annual air temperature: 68 to 75 degrees F

Frost-free period: 290 to 320 days

Map Unit Composition

Wabasso, non-hydric, and similar soils: 70 percent

Wabasso, hydric, and similar soils: 15 percent

Minor components: 15 percent

Description of Wabasso, Non-hydric

Setting

Landform: Flatwoods on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Sandy and loamy marine deposits

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)

Depth to water table: About 12 to 18 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 20 percent

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water capacity: Moderate (about 8.5 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 4w

Hydrologic Soil Group: B/D

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

Typical profile

0 to 4 inches: Fine sand

4 to 15 inches: Fine sand

15 to 21 inches: Loamy fine sand

21 to 60 inches: Sandy clay

60 to 80 inches: Sandy clay loam

Description of Wabasso, Hydric

Setting

Landform: Flats on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Sandy and loamy marine deposits

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)

Depth to water table: About 0 to 12 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 20 percent

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water capacity: Moderate (about 8.5 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 4w

Hydrologic Soil Group: B/D

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

Typical profile

0 to 4 inches: Fine sand

4 to 15 inches: Fine sand

15 to 21 inches: Loamy fine sand

21 to 60 inches: Sandy clay

60 to 80 inches: Sandy clay loam

Minor Components**Paisley**

Percent of map unit: 5 percent

Landform: Flats on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Loamy and clayey soils on flats of hydric or mesic lowlands (G154XB341FL)

Eaugallie, non-hydric

Percent of map unit: 5 percent

Landform: Flatwoods on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

Mabel, bouldery subsurface

Percent of map unit: 5 percent

Landform: Ridges on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex

Across-slope shape: Convex

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Loamy and clayey soils on flats and rises of mesic lowlands (G154XB331FL)

27—Sumterville fine sand, bouldery subsurface, 0 to 5 percent slopes

Map Unit Setting

Elevation: 50 to 100 feet

Mean annual precipitation: 45 to 53 inches

Mean annual air temperature: 68 to 75 degrees F

Frost-free period: 290 to 320 days

Map Unit Composition

Sumterville, bouldery subsurface, and similar soils: 80 percent

Minor components: 20 percent

Description of Sumterville, Bouldery Subsurface

Setting

Landform: Ridges on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Sandy and clayey marine deposits

Properties and qualities

Slope: 0 to 5 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 18 to 36 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water capacity: Moderate (about 6.6 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 2w

Hydrologic Soil Group: C/D

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Loamy and clayey soils on flats and rises of mesic lowlands (G154XB331FL)

Typical profile

0 to 9 inches: Fine sand

9 to 29 inches: Fine sand

29 to 80 inches: Sandy clay

Minor Components

Mabel, bouldery subsurface

Percent of map unit: 10 percent

Landform: Ridges on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex

Across-slope shape: Convex

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Loamy and clayey soils on flats and rises of mesic lowlands (G154XB331FL)

Sparr, bouldery subsurface

Percent of map unit: 10 percent

Landform: Rises on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve, rise

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G154XB131FL)

28—Seffner fine sand**Map Unit Setting**

Elevation: 10 to 150 feet

Mean annual precipitation: 45 to 53 inches

Mean annual air temperature: 68 to 75 degrees F

Frost-free period: 290 to 320 days

Map Unit Composition

Seffner and similar soils: 80 percent

Minor components: 20 percent

Description of Seffner**Setting**

Landform: Flats on marine terraces, rises on marine terraces

Landform position (three-dimensional): Interfluve, talf

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Sandy marine deposits

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)

Depth to water table: About 18 to 42 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water capacity: Low (about 4.3 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 3w

Hydrologic Soil Group: A/D

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G154XB131FL)

Typical profile

0 to 12 inches: Fine sand

12 to 18 inches: Fine sand

18 to 80 inches: Fine sand

Minor Components

Florahome

Percent of map unit: 4 percent

Landform: Rises on marine terraces

Landform position (three-dimensional): Interfluve, rise

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Sandy soils on rises, knolls, and ridges of mesic uplands (G154XB121FL)

Sparr

Percent of map unit: 4 percent

Landform: Rises on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve, rise

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G154XB131FL)

Ona, non-hydric

Percent of map unit: 4 percent

Landform: Flats on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

Pompano

Percent of map unit: 4 percent

Landform: Flats on marine terraces, drainageways on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Slough (R154XY011FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

Adamsville

Percent of map unit: 4 percent

Landform: Rises on marine terraces, flats on marine terraces

Landform position (three-dimensional): Interfluve, talf

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G154XB131FL)

33—Sparr fine sand, bouldery subsurface, 0 to 5 percent slopes

Map Unit Setting

Mean annual precipitation: 45 to 53 inches

Mean annual air temperature: 68 to 75 degrees F

Frost-free period: 290 to 320 days

Map Unit Composition

Sparr, bouldery subsurface, and similar soils: 80 percent

Minor components: 20 percent

Description of Sparr, Bouldery Subsurface

Setting

Landform: Rises on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve, rise

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Sandy and loamy marine deposits

Properties and qualities

Slope: 0 to 5 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)

Depth to water table: About 18 to 42 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water capacity: Low (about 5.3 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 3w

Hydrologic Soil Group: A/D

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G154XB131FL)

Typical profile

0 to 8 inches: Fine sand

8 to 46 inches: Fine sand

46 to 58 inches: Sandy clay loam

58 to 80 inches: Sandy clay

Minor Components**Eaugallie, non-hydric**

Percent of map unit: 5 percent

Landform: Flats on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

Mabel, bouldery subsurface

Percent of map unit: 5 percent

Landform: Ridges on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex

Across-slope shape: Convex

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Loamy and clayey soils on flats and rises of mesic lowlands (G154XB331FL)

Adamsville, bouldery subsurface

Percent of map unit: 5 percent

Landform: Rises on marine terraces, flats on marine terraces

Landform position (three-dimensional): Interfluve, talus

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G154XB131FL)

Millhopper, bouldery subsurface

Percent of map unit: 5 percent

Landform: Rises on marine terraces, flats on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Sandy soils on rises, knolls, and ridges of mesic uplands (G154XB121FL)

36—Floridana mucky fine sand, depressional

Map Unit Setting

Mean annual precipitation: 45 to 53 inches

Mean annual air temperature: 68 to 75 degrees F

Frost-free period: 290 to 320 days

Map Unit Composition

Floridana, depressional, and similar soils: 85 percent

Minor components: 15 percent

Description of Floridana, Depressional

Setting

Landform: Depressions on marine terraces

Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy and loamy marine deposits

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water capacity: Moderate (about 8.0 inches)

Interpretive groups

Farmland classification: Not prime farmland
Land capability (nonirrigated): 7w
Hydrologic Soil Group: C/D
Ecological site: Freshwater Marshes and Ponds (R154XY010FL)
Other vegetative classification: Sandy over loamy soils on stream terraces, flood plains, or in depressions (G154XB245FL)

Typical profile

0 to 4 inches: Mucky fine sand
4 to 12 inches: Fine sand
12 to 25 inches: Fine sand
25 to 80 inches: Sandy clay loam

Minor Components

Gator

Percent of map unit: 8 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave

Ecological site: Freshwater Marshes and Ponds (R154XY010FL)

Other vegetative classification: Organic soils in depressions and on flood plains (G154XB645FL)

Placid

Percent of map unit: 7 percent

Landform: Depressions on marine terraces, drainageways on marine terraces

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Concave

Ecological site: Freshwater Marshes and Ponds (R154XY010FL)

Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G154XB145FL)

37—Astatula fine sand, 0 to 8 percent slopes

Map Unit Setting

Elevation: 20 to 150 feet

Mean annual precipitation: 45 to 53 inches

Mean annual air temperature: 68 to 75 degrees F

Frost-free period: 290 to 320 days

Map Unit Composition

Astatula and similar soils: 80 percent

Minor components: 20 percent

Description of Astatula

Setting

Landform: Ridges on marine terraces, hills on marine terraces

Landform position (three-dimensional): Side slope, interfluvium

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Eolian or sandy marine deposits

Properties and qualities

Slope: 0 to 8 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Excessively drained

Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 to 50.02 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water capacity: Very low (about 2.5 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 6s

Hydrologic Soil Group: A

Ecological site: Sand Pine Scrub (R154XY001FL)

Other vegetative classification: Sandy soils on ridges and dunes of xeric uplands (G154XB111FL)

Typical profile

0 to 5 inches: Fine sand

5 to 80 inches: Fine sand

Minor Components

Candler

Percent of map unit: 7 percent

Landform: Ridges on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Convex

Ecological site: Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Other vegetative classification: Sandy soils on ridges and dunes of xeric uplands (G154XB111FL)

Lake

Percent of map unit: 7 percent

Landform: Ridges, knolls, marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Other vegetative classification: Sandy soils on ridges and dunes of xeric uplands (G154XB111FL)

Tavares

Percent of map unit: 6 percent

Landform: Ridges on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Other vegetative classification: Sandy soils on rises, knolls, and ridges of mesic uplands (G154XB121FL)

39—Mabel fine sand, bouldery subsurface, 0 to 5 percent slopes

Map Unit Setting

Elevation: 30 to 100 feet

Mean annual precipitation: 45 to 53 inches

Mean annual air temperature: 68 to 75 degrees F

Frost-free period: 290 to 320 days

Map Unit Composition

Mabel, bouldery subsurface, and similar soils: 80 percent

Minor components: 20 percent

Description of Mabel, Bouldery Subsurface

Setting

Landform: Ridges on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Side slope, interfluvium

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Sandy, loamy, and clayey marine deposits

Properties and qualities

Slope: 0 to 5 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 18 to 36 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 20 percent

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water capacity: Moderate (about 8.2 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 3w

Hydrologic Soil Group: D

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Loamy and clayey soils on flats and rises of mesic lowlands (G154XB331FL)

Typical profile

0 to 6 inches: Fine sand

6 to 16 inches: Fine sand

16 to 24 inches: Sandy clay loam

24 to 30 inches: Clay

30 to 80 inches: Clay loam

Minor Components

Sumterville, bouldery subsurface

Percent of map unit: 5 percent

Landform: Ridges on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Loamy and clayey soils on flats and rises of mesic lowlands (G154XB331FL)

Paisley

Percent of map unit: 5 percent

Landform: Flats on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Loamy and clayey soils on flats of hydric or mesic lowlands (G154XB341FL)

Wabasso, non-hydric

Percent of map unit: 5 percent

Landform: Flats on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

Oldsmar, non-hydric

Percent of map unit: 5 percent

Landform: Flats on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

40—Millhopper sand, bouldery subsurface, 0 to 5 percent slopes

Map Unit Setting

Elevation: 50 to 100 feet

Mean annual precipitation: 45 to 53 inches

Mean annual air temperature: 68 to 75 degrees F

Frost-free period: 290 to 320 days

Map Unit Composition

Millhopper, bouldery subsurface, and similar soils: 85 percent

Minor components: 15 percent

Description of Millhopper, Bouldery Subsurface

Setting

Landform: Rises on marine terraces, flats on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Sandy and loamy marine deposits

Properties and qualities

Slope: 0 to 5 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)

Depth to water table: About 42 to 72 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water capacity: Low (about 5.2 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 3s

Hydrologic Soil Group: A

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Sandy soils on rises, knolls, and ridges of mesic uplands (G154XB121FL)

Typical profile

0 to 7 inches: Sand

7 to 45 inches: Fine sand

45 to 80 inches: Sandy clay loam

Minor Components

Sumterville, bouldery subsurface

Percent of map unit: 4 percent

Landform: Ridges on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Loamy and clayey soils on flats and rises of mesic lowlands (G154XB331FL)

Mabel, bouldery subsurface

Percent of map unit: 4 percent

Landform: Ridges on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex

Across-slope shape: Convex

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Loamy and clayey soils on flats and rises of mesic lowlands (G154XB331FL)

Candler, bouldery subsurface

Percent of map unit: 4 percent

Landform: Ridges on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Convex

Ecological site: Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Other vegetative classification: Sandy soils on ridges and dunes of xeric uplands (G154XB111FL)

Tavares, bouldery subsurface

Percent of map unit: 3 percent

Landform: Ridges on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Other vegetative classification: Sandy soils on rises, knolls, and ridges of mesic uplands (G154XB121FL)

44—Oldsmar fine sand, bouldery subsurface

Map Unit Setting

Mean annual precipitation: 45 to 53 inches

Mean annual air temperature: 68 to 75 degrees F

Frost-free period: 290 to 320 days

Map Unit Composition

Oldsmar, non-hydric, and similar soils: 70 percent

Oldsmar, hydric, and similar soils: 15 percent

Minor components: 15 percent

Description of Oldsmar, Non-hydric

Setting

Landform: Flatwoods on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Sandy and loamy marine deposits

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 6 to 18 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water capacity: Low (about 5.1 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 4w

Hydrologic Soil Group: A/D

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

Typical profile

0 to 9 inches: Fine sand

9 to 31 inches: Fine sand

31 to 48 inches: Fine sand

48 to 80 inches: Sandy clay loam

Description of Oldsmar, Hydric

Setting

Landform: Flats on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Sandy and loamy marine deposits

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 0 to 6 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water capacity: Low (about 5.1 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 4w

Hydrologic Soil Group: A/D

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

Typical profile

0 to 9 inches: Fine sand

9 to 31 inches: Fine sand

31 to 48 inches: Fine sand

48 to 80 inches: Sandy clay loam

Minor Components

Eaugallie, non-hydric

Percent of map unit: 4 percent

Landform: Flatwoods on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

Electra, bouldery subsurface

Percent of map unit: 4 percent

Landform: Rises on marine terraces, ridges on marine terraces

Landform position (three-dimensional): Interfluve, rise

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G154XB131FL)

Immokalee, non-hydric

Percent of map unit: 4 percent

Landform: Flatwoods on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

Wabasso, non-hydric

Percent of map unit: 3 percent

Landform: Flatwoods on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

45—Electra fine sand, bouldery subsurface

Map Unit Setting

Mean annual precipitation: 45 to 53 inches

Mean annual air temperature: 68 to 75 degrees F

Frost-free period: 290 to 320 days

Map Unit Composition

Electra, bouldery subsurface, and similar soils: 85 percent

Minor components: 15 percent

Description of Electra, Bouldery Subsurface

Setting

Landform: Rises on marine terraces, ridges on marine terraces

Landform position (three-dimensional): Interfluve, rise

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Sandy and loamy marine deposits

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 24 to 42 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water capacity: Low (about 4.6 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 6s

Hydrologic Soil Group: A

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G154XB131FL)

Typical profile

0 to 3 inches: Fine sand

3 to 35 inches: Fine sand

35 to 40 inches: Fine sand

40 to 46 inches: Fine sand

46 to 80 inches: Fine sandy loam

Minor Components

Eaugallie, non-hydric

Percent of map unit: 4 percent

Landform: Flatwoods on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

Sparr, bouldery subsurface

Percent of map unit: 4 percent

Landform: Rises on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve, rise

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G154XB131FL)

Pomello

Percent of map unit: 4 percent

Landform: Ridges on marine terraces, rises on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G154XB131FL)

Wabasso, non-hydric

Percent of map unit: 3 percent

Landform: Flatwoods on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

46—Ft. Green fine sand, bouldery subsurface**Map Unit Setting**

Elevation: 30 to 130 feet

Mean annual precipitation: 45 to 53 inches

Mean annual air temperature: 68 to 75 degrees F

Frost-free period: 290 to 320 days

Map Unit Composition

Ft. green, non-hydric, and similar soils: 70 percent

Ft. green, hydric, and similar soils: 15 percent

Minor components: 15 percent

Description of Ft. Green, Non-hydric**Setting**

Landform: Rises on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve, rise

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Sandy and loamy marine deposits

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)

Depth to water table: About 6 to 18 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water capacity: Moderate (about 7.0 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 3w

Hydrologic Soil Group: C/D

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Sandy over loamy soils on flats of hydric or mesic lowlands (G154XB241FL)

Typical profile

0 to 6 inches: Fine sand

6 to 28 inches: Fine sand

28 to 38 inches: Sandy clay loam

38 to 58 inches: Sandy clay loam

58 to 80 inches: Cobbly sandy clay loam

Description of Ft. Green, Hydric

Setting

Landform: Flats on marine terraces

Landform position (three-dimensional): Dip

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Sandy and loamy marine deposits

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)

Depth to water table: About 0 to 6 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water capacity: Moderate (about 7.0 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 3w

Hydrologic Soil Group: C/D

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Sandy over loamy soils on flats of hydric or mesic lowlands (G154XB241FL)

Typical profile

0 to 6 inches: Fine sand

6 to 28 inches: Fine sand

28 to 38 inches: Sandy clay loam

38 to 58 inches: Sandy clay loam

58 to 80 inches: Cobbly sandy clay loam

Minor Components

Paisley

Percent of map unit: 5 percent

Landform: Flats on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Loamy and clayey soils on flats of hydric or mesic lowlands (G154XB341FL)

Mabel, bouldery subsurface

Percent of map unit: 5 percent

Landform: Ridges on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex

Across-slope shape: Convex

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Loamy and clayey soils on flats and rises of mesic lowlands (G154XB331FL)

Wabasso, non-hydric

Percent of map unit: 5 percent

Landform: Flats on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

48—Malabar fine sand, frequently flooded

Map Unit Setting

Elevation: 10 to 130 feet

Mean annual precipitation: 45 to 53 inches

Mean annual air temperature: 68 to 75 degrees F

Frost-free period: 290 to 320 days

Map Unit Composition

Malabar and similar soils: 80 percent

Minor components: 20 percent

Description of Malabar

Setting

Landform: Flood plains on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Sandy and loamy marine deposits

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 0 to 12 inches

Frequency of flooding: Frequent

Frequency of ponding: None

Calcium carbonate, maximum content: 5 percent

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water capacity: Low (about 5.3 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 6w

Hydrologic Soil Group: A/D

Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G154XB145FL)

Typical profile

0 to 6 inches: Fine sand

6 to 48 inches: Fine sand

48 to 80 inches: Fine sandy loam

Minor Components

Ft. green, non-hydric

Percent of map unit: 4 percent

Landform: Rises on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluvial, rise

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Sandy over loamy soils on flats of hydric or mesic lowlands (G154XB241FL)

Pompano

Percent of map unit: 4 percent

Landform: Flats on marine terraces, drainageways on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Slough (R154XY011FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

Eaugallie, hydric

Percent of map unit: 4 percent

Landform: Flats on marine terraces

Landform position (three-dimensional): Dip

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

Kanapaha, non-hydric

Percent of map unit: 4 percent

Landform: Flats on marine terraces, rises on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

Oldsmar, non-hydric

Percent of map unit: 4 percent

Landform: Flats on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

49—Terra Ceia muck, frequently flooded

Map Unit Setting

Elevation: 20 to 120 feet

Mean annual precipitation: 45 to 53 inches

Mean annual air temperature: 68 to 75 degrees F

Frost-free period: 290 to 320 days

Map Unit Composition

Terra ceia and similar soils: 85 percent

Minor components: 15 percent

Description of Terra Ceia

Setting

Landform: Depressions on flood plains on marine terraces

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Herbaceous organic material

Properties and qualities

Slope: 0 to 1 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Very poorly drained

Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)

Depth to water table: About 0 to 12 inches

Frequency of flooding: Frequent

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water capacity: Very high (about 23.9 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 7w

Hydrologic Soil Group: A/D

Other vegetative classification: Organic soils in depressions and on flood plains (G154XB645FL)

Typical profile

0 to 80 inches: Muck

Minor Components

Gator

Percent of map unit: 8 percent

Landform: Flood plains on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Other vegetative classification: Organic soils in depressions and on flood plains (G154XB645FL)

Okeelanta

Percent of map unit: 7 percent

Landform: Depressions on flood plains on marine terraces

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Concave

Other vegetative classification: Organic soils in depressions and on flood plains (G154XB645FL)

51—Pits-Dumps complex

Map Unit Setting

Mean annual precipitation: 45 to 53 inches

Mean annual air temperature: 68 to 75 degrees F

Frost-free period: 290 to 320 days

Map Unit Composition

Dumps: 50 percent

Pits: 40 percent

Minor components: 10 percent

Description of Dumps

Setting

Landform: Marine terraces

Landform position (three-dimensional): Rise

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Altered marine deposits

Interpretive groups

Farmland classification: Not prime farmland

Other vegetative classification: Forage suitability group not assigned (G154XB999FL)

Description of Pits

Setting

Landform: Marine terraces

Landform position (three-dimensional): Interfluve, dip

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Altered marine deposits

Interpretive groups

Farmland classification: Not prime farmland

Other vegetative classification: Forage suitability group not assigned (G154XB999FL)

Minor Components

Aquents, non-hydric

Percent of map unit: 5 percent

Landform: Marine terraces

Down-slope shape: Linear

Across-slope shape: Linear

Other vegetative classification: Forage suitability group not assigned (G154XB999FL)

Aquents, hydric

Percent of map unit: 5 percent

Landform: Depressions on marine terraces

Down-slope shape: Concave

Across-slope shape: Concave

Other vegetative classification: Forage suitability group not assigned (G154XB999FL)

54—Monteocha fine sand, depressional

Map Unit Setting

Mean annual precipitation: 45 to 53 inches

Mean annual air temperature: 68 to 75 degrees F

Frost-free period: 290 to 320 days

Map Unit Composition

Monteocha and similar soils: 80 percent

Minor components: 20 percent

Description of Monteocha

Setting

Landform: Depressions on marine terraces

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Sandy and loamy marine deposits

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Very poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)

Depth to water table: About 0 inches

Frequency of flooding: None

Frequency of ponding: Frequent

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water capacity: Moderate (about 8.9 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 7w

Hydrologic Soil Group: A/D

Ecological site: Freshwater Marshes and Ponds (R154XY010FL)

Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G154XB145FL)

Typical profile

0 to 11 inches: Fine sand

11 to 28 inches: Fine sand

28 to 34 inches: Fine sand

34 to 55 inches: Fine sand

55 to 80 inches: Fine sandy loam

Minor Components

Floridana, depressional

Percent of map unit: 4 percent

Landform: Depressions on marine terraces

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Concave

Ecological site: Freshwater Marshes and Ponds (R154XY010FL)

Other vegetative classification: Sandy over loamy soils on stream terraces, flood plains, or in depressions (G154XB245FL)

Wabasso, non-hydric

Percent of map unit: 4 percent

Landform: Flats on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

Okeelanta

Percent of map unit: 4 percent

Landform: Depressions on marine terraces

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Concave

Ecological site: Freshwater Marshes and Ponds (R154XY010FL)

Other vegetative classification: Organic soils in depressions and on flood plains (G154XB645FL)

Placid

Percent of map unit: 4 percent

Landform: Depressions on marine terraces, drainageways on marine terraces

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Concave

Ecological site: Freshwater Marshes and Ponds (R154XY010FL)

Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G154XB145FL)

Basinger

Percent of map unit: 4 percent

Landform: Drainageways on marine terraces

Landform position (three-dimensional): Dip

Down-slope shape: Linear

Across-slope shape: Concave

Ecological site: Slough (R154XY011FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

55—Pomello fine sand, 0 to 5 percent slopes

Map Unit Setting

Elevation: 10 to 150 feet

Mean annual precipitation: 45 to 53 inches

Mean annual air temperature: 68 to 75 degrees F

Frost-free period: 290 to 320 days

Map Unit Composition

Pomello and similar soils: 85 percent

Minor components: 15 percent

Description of Pomello

Setting

Landform: Ridges on marine terraces, rises on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Sandy marine deposits

Properties and qualities

Slope: 0 to 5 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (K_{sat}): High (1.98 to 5.95 in/hr)

Depth to water table: About 24 to 42 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water capacity: Low (about 4.9 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 6s

Hydrologic Soil Group: A

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G154XB131FL)

Typical profile

0 to 6 inches: Fine sand

6 to 40 inches: Fine sand

40 to 56 inches: Fine sand

56 to 80 inches: Fine sand

Minor Components

Sparr

Percent of map unit: 3 percent

Landform: Rises on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve, rise

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G154XB131FL)

Adamsville

Percent of map unit: 3 percent

Landform: Rises on marine terraces, flats on marine terraces

Landform position (three-dimensional): Interfluve, talf

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: Upland Hardwood Hammocks (R154XY008FL)

Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G154XB131FL)

Myakka, non-hydric

Percent of map unit: 3 percent

Landform: Flatwoods on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

Oldsmar, non-hydric

Percent of map unit: 3 percent

Landform: Flatwoods on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

Immokalee, non-hydric

Percent of map unit: 3 percent

Landform: Flatwoods on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

56—Wabasso fine sand, depressional

Map Unit Setting

Mean annual precipitation: 45 to 53 inches

Mean annual air temperature: 68 to 75 degrees F

Frost-free period: 290 to 320 days

Map Unit Composition

Wabasso and similar soils: 80 percent

Minor components: 20 percent

Description of Wabasso

Setting

Landform: Depressions on marine terraces

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Sandy and loamy marine deposits

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Very poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)

Depth to water table: About 0 to 12 inches

Frequency of flooding: None

Frequency of ponding: Frequent

Calcium carbonate, maximum content: 20 percent

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water capacity: Moderate (about 6.7 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 7w

Hydrologic Soil Group: C/D

Ecological site: Freshwater Marshes and Ponds (R154XY010FL)

Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G154XB145FL)

Typical profile

0 to 5 inches: Fine sand

5 to 12 inches: Fine sand

12 to 28 inches: Fine sand

28 to 55 inches: Sandy clay loam

55 to 80 inches: Fine sandy loam

Minor Components**Floridana, depressional**

Percent of map unit: 5 percent

Landform: Depressions on marine terraces

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Concave

Ecological site: Freshwater Marshes and Ponds (R154XY010FL)

Other vegetative classification: Sandy over loamy soils on stream terraces, flood plains, or in depressions (G154XB245FL)

Gator

Percent of map unit: 5 percent

Landform: Depressions on marine terraces

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Concave

Ecological site: Freshwater Marshes and Ponds (R154XY010FL)

Other vegetative classification: Organic soils in depressions and on flood plains (G154XB645FL)

Paisley

Percent of map unit: 5 percent

Landform: Depressions on marine terraces

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Concave

Ecological site: Freshwater Marshes and Ponds (R154XY010FL)

Other vegetative classification: Loamy and clayey soils on stream terraces, flood plains, or in depressions (G154XB345FL)

Monteocha

Percent of map unit: 5 percent

Landform: Depressions on marine terraces

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Concave

Ecological site: Freshwater Marshes and Ponds (R154XY010FL)

Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G154XB145FL)

57—Gator muck, frequently flooded

Map Unit Setting

Mean annual precipitation: 45 to 53 inches

Mean annual air temperature: 68 to 75 degrees F

Frost-free period: 290 to 320 days

Map Unit Composition

Gator and similar soils: 80 percent

Minor components: 20 percent

Description of Gator

Setting

Landform: Flood plains on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Herbaceous organic material over loamy and sandy marine deposits

Properties and qualities

Slope: 0 to 1 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Very poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: About 0 to 12 inches

Frequency of flooding: Frequent

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water capacity: High (about 12.0 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 7w

Hydrologic Soil Group: A/D

Other vegetative classification: Organic soils in depressions and on flood plains (G154XB645FL)

Typical profile

0 to 25 inches: Muck

25 to 40 inches: Fine sand

40 to 80 inches: Sandy clay loam

Minor Components

Terra ceia

Percent of map unit: 10 percent

Landform: Depressions on flood plains on marine terraces

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Concave

Other vegetative classification: Organic soils in depressions and on flood plains (G154XB645FL)

Floridana

Percent of map unit: 10 percent

Landform: Flood plains on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Other vegetative classification: Sandy over loamy soils on stream terraces, flood plains, or in depressions (G154XB245FL)

61—EauGallie fine sand

Map Unit Setting

Mean annual precipitation: 45 to 53 inches

Mean annual air temperature: 68 to 75 degrees F

Frost-free period: 290 to 320 days

Map Unit Composition

Eaugallie, non-hydric, and similar soils: 70 percent

Eaugallie, hydric, and similar soils: 15 percent

Minor components: 15 percent

Description of Eaugallie, Non-hydric

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water capacity: Low (about 5.8 inches)

Interpretive groups

Farmland classification: Not prime farmland
Land capability (nonirrigated): 4w
Hydrologic Soil Group: A/D
Ecological site: South Florida Flatwoods (R154XY003FL)
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

Typical profile

0 to 6 inches: Fine sand
6 to 21 inches: Fine sand
21 to 34 inches: Fine sand
34 to 50 inches: Fine sand
50 to 65 inches: Sandy clay loam
65 to 80 inches: Fine sandy loam

Description of Eaugallie, Hydric

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear

Parent material: Sandy and loamy marine deposits

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)

Depth to water table: About 0 to 6 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water capacity: Low (about 5.8 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 4w

Hydrologic Soil Group: A/D

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

Typical profile

0 to 6 inches: Fine sand

6 to 21 inches: Fine sand

21 to 34 inches: Fine sand

34 to 50 inches: Fine sand

50 to 65 inches: Sandy clay loam

65 to 80 inches: Fine sandy loam

Minor Components

Myakka, non-hydric

Percent of map unit: 4 percent

Landform: Flatwoods on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

Oldsmar, hydric

Percent of map unit: 4 percent

Landform: Flats on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

Immokalee, non-hydric

Percent of map unit: 4 percent

Landform: Flatwoods on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

Wabasso, non-hydric

Percent of map unit: 3 percent

Landform: Flatwoods on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: South Florida Flatwoods (R154XY003FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

63—Floridana-Basinger association, frequently flooded**Map Unit Setting**

Elevation: 10 to 100 feet

Mean annual precipitation: 45 to 53 inches

Mean annual air temperature: 68 to 75 degrees F

Frost-free period: 290 to 320 days

Map Unit Composition

Floridana and similar soils: 65 percent

Basinger and similar soils: 20 percent

Minor components: 15 percent

Description of Floridana

Setting

Landform: Flood plains on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Sandy and loamy marine deposits

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Very poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 0 to 12 inches

Frequency of flooding: Frequent

Frequency of ponding: None

Calcium carbonate, maximum content: 15 percent

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water capacity: Moderate (about 7.9 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 5w

Hydrologic Soil Group: C/D

Other vegetative classification: Sandy over loamy soils on stream terraces, flood plains, or in depressions (G154XB245FL)

Typical profile

0 to 5 inches: Mucky fine sand

5 to 11 inches: Fine sand

11 to 26 inches: Fine sand

26 to 80 inches: Sandy clay loam

Description of Basinger**Setting**

Landform: Flood plains on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Concave

Parent material: Sandy marine deposits

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)

Depth to water table: About 0 to 12 inches

Frequency of flooding: Frequent

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water capacity: Low (about 5.5 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 5w

Hydrologic Soil Group: A/D

Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G154XB145FL)

Typical profile

0 to 5 inches: Fine sand

5 to 22 inches: Sand

22 to 80 inches: Sand

Minor Components

Malabar

Percent of map unit: 4 percent

Landform: Flood plains on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G154XB145FL)

Chobee

Percent of map unit: 4 percent

Landform: Flood plains on marine terraces, drainageways on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Other vegetative classification: Loamy and clayey soils on stream terraces, flood plains, or in depressions (G154XB345FL)

Delray

Percent of map unit: 4 percent

Landform: Depressions on marine terraces

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Concave

Ecological site: Freshwater Marshes and Ponds (R154XY010FL)

Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G154XB145FL)

Pompano

Percent of map unit: 3 percent

Landform: Flats on marine terraces, drainageways on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Slough (R154XY011FL)

Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

64—Gator muck

Map Unit Setting

Mean annual precipitation: 45 to 53 inches

Mean annual air temperature: 68 to 75 degrees F

Frost-free period: 290 to 320 days

Map Unit Composition

Gator and similar soils: 85 percent

Minor components: 15 percent

Description of Gator

Setting

Landform: Depressions on marine terraces

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Herbaceous organic material over loamy and sandy marine deposits

Properties and qualities

Slope: 0 to 1 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Very poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 0 to 12 inches

Frequency of flooding: None

Frequency of ponding: Frequent

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0

Available water capacity: Very high (about 15.8 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 7w

Hydrologic Soil Group: A/D

Ecological site: Freshwater Marshes and Ponds (R154XY010FL)

Other vegetative classification: Organic soils in depressions and on flood plains (G154XB645FL)

Typical profile

0 to 38 inches: Muck

38 to 42 inches: Fine sand

42 to 80 inches: Sandy clay loam

Minor Components

Placid

Percent of map unit: 5 percent

Landform: Depressions on marine terraces, drainageways on marine terraces

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Concave

Ecological site: Freshwater Marshes and Ponds (R154XY010FL)

Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G154XB145FL)

Pompano, depressional

Percent of map unit: 5 percent

Landform: Depressions on marine terraces

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Concave

Ecological site: Freshwater Marshes and Ponds (R154XY010FL)

Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G154XB145FL)

Terra ceia

Percent of map unit: 5 percent

Landform: Depressions on flood plains on marine terraces

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Concave

Other vegetative classification: Organic soils in depressions and on flood plains (G154XB645FL)

99—Water

Map Unit Composition

Water: 100 percent

Description of Water

Interpretive groups

Farmland classification: Not prime farmland

Other vegetative classification: Forage suitability group not assigned (G154XB999FL)

13.6 Cultural Resources - Management Procedures Guidelines - Management of Archaeological and Historical Resources

Management Procedures for Archaeological and Historical Sites and Properties on State-Owned or Controlled Properties

(revised March 2013)

These procedures apply to state agencies, local governments, and non-profits that manage state-owned properties.

A. General Discussion

Historic resources are both archaeological sites and historic structures. Per Chapter 267, Florida Statutes, *‘Historic property’ or ‘historic resource’ means any prehistoric district, site, building, object, or other real or personal property of historical, architectural, or archaeological value, and folklife resources. These properties or resources may include, but are not limited to, monuments, memorials, Indian habitations, ceremonial sites, abandoned settlements, sunken or abandoned ships, engineering works, treasure trove, artifacts, or other objects with intrinsic historical or archaeological value, or any part thereof, relating to the history, government, and culture of the state.’*

B. Agency Responsibilities

Per State Policy relative to historic properties, state agencies of the executive branch must allow the Division of Historical Resources (Division) the opportunity to comment on any undertakings, whether these undertakings directly involve the state agency, i.e., land management responsibilities, or the state agency has indirect jurisdiction, i.e. permitting authority, grants, etc. No state funds should be expended on the undertaking until the Division has the opportunity to review and comment on the project, permit, grant, etc.

State agencies shall preserve the historic resources which are owned or controlled by the agency.

Regarding proposed demolition or substantial alterations of historic properties, consultation with the Division must occur, and alternatives to demolition must be considered.

State agencies must consult with Division to establish a program to location, inventory and evaluate all historic properties under ownership or controlled by the agency.

C. Statutory Authority

Statutory Authority and more in depth information can be found at:
<http://www.flheritage.com/preservation/compliance/guidelines.cfm>

D. Management Implementation

Even though the Division sits on the Acquisition and Restoration Council and approves land management plans, these plans are conceptual. Specific information regarding individual projects must be submitted to the Division for review and recommendations.

Managers of state lands must coordinate any land clearing or ground disturbing activities with the Division to allow for review and comment on the proposed project. Recommendations may include, but are not limited to: approval of the project as submitted, cultural resource assessment survey by a qualified professional archaeologist, modifications to the proposed project to avoid or mitigate potential adverse effects.

Projects such as additions, exterior alteration, or related new construction regarding historic structures must also be submitted to the Division of Historical Resources for review and comment by the Division's architects. Projects involving structures fifty years of age or older, must be submitted to this agency for a significance determination. In rare cases, structures under fifty years of age may be deemed historically significant. These must be evaluated on a case by case basis.

Adverse impacts to significant sites, either archaeological sites or historic buildings, must be avoided. Furthermore, managers of state property should make preparations for locating and evaluating historic resources, both archaeological sites and historic structures.

E. Minimum Review Documentation Requirements

In order to have a proposed project reviewed by the Division, certain information must be submitted for comments and recommendations. The minimum review documentation requirements can be found at:

http://www.flheritage.com/preservation/compliance/docs/minimum_review_documentation_requirements.pdf.

* * *

Questions relating to the treatment of archaeological and historic resources on state lands should be directed to:

Deena S. Woodward
Division of Historical Resources
Bureau of Historic Preservation
Compliance and Review Section
R. A. Gray Building
500 South Bronough Street
Tallahassee, FL 32399-0250

Phone: (850) 245-6425

Toll Free: (800) 847-7278
 Fax: (850) 245-6435

Archaeological and Historical Sites of Half Moon WMA

Florida Sites									
SITE NAME	SITEID	SITETYPE1	SITETYPE2	SITETYPE3	SITETYPE4	SITETYPE5	SITETYPE6HUMANREMNANS	Total Area (acres)	Percent of Area
HODGE PLACE	SM00123	Subsurface features are present	Homestead	Land-terrestrial				1.05	0.01 %
McKinney Place Site	SM00125A	Building remains	Cistern	Subsurface features are present	Homestead	Land-terrestrial		0.12	0 %
UNNAMED FORMER HOUSE	SM00127	Building remains	Subsurface features are present	Homestead	Land-terrestrial			1.24	0.01 %
WELCH PLACE	SM00124	Subsurface features are present	Homestead	Land-terrestrial				1.35	0.01 %
TOTAL:								3.75	0.04 %
Florida Structures									
SITE NAME	SITEID							# Features	
MCKINNEY PLACE	SM00125							1	
							TOTAL:	1	
Historic Cemeteries									
SITE NAME	SITEID					Total Area (acres)	Percent of Area		
ALTO CEMETERY	SM00126					1.10	0.01 %		
					TOTAL:	1.10	0.01 %		
Historic Bridges									
No Records Found									
National Register of Historic Places									
No Records Found									
Resource Groups									
SITE NAME	SITEID					Total Area (acres)	Percent of Area		
Cummer Logging Tram	SM00621					28.10	0.29 %		
					TOTAL:	28.10	0.29 %		
Field Survey									
TITLE							Total Area (acres)	Percent of Area	
Cove of the Withlacoochee - Archaeological Project							14.08	0.15 %	
Survey of Spanish Contact and Seminole Site along the Withlacoochee River							14.08	0.15 %	
Archaeological and Historical Survey of the Carlton Tract, Sumter County, Florida: a Report Submitted to the Southwest Florida Water Management District, Brooksville							2,135.18	22.13 %	
Cultural Resource Assessment Survey of the Florida Department of Transportation's Florida Turnpike Extension Study from Wildwood to Lebanon Station							3,598.99	37.3 %	
Proposed Cellular Tower Site: Inverness East							531.71	5.51 %	
An Archaeological and Historical Survey of the Proposed Dean Tower Location in Citrus County, Florida							462.40	4.79 %	
TOTAL:							6,756.44	70.01 %	

13.7 FWC Agency Strategic Plan

Florida Fish and Wildlife Conservation Commission
Agency Strategic Plan
2014 – 2018

Theme One – Florida’s Fish and Wildlife Populations and Their Habitats

Goal 1: Ensure the sustainability of Florida’s fish and wildlife populations.

Strategies:

1. Manage listed species so they no longer meet Florida’s endangered and threatened listing criteria.
2. Manage species to keep them from meeting Florida’s endangered and threatened listing criteria.
3. Anticipate and address fish and wildlife species’ conservation needs in light of adaptation to long-term environmental changes.
4. Develop, acquire and apply the appropriate biological and sociological science to inform fish and wildlife conservation decisions.
5. Inform and guide partners regarding how their regulations, policies, procedures and other actions affect fish and wildlife conservation.
6. Protect fish and wildlife species through effective outreach and enforcement.

Goal 2: Ensure sufficient habitats exist to support healthy and diverse fish and wildlife populations.

Strategies:

1. Use science to determine quantity, quality and location of the habitats most critical to sustain healthy and diverse fish and wildlife populations.
2. Protect lands and waters critical to sustaining healthy and diverse fish and wildlife populations through diverse incentive programs.
3. Manage habitats to sustain healthy and diverse fish and wildlife populations.

Theme Two – Interactions with Fish and Wildlife, including Fishing, Hunting, Boating and Wildlife Viewing Opportunities

Goal 1: Provide residents and visitors with quality fishing, hunting, boating and wildlife viewing opportunities that meet their needs and expectations while providing for the sustainability of those natural resources.

Strategies:

1. Develop, acquire and use the appropriate biological and sociological science necessary to provide sustainable fishing, hunting, boating and wildlife viewing opportunities that meet the needs and expectations of user groups while providing for the sustainability of those resources.
2. Manage fish and wildlife populations to provide sustainable fishing, hunting, and wildlife viewing opportunities.
3. Develop and maintain widely available, diverse and accessible fishing, hunting, boating and wildlife viewing opportunities that meet the needs and expectations of residents and visitors while providing for the sustainability of those resources and emphasizing partnerships with both public and private landowners.
4. Recruit and manage sustainable levels of resident and visitor participation in fishing, hunting, boating and wildlife viewing.
5. Provide targeted fishing, hunting, boating and wildlife viewing programs for youth, the disabled and veterans.

Goal 2: Enhance the safety and outdoor experience of those who hunt, fish, boat and view wildlife.

1. Provide and promote opportunities for residents, and visitors to learn safety practices for fishing, hunting, boating and wildlife viewing.
2. Enhance the boating safety and waterway experience of residents and visitors through improved access, management, education and enforcement.
3. Promote Florida's outdoor environment as a safe and healthy recreational option for residents and visitors.
4. Address the growing disconnect between people and nature by marketing and providing opportunities and education for diverse age, race, gender, ethnic and other demographic sectors.

Goal 3: Use minimal regulations to manage sustainable fish and wildlife populations, manage access to fish and wildlife resources, and protect public safety.

Strategies:

1. Continually evaluate proposed and existing regulations, based on resource management benefits, public safety concerns, and economic and social impacts, to improve or eliminate regulations as warranted.
2. Coordinate with partners and stakeholders to ensure that appropriate authorities and regulations exist to maintain sustainable fish and wildlife populations.
3. Implement and enforce regulations in an informative, proactive and influential manner to enrich resident and visitors' outdoor experience while safeguarding the natural resources.

Goal 4: Minimize adverse environmental, social, economic and health and safety impacts from fish, wildlife and plants that are known, or have a potential, to cause adverse impacts.

Strategies:

1. Manage species and their habitats, as well as species and human interactions, to eliminate or reduce the adverse environmental, social, economic and health and safety impacts from native and non-native fish, wildlife and plants.
2. Effectively communicate to residents, visitors and businesses how to be safe and act responsibly when interacting with or possessing fish, wildlife and plants.
3. Manage captive and non-native wildlife movement and trade through proactive and responsive enforcement, regulation and education, with an emphasis on species that pose a high risk to our native fish and wildlife.
4. Enhance partnerships to address adverse environmental, social, economic and health and safety impacts from fish, wildlife and plants and ensure a consistent and integrated approach with FWC.

Theme Three – Sharing Responsibility for Fish and Wildlife Conservation and Management with an emphasis on developing conservation values in our youth

Goal 1: Ensure current and future generations support fish and wildlife conservation.

Strategies:

1. Expand and promote a network of youth conservation centers, programs and initiatives through leveraging FWC programs and staff, and developing public and private partnerships and sponsorships.

2. Develop and deliver standardized youth conservation curricula and fishing, hunting, boating and wildlife viewing outdoor activity programs, and assist with adapting programs and curricula to meet the needs of diverse communities.
3. Foster stewardship and shared responsibility for fish and wildlife conservation through conservation education programs.
4. Expand marketing and outreach to reach diverse audiences and engage all staff in priority outreach initiatives.

Goal 2: Ensure residents, visitors, stakeholders and partners are engaged in the processes of developing and implementing conservation programs.

Strategies:

1. Foster a common vision among partners and the FWC to maintain and enhance fish and wildlife populations and their habitats through interagency coordination, mutually beneficial goals and initiatives.
2. Engage residents, visitors, stakeholders and partners to understand their perspectives, develop and implement conservation programs, and implement fishing, hunting, boating and wildlife viewing management activities.
3. Use citizen science to enhance conservation programs.

Goal 3: Increase opportunities for residents and visitors, especially youth, to actively support and practice fish and wildlife conservation stewardship.

Strategies:

1. Inform residents and visitors about conservation stewardship and encourage their active involvement in achieving conservation of fish and wildlife.
2. Provide and promote opportunities for residents and visitors, especially youth, to participate in conservation stewardship activities, including FWC volunteer opportunities.

Goal 4: Encourage communities to conserve lands and waters critical to sustaining healthy and diverse fish and wildlife populations.

1. Provide communities with the necessary assistance to help them obtain the social and economic benefits of local conservation lands.
2. Provide residents and visitors with relevant information on the social and economic benefits of conservation, fishing, hunting, boating, and wildlife viewing.

3. Support community events and programs that promote fish and wildlife conservation.

Theme Four – Responsive Organization and Quality Operations

Goal 1: Integrate our commitment to benefit the community and enhance the economy through our conservation efforts and public service.

Strategies:

1. Identify and implement ways to support Florida businesses and job growth while managing fish and wildlife.
2. Identify and promote opportunities for staff to benefit local communities through participation in approved activities where FWC resources can be used (for example, the Florida State Employees' Charitable Campaign, the Guardian ad Litem Program, mentoring programs, FWC Disaster Response Teams, and American Red Cross Disaster Services).
3. Provide residents and visitors with reliable and current information on Florida's fish and wildlife.
4. Continue to attract visitors by providing top-quality fishing, hunting, boating and wildlife viewing opportunities.

Goal 2: Provide resources and support for the safety and protection of residents and visitors, our natural and cultural resources, and for emergency responses to critical incidents and environmental disasters.

Strategies:

1. Identify existing and emerging risks to the safety of residents and visitors and foster internal collaboration and external partnerships necessary to effectively manage, reduce or eliminate those risks. (*Note – new strategy*)
2. Provide immediate and effective disaster response and recovery through mutual-aid efforts with local, state and federal partners.
3. Provide search, rescue, and recovery services in coordination with local, state and federal entities to ensure the safety of residents and visitors.
4. Protect natural and cultural resources through proactive and responsive enforcement efforts.

Goal 3: Ensure the FWC has highly effective and adaptive business practices.

Strategies:

1. Address emerging biological, social and economic trends, anticipate impacts and take advantage of opportunities to accomplish FWC's mission. (*Note – new strategy*)
2. Expect each employee to be an ambassador for FWC and its mission to Florida's diverse residents and visitors.
3. Provide efficient and effective service to Florida's diverse residents, visitors, and FWC staff.
4. Foster a diverse, accountable, responsive and skilled workforce who effectively serves Florida's residents and visitors.
5. Manage existing and secure additional resources necessary to achieve fish and wildlife conservation and meet residents, visitor and stakeholder needs.
6. Create and maintain an effective business model that supports the FWC's mission by using continuous improvement approaches that foster a collaborative and professional culture.

13.8 Prescribed Burning Plan

PRESCRIBED BURNING PLAN

for

HALF MOON WILDLIFE MANAGEMENT AREA

Prepared by:

William O. Sermons, Jr., Stephen L. Jester and Nancy Dwyer
Florida Fish & Wildlife Conservation Commission
2012

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I. INTRODUCTION

Background

Few plant communities are as fire-dependent and pyrogenic as those of the southeastern U.S. Shantz (1947) estimated that one-third of the natural vegetation of earth's land surface has been affected by fire. However, in southeastern Georgia, Eldridge (1935) observed that 85% of land under forests of all types and 91% occupied by pines displayed evidence of fire history. Fire continues to be an important factor in determining what biota occur in many areas (Stoddard 1931). Fire is the primary ecological force that determines the structure and composition of native plant communities in Florida.

With clear-cutting of southeastern pine forests in the early twentieth century, a need for roundwood regeneration, and growing public disdain for open burning, fire suppression pervaded the increasingly industrialized region (Pyne 1982). Widespread use of fire in woodlands slowly reemerged several decades later as prescribed burning. In 1942, the Florida Forest Service (FFS) implemented a policy permitting the use of fire to eradicate heavy accumulations of understory growth in pine plantations, provided no more than one-half of the crown would be scorched.

Since then, fire has been refined and used increasingly as a management tool by land managers to improve forest regeneration and maintenance, and to enhance wildlife habitat, cattle range, and aesthetics (Wade and Lunsford 1989). New challenges now confront natural resource managers. Social attitudes, habitat fragmentation, species isolation, air quality, and the buildup of fuel loads require innovative approaches to management, especially prescribed burning, of natural communities.

Goals

The primary goal of prescribed burning on Half Moon Wildlife Management Area is to apply fire in a carefully organized manner, using a team approach to develop effective prescriptions, so that predetermined goals are safely and effectively met for each burn unit. Objectives are as follows:

1. Restore and Maintain Natural Communities: maintain the physiognomy and composition of extant natural communities and restore altered landscapes to resemble pre-settlement plant communities.
2. Maintain and Restore Florida Scrub-Jay Habitat: maintain the appropriate habitat structure, spatial distribution, and plant composition of areas occupied by Florida Scrub-jays (*Aphelocoma coerulescens*) and restore altered, former habitats to conditions suitable for occupancy by jays.

3. Increase Heterogeneity Within and Among Community Types: maintain or increase plant-species and foliage-height diversity within native communities by varying fire regimes within and among community types.
4. Reduce Wildfire Fuel Hazard: reduce fuel buildup to diminish the probability and spread of wildfire.
5. Control Exotic Flora: eradicate or control abundance and distribution of fire-intolerant exotic vegetation.

II. AREA DESCRIPTION

Acquisition

The Carlton Half Moon Ranch project qualified for purchase by the State under ‘other lands’ criteria of the Conservation and Recreation Lands (CARL) program. On August 15, 1989, W. Albert and Barbara C. Carlton conveyed title to Carlton Half Moon Ranch to the Board of Trustees of the Internal Improvement Trust Fund of the State of Florida with the purpose of protecting local water resources, providing public recreation, restoring altered ecosystems, and preserving archaeological and historical sites.

The 4,458-acre Carlton tract was the largest single acquisition of the 11,500 acre project. The primary objective of the purchase was to preserve water quality of the Withlacoochee River, Gum Slough, and their proximal tributaries and to establish a wildlife management area. Three additions totaling 1,036 acres and 4,021 acres owned by Southwest Florida Water Management District now make up the 9,515-acre Half Moon Wildlife Management Area (HMWMA).

History and Location

HMWMA lies along the Withlacoochee River near Rutland in northwestern Sumter County, approximately 25 miles south-southwest of Ocala. Public access is available from County Road 247, off State Road 44, about 7 miles west of Interstate 75 and the Florida Turnpike.

HMWMA has a long history of human use, although prehistoric people primarily used the western (opposite) bank of the Withlacoochee River. Pioneers lived on HMWMA in the 19th and 20th centuries. Longleaf pine was extracted, land was cleared and crops were planted. Railroad trams were constructed adjacent to the river swamp to facilitate removal of cypress; many of these trams now provide access for recreation. From the 1960s to the 1980s, HMWMA was a working cattle ranch and was leased for hunting.

Topography

Straddling the north-south trending Tsala Apopka Plain and Western Valley physiographic provinces, topography of HMWMA is comparatively flat. Conspicuous relief occurs only near

margins of paludal depressions and crests of widely dispersed, relic dunes. Land surface altitudes range from 40 to 60 feet above mean sea level and increase generally from the Tsala Apopka Plain in the west to the Western Valley in the east.

Soils

Much of HMWMA lies over thick limestone formations that include chert and dolomite. Crystal River and Lower Ocala Group limestone formations give rise to 68 soil types in Sumter County, 23 of which, representing 7 soil orders, occur on HMWMA (Yamataki et al. 1988). The majority of the upland soils on the area are poorly drained or somewhat poorly drained fine sands. Most of HMWMA's soils can be placed the following 4 series:

Gator Muck - a wetland series formed by decomposition of hydrophytic plants and underlain by beds of loamy and sandy marine sediment; 55-85% organic; pH 6.1-8.4 (at 25 inches); permeability: 6 inches/20 hours; available water capacity: .30 inches of water/.40 inches of soil;

EauGallie fine sand - poorly drained, mineral soil; organic matter 1-4%; water permeability: 6 inches/20 hours; water capacity: .03 inches/.08 inches of soil;

Vero sands (depressional and bouldery) - nearly level, poorly drained mineral soil; pH 5.6-8.4; available water capacity: .10 inches/.15 inches of soil;

Sparr fine sand - nearly level to gently sloping and somewhat poorly drained; organic matter <3%; permeability: 6 inches/20 hours; water capacity: .05 inches/.08 inches of soil.

Climate

The climate of Sumter County is characterized as subtropical with long, warm, and relatively humid summers and dry, mild winters. About 55% of the annual precipitation occurs from June through September in the form of intense late afternoon thunderstorms which develop as a result of convective land air masses mixing with cool, encroaching sea breezes. Winter and spring precipitation generally result from less intense, longer lasting continental frontal systems.

Data collected by Southwest Florida Water Management District shows that an average of 52 inches of rain fell annually from 1915-2010. Average monthly precipitation levels during that time were highest in June, July and August with 7.4, 8.0 and 7.4 inches of rainfall, respectively. In contrast, rainfall of November, December, January and February averaged 1.9, 2.5, 2.7 and 3.0 inches, respectively.

Summer temperatures regularly exceed 90° F, especially during July and August which are the two hottest months of the year. Winter temperatures can vary widely, but usually average 50° F to 60° F from December through February. Sub-freezing temperatures, greater than 20° F, can be expected once each winter.

Vegetation

Vegetation on HMWMA consists of a mosaic of freshwater wetlands closely interspersed among flatwoods, hammocks, and old improved pastures. Wetlands cover about 46% of the total area. Human influences during the last 100 years have altered and reshaped the landscape. Alterations have included the ditching and draining of wetlands, pasture development, cultivation of row crops, continuous grazing, selective logging, and exploitation of gum and wood navel stores. Almost all forested wetlands have been logged. Portions of at least 15 marshes were excavated to provide permanent sources of surface water for cattle. The Florida Natural Areas Inventory (FNAI) identified and delineated the floral communities as part of the FWC's Objective Based Vegetation Monitoring project (OBVM). FNAI also denoted the historical natural community on presently-occurring ruderal areas such as old improved pasture. Important natural and altered communities are further described in the Half Moon WMA Management Plan.

Fire Management History

All natural communities on the area are fire-based, dependent on periodic yet irregular disturbances for maintenance of biological diversity and relative stability. Evidence of previous fires conspicuously pervades all community types and stands except the interiors of some larger, forested wetlands. However, fire management history of the area is largely unknown until 1989. Recent, previous owners and managers periodically burned pastures, flatwoods, and emergent wetlands during winter to improve cattle forage. Scrubby flatwoods were burned on average "every several years during winter to reduce scrub oaks" (J. Taylor - pers. comm.).

III. PROPOSED BURNING PROGRAM

General

Restoration of a pre-Columbian landscape is impractical and, perhaps, impossible on Half Moon WMA due to the area's comparatively small size and its history of human alterations. In addition, accounts of pre-settlement communities are vaguely descriptive and based largely on general inferences from post-settlement communities and preclude measurable replication. Nevertheless, some attributes of former communities can probably be restored by mimicking natural fire regimes under present environmental conditions.

To achieve broad goals of ecological restoration and maintenance of native plant communities, no single or fixed fire regime will be applied across plant communities or burn units. Instead, fire frequency, its intensity, season of application, pattern of spread, and regularity will be varied among and within burn units.

Maintenance of suitable structure and composition of habitat, while avoiding disruption of jay recruitment, are paramount objectives in stands occupied by scrub-jays. Present population size, increasing insularity, and isolation from other populations necessitate intensive management.

Although scrub-jay management objectives usually can be accomplished collaterally with other goals, deviations from ecological prescriptions may be necessary occasionally. Specific instances are discussed below.

Firelines

About 16.7 miles of perimeter firelines, measuring 10 to 15 feet wide, were developed or re-established during late spring 1991 to facilitate fire control. Perimeter firebreaks, separating stands adapted to frequent fire, require annual maintenance, generally discing, to exclude wildfire and contain prescribed fire. Forested and riverine wetlands will provide natural fire breaks along approximately 5 miles of area boundary.

Fireline placement (Figure 1) resulted from an effort to use natural firebreaks, existing firelines, public use roads and other previously disturbed sites, especially bahiagrass pastures. No firelines have been routed through communities that have not been disturbed recently or altered significantly. Pre-existing firebreaks (e.g., roads, perimeter firelines) comprise nearly 90% of all artificial firebreaks and the remainder were established in ruderal sites and aligned so as to avoid existing natural ecotones. Further, natural firebreaks such as ponds, swamps and hydric hammocks will be used for fire containment when possible. The use of black lines to contain fire will be explored when burning units containing communal arrays, particularly those adapted to widely differing fire frequencies. However, their use in large continuous stands of scrubby flatwoods jeopardizes safety. Area fuel types preclude use of black lines as a sole source of fire containment in most units, but black lines may serve to widen existing firebreaks on units bounded by fine fuels.

All firelines requiring soil disturbance will receive final treatment with a tractor and offset disc before each fire. This allows for removal of vegetation while retaining soil in its initial location, and therefore, should not impact pre-treatment rates of water flow or direction. Further, disced interior firelines will be allowed to revegetate in order to help stabilize the soil during times when burning activities are not being implemented. Perimeter firelines abutting scrubby flatwoods may require pre-burn widening by mowing or roller-chopping to reduce spotover hazard and liability.

Table 1. Management unit names and acreages for Half Moon WMA.

OBVM Id#	Acres	Former Unit Id	Management Status	OBVM Id#	Acres	Former Unit Id	Treatment
1	42	MCS-2	Active	21	1.3	AMS 12	Mow
2	51	MCS-3	Active	25	1.3	AMS 11	Control
3	19	MCS-4	Active	26	1.3	AMS 9	Winter burn
4	83	MCS-10	Active	28	1.3	AMS 10	Summer burn
5	48	MCS-5	Active	30	1.3	AMS 6	Winter burn
6	98	MCS-9	Active	31	1.3	AMS 5	Mow
7	115	MCS-6	Active	33	1.3	AMS 7	Summer burn
8	64	MCS-8	Active	35	1.3	AMS 8	Control
9	45	MCN1-2	Active	36	1.3	AMS 3	Winter burn
10	126	MCN1-3	Active	37	1.3	AMS 2	Summer burn
11	243	MCS-7	Active	38	1.3	AMS 1	Mow
13	197	MCN1-4	Active	39	1.3	AMS 4	Control
14	76	MCN1-1	Active				
15	76	MCN1-5	Active				
16	116	MCN1-9	Active	12	378	NM1	Non-Active
17	302	MCN1-10	Active	18	94	NM2	Non-Active
19	150	MCN1-6	Active	51	317	NM3	Non-Active
20	247	MCN1-11	Active	53	668	NM4	Non-Active
22	17	MCN2-2	Active				
23	14	MCN2-10	Active				
24	77	MCN2-1	Active				
27	44	MCN2-7	Active				
29	75	MCN2-8	Active				
32	96	MCN2-9	Active				
34	142	MCN2-3	Active				
40	62	MCN3-7	Active				
41	115	MCN2-4	Active				
42	83	MCN2-5	Active				
43	190	MCN2-6	Active				
44	13	MCN3-8	Active				
45	38	none	Active				
46	81	MCN3-3	Active				
47	161	MCN3-1	Active				
48	199	MCN3-4	Active				
49	121	MCN3-2	Active				
50	146	MCN3-5 & 6	Active				
52	120	MCN3-10	Active				
54	112	MCS-1	Active				
55	30	WMD-1	Active				
56	41	WMD-2	Active				
57	55	WMD-3	Active				
58	173	WMD-4	Active				
59	146	WMD-5	Active				
60	33	WMD-6	Active				
61	57	none	Active				

Total	4554							
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Size and Arrangement of Compartments

An estimated 4,566 acres of fire-maintained communities exists on HMWMA. This figure may differ within and among years with changes in weather, hydroperiods, fuel accumulations, and other factors. Half Moon was initially divided into 4 burn zones and 37 burn units. The zones were Mill Creek South (MCS), Mill Creek North 1 (MCN1), Mill Creek North 2 (MCN2), and Mill Creek North 3 (MCN3). Units have since been refined and added, as when FWC began managing the SWFWMD portion of the area in 2008, resulting in the current configuration of 61 burn units and 4 managements units that are not managed with fire (Figure 1). Ten of these units are 0.5-hectare study plots in scrubby flatwoods. Excluding these study plots, burn units average 101 acres (R:13-302). OBVM identification numbers are now used rather than the original alpha-numeric system based on the 4 zones (Table 1).

Configurations and minimum sizes of burn units are limited by the availability of natural (e.g., forested wetlands) and pre-existing (e.g., road networks) firebreaks, but tempered by efficiency demands and general goals of ecological restoration. Average size and upper limits reflect mitigating constraints imposed by stringent smoke management statutes and safety guidelines. Erratic fire behavior and unpredictable weather changes will require exacting, perhaps unrealistic, prescriptions (e.g., narrow acceptable wind directions) when burning larger units during the growing season.

Maximum sizes of approximately one-half of all burn units are limited by abutment with property boundaries and public use roads. Consolidation of these units with adjacent ones would confer no appreciable ecological benefit, as marginal, "artificial" ecotones would persist. Instead, overall heterogeneity would likely diminish if presently arranged units are consolidated with adjacent units.

Burn unit sizes were restricted further by management needs and habitat requirements of scrub-jays. Where possible, unit configurations were designed to bisect jay territories so as to ensure continual access and availability of suitable post-burn foraging habitat, nest sites, and escape cover. Because several territories overlap adjacent properties, this was often accomplished by perimeter firelines alone.

Burning Schedule

After initial fuel hazard reduction burns, all units will be burned using irregular fire return intervals, within adapted ranges, for each association or community type. Each unit will be classified broadly as scrubby flatwoods, mesic flatwoods, or sandhill, according to the predominate natural association or relict plant species within its uplands. Growing season (summer) burns are preferred over dormant season (winter) fires in units dominated by these natural plant communities because May and June are when most natural fires occur. Units dominated by improved pasture may require dormant season burns in order for fire to carry

through the unit. Wetlands will burn in conjunction with fire application to more pyrogenic surrounding communities, but efforts will be made to burn wetlands whenever fire will carry across them.

Fire return intervals will be selected based on community-specific ranges of fire frequencies: mesic flatwoods will be burned every 2 to 5 years and sandhill every 1 to 4 years. Scrubby flatwoods will be burned every 3 to 8 years to allow for oak structure conducive to scrub-jay nesting.

Deviations from these burn schedules may be necessary in specific instances. Should drought render natural firebreaks ineffective or increase the likelihood of peat/muck fires in wetlands, fire return intervals will be delayed until the next safe opportunity to burn within prescriptions. In addition, scrub-jay management efforts may supercede scheduling of ecological burns in some units. For example, should oak patches approach or exceed dimensions tolerated by jays or burn schedules of contiguous units, including adjacent property, nearly coincide, fire return intervals will be changed to meet specific objectives of jay habitat management.

Firing Techniques

A variety of firing techniques will be used within and among burns, varying with burn unit size, specific objectives, and fuel and weather conditions, to regulate fire intensity and emissions. Usually, initial backfires will be used to secure the downwind part of the unit. Ground and aerial ignitions will continue to be used.

Season and Time of Day

Within safety limits, prescribed burns will be conducted throughout the year to encompass a broad range of weather conditions and phenological stages of flora. Recognizing that fire may produce different results when applied at different times within seasons, efforts will be made to avoid burning repeatedly during the same period within a season. However, peak periods of public recreational use, particularly controlled hunts, may briefly curtail prescribed burning during intervals of some seasons.

Dormant season burns may be needed in some units to reduce heavy fuel loads before subsequent ecological burns. More stable weather conditions, particularly wind speed and direction, during winter permit lower fire intensities and diminish spot-over probability (Bunting and Wright 1974). However, growing season burns will be prescribed for all burns units where fuel loads, ground cover and safety considerations permit their use.

Scrub-jay management objectives may determine season of burn in some areas. To avoid adversely impacting recruitment through increasing the vulnerability of or directly destroying nests, nestlings, or fledglings, spring burns will be avoided in units occupied by scrub-jays.

Generally, burning will occur during daylight hours, preferably after the dew evaporates from fine fuels. No burning will be initiated prior to 9:00 A.M. (F.A.C. 5I-2.06). Every attempt will be made to complete all burning activities by 5 P.M., or at least 1 hour before sunset (F.A.C. 5I-2.06). In cases that merit burning into the night, a permit may be requested from the FFS.

Optimal Weather Conditions

Ideal weather conditions for dormant season burning occur within 1 to several days after the passage of a cold front which has brought 1/4 to 3/4 inches of rainfall. Weather associated with this period generally produces persistent winds with a steady direction, cool temperatures, low relative humidities and sunny days (Wade and Lunsford 1989). Preferred temperatures range from 40° F to 70° F. Preferred relative humidities will vary depending on unit objectives, but are considered ideal when between 30% and 60%.

Relative humidities of 35-60% are also preferred for growing season burns. Wind direction should be generally steady with surface wind speeds of 3-12 miles per hour and temperatures of <95 degrees F. Growing season burns will be conducted no more than 10 days after rainfall.

Night-time burning will be conducted only when the stagnation index permits effective dispersion of smoke. For safe and effective night burning, relative humidities must be in the 20 to 75% range for the 5-hour period following the start of the burn, wind speeds at 20 feet must be between 5 and 20 m.p.h., and wind direction must stay within 45 degrees of the starting direction (Lamb 1969).

Critical smoke sensitive areas will always be considered regarding wind speed and direction. Steady in-stand wind speeds (measured at eye-level) of 1 - 3 mph are preferred for control of fire intensity. Specific prescriptions will be developed with these levels in mind but may be altered somewhat to meet unit goals if safety can be maintained.

Special Considerations

Plantings of pines, xerophytic oaks, shrubs, grasses, and forbs may require brief intervals of fire exclusion. Burning units containing artificially regenerated stands will be delayed as needed to ensure protection and establishment of planted flora. Where fire delay is impractical, narrow disc lines can be used to exclude fire from vulnerable plots. Cattle and cattle lease accoutrements require no special considerations but apiary sites, if present, will be protected from fire. The 12 adaptive management (AMS) study plots remain on their prescribed treatment schedule of no burning (control), mowing, summer burn and winter burn.

IV. SMOKE MANAGEMENT

HMWMA lies in a rural location, yet smoke screening radii encompass numerous structures and populated areas sensitive to airborne particulate matter that are a product of fire. These include several cities or towns, dense, unincorporated residential developments, county roads, state and federal highways, an interstate highway, hospitals, and airports. Critical smoke sensitive areas near the periphery of the area will necessitate use of narrow wind direction prescriptions and may alter desired firing techniques.

Before developing burn prescriptions, each unit must pass a smoke screening test to determine if burning can be conducted without impacting the areas of concern. Prescriptions will be modified, as needed, to meet considerations of the smoke screening process. Ideal conditions needed to safeguard against problem smoke are a neutral or slightly unstable atmosphere, a mixing height of 1,700-6,500 feet above the ground and transport wind speeds exceeding 9 mph, but below 20. These conditions should promote convection, thereby forcing smoke-filled air straight upward into the transport winds with a high level of dissipation.

V. PERSONNEL AND EQUIPMENT NEEDED

Personnel

The size of the burning crew will depend on fuel types, fuel accumulations and fire weather. However at least 1 person, who has been certified by the Florida Forest Service of the Department of Agriculture and Consumer Services, will be in attendance at all times on each of the burns in order to meet the requirements listed in F.S. 590.026(5).

A minimum of 4 experienced crew members will be required for burning in light flashy fuels. Five or 6 crew members are needed in the larger units and areas with heavy rough. Training required by crew members is described in Prescribed Burning and Wildfire Suppression Standards policy adopted in March 2011.

Equipment

The following equipment will be readily available and operational on all prescribed burns. In addition, an operational water delivery system and at least 5 gallons water shall be installed on all mobile equipment used in the interior of a burn unit.

- drip torches (7+)
- pre-mixed burn fuel (5 gallons)
- matches or lighter (2+)
- portable, hand-held radio (6+)
- ATVs (3+)
- ATV-mounted water pump, 10 gallon capacity (2+)

- backpack water pump (1+)
- truck-mounted water pump, 200+ gallon capacity (1+)
- reserve suppression water (10+ gallons)
- water for personal consumption
- shovels (2+)
- fire flaps (3+)
- first aid kits (2+)
- an ABC fire extinguisher in all mobile equipment
- a winch on any vehicle used inside the fire lines

Pending specific prescriptions, vagaries of fire weather, fuel loading, and special safety precautions, the following additional equipment may be needed.

- bulldozer/plow unit - FFS standby
- tractor-mounted water pump, 75+ gallon capacity
- fire-retardant foam
- leaf blower

The following personal protection equipment is needed by all personnel.

- flame resistant shirt and pants, or jumpsuit
- wildland fire hard hat
- leather gloves
- leather boots - 8" lace-up
- eye protection (face shield or goggles)
- bandana or dust mask
- hand held radio
- fire shelter

VI. PERMITS AND NOTIFICATIONS

If any potential for smoke on major roads exists, the Florida Department of Transportation will be advised of a scheduled prescribed fire and requested to temporarily install "FOG/SMOKE" warning signs at recommended locations. A burn permit will be obtained each burn day from the FFS Withlacoochee Center. The required burn prescription will include all necessary information and contingencies (sample prescription Appendix A). Courtesy/safety notifications will be made to nearby landowners, law enforcement agencies, and media. To alert area recreationists, a caution sign will be placed near the entrance to the area during prescribed burning.

AGENCY

	<u>PHONE</u>
1) Florida Forest Service	352-754-6757
2) Local radio station (WKTK-FM 98.5)	352-377-0985
3) Local newspaper (Sumter County Times)	352-793-2161
4) Sumter County Fire and Rescue Dispatch Office	352-569-1011
5) Citrus County Fire Dispatch	352-746-2555
6) Marion County Fire Dispatch	352-369-6779
7) DOT-Leesburg	352-315-3100
8) Ventura Ranch (Scott Stephens)	352-303-7305
9) Seven Springs Ranch (Judy Smith 352-454-0735)	352-237-2836
10) Residences along CR 247	various/use letter
11) Southwest Florida Water Management District	352-796-7211

VII. EVALUATION OF BURN

An initial post-burn evaluation will be conducted on each unit immediately after the fire to determine if unit prescriptions met predetermined objectives. This evaluation will be entered on the unit prescription and include: percent crown scorch, bark char (height), fuel consumption, flame height, fire behavior, smoke dispersion, any escape, adverse publicity, progress toward objectives and other observations. A follow-up evaluation will be completed within one month and will include crown scorch, understory kill, adverse insect activity and other observations. These observations will be incorporated into future burn prescriptions. Photopoints will also help to compare pre- and post-burn conditions.

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Appendix A. Sample Burn Prescription Form

Florida Fish & Wildlife Conservation Commission
PRESCRIBED BURNING PLAN Half Moon WMA



GENERAL INFORMATION				
Burn Manager		Certified Burn #		Burn Authorization #
Nancy Dwyer # 1304214		02-3188		2012-
Address: 8864 CR 247	Lake Panasoffkee	33538	Phone: 352.330.1370	
<i>Previous authorization: 2009- 013908</i>		Burn Manager Signature & Date		
Start time: _____ Completion time: _____ Signed _____ Burn Date _____				
LOCATION				
Landowner: #57498	County: Sumter	Section(s)	Range	Township
# 57498	Sumter	5	21E	19S
Nearest Crossroad: SR 44 & CR 247		Lat: 28 53.060 N	Long: 82 13.655 W	
BURN UNIT DESCRIPTION				
Burn Unit	Size of Burn (acres)	Fuel Model(s)	Plant Communities	
MU 54	112	southern rough	old pasture, LL plantation, marsh	

planted longleaf overstory, old pasture, some palmetto/gallberry, grasses, wetlands, second growth 'flatwoods'; S and W is Sanchez property; to the E are residences along CR 247.

Stand Des.	flatwoods	Fuel Description	moderate		
Boundaries					
W: fenceline, fireline	E: Mill Creek Rd & CR 247	N: Sanchez easement	S: fenceline, fireline		
Management History					
Last Burned:	2/10/2009	Tree Cutting:	various (Rigoni 3/11) & Velpar		
Mechanical:	None	Other:	None		
Sensitive Areas:	Sanchez pasture & property, Trudy Dickinson & other CR 247 residences				
OBJECTIVES					
To enhance fire-maintained native plant communities, reduce hardwoods, and control fuel buildup. Reduce oak piles to ash.					
WEATHER PARAMETERS					
Weather Parameters	Acceptable	Actual			
Air Temperature (°F)	< 95 F				
Relative Humidity (%)	30% -55%				
Wind Direction(s)	E/NE/SE				
Surface Winds (mph)	5-20 mph				
Mixing Height (ft)	≥ 1700 ft	Time of weather readings			
Transport Winds	> 9 mph	am	am	m	pm
Dispersion Index (Day)	30-70	Initials of recorder			
Dispersion Index (Night)	≥ 2				
LVORI	<10				
KBDI	< 600				

Days Since Rain				
Fine Fuel Moisture (1-hr fuels; %)	> 6%			
PERSONNEL NEEDS				
# Needed	Position	Names (optional)		
1	Burn Boss			
1	Suppression/ Ignition 1 ATV			
1	Suppression/ Ignition 2 ATV			
1	Ignition 1 Foxfire			
	Suppression/ Ignition 3 Ranger ATV			
1	Suppression 3 Brush Truck			
EQUIPMENT NEEDS				
Needed Y/N	Equipment Type	Source		
	500 Gallon Brush Truck (Type 5)	FWC Half Moon		
	Polaris Ranger 6X6 with 25 Gallon Skid Unit	FWC Half Moon		
	Suzuki 700 ATV with 25 gallon pumper	FWC Half Moon		
	Polaris 500 ATV with 25 Gallon Spot Sprayer	FWC Half Moon		
	Honda ATV Foxfire	FWC Half Moon		
	Polaris 400 ATV with 15 gallon spot sprayer	FWC Half Moon		
	Tractor with disc	FWC Half Moon		
Possible Smoke Sensitive Areas (include direction and distance)				
Interstate I-75 to the East (7 mi), S.R. 44 to the S (3 mi), Hernando to the WNW (6 mi).				

Smoke Management Techniques (*mitigation, safety, mop up, etc.*)

Smoke signs. Mop up/put out open flame within 50' of unit boundaries.

OPERATIONS PLAN

Pre-burn Site Preparation Plan

Burn unit has been prepped with an ten foot mineral firebreak; portions will be freshened up as needed. Snags or other hazardous fuels w/in 50' of boundaries have been cut or identified.

Ignition/Firing (*include test fire, firing pattern, firing device, etc.*)

Test fire will be near Sanchez easement road, west end. Once test fire is complete and burn is considered safe to continue, ignition team 1 will ignite black line on entire W boundary of units (Sanchez fenceline); ignition team 2 will use flanking and spot head fires to fill in before using spot headfires on the E lines.

(Include staging areas, holding lines, location of resources and equipment, etc.)

Staging area will be WMA entrance. Additional water will be available tower at office facilities.

(Include equipment needed, standards to be met, and patrol schedule)

Ignition personnel will have ATV with drip torch. A suppression unit will accompany each ignition unit. Up to 3 units will patrol the lines as needed. Type 5 Engine: 1 water filled, pump working, with gas for pump, hand tools, chain saw, fence tool, working winch.

CONTINGENCY PLAN

Half Moon water tower/well is water source. Type 5 engine ready & its crew assignment made. Secondary control lines identified. Tractor and disc harrow nearby and ready to go. ATVs with water tanks/pumps available for hard-to-reach areas. Hand tools are located in engine.

Location of Safety Zones and Escape Routes

Mineral fire lines, roads, areas of black, any bodies of water.		
Communications Plan		
FWC VHF radios, handheld and mobile channel 8. If DOF is present, channel 7 (DOF car to car) on FWC radios.		
Other Safety Concerns		
All crew members must have required PPE, water, headlamps (and light bars), protection from excessive smoke inhalation, awareness of moving equipment and fire along the fire line.		
Contingency Call List: Agency	Contact Person	Phone
Withlatchoochee FFS Dispatch	Dispatch	352-754-6757
Sumter County Fire Rescue	Dispatch	352-569-1011 x1
DOT Leesburg	Dispatch	352-315-3100
Citrus County Dispatch	Dispatch	352-746-2555
Marion County Dispatch	Dispatch	352-369-6779
FFS Forest Area Supervisor	Anthony Petellat	352-442-2897
Citrus Memorial Hospital	Main	352-726-1551
GO/NO GO CHECKLIST		
<input type="checkbox"/> All prescription requisites met. <input type="checkbox"/> Authorization obtained. (and # written on this form) <input type="checkbox"/> All required notifications made (landowners, FHP, SO, Fire Dept., etc.) <input type="checkbox"/> Smoke screening performed & documented, test passed. <input type="checkbox"/> All needed equipment on scene and fully operational. RADIO CHECK. <input type="checkbox"/> Each crew member has proper personal gear and clothing (PPE).		

- Prescribed-burn-in-progress **SIGNS** in place, if needed.
- Test burn performed and fire behavior within expectations.

CREW BRIEFING

- Burn unit size & boundaries;** burn objectives/ purpose.
- Predicted weather &** anticipated fire and smoke behavior.
- Hazards & safety** issues discussed, including LCES.
- Crew assignments. Authority & communications.**
- Methods of ignition, holding, and mop-up.**
- Location of back-up equipment, fuel, water, supplies, keys, etc.**
- Contingencies** for escaped fire including escape routes & procedures.
- Sources of nearest assistance.** (*Citrus Memorial 507 W Highland Blvd, Inverness*)
- Special instructions regarding smoke management, contact with the public and traffic.
- Questions? Crew members given the opportunity to decline participation.

Post Burn Evaluation & Recommendations

% crown scorch:	smoke dispersion, escapes?, adverse publicity? insect activity?
bark char height:	
fuel consumption:	
flame height:	
fire behavior:	

Burn unit checked next day:

DATE PRESCRIBED BURN IS CALLED OUT:

Attachments

<input type="checkbox"/>	Site Burn Unit Map	<input type="checkbox"/>	Fire Weather Forecast
<input type="checkbox"/>	Smoke Screening Map	<input type="checkbox"/>	Spot Weather Forecast
Prescription Prepared By:		Date RX Prepared	Date RX Updated
Nancy Dwyer		7/25/2012	

13.9 FWC Apiary Policy

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

Apiary Policy

Division of Habitat and Species Conservation

Issued by:
Terrestrial Habitat Conservation and Restoration Section
9/1/2010

DIVISION OF HABITAT AND SPECIES CONSERVATION POLICY

Issued September 2010

**SUBJECT: APIARY SITES ON FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION
WILDLIFE MANAGEMENT AREAS AND WILDLIFE AND ENVIRONMENTAL AREAS**

STATEMENT OF PURPOSE: It is the intent of this policy to determine which Florida Fish and Wildlife Conservation Commission (FWC) Wildlife Management Areas or Wildlife and Environmental Areas (WMA/WEA) may have apiary sites, and provides direction on site location, management and administration of said apiaries.

Definitions

Apiary – A place where bees and beehives are kept, especially a place where bees are raised for their honey.

Apiary Site – An area set aside on a WMA/WEA for the purpose of allowing a beekeeper to locate beehives in exchange for a fee as established by contract between the beekeeper and FWC.

Apiary Wait List – An apiary wait list will be maintained by the Terrestrial Habitat Conservation and Restoration (THCR) Section Leader’s Office based on applications received from interested beekeepers. Only qualified apiarists will be added to the list. To become qualified the new apiarist must submit an application form and meet the criteria below under the section titled “Apiary Wait List and Apiary Application.”

Beekeeper/Apiarist – A person who keeps honey bees for the purposes of securing commodities such as honey, beeswax, pollen; pollinating fruits and vegetables; raising queens and bees for sale to other farmers and/or for purposes satisfying natural scientific curiosity.

Best Management Practices – The Florida Department of Agriculture & Consumer Services (FDACS; Division of Plant Industry (DPI), Apiary Inspection Section, P.O. Box 147100, Gainesville, FL 332614-1416) provides Best Management Practices (BMP) for maintaining European Honey Bee colonies and FWC expects apiarists to follow the BMP.

Hive/Colony – Means any Langstroth-type structure with movable frames intended for the housing of a bee colony. A hive typically consists of a high body hive box with cover, honey frames, brood chambers and a bottom board and may have smaller super hive boxes stacked on top for the excess honey storage. A hive/colony includes one queen, bees, combs, honey, pollen and brood and may have additional supers stacked on top of a high body hive box.

Establishment of Apiary Sites on WMA/WEA

During the development of an individual WMA/WEA Management Plan, apiaries will be considered under the multiple-use concept as a possible use to be allowed on the area. "Approved" uses are deemed to be in concert with the purposes for state acquisition, with the Conceptual State Lands Management Plan, and with the FWC agency mission, goals, and objectives as expressed in the agency strategic plan and priorities documents. Items to consider when making this determination can also include:

- Were apiaries present on the area prior to acquisition?
- Are there suitable available sites on the WMA/WEA?
- Will the apiary assist in pollination of an onsite FWC or offsite (adjacent landowner) citrus grove or other agricultural operation?

For those WMA/WEAs that have not considered apiaries in their Management Plan, upon approval of this policy Regional Staff will work with the Conservation Acquisition and Planning (CAP) staff and THCR Section leadership to determine if apiaries are an approved use on the area. If apiaries are considered an approved use then a request will be made to the Division of State Lands to allow this use as part of an amended Management Plan. This request will be made through the THCR's Section Leader's office and coordinated by the CAP.

Determination of apiary site locations on WMA/WEAs should be done using the following guidelines:

- Apiary sites should be situated so as to be at least one-half mile from WMA/WEA property boundary lines, and at least one mile from any other known apiary site. Exceptions to this requirement must be reviewed by the Area Biologist and presented to the THCR Section Leader for approval.
- Site should be relatively level, fairly dry, and not be prone to flooding when bees would normally be present.
- Site should be accessible by roads which allow reasonable transfer of hives to the site by vehicle.
- If a site is to be located near human activity, such as, an agricultural field, food plot, wildlife opening, campsites, etc., or if the site may be manipulated by machinery at a time when bees would be present, then the apiary site should be located at a minimum of 150 to 200 yards from the edge of that activity. This will ensure minimal disturbance to the bees and minimize incidents with anyone working in the area.

- It is preferable to have apiary sites located adjacent to or off roads whenever possible. If traditional apiary sites were located on roads and the Area Biologist determines that the site will not impact use of the road by visitors then it will be allowed.
- FWC Area Biologist shall select apiary site(s) and the site(s) selected should not require excessive vegetation clearing (numerous large trees, dense shrubs) or ground disturbance (including fill).

WMA/WEA Staff Responsibilities

Area Biologist on WMAs/WEAs with approved apiary sites will forward a GIS shapefile depicting all the apiary site polygon(s), including a name or number with coordinates for each apiary site, to the THCR Contract Manager.

Area Biologist will monitor each apiary site no less than once a year to determine if the beekeeper is abiding by the contract requirements. If violations are noted, staff should bring them to the attention of the beekeeper for correction. If violations continue staff should notify the THCR Contract Manager who will determine if or what additional action is warranted.

Area Biologist will establish and maintain firelines around the apiary site to ensure the apiary site is ready when a planned burn is scheduled.

Area Biologist will advise the beekeeper of burn plans, road work, gate closures, or other site conditions and management activities that may affect the beekeeper's ability to manage or access the apiary site.

Area Biologist is not responsible to ensure access roads are in condition suitable for beekeepers to access their hives with anything other than a four wheeled drive vehicle. (The site of the apiary may be high and dry, but the roads accessing them may be difficult to impossible to get a two wheeled drive vehicle into during extreme weather, e.g., heavy rainfall events.)

Apiary Wait List and Apiary Application

An electronic waiting list for apiary sites will be maintained by the THCR's Contract Manager for each WMA/WEA. To be placed on the waiting list an interested beekeeper must submit an apiary application form to the contract manager (See Enclosed Application Form). Each applicant will be considered based on the following criteria:

- Proof of a valid registration with the FDACS/DPI.
- Proof of payment of outstanding special inspection fees for existing sites.
- A validated history of being an apiary manager.
- Three references that can attest to the applicant's beekeeping experience.

If an apiary site becomes available on a WMA/WEA and there are beekeepers on the waiting list interested in that particular area, those individuals meeting the criteria above will be given preference. If there is more than one beekeeper meeting the criteria with their name on the list then a random drawing will be held by the THCR Contract Manager to determine who will receive the site. Beekeepers on the waiting list will be notified in writing of the random drawing's date/location and will be invited to attend. The individual's name selected during this drawing will be awarded the contract.

Apiary agreements are non-transferable. Each agreement serves as a contract between a specific individual or company and FWC, and the rights and responsibilities covered by an individual agreement cannot be transferred.

Contracts

Apiary contracts are for five (5) years and renewals are contingent upon a satisfactory performance evaluation by Area Biologist and concurrence of the THCR Section Leader. Approval is based on apiarist performance, adherence to rules and regulations and general cooperation. If an Area Biologist decides an apiarist whose contract is expiring is unacceptable he may recommend not approving the new contract. If this transpires then the wait list process using random selection will be used. If there is no apiarist on a current wait list then the apiarists who are in good standing with existing contracts will be notified to see if any want to be put on the wait list for the drawing. If none are interested then the site will be put on hold pending a valid request.

Pricing of Apiary Site(s)

Cost of each apiary site will be \$40 annually which will include up to 50 beehives. Additional beehives will be charged at the rate of \$40 per 50 beehives.

Pricing examples:

- A beekeeper is leasing 2 apiary sites with up to 100 beehives - the fee per year is \$80.
- A beekeeper is leasing 3 apiary sites with up to 200 beehives - the fee per year is \$160.

Note: The maximum number of hives/colonies allowed on an apiary site will be at the discretion of the apiarist. However, the apiarist is strongly recommended to follow the BMP as recommended by the FDACS/DPI. In addition to providing the BMP, FDACS/DPI's management has recommended 50 hives per site in pineland communities and no more than 100 hives per site in areas with bountiful resources. However, FWC will not dictate the number of hives on a site unless they create land management issues.

Bear Depredation Control at Apiary Site(s)

Beekeepers are required to consult with the WMA/WEA Area Biologist to see if electric fencing is required for their apiary sites. If the Area Biologist requires electric fencing then the

Beekeeper shall construct and maintain electric fences for each apiary site. Numerous electric fence designs have been used to varying success and FWC as a courtesy provides an electric fence technical information bulletin with each Agreement. This bulletin is attached in order to assist the Beekeeper and/or provide a design that has been proven to be reasonable effective.

SUBJECT MATTER REFERENCES

Apiary Inspection Law - Chapter 586, Florida Statutes (see <http://www.leg.state.fl.us/Statutes/>), Rule Chapter 5B-54, Florida Administrative Code (see www.flrules.org).

The Board of Trustees of the Internal Improvement Trust Fund – Recommended Apiary Agreement Guidelines For Apiaries & Revisions to an Agreement for Apiary Activities on State Lands on September 23, 1986

S:\HSC\THCR\APIARY.BACKUP.POLICY\dlissupport@dos.state.fl.us 20100903 111446.pdf

Senate Resolution 580, September 21, 2006: http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=109_cong_bills&docid=f:sr580ats.txt.pdf

Attachments

Sample Apiary Agreement W/Attachments (Map Placeholder & Electric Fence Bulletin)

Sample Apiary Site Application Form W/Mission Statement

Best Management Practices for Maintaining European Honey Bee Colonies

Sample of Random Selection Process Procedure

APPROVED:

Division Director or Designee

DATE: _____

APIARY AGREEMENT

AGREEMENT FOR APIARY ACTIVITIES ON STATE LANDS

THIS AGREEMENT is made by and between the Florida Fish and Wildlife Conservation Commission, 620 South Meridian Street, Tallahassee, FL 32399-1600, hereinafter known as “the COMMISSION,” and (Insert Name and Address of Apiarist Here), telephone number (Insert Phone Number of Apiarist Here), hereinafter known as “the USER.”

WITNESSETH

In consideration of the mutual promises to be kept by each and the payments to be made by the USER, the parties agree as follows:

1. TERM: This Agreement will begin (Insert date here) or the date signed by both parties, whichever is later, and will end five (5) years from the date of execution. Issuance of a new five (5) year Agreement is contingent upon satisfactory performance evaluation by the Area Biologist and approval of the THCR Section Leader.
2. The COMMISSION Agrees:
 - a. To provide apiary sites on state lands, which will be identified by the COMMISSION staff and located on the property identified in (4)(f) below.
 - b. To provide technical assistance for bear-proofing, if required by Area Biologist, of sites made available under this Agreement.
 - c. To allow the USER to place a total number of (insert number of hive boxes here) hive boxes on the COMMISSION-managed property at the apiary site(s).
3. The USER Agrees:
 - a. To pay (Insert Total Dollars Here) on or before the execution date of this Agreement and each year thereafter on or before anniversary date of the original contract execution date, with check or money order payable to the Florida Fish and Wildlife Conservation Commission. All payments shall be remitted to The Florida Fish and Wildlife Conservation Commission, Finance and Budgeting, Accounting Section, PO Box 6150, Tallahassee, FL 32399-6150, and a copy of the check to The Florida Fish and Wildlife Conservation Commission, Terrestrial Habit Conservation and Restoration Section, Attn: Section Leader, 620 South Meridian Street, Tallahassee, Florida 32399-1600.

- b. To have no more than (Insert Number of Hive boxes here) hive boxes on the property at one time.
- c. To comply with the Florida Honey Certification and Honeybee Law, Chapter 586, Florida Statutes, and Rule 5B-54, Florida Administrative Code, and all other applicable federal, state, or local laws, rules or ordinances.
- d. To not damage, cut or remove any trees in the course of preparing for or conducting operations under this Agreement.
- e. To repair within 30 days of occurrence any damage to roads, trails, fences, bridges, ditches, or other public property caused by USER'S operations under this Agreement based on discretion of the COMMISSION to ensure the WMA/WEA management goals are met. All repairs will be coordinated with the Area Biologist to ensure management goals are met. If USER does not comply within the 30 day requirement, then the COMMISSION may use a third party to perform the repairs and charge the USER accordingly.
- f. To report any forest fires observed and to prevent forest fires during the course of operations under this Agreement.
- g. To abide by all WMA/WEA rules and regulations in addition to items in this Agreement.
- h. To notify the Area Biologist within 24 hours when a bear depredation event occurs.
- i. To post their name in an agreed upon location at each site covered by this Agreement or otherwise use an identifying system that is approved by the Area Biologist.
- j. To furnish proof of general liability insurance prior to starting apiary activities on state property or within 30 days of execution of this Agreement, whichever is earlier, and proof of annual renewal of the general liability insurance policy prior to or upon expiration date of the policy. The USER shall maintain continuous general liability insurance throughout the term of this Agreement for no less than \$300,000 for bodily injury and \$100,000 for property damage for each occurrence. Such a policy shall name the COMMISSION as the Certificate Holder. The USER's current certificate of insurance shall contain a provision that the insurance will not be canceled for any reason during the term of this Agreement except after thirty (30) days written notice to the COMMISSION.

- k. To be liable for all damage to persons or property resulting from operations under this Agreement, and to release, acquit, indemnify, save and hold harmless the COMMISSION, its officers, agents, employees and representatives from any and all claims, losses, damages, injuries and liabilities whatsoever, whether for personal injury or otherwise, resulting from, arising out of or in any way connected with activities under this Agreement or activities occurring from any other source not under this Agreement and the USER further agrees to assume all risks of loss and liabilities incidental to any natural or artificial condition occurring on state lands cover by this Agreement.
- l. To construct and maintain electric fences, if required by the Area Biologist at the Area Biologist's discretion, to provide protection of apiaries from black bear depredation consistent with the technical information bulletin attached to this agreement, and, if so required, to maintain an open buffer around the fencing of five (5) feet or more. (See Attachment 1)
- m. To remove all personal property from the site within thirty (30) days of termination or expiration of this Agreement. The USER understands that after this time, all the USER'S personal property remaining on the WMA/WEA shall be deemed abandoned and become the property of the COMMISSION, which will be utilized or disposed of at the sole discretion of the COMMISSION, and that reasonable storage and/or disposal fees and/or costs may be charged to the USER.

4. The parties mutually agree:

- a. This Agreement is not transferable.
- b. The USER's failure to submit payment by the due date established herein may result in cancellation of the Agreement by the COMMISSION.
- c. The USER's failure to submit proof of general liability insurance or proof of annual renewal in compliance with (3) (j) above may result in cancellation of this Agreement by the COMMISSION.
- d. This Agreement shall be in effect for a period of five (5) years and issuance of a new agreement will be contingent upon a satisfactory performance evaluation and approval of the Area Biologist and THCR Section Leader.
- e. Each apiary site shall be situated so as to be at least one-half (1/2) mile inward from state property lines and there shall be at least one (1) mile separation between sites. Exceptions to this rule must be reviewed by Area Biologist

presented to and approved by the Terrestrial Habitat Conservation and Restoration Section Leader.

- f. The property covered by this Agreement is described as follows: That the property sites (Insert Area Name) Wildlife Management Area are represented by Attachment 2.
- g. In accordance with Section 287.134, Florida Statutes, an entity or affiliate who has been placed on the discriminatory vendor list may not submit a bid, proposal or reply on a contract to provide goods or services to any public entity; may not submit a bid, proposal or reply on a contract with a public entity for the construction or repair of a public building or public work; may not submit bids, proposals or replies on leases of real property to a public entity; may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant with any public entity; and may not transact business with a public entity.
- h. As part of the consideration of this Agreement, the parties hereby waive trial by jury in action brought by either party pertaining to any matter whatsoever arising out of or in any way connected with this Agreement. Exclusive venue for all judicial actions pertaining to this Agreement is in Leon County, Florida.
- i. This Agreement may be terminated by the COMMISSION upon thirty (30) days written notice to the USER in the event the continuation of the apiary activities are found to be incompatible with the COMMISSION'S management plans or for any other reason at the sole discretion of the COMMISSION.

This Area Intentionally Left Blank

IN WITNESS WHEREOF, the parties have executed this Agreement on the day and year last below written.

USER SIGNATURE

Date: _____

Witness

Witness

FLORIDA FISH AND WILDLIFE
CONSERVATION COMMISSION

Mike Brooks, Section Leader
Terrestrial Habitat Conservation and
Restoration

Date: _____

Approved as to form and legality

Commission Attorney

Date: _____

AGREEMENT
ATTACHMENT 1

**Use of Electric Fencing to Exclude Bears
And Prevent Property Damage**

Florida Fish and Wildlife Conservation Commission
Technical Information Bulletin (2001)

Electric fencing has proven effective in deterring bears from entering landfills, apiaries (beehives), livestock pens, gardens, orchards, and other high-value properties. Numerous electrical fence designs have been used with varying degrees of success. Design, quality of construction, and proper maintenance determine the effectiveness of an electric fence. The purpose of this technical bulletin is to assist the property owner in understanding and implementing electrical fencing as a tool to exclude and prevent damage caused by black bears.

Understanding Electric Fencing

Electric fencing provides an electrical shock when an animal comes into contact with the electrically charged wires of the fence. People unfamiliar with electric fencing often are afraid that it will injure, permanently damage, or kill an individual or pet that contacts the fence. **This is not true!** A properly constructed electric fence is safe to people, pets, and bears.

Components of Electric Fencing

An electric fence is composed of four main elements: a charger, fence posts, wire, and the ground rod.

Fence Charger. On a small scale electric fence (like that typically needed for bear exclusion), the largest cost is normally the fence charger. A fence charger's job is to send an electrical pulse into the wire of the fence. Contrary to popular belief, there is not a continuous charge of electricity running through the fence. Instead the charger emits a short pulse or burst of electricity through the fence. The intensity and duration of the electrical pulse varies with the type of charger or controller unit. Chargers with a high-voltage, short duration burst capacity are the best because they are harder to ground out by tall grass and weeds. These types are also the safest, because, even though the voltage is high (5 kilovolts) the duration of the burst is very short (2/10,000 of a second) (FitzGerald, 1984).

Two basic energy sources for chargers are batteries (12-volt automotive type) and household current (110 volt). Battery-type chargers are typically cheaper to purchase but require more maintenance because of the necessity of charging the battery. The advantage of a battery powered charger is that it can be used in a remote location where 110-volt current is not available. Most units that are powered by a fully charged 12-volt deep-cycle batteries can last three weeks before needing a charge. Addition of a solar trickle charger will help prolong the duration of effective charge in 12-volt batteries.

Fence Posts. On small scale fences, the posts are normally the second largest expense involved in construction. Therefore, when planning an electric fence it is a good idea to utilize existing fencing in order to save money. If no existing fence is available, posts will need to be placed around the area needing protection. Posts may be wood, metal, plastic, or fiberglass. Wood and metal posts will need to have plastic insulators attached to them which prevent the electric wire from touching the post causing it to ground out. Plastic and fiberglass posts do not need insulators, the wire may be affixed directly to these posts. Wood and metal posts are typically more expensive and require the added expense of insulators, however, they are more durable and generally require less maintenance.

Wire. Fourteen to seventeen gauge wire is the most common size range used in electric fencing. Heavier wire (a lower gauge number) is more expensive but carries current with less resistance and is more durable (FitzGerald, 1984).

The two most common types of wire are galvanized and aluminum. Galvanized wire is simply a steel wire with a zinc coating to prevent rust, which makes the wire last longer. Some wire is more galvanized than others. The degree or amount of zinc coating that is around the core steel wire is measured in three classes. A class I galvanization means the wire has a thinner coating of zinc than a class II galvanization. Class III galvanized wire has the heaviest zinc coating and will last longer than the class I and class II wire (FitzGerald, 1984). In general, the cost of galvanized wire increases as the class or amount of galvanization increases.

Aluminum wire is typically more expensive than the galvanized wire. Some advantages of aluminum wire are: it will not rust, it conducts electricity four times better, and it weighs one-third less than steel wire.

The Ground Rod. The ground is an often overlooked, but critical part of an electric fence. Without a good ground, electricity will not flow through the wire. When an animal touches a charged wire, the body of the animal completes the electrical circuit and the animal feels the “shock”. The current must travel from the charger through the wire to the animal and then back through the ground to the charger if the animal is to feel the shock. The soil acts as the return “wire” (ground) in the circuit. However, if a

bird was to land on a charged wire without touching the soil the bird would not complete the circuit and would be unaffected (FitzGerald, 1984). Some fence configurations use actual grounded wires within the fence to enhance the grounding system.

The ground may be a commercial ground rod or a copper tube or pipe driven six to eight feet in moist soil. Copper is expensive, so a copper coated steel pipe or any other good conducting metal pipe will work also. Very dry soil can effect the ability to create a good ground and has sometimes been a problem during drought conditions. Pipe may be a better choice than a solid rod during drought conditions, because water may be poured down the ground pipe to improve the ground. Some fence configurations use wires as the grounding system, rather than relying solely on the soil as a ground.

Recommended Electric Fence to Deter Black Bears

Conditions at fence sites will vary and will determine what the most effective fence configuration will be. Commission biologists welcome the opportunity to visit sites and provide custom tailored advice on constructing an effective electric fence. The following recommendation will cover most situations with low to moderate pressure from black bears. Use a five strand aluminum wire fence that is 40 inches high with wire spacing every eight inches apart using the previously mentioned wired grounding system (see Figure 1). The wire closest to the ground level (the lowest wire) should be a charged or "hot" wire. The second wire should be grounded. The third wire should be hot. The fourth wire should be grounded and the fifth wire should be hot. If using metal or wood posts, insulators must be used to keep the hot wires from grounding out. The cost of this type of electric fence utilizing fiberglass posts and a 110 volt fence charger is approximately \$200 for a 40' x 40' area (160 linear feet of fence).

Materials:

- 1 - 1, 312 foot roll (1/4 mile) 14 gauge aluminum electric fence wire
- 1 - 50 foot roll 12 gauge insulated wire
- 20 - 5 foot 5/8 inch dia fiberglass fence posts
- 5 - plastic gate handles
- 1 - 110 volt fence charger
- 1 - 10 foot ground pipe
- 4 - plastic electric fence signs

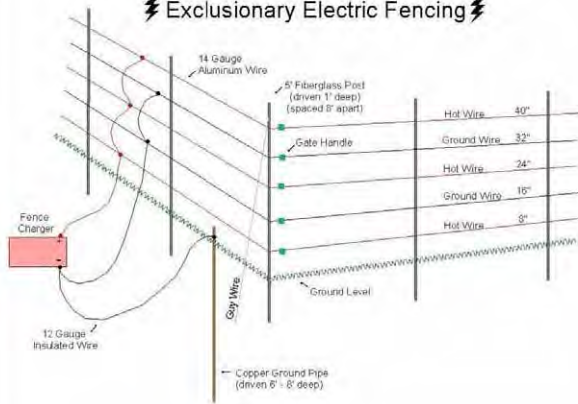
Installation. These instructions are for a square shape fence exclusion, but the process would be very similar for other applications. Drive 4 corner posts 1-foot deep into ground and stake with guy wires. Clip, rake, and keep clear any vegetation in a 15-inch wide strip under the fence and apply herbicide. Attach and stretch the aluminum wire at 8-inch increments starting 8 inches from ground level. A loop of wire should be left on each wire at the first corner post. Once the wire has been stretched around the outside of all the corner posts back to the first post a plastic gate handle should be attached to each wire and the gate handles should be attached to each

corresponding loop on the first corner post. Drive in the remaining 16 posts to the same depth at 8-foot intervals between corner posts. Secure each of the five wires to each of the posts with additional wire. Attach four plastic electric fence signs (one on each side) to the top wire of the fence. Attach a 12-gauge strand of insulated wire to the positive terminal of the fence charger and attach it to the first, third, and fifth wires of the fence. Attach another 12 gauge insulated wire to the negative terminal of the charger and attach this wire to the ground pipe which has been driven into the ground 6 to 8-feet deep. Attach another 12 gauge insulated wire from the negative terminal of the charger to the second and fourth wires on the fence. Plug the charger into a 110 volt power supply and the fence is in operation.

Tips to improve the effectiveness of your electric fence to deter black bears:

1. If using a 12-volt fence charger, ensure that the battery is charged; check every two weeks.
2. Make sure terminals on the charger and battery are free of corrosion.
3. Make sure hot wires are not being grounded out by tall weeds, fallen tree branches, broken insulators, etc.
4. If fence wires have been broken and repaired, make sure wires are corrosion free where they have been spliced together. Also, tighten the fence at each corner post as wires that have been spliced and are loose make poor connections.
5. Be sure to rake vegetation from under and around the outside of the fence as this may act as an insulator.
6. To improve the ground around the perimeter of the fence add a piece of 24 inch chicken wire laying on the ground around the outside of the fence. This should be connected to ground.
7. During periods of drought pour water down the ground pipe and around the ground pipe to improve the ground. Digging a 6 inch deep 6 inch diameter hole around the ground pipe and back filling with rock salt will also improve the ground. Additional ground pipes may also be added to portions of the fence farthest from the charger.
8. To ensure that the bear solidly contacts the charged portion of the fence, a bait like bacon strips, a can of sardines, or tin foil with peanut butter may be attached to one of the top hot wires. Make sure these do not contact the ground, thus shorting out the fence.
9. When protecting a specific structure (like a shed or rabbit hutch), the fence should be placed 3 to 5 feet away from the structure (rather than on it) so that the bear encounters the fence before reaching the attractant.
10. Protect the fence charger from the elements by covering it with a plastic bucket or a wooden box.
11. Place plastic electric fence signs around the perimeter of your fence to improve visibility and to warn other people.

⚡ Exclusionary Electric Fencing ⚡



AGREEMENT
ATTACHMENT 2

Place Holder for Map

Of

Apiary Locations

At

WMA/WEA

APIARY SITE APPLICATION FORM

Florida Fish and Wildlife Conservation Commission

RETURN TO: The Florida Fish and Wildlife Conservation Commission, 620 South Meridian Street, Tallahassee, FL 32399-1600. Please print or type all information. Attach additional sheets if necessary.

Name _____ Telephone Number _____

Mailing Address _____

City or Town _____ County _____ Zip Code _____

Physical Address (If Different from Mailing Address) _____

Company Name: _____

Email Address _____

Requested Wildlife Management or Wildlife and Environmental Area(s)(see attached list of WMA/WEAs with apiary sites):

WMA/WEA _____ County _____ # of Sites _____

WMA/WEA _____ County _____ # of Sites _____

WMA /WEA _____ County _____ # of Sites _____

WMA /WEA _____ County _____ # of Sites _____

Planned Number of Hives Per Site: _____ Permanent: ____ Seasonal: ____

Member of Beekeepers Association: Yes ____ No ____

Number of Years a Member _____

Name of Beekeepers Association: _____

Are you registered with Florida Department of Agriculture and Consumer Services/Division of Plant Industry (FDACS/DPI): ____ Yes ____ No ____ N/A If yes, please provide proof.

Are you current with any and all special inspection fees: ____ Yes ____ No ____ N/A. If yes, please provide proof.

Do you follow all recommended Best Management Practices from FDACS/DPI?: ____ Yes ____ No

If no, then please explain on a separate piece of paper.

Please provide below a chronological history of your beekeeping experience. If you need more space, please provide additional sheets:

References: If a new apiary contractor, please provide on a separate piece of paper at least 3 references who can verify your apiary experience. Provide each reference's name, address, phone number and email address (if applicable). Please attach reference sheet to this document and submit.

MISSION STATEMENT

Management

Of

Florida Fish and Wildlife Conservation Commission's

Wildlife Management Areas

And

Wildlife and Environmental Areas

The mission of the Florida Fish and Wildlife Conservation Commission (FWC) is to manage fish and wildlife resources for their long-term well-being and the benefit of the people. To aid in accomplishing this mission, one of FWC's management goals is to manage fire-adapted natural communities on our Wildlife Management and Environmental Areas (WMA/WEA) to support healthy populations of the plants and animal's characteristic of each natural community. In order to achieve this goal various habitat management techniques are used. These include prescribed burning, applications of herbicides and mechanical treatment of vegetation. These management efforts will take place at various times and locations on each of the FWC's WMA/WEAs. Staff on each WMA/WEA will work with and make users aware of these activities when necessary. Users must be aware and accept that these activities are necessary for the proper management of the area.

Note: This document is included as an attachment with each Application and executed Contract.

FDACS/DPI's BMP

Florida Department of Agriculture & Consumer Services

BEST MANAGEMENT PRACTICES FOR

MAINTAINING EUROPEAN HONEY BEE COLONIES

1. Beekeepers will maintain a valid registration with the Florida Department of Agriculture and Consumer Services/Division of Plant Industry (FDACS/DPI), and be current with any and all special inspection fees.
2. A Florida apiary may be deemed as European Honey Bee with a minimum 10% random survey of colonies using the FABIS (Fast African Bee Identification System) and/or the computer-assisted morphometric procedure (i.e., Universal system for the detection of Africanized Honey Bees (AHB) (USDA-ID) or other approved methods by FDACS on a yearly basis or as requested.
3. Honey bee colony divisions or splits should be queened with production queens or queen cells from EHB breeder queens following Florida's Best Management Practices.
4. Florida beekeepers are discouraged from collecting swarms that cannot be immediately re-queened from EHB queen producers.
5. Florida Beekeepers should practice good swarm-prevention techniques to prevent an abundance of virgin queens and their ready mating with available AHB drones that carry the defensive trait.
6. Maintain all EHB colonies in a strong, healthy, populous condition to discourage usurpation (take over) swarms of AHB.
7. Do not allow any weak or empty colonies to exist in an Apiary, as they may be attractive to AHB swarms.
8. Recommend re-queening with European stock every six months unless using marked or clipped queens and having in possession a bill of sale from an EHB Queen Producer.
9. Immediately re-queen with a European Queen if previously installed clipped or marked queen is found missing.
10. Maintain one European drone source colony (250 square inches of drone comb) for every 10 colonies in order to reduce supercedure queens mating with AHB drones.
11. To protect public safety and reduce beekeeping liability, do not site apiaries in proximity of tethered or confined animals, students, the elderly, general public, drivers on public roadways, or visitors where this may have a higher likelihood of occurring.
12. Treat all honey bees with respect.

RANDOM
SELECTION PROCESS
FOR VACANT APIARY SITE

When an apiary site becomes available the following procedure is used to randomly select the next apiarist (beekeeper) for an available apiary site on a WMA or WEA. Only those who have been evaluated and deemed qualified to be an apiarist on a WMA/WEA through the Apiary Application process will be eligible for this selection process. The steps below will be followed by the THCR Contract Manager when a site becomes available to be filled by a qualified apiarist:

1. The THCR Contract Manager will maintain an “Apiary Wait List Folder” on the THCR SharePoint for each WMA/WEA with apiary sites.
2. A wait list is either created or updated when an Apiary Application(s) is received by the THCR Contract Manager from a qualified apiarist.
3. Upon receipt of an apiary site application, the THCR Contract Manager will review the WMA/WEA folder to see if there is an “Apiary Wait List”.
4. If a list exists then the qualified applicant will be added to the list.
5. When an apiary site becomes available if there are more than one qualified apiarist then these apiarists will be contacted by certified letter to determine their interest.
6. The letter will request a response within 10 working days to make them eligible for the random drawing.
7. If there is no response or is negative then that apiarist will not be included in the random drawing and the name will be removed from the waiting list*.
8. If only one apiarist responds positively to the certified letter then the available site will be awarded to that interested apiarist.
9. If there are no apiarists on a wait list or all responses are negative then apiarists who currently have site(s) under Agreement and where not on the waiting list will be contacted to see if any have interest in the available site. If more than one responds then the random drawing process will be used to determine who will be awarded the site.

10. Steps to be performed by the THCR Contract Manager to execute the random selection for an available apiary site are listed below:

- a. The names of each interested apiarist will be noted on a 1" X 2" piece of paper and folded in half.
- b. The pieces of paper will be inserted into a "black film canister" which has a snap top and placed into a container and stirred up prior to the selection.
- c. A non-biased person will be selected to reach into the bowl (which will be held above the selection person's eyesight) and randomly select one of the canisters.
- d. The canister will be opened by the person performing the selection and the name is read aloud for those in attendance. Everyone in attendance will sign a witness sheet.
- e. The apiarist whose name is selected will be awarded the available site.
- f. A new Agreement will be developed by the THCR Contract Manager.

*A new apiary application must be submitted once requestor's name is removed from a waiting list.

13.10 Florida Scrub-jay Management Plan

Florida Scrub-jay Habitat Management Plan
Half Moon WMA
November 2012

INTRODUCTION

Half Moon Wildlife Management Area (Half Moon) lies in northwestern Sumter County and hosts the largest documented and one of the few remaining populations of Florida scrub-jays (*Aphelocoma coerulescens*) in the county. These scrub-jays are part of the Northern Gulf Coast Subregion, one of five scrub-jay population subregions corresponding to the major sand deposits on the Florida peninsula (Fitzpatrick *et al.* 1994). Most scrub-jays in Sumter County rely on scrubby and mesic flatwoods as typical scrub habitat is lacking.

About 350 acres of scrubby and mesic flatwoods on Half Moon is potential or occupied scrub-jay habitat (Figure 1). Most of the habitat used by scrub-jays lacks the classic open patches of bare sand preferred by the birds (Fitzpatrick *et al.* 1991). Some scrub-jay territories include unimproved roads and fire lanes which the birds use for foraging and acorn-caching. Many of these fire lanes are peripheral and thus are disked annually.

Most of Half Moon's scrub-jay groups reside near the management area's eastern boundary and use adjoining privately-owned Ventura Ranch. The jay population on Ventura Ranch is unknown. In 1996 and 1999 a total of about 230 acres of jay habitat was cleared on this private land and planted with slash pine (*Pinus elliottii*) which excludes scrub-jays from using this area.

POPULATION SURVEYS

Scrub-jay surveys are conducted on calm, clear days beginning one hour after sunrise and ending before midday heat or wind. An audio recording of scrub-jay territorial calls and scolds, including the female "hiccup" call, is broadcast at each station for at least one minute in all 4 directions (4 min. total) to attract jays. Playback stations were 100-200 m apart. Areas were visited as often as necessary to establish an accurate count of jay groups and individuals. A minimum of three visits were made to a site during March, September or October before that site was deemed unoccupied. Reproductive success was monitored in mid-summer (July), when young of the year are independent but still distinguishable by plumage (Fitzpatrick *et al.* 1991).

A baseline survey conducted on Half Moon in 1990 detected an estimated 15 scrub-jay groups, consisting of 1-6 birds. In 1992, 17 groups comprising 57 individuals were located and one individual was observed in an additional area in spring 1993. An estimated 700 acres were used

by these jays although territory size averages only 25 acres (Fitzpatrick *et al.* 1991). In 1995, 38 birds in 13 groups were identified. The apparent population decline continued with only 33 birds in 14 groups counted in spring of 1997. Although some of these groups were new, eight previously identified groups were still missing. An inventory in summer 1997 resulted in 17 juveniles counted, with a total population estimate of 50 scrub-jays using Half Moon. Extremely high water and a staff shortage hindered a complete census in 1998; only 7 groups comprising 14 individuals were observed. Again in 1999, survey effort was inadequate to assess the population. But, during 9 mornings of jay surveys in April, May and August, only 5 individuals were observed. During 13 mornings of surveys in February and March 2000, 11 individuals were observed; other jays were seen and heard on neighboring Ventura Ranch. The decline in jay numbers has been attributed to successional changes in vegetation on Half Moon; the management area in general is less open.

In 2001 a more intensive monitoring effort began by color-banding 10 birds (Table 1). With most jays banded, the potential for double counting an individual is reduced. Birds were monitored biweekly until the Jay Watch protocol was adopted in 2008. The population using Half Moon was estimated at 30 birds from 2001 to 2005 and grew to 40 birds in 2007. A record 15 juveniles were banded in 2008, but numbers again fell with only 25 to 30 birds observed in the late 2000s.

Table 1. Number of Florida scrub-jays banded on Half Moon WMA since 2001.

Year	No. of Adults or Unknown Age	No. of Young of the Year	Total
2001	8	2	10
2002	16	5	21
2003	17	0	17
2004	12	0	12
2005	4	2	6
2006	6	4	10
2007	6	10	16
2008	3	15	18
2009	0	1	1
2010	0	0	0
2011	1	7	8
2012	4	3	7
Total	77	49	126

HABITAT MANAGEMENT

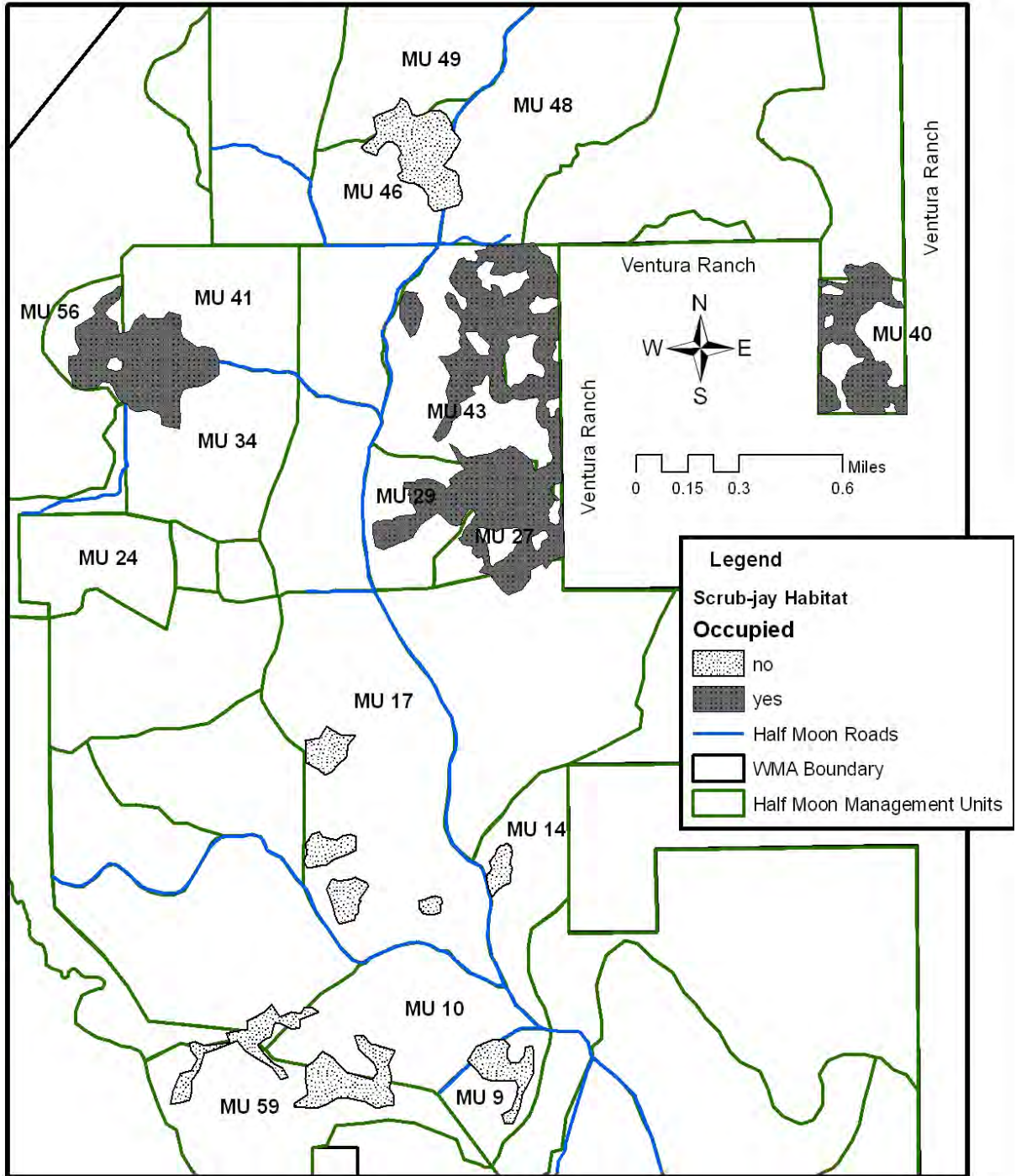
Optimal scrub-jay habitat consists of scrub oak species 1-3 m high covering 50-75% of the area, 10-30% bare sandy patches, and scattered-tree canopy coverage of less than 20% (Cox 1987, Fernald 1989, Woolfenden and Fitzpatrick 1984, Fitzpatrick *et al.* 1991). Scrub oak species include sand live oak (*Quercus geminata*), myrtle oak (*Q. myrtifolia*), Chapman oak (*Q. chapmanii*) and scrub oak (*Q. inopina*). The latter two species have not been observed on Half Moon. Other habitat features preferred by scrub-jays include a matrix of recently burned flatwoods and marshes, few or no patches unburned for more than 20 years, and few or no dense stands of trees within or adjacent to managed scrub (Fitzpatrick *et al.* 1991).

Half Moon's 350 acres of potential or occupied jay habitat includes 12 polygons ranging in size from 148 acres to only 2 acres (Fig. 1). If marshes are included, this habitat totals about 500 acres. Only the three largest polygons are currently occupied by jays. The non-contiguous nature of the other potential habitat areas makes them less likely to be used by jays, but jays documented in these areas in 1992. Succession in plant communities adjacent to potential jay habitat has probably affected the suitability of these areas for jays.

Prescribed Burning - Fitzpatrick *et al.* (1991) state that fire is the preferred method of scrub habitat management. Fire frequencies for maintaining scrubby flatwoods range from 5-10 years, while fire in oak-dominated scrubs only occurs every 10-20 years or longer Myers (1991). Fires every 2-4 years maintain some oaks below acorn-bearing height and may encourage saw palmettos (*Serenoa repens*) at the expense of oaks. Summer, or growing-season, burns may help control palmettos, thereby maintaining the open patches needed by scrub-jays. Summer burns are also more likely to kill oaks and are sometimes necessary if the scrub is overgrown. Summer burns are preferable to winter burns because scrub-jays have time for territorial boundary adjustments before acorn caching is completed and spring hawk migration occurs (Woolfenden and Fitzpatrick 1996).

Fitzpatrick *et al.* (1991) recommend burning every 10-20 years to maintain optimal scrub-jay habitat, whereas Cox (1994) suggests a fire frequency of five years and Woolfenden and Fitzpatrick (1996) suggest a fire return interval of 8-15 years. A fire frequency of >20 years results in oak scrub that is too tall and dense for scrub jays. However, the true scrub habitat addressed in the literature does not occur on Half Moon; instead, jays reside in mesic and scrubby flatwoods, where fires occur more frequently.

Figure 1. Half Moon WMA Scrub-jay Habitat



An entire scrub-jay group territory should not be burned at one time. In typical scrub, burn units should be relatively small (15-30 ac) and should bisect scrub-jay occupied areas. No more than 25% of an area occupied by jays should be burned at once (Fitzpatrick *et al.* 1991). Fire in scrub tends to burn some vegetation patches while leaving other areas unburned. Woolfenden and Fitzpatrick (1996) state that few scrub-jay families must relocate to survive after a fire due to the size and spacing of these naturally unburned patches. Small, unburned patches will provide cover, nesting habitat and foraging sites for jays while the scrub rapidly regenerates. Because all Half Moon burn units used by jays abut units with jay habitat, and most jay territories cross burn unit boundaries, burn unit acreages have not been reduced. Also, only part of any burn unit containing jays is made up of scrubby flatwoods and care will be taken not to burn these areas so thoroughly that they are unusable by jays. Burn unit MU 43 should be divided when burning, as occurred in the 2008 burn. Burn units MU 27 and MU 29 have been treated together but will be divided in the future.

Planned fire frequency for Half Moon jay areas is 3-5 years; however weather, fuel, personnel and equipment conditions will also dictate burn schedules, thus providing a more random burn rotation. The goal of the burns is to maintain an open physiognomy while maintaining shrubby oaks at less than 3 meters. Too frequent fire, however, may eliminate many shrub-sized oaks. In cases where fire is postponed to maintain shrubby oaks, roller chopping and mowing will be used to reduce palmettos, which typically are not diminished by periodic fire. So, although fire will be used to maintain the canopy of scrub-jay habitat, chopping and mowing will continue to be used to maintain a more grassy, open ground cover where needed. In addition, burns will be coordinated with Ventura Ranch so that adjacent jay habitat is not burned in one season.

It is critical to include open buffer habitat around scrub patches and to maintain or create corridors between patches of suitable habitat to facilitate dispersal (Root 1996). Aggressive prescribed burning, where possible, of stands adjacent to scrub areas should help to maintain open habitat through which the jays will traverse. To minimize disruption to scrub-jay territories, prescribed burning and other management activities should be coordinated with adjacent landowners, specifically Ventura Ranch (and formerly, Southwest Florida Water Management District).

Mechanical Alteration - Although fire is the best tool for scrub management, mechanical manipulation of vegetation is sometimes needed to enable fire to penetrate dense, overgrown scrub oaks. In the absence of ground fuel to effectively carry a fire, mechanical means are used. Mechanical alteration is a short-term management method, with the goal being to reach a point where fire is the sole means of managing scrub ecosystems. However, repeated mechanical

treatments have been found to be necessary. Mechanical alteration also provides a practical means to control volatile summer fires, but the long-term ecological effects of mechanical clearing remain poorly understood (Woolfenden and Fitzpatrick 1996).

Mechanical treatments include mowing, roller-chopping, various tree cutters and shredders (i.e. Brown's, V-blade, K-G blade, Barco mulcher, Hydroax, Temco feller, Fecon mower/mulcher, Gyrotrac, Kershaw Klearway etc.), and chain-saw use. Roller-chopping causes the most soil disturbance while manual chainsaw use causes the least. Where possible, soil disturbance should be minimized (Fernald 1989, Myers 1991). However, soil disturbance is a method of producing or maintaining open sandy patches preferred by scrub-jays and are generally lacking in Half Moon's marginal habitat. Mowing and roller chopping are the least costly method of mechanical treatment. Roller chopping has been applied to 135 acres of jay habitat since 2000; efforts were made to target palmetto areas and larger oaks, leaving patches of oaks that are 1-2 m high. Mowing is applied to about 25 acres of jay habitat per year. Mechanical treatment of scrubby areas will remain an integral component of the scrub management strategy on Half Moon. Larger oak trees will be controlled individually when needed

In 1998, prison work crews manually and mechanically cut selected oak trees on a 15 acre site, Potter Bend, occupied by scrub-jays. This site had no burn history and the potential for fire to carry into some of the oak stands was poor. This area was roller chopped in 2000 and then burned in February 2002 and September 2005. Jays reoccupied the area in June 2004. Table 2 provides a schedule of mechanical and burn treatments on Half Moon's scrubby areas.

In January 2007, a contractor cut the majority of the live oaks in MU 47 (west of MU 49), an area of semi-improved old pasture. Jays subsequently occupied the area for about a year, using the felled oaks as perches and escape cover. Habitat management treatments sometimes result in these temporary occupations of jays.

Firelines will also be managed as jay habitat. Line disking will occur in April through June, before prescribed burns, and before acorn-caching season in the fall. Disking firelines will be avoided from fall until spring, the season when jays are recovering their cached seeds.

Scrub Oak Reforestation & Ground Cover Restoration - Soils, topography and adjacent vegetation indicate that most of Half Moon's approximately 1200 acres of cleared pastures were historically mesic and scrubby flatwoods. About 170 acres of these ruderal sites have been planted with longleaf pine (*P. palustris*) resulting in a stocking ranging from 3-140 trees per acre. In 1994, 35 acres were planted with 7,000 sand live oak tubelings. Despite site preparation with burning and herbicide, survival was less than 20% due to lack of moisture. Sod removal

also has been considered at these sites to reduce bahiagrass (*Paspalum notatum*) cover. This would allow the propagation of plants with seeds needing exposed mineral soil to germinate.

The oak reforestation area was chosen as a ground cover restoration site in 2005, the bahia was treated with herbicide, and the area planted with native seed from Three Lakes WMA. This area has the potential to be reoccupied by jays when the oak shrubs reach 1.5 meters. Oak reforestation will continue in 2012 with scrub oak species such as Chapmans and myrtle.

Monitoring - Six permanent photographic monitoring sites established in June 1997 are used to monitor vegetation successional changes and responses to fire. Panoramic photos are taken annually at each site; additional photos document plant responses to management practices. Other permanent photo points monitor reforestation sites.

An objective-based vegetation monitoring program was implemented in 2006-07. In scrubby flatwoods, and mesic flatwoods occupied by jays, physiognomic goals include a pine basal area of 10-40 sq. ft./acre, an overstory canopy cover of less than 30%, total shrub cover of 10-60%, palmetto cover of 5-15%, herbaceous cover of 1-10%, bare ground of 10-20%, and an average maximum shrub height of less than 10 feet. Contractors measure these parameters to monitor vegetation and help in habitat treatment decisions.

Faunal inventories also will be used to determine the effects of habitat management on Half Moon. Annual scrub-jay censuses help assess the efficacy of scrub management techniques. Banding assures that individual jays are not counted twice and a minimum number of birds inhabiting the area is known. Scrub-jay recruitment surveys done in mid-summer (July) contribute to monitoring population health and productivity. In addition, future herptile sampling at 3 scrubby flatwoods sites can be compared with results of sampling conducted in 1998.

Table 2. Time line of scrub management activities on Half Moon WMA, 2004-2021. Treatments include roller chopping, mowing, tree cutting and herbicide application. An asterisk * indicates accomplished treatments. See Figure 1 for burn unit location (OBVM management unit ids in parentheses). Treatments missed during growing seasons can occur in following dormant seasons.

Burn Unit with Scrubby Area	Ac.	No. Jays	Previous Burns	grow 2004	dorm 04-05	grow 2005	dorm 05-06	grow 2006	grow 2007	grow 2008	grow 2009	grow 2010	grow 2011	grow 2012	grow 2013	grow 2014	grow 2015	grow 2016	grow 2017	grow 2018	grow 2019	grow 2021
MU 9	46	0	3/3/98 12/17/02	mow*/ burn*	burn*			mow*		burn*			burn	dorm burn*				mech burn				
MU 10	126	0	11/30/95 12/17/02	mow*/ burn*	burn*			chop*/ burn*			burn*			burn	mech				burn			
MU 14	84	0	2/11/97 12/17/02		burn*				burn*			mech */burn*			burn				mech /burn			
MU 17	303	0	12/17/02		burn*		burn*			burn*		dorm /burn*	dorm. burn*		burn			burn			burn	
MU 24	69	0	3/24/94		burn*	herb*	plant*				burn*	mech *	burn*		burn		burn			burn		
MU 27 & 29	119	6-8	2/15/95 3/6/02			burn*		chop*			burn	burn*				mech	burn				burn	
MU 34	142	0	8/9/02				chop*	burn*				burn*					burn				burn	
MU 40	62	8-10	2/12/04					chop*	burn*				mech *	burn			mech	burn				
MU 41	93	2-4	2/26/02			burn*				burn*		mech *	burn ½	burn ½	burn ½				burn			
MU 43	190	10-12	2/15/99	burn*				chop*		burn*	chop*	mech *		burn ½		burn ½					burn	
MU 46	81	0	1/26/99 9/17/03			burn*	chop*				burn*		mech *		burn				burn			

Burn Unit with Scrubby Area	Ac.	No. Jays	Previous Burns	grow 2004	dorm 04-05	grow 2005	dorm 05-06	grow 2006	grow 2007	grow 2008	grow 2009	grow 2010	grow 2011	grow 2012	grow 2013	grow 2014	grow 2015	grow 2016	grow 2017	grow 2018	grow 2019	grow 2021	
MU 48	199	0	3/10/98 2/12/03			burn*	chop*		burn*			mech burn*	mech *			burn				burn			
MU 49	121	0	2/21/95 1/6/00	burn*			chop*	burn*				dorm burn*			burn			burn					
MU 56	40	0	dorm 05	Under Southwest Florida Water Management District management.						burn	burn*	mech *	burn	burn					burn				
MU 59	146	0	dorm 97							dorm burn*	burn	burn*			burn					burn			

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13.11 Wildlife Conservation Prioritization and Recovery Species Management Strategy

Half Moon WMA

Species Management Strategy

2/4/09

Florida Fish & Wildlife Conservation Commission
Division of Habitat & Species Conservation
Terrestrial Habitat Conservation & Restoration Section
A product of the Wildlife Conservation
Prioritization & Recovery Program



EXECUTIVE SUMMARY

The Florida Fish & Wildlife Conservation Commission's (FWC) Terrestrial Habitat Conservation and Restoration section (THCR) takes a proactive, science informed approach to species management on lands in the Wildlife Management Area (WMA/WEA) system. This approach uses site-specific wildlife assessments of a number of focal species in conjunction with area and species expert knowledge to develop a wildlife management strategy for the area. This strategy is intended to: 1) provide land managers with information on actions that should be taken provided the necessary resources are available, 2) promote the presence of and ensure the persistence of focal wildlife species on the area, and 3) provide measurable species objectives that can be used to evaluate the success of wildlife management on the area.

This document represents the results of a science informed approach to evaluating focal species needs within a natural communities management approach. Natural community management focused on a set of focal species provides benefits to a host of species reliant upon these natural communities. Monitoring select species provides information that verifies whether or not natural community management is having the desired effect on wildlife. Throughout the process, the role of the area in regional and statewide conservation initiatives was considered to maximize the potential benefit.

[Section 1](#) informs the reader about the process used to generate this document.

[Section 2](#) describes ongoing management actions on the property. [Section 3](#) provides a list of the 20 focal species modeled to have potential habitat on the area, and an assessment of each species' level of opportunity/need. This includes species-specific goals and objectives when appropriate. Objectives are identified for 6 species on this area: the Florida scrub-jay, Bachman's sparrow, gopher tortoise, northern bobwhite, gopher frog and striped newt.

[Section 4](#) describes specific land management actions recommended for focal species. This includes Strategic Management Areas (SMA) and Objective-Based Vegetation Management (OBVM) considerations. A SMA is an area in which a specific land or species management action(s) can be taken to facilitate conservation of a single or group of species. This section also discusses management necessary to ensure continued persistence of focal species.

[Section 5](#) describes species-specific management (e.g. restocking, nest structures, etc), the species monitoring prescribed for the area, and research that would be necessary to guide future management efforts. Potential species-specific management actions are described for southeastern American kestrels. Monitoring efforts are described for 10 species: Florida scrub-jay, Bachman's sparrow (songbirds), northern bobwhite, gopher tortoise, striped newt, gopher frog, Florida mouse, southeastern American kestrel, southern bald eagle, limpkin, and opportunistic monitoring of other focal and imperiled species. The conservation of Half Moon WMA's wildlife requires interaction with other entities beyond local staff. Intra-agency coordination with 5 other units in FWC and inter-agency coordination with 4 other entities are identified in [Section 6](#). [Section 7](#) describes efforts that are prescribed to occur "beyond the area's boundaries" to ensure conservation of the species on the area.

Most of the land management recommended in this document is currently being implemented by area staff or through contracting using existing resources. Some of the species management and monitoring recommendations may require additional resources, while others can be accomplished with existing resources. Additional resources will likely be required to implement some natural community restoration projects.

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Section 1: Introduction

The Florida Fish & Wildlife Conservation Commission's (FWC) Terrestrial Habitat Conservation and Restoration section (THCR) takes a proactive, science informed approach to species management on lands in the Wildlife Management Area (WMA/WEA) system. Staff integrates conservation planning, Population Viability Analysis (PVA) results, and geospatial analytical techniques to model potential habitat to help FWC determine where focal species conservation can be affected. These landscape level assessments are then combined with area specific and expert knowledge and result in the creation of Species Management Strategies (Strategy) specific to each WMA.

The Strategy is intended to: 1) provide land managers with information on actions that should be taken provided the necessary resources are available, 2) promote the presence and ensure the persistence of focal wildlife species on the area, and 3) provide measurable species objectives that can be used to evaluate the success of wildlife management on the area. On FWC lead areas, goals and objectives included in the Management Plan (formerly known as Conceptual Management Plan) are referenced when discussing the species and drafting the Strategy; therefore this Strategy will help guide and support the goals of the Management Plan. The species-specific objectives identified in this Strategy will be incorporated into the Management Plan and this Strategy will be appended to the Plan.

In this document, goals, objectives and strategies are defined as follows: Goals are broad statements of a condition or accomplishment to be achieved in the future; goals may be unattainable, but provide direction and inspiration. Objectives are a measurable, time-specific statement of results that responds to pre-established goals. Strategies are the actions that will be taken to accomplish a goal or objective, and strategies may be measurable.

Species-specific habitat models were used to create statewide potential habitat maps. A GIS analysis was conducted to determine which of the focal species were modeled to have potential habitat on each area. We use local staff's knowledge, species-expert knowledge, and area-specific maps of natural communities to refine habitat information for each species and evaluate the area's potential role in conservation of the species. A workshop is conducted at which all individuals involved in the decision making process discuss the focal species status, evaluate opportunities for land and species management on the area, and decide on appropriate monitoring and/or research actions. Some species cannot be expected to persist on an area based solely on area-specific measures; therefore this strategy identifies intra- and interagency coordination and any "beyond the boundary" considerations (i.e. working with neighboring land owners) necessary for the management of focal species. Area-specific species objectives, a list of necessary actions to achieve these objectives, and the monitoring necessary to verify progress towards objectives are agreed upon and used to create the area's Strategy.

The primary focus of this approach is non-game species; however 2 of the focal species are game birds. Specific game management actions are not included in this Strategy, though game management actions are considered when drafting the Strategy and are compatible with the actions prescribed by this Strategy. While this Strategy focuses on the Half Moon WMA, it considers the role of the area within the larger state or regional context. Similarly, while the Strategy has species-specific objectives and

actions, it does not espouse single-species management. FWC land management focuses on natural community management that benefits the host of species that naturally occur in each natural community. However, some species may need directed actions if they are to recover from past declines or be restored to habitat from which they were previously extirpated. By implementing the Strategy, FWC believes our management will benefit the largest suite of native wildlife by keeping common species common and aiding in the recovery of listed species.

Section 2: Current Management Actions on Half Moon WMA

Half Moon WMA was acquired by the State of Florida through several purchases occurring between 1989 and 1996. The initial 4,458 acres were purchased under the Conservation and Recreational Lands (CARL) program. Subsequent CARL purchases of the Seven Springs/Smith Tract (878 acres) and the Potter property (122 acres) were added. The Southwest Florida Water Management District (SWFWMD) purchased an additional 4,021 acres of riverine corridor and associated uplands under the Save Our Rivers (SOR) program and granted lead management responsibility to FWC in 2008. As a result of these additions, the area is currently 9,479 acres.

Actively managed natural communities include mesic flatwoods, scrubby flatwoods, wet flatwoods, and sandhill and account for approximately 1,630 acres ([Table 1](#)). Other upland communities actively managed on the area include semi-improved pasture (245 acres), improved pasture (1,020 acres) and pine plantation (62 acres). These communities are currently managed with prescribed fire, grazing, and mechanical and chemical vegetation control. Through the Objective-Based Vegetation Management (OBVM) workshop process, management units were delineated and desired future conditions (DFC) were defined for specific vegetative parameters in the actively managed natural communities. The OBVM sampling plan for Half Moon WMA is available [Half Moon Sample Plan.pdf](#), and more information on OBVM is available in [Section 4.2](#).

The use of prescribed fire is critical to the maintenance and restoration of natural communities. With the exception of 40 acres, all management units on Half Moon WMA which contain burnable acres have been burned 2 or 3 times in the past 7 years. In natural communities, growing season fire is preferred but dormant season burns are used to maintain fire frequency as needed. Management units that are primarily in semi-improved or improved pasture are difficult to burn during growing season due to the spring flush of bahia grass (*Paspalum notatum*). These management units are often burned in the dormant season when burns are not as effective at controlling hardwood encroachment. Grazing often reduces fuels making it difficult to carry fire with sufficient intensity to control woody species. Pastures will continue to require mechanical or chemical treatments to prevent succession to xeric hammock unless they can be converted to native grasses. The terms and conditions of the cattle lease on the property complicate efforts to convert pasture to native grasses.

Area staff is working with the Florida Division of Forestry (DOF) to thin 426 acres of merchantable pine in an effort to move stands to a more natural structure and species composition, thereby enhancing wildlife habitat. Currently, these stands are dominated by loblolly (*Pinus taeda*) and slash pine (*Pinus elliotti*) with basal area

exceeding 80 ft²/acre. Many of these stands are established around wetland margins where the pines were protected from fire due to the management regime of the previous owners. The affected stands will be thinned to a basal area of 40-50 ft²/acre and target the removal of loblolly and slash pine while retaining longleaf pine (*Pinus palustris*). Thinning will increase the penetration of sunlight and enhance the development of herbaceous vegetation, thus improving the effectiveness of prescribed burns. A 62-acre slash pine plantation was thinned in 1999 and in the future will be thinned to 20-30 ft²/acre. Longleaf pine will be under-planted in this stand in the open areas.

Table 1. Mapped acreage of current and historic natural communities with actively managed natural communities highlighted and providing the number of focal species known to use the community type.

Community type	Acreage mapped	Historic acres	Number of focal species use
basin marsh	295	401	5
basin swamp	442	432	7
baygall	4	4	2
blackwater stream	177	177	1
depression marsh	715	845	5
dome swamp	121	109	4
floodplain forest	904	900	7
floodplain swamp	1,762	1,768	6
hydric hammock	575	552	4
mesic flatwoods	1,351	2,659	9
mesic hammock	1,445	1,134	2
pasture improved	1,021	0	2
pasture semi-improved	245	0	7
pine plantation	62	0	3
ruderal	2	0	4
sandhill	44	465	9
scrubby flatwoods	127	85	11
spring-run stream	15	15	2
upland mixed forest	0	38	7
wet flatwoods	110	9	5
wet prairie	0	25	5
xeric hammock	200	0	5

Highlighted = communities that are actively managed and monitored via the OBVM process. Other communities are managed, but not monitored via OBVM.

Mechanical treatments are an important component of management on the area. Roller chopping has been used to manage saw palmetto (*Serenoa repens*) and oak (*Quercus sp.*) encroachment on approximately 200 acres. Removal of larger trees with a mulching mower, Brown tree-cutter or feller-buncher type machine has been done on an additional 500 acres. In some areas girdling and subsequent herbicide application has been effective in reducing oak encroachment. These treatments will continue to be

required in areas that are open to grazing and dominated by bahia grass since it will be difficult to effectively apply fire.

Herbicides are used to control oaks and exotic invasive species as well as bahia grass in old pastures; however invasive exotic species are not a widespread problem on Half Moon WMA. Scattered, small infestations of tropical soda apple (*Solanum viarum*), Japanese climbing fern (*Lygodium japonicum*), Chinaberry (*Melia azedarach*), skunk vine (*Paederia foetida*), cogon grass (*Imperata cylindrical*), camphor tree (*Cinnamomum camphora*), Caesarweed (*Urena lobata*), and Chinese tallow (*Triadica sebifera*) are treated as needed.

A cattle grazing lease on 4,270 acres is in effect through 2013. Stocking rates are one-half the animal units (AUs) recommended by United States Department of Agriculture Natural Resources Conservation Service grazing specialists and result in about 21 acres per AU. The current lease does not require a rotational grazing strategy or restrict grazing spatially or temporally within the lease area. This imposes some limitations on management including limiting opportunities for natural community restoration and reducing the effectiveness of prescribed fire in areas where grazing significantly reduces fuels. When reading the species assessments, acres of potential habitat following restoration will not be attainable if these same conditions continue in the future. Further, while pasture is a community that will be used by a number of species that use this area, pasture is typically less suitable for these species and results in the species occurring in lower densities than could be supported if the historic natural community were restored. Cattle graze heavily on maidencane (*Panicum hemitomon*) in the wetlands and impacts of grazing in wetlands can create an artificial barrier to fire and breeding amphibians.

Xeric hammock occurs on a greater proportion of the area than it historically occurred. Many of the current user groups enjoy the shade and the mast production in this community. As such, efforts to restore these acres to the more natural condition, which would benefit a number of species, may be controversial.

Ongoing restoration activities include a 23-acre native groundcover restoration project and hydrological restoration through ditch plugging. Groundcover restoration has been initiated on an additional 70 acres that is outside of the grazing lease. Additional hydrological restoration opportunities will be determined by a hydrological assessment and ephemeral pond survey scheduled for FY 2009-2010.

Ongoing species management and monitoring actions include Florida scrub-jay (*Aphelocoma coerulescens*) banding and population monitoring, game surveys, intermittent surveys for striped newt (*Notophthalmus perstriatus*) and nest boxes for wood ducks (*Aix sponsa*), bats, southeastern American kestrels (*Falco sparverius paulus*), and eastern bluebirds (*Sialia sialis*).

Section 3: Area Focal Species

FWC's land management is based on restoring the natural form and function of natural communities. However, in some instances it is important to consider the needs of specific species, and necessary to monitor the impacts of natural community management on select wildlife. In an effort to ensure a focused, science-based approach to species management, FWC is using the focal species approach embraced by Closing the Gaps.

The focal species approach incorporates a variety of concepts and considerations that identifies the needs of wildlife collectively by strategically selecting a subset of wildlife species. The group of focal species includes umbrella species, keystone species, habitat specialists, and indicator species. Sixty focal species were selected for the statewide assessment. For each of these species, potential habitat maps were generated and Population Viability Analyses (PVA) were conducted.

Of the 60 focal species, 20 were modeled to have potential habitat on Half Moon WMA. The potential habitat maps and PVA results were used in conjunction with area-specific natural community maps and knowledge from local managers and species experts at the Wildlife Conservation Prioritization & Recovery (WCPR) Workshop to prioritize management of these species on the area. To accomplish this, the “level of opportunity and need” for each species was analyzed. This included analyzing the long-term security of the species (i.e., examine PVA results), considering if the species occurs in actively managed communities, if the species is management responsive, and any other local overriding considerations (e.g., status of species in the region, local declines/extirpations). A brief summary of this assessment of each species is available in [Section 3.2](#).

3.1: Half Moon WMA Focal Species

Gopher frog (*Rana capito*)
Striped newt (*Notophthalmus perstriatus*)

Florida pine snake (*Pituophis melanoleucus mugitus*)
Gopher tortoise (*Gopherus polyphemus*)

American swallow-tailed kite (*Elanoides forficatus*)
Bachman’s sparrow (*Aimophila aestivalis*)
Brown-headed nuthatch (*Sitta pusilla*)
Cooper’s hawk (*Accipiter cooperii*)
Florida mottled duck (*Anas fulvigula*)
Florida sandhill crane (*Grus canadensis pratensis*)
Florida scrub-jay (*Aphelocoma coerulescens*)
Limpkin (*Aramus guarana*)
Northern bobwhite (*Colinus virginianus*)
Southeastern American kestrel (*Falco sparverius paulus*)
Southern bald eagle (*Haliaeetus leucocephalus*)
Wading birds (*Multiple spp.*)

Florida black bear (*Ursus americanus floridanus*)
Florida mouse (*Peromyscus floridanus*)
Sherman’s fox squirrel (*Sciurus niger shermani*)
Southeastern bat (*Myotis austroriparius*)

3.2: Focal Species Opportunity/Needs Assessment

3.2.1: Gopher Frog

Gopher frogs have been heard calling on Half Moon WMA and were documented during a 1998 drift fence survey with over 50 captures. For breeding, this state listed species of special concern relies on ephemeral to semi-permanent, grass-dominated wetlands that lack predatory fish. After tadpoles metamorphose, frogs move into uplands and most often occupy gopher tortoise burrows, but are also found in rodent burrows and crayfish holes. They rarely move more than 1 mile from breeding habitat. Approximately 2,475 acres of potential habitat is modeled to occur on the area. With restoration of historic natural communities, 3,230 acres of potential habitat is modeled. While pasture is included as current potential habitat, the species would likely experience increased viability if the pasture were restored to historic natural communities. Little information is available on minimum viable population size or habitat requirements, but the current population suggests that sufficient habitat is available to maintain a population.

This species is management responsive and the interspersed of upland and ephemeral wetland habitat provides good opportunity for maintaining and enhancing habitat for gopher frogs. The gopher frog triggers 2 of 6 statewide prioritization parameters (a decreasing population trend and a low proportion of populations on state lands modeled to persist). This species is a moderate priority based on the combination of prioritization scores and level of opportunity.

Ongoing application of prescribed fire in upland communities and efforts to increase the frequency of fire in ephemeral wetlands will improve habitat conditions. More specific land management recommendations are found in [Section 4.3.1](#). Other than monitoring and habitat management, there are no specific species management recommendations at this time. Monitoring of potential breeding ponds with call surveys to track presence/absence and changes in distribution is recommended ([Section 5.2.1](#)).

Ongoing natural communities' management, management of ephemeral ponds for striped newt, and management of scrubby flatwoods for Florida scrub-jay should carry habitat benefits to this species; therefore no Strategic Management Area (SMA) is recommended. The area goal is to maintain or increase the population of gopher frogs on Half Moon WMA. The measurable objective is to:

- 1) Increase the number of documented gopher frog breeding ponds by 2018.

3.2.2: Striped Newt

For breeding, striped newts are dependent on ephemeral breeding ponds that lack large predatory fish. These wetlands must be found in a larger landscape of open, fire-maintained forests. This is a management responsive species that is dependant on fire to maintain its preferred habitat conditions. Breeding ponds

must be maintained in a natural condition and should not be altered to enhance fishing opportunities. The striped newt has been documented on Half Moon WMA. Adults were captured in a 1998 drift fence survey, but subsequent dipnet surveys have failed to document reproduction in breeding ponds. The potential habitat model for this species indicates 789 acres in current natural communities, while restoration to historic natural communities would provide 3,600 acres of habitat.

This is one of the most imperiled amphibian species in Florida due to the loss of habitat from agriculture, intensive silviculture and development, and degradation of habitat due to fire suppression and alteration of breeding ponds. This species triggers 4 of 6 statewide prioritization parameters (a low and declining population, and high biological and supplemental scores).

The United States Fish and Wildlife Service was recently petitioned to list the striped newt as a federally threatened species. FWC's Fish and Wildlife Research Institute (FWRI) recently established a statewide monitoring program for striped newts. FWC's Aquatic Habitat Restoration Team recently contracted with Coastal Plains Institute (CPI) to conduct surveys on several WMAs throughout the state that are considered high priority for amphibian conservation. These surveys will evaluate the conditions of these wetlands and result in management recommendations for the restoration/maintenance of the wetlands. Half Moon WMA is included in this project and is scheduled to be surveyed in FY 09-10.

Due to the need for conservation of this species and the level of opportunity on Half Moon WMA a SMA has been designated for this species ([Section 4.1.1](#)). The SMA is based on the location of previously captured newts and around xeric uplands and potential breeding ponds within dispersal distance of the xeric uplands. This SMA is subject to re-evaluation based on results of the CPI survey and their corresponding recommendations. Outside of the SMA FWC's natural community management emphasizing growing season prescribed fire will benefit this species. Monitoring recommendations are in [Section 5.2.2](#). Intra/interagency coordination requirements are found in [Section 6.1.3](#).

The goal for this species is to maintain a viable population that has the potential to function as part of a larger regional population. The measurable objectives are:

- 1) Complete assessment of potential breeding ponds and begin planning any necessary hydrologic restoration activities by 2012, and
- 2) Conduct surveys to document breeding in all potential breeding ponds in all years with sufficient rainfall from 2013 through 2018.

3.2.3: Florida Pine Snake

The Florida pine snake, a state species of special concern, has not been documented on Half Moon WMA. Habitat requirements for Florida pine snakes are not well known, and though it has been documented using a variety of natural communities, it typically occupies sites with sandy soil that are dominated by pines and a well-developed herbaceous understory dominated by grasses. The

primary prey of the Florida pine snake is the pocket gopher (*Geomys pinettis*), which are in low abundance on Half Moon WMA. Pine snakes will consume other small rodents, small snakes and lizards, birds and eggs. Current potential habitat is modeled to be less than 300 acres, and less than 500 acres is mapped as historic habitat. While these estimates are likely lower than the actual potential habitat, Florida pine snakes require a large home range and several thousand acres of suitable habitat to maintain a viable population. The secretive nature of the species makes population estimation problematic. Sandhill restoration and ongoing management for scrubby flatwoods will benefit this species if present, but the available habitat on Half Moon WMA is insufficient to sustain a population without cooperation of adjacent land managers.

Because the area has a small amount of potential habitat and the species will benefit from ongoing management no SMA is recommended. Due to the limited opportunity and the inability to accurately assess the species' population over time it would be inappropriate to delineate measurable objectives for this species on this area. The goal is to maintain suitable habitat on site for the Florida pine snake. Sightings of this species will be documented and if any drift fence surveys are conducted in the future, traps for large-bodied snakes should be included. The xeric uplands on adjacent private lands are designated as a focal area by FWC's Habitat Conservation Scientific Services section. Efforts to work with private landowners in the area ([Section 6.1.4](#)) could benefit this species. By maintaining the xeric uplands in a condition suitable for this species, Half Moon WMA will fulfill its role in the conservation of this species.

3.2.4: Gopher Tortoise

The gopher tortoise is threatened in Florida and a management plan that emphasizes increasing the number of tortoises on public lands to facilitate recovery of this species was recently approved by the FWC.

The ecological role of the gopher tortoise as a keystone species has been well-documented. In most cases, management actions that enhance tortoise populations will provide benefits to numerous other vertebrate and invertebrate species. The gopher tortoise is common on Half Moon WMA and a survey was completed by staff of the Florida Natural Areas Inventory in 2008. The current population is estimated at approximately 600 individuals distributed over 3,000 acres of mostly suboptimal habitat. The burrows were classified by size (small, medium, large) and the size distribution indicated a healthy population with recent recruitment. Less than 200 acres are currently high quality sandhill and scrubby flatwoods habitats with the remainder being pasture, mesic flatwoods and xeric hammock. Gopher tortoise densities in various communities varied greatly from 0.12/acre in xeric hammock to 0.38/acre in pasture to 1.6/acre in sandhill.

This species is management responsive and potential habitat models indicate 2,550 acres of potential habitat. The restoration to historic natural communities would create 2,750 acres of potential habitat. A large portion of the modeled current potential habitat is pasture. On Half Moon WMA, gopher tortoises reach higher densities in the scrubby flatwoods and sandhill than in

pasture. If more pasture could be restored to historic natural communities, restored habitats could likely support greater densities of gopher tortoises. However, the terms of the current cattle lease may limit the extent of possible restoration. Due to the restoration potential and the status of the existing population, the gopher tortoise is a high priority species on Half Moon WMA. The current prescribed fire program and planned ground cover restoration effort will improve the quality and quantity of habitat for gopher tortoises. Due to the expected benefits of ongoing management and wide distribution of tortoises on Half Moon WMA, no SMA is recommended.

Specific land management actions required to achieve species objectives can be found in [Section 4.3.2](#). The species' current distribution on the property does not meet the guidelines for restocking. Other than monitoring and habitat management there is no species management recommended for this species at this time. Monitoring recommendations to determine progress toward the objectives is described in [Section 5.2.3](#).

By restoring the structure and function of natural communities to better suit the gopher tortoise, Half Moon WMA will fulfill the area's role in the recovery of this species. By increasing the number of tortoises on public land, the area will help meet the goal of FWC's gopher tortoise management plan and other regional conservation efforts aimed at this species. The area goal is to improve habitat quality and increase the population of gopher tortoises on the area. The measurable objectives for gopher tortoises on Half Moon WMA are:

- 1) Enhance and maintain 2,550 acres of existing potential habitat and increase available habitat quality by restoring 200 acres of pasture and 50 acres of xeric hammock to sandhill by 2028, and
- 2) Increase the area's population estimate 20% (to 720 tortoises) by 2028.

3.2.5: American Swallow-Tailed Kite

The American swallow-tailed kite is commonly seen on Half Moon WMA. Though no nests have been documented on the area, the fact that kites are commonly seen during nesting season indicates nesting likely occurs on or near the area. The swallow-tailed kite uses a wide variety of natural communities and requires a mosaic habitat which includes tall trees for nesting and open areas for foraging. Dominant trees that are significantly taller than the surrounding co-dominants are preferred for nest sites. Shrub height and density tends to be higher around nest sites. Potential habitat models indicate 3,497 acres of current potential habitat with 4,048 acres possible based on historic natural communities. This species is not typically considered management dependent and the opportunity for management to have significant impact on this species at the local level is low. However, ongoing efforts to restore hydrology and to restore and maintain natural community structure and function will benefit this species.

It would be impractical to set an area-specific objective for this species due to its low opportunity for local management. Should nests be detected, management consideration around nest sites should be employed ([Section 4.3.3](#)). Monitoring recommendations can be found in [Section 5.2.10](#). It is unlikely any

single management area could independently sustain a population of swallow-tailed kites. However, by providing suitable forage and nesting sites, the area can fulfill its role in the conservation of the species.

3.2.6: *Bachman's Sparrow*

Bachman's sparrows are currently experiencing range-wide population declines. While the species is known to occur on Half Moon WMA, their population size, trend and distribution on the area is unknown. This species prefers mature pine forests maintained with frequent fire or early-successional old-field habitat. Use of an area by Bachman's sparrow declines rapidly around 18 months post-fire. Pockets of open ground are important for this species' nesting habitat, and small clumps of shrubs are needed as perching sites for singing males. As such, ongoing timber management that focuses on restoring open, mature stands of pine maintained by prescribed fire will continue to improve conditions for this species.

Models indicate approximately 1,500 acres of mesic flatwoods, sandhill, and scrubby flatwoods that are potential habitat for Bachman's sparrows. With conversion of pastures to historic natural communities, Half Moon WMA has the potential for >3,000 acres of habitat. However, due to the current cattle lease on Half Moon WMA, restoration opportunities are limited. While this species does occur in native habitats managed for cattle, the presence of improved pasture decreases the suitability of the area for this species. Currently the area available for restoration is limited to approximately 630 acres. The literature suggests this is enough habitat to sustain a population providing densities of 0.13/acre could be maintained on at least 520 acres. As this species is management responsive and has significant restoration potential on the area, the level of management opportunity for this species on Half Moon WMA is high.

Due to the restoration potential on Half Moon WMA and the fact that this species is management responsive, a SMA has been designated for this species ([Section 4.1.2](#)). Current land management actions designed to restore natural community structure and function within Half Moon WMA will benefit Bachman's sparrow in management units not included in the SMA. Other than monitoring and habitat management there is no species management recommended for this species at this time. Monitoring will be conducted according to the northern bobwhite and songbird monitoring protocol developed by the Upland Ecosystem Restoration Program (UERP) ([Section 5.2.6](#)). If necessary, this protocol may be supplemented with the use of callback tapes to increase the chance of detecting this species.

The goal for this species is to maintain a viable, self-sustaining population that has the potential to function as part of a larger regional population. The measurable objectives for Bachman's sparrow on Half Moon WMA are:

- 1) Conduct an initial survey using breeding season point counts to get a baseline estimate for Bachman's sparrow population by 2010, and
- 2) Increase the number of Bachman's sparrows heard on songbird point count routes by 20% by 2018.

NOTE; a monitoring protocol is being developed for this species. These objectives may be modified to reflect the level of detail the standard protocol will accommodate.

3.2.7: *Brown-Headed Nuthatch*

The brown-headed nuthatch has not been documented on Half Moon WMA. This primary cavity nester prefers open stands of mature pine timber managed with frequent fire and selects older, very decayed snags to excavate nest cavities. With restoration of all historic natural communities >3,000 acres of potential habitat could be available. As with the Bachman's sparrow, restoration potential is limited due to the cattle lease in place on approximately 1,100 acres of potential habitat. Currently most of the timber stands are not mature enough to support optimal brown-headed nuthatch populations. As timber is thinned and remaining trees mature, habitat conditions will improve for this species. However, this species is a poor disperser and has problems recolonizing restored habitat unless it is close to occupied habitat. The absence of the species from the nearby State Forest suggests natural recolonization of Half Moon WMA by this species may be unlikely. If this species does not recolonize the area after habitat parameters are more suitable to this species' needs, restocking may need to be considered in the future.

Although this is a management responsive species and ongoing management activities directed at other focal species will improve habitat conditions for the brown-headed nuthatch, it will be many years before significant acreage of suitable habitat is available and there is little opportunity for dispersal of individuals from adjacent lands. At this time, the brown-headed nuthatch is a lower priority species for Half Moon WMA, but may warrant consideration in the future as habitat conditions improve. Reintroduction in coordination with managers of nearby public lands should be considered in the future if necessary. While no SMA or specific monitoring is proposed for this species at this time, planned implementation of spring point counts using the UERP protocol will ensure that presence is documented if observed on the area ([Section 5.2.6](#)). Specific land management considerations for this species are included in [Section 4.3.4](#) to ensure the area becomes more suitable for this species.

3.2.8: *Cooper's Hawk*

The Cooper's hawk has not been documented nesting on Half Moon WMA, but is likely an occasional visitor. Models indicate 4,486 acres of current potential habitat and 4,387 acres of potential habitat based on historic natural communities. Cooper's hawks nest in a variety of natural communities, including swamps, floodplain and bottomland forests, sand pine scrub, and baygalls. Nests are placed in the crown of a tree close to the forest edge, a natural opening, or man-made clearing that facilitates an unimpeded flyway to the nest. Nests are usually placed in relatively dense stands of moderately young live oak (*Quercus virginiana*) or laurel oak (*Quercus laurifolia*) trees adjacent to pines, old-fields,

streams, marshes, or agricultural fields. This species is generally not management dependent and the opportunity to impact this species with management is low. However, continued thinning of pine timber and efforts to maintain open fire-dependent natural communities will likely increase suitable foraging habitat. If Cooper's hawk nests are located, nest protection guidelines should be observed ([Section 4.3.5](#)) and the nest location documented ([Section 5.2.10](#)).

Because the management opportunity for this species is low, no SMA is necessary and it would be impractical to set an area-specific goal or objective. It is unlikely any single management area could independently sustain a population of Cooper's hawk. However, by providing suitable forage and nesting sites, the area can fulfill its role in the conservation of the species.

3.2.9: Florida Mottled Duck

Florida mottled ducks have been observed foraging in shallow ponds on Half Moon WMA, but have not been documented nesting on the area. Preferred nesting habitat includes upland grassy areas near wetlands, but they are known to nest in dry marsh, pine flatwoods, and even urban areas. Management activities that promote shallow emergent wetlands with a mosaic of open water and herbaceous cover provide good foraging habitat. Models indicate 915 acres of potential habitat and 1,152 acres of habitat based on historic natural communities. Current and future management practices proposed in this strategy such as maintaining open emergent ponds with fire and using frequent fire in uplands adjacent to ponds will benefit the mottled duck. Statewide aerial waterfowl surveys have been conducted in March of each year since 1985, and monitoring at the area level is not recommended. Statewide data indicate breeding populations of mottled ducks have varied slightly from year to year. No trend has been detected and overall the population has remained stable.

No SMA or area-specific goal is recommended. If nesting is observed it should be documented ([Section 5.2.10](#)). By providing suitable forage and nesting sites, the area can fulfill its role in the conservation of the species.

3.2.10: Florida Sandhill Crane

Florida sandhill cranes, a state listed threatened species, are commonly observed on Half Moon WMA and nest in wetlands on or near the area. This species uses a variety of upland habitats that are relatively open with a majority of the vegetative cover equal to or less than 20 inches in height. Standing water is an important component of nesting habitat for Florida sandhill cranes. Nests consist of herbaceous plant material mounded in shallow water or in marshy areas. Home ranges for adult pairs are approximately 1,000 acres and consist of a mosaic of emergent palustrine wetlands and open uplands such as pasture, prairie, and open pinelands. Models indicate < 500 acres of current potential habitat on the area and similar amounts of historic habitat; however, the models likely underestimate the amount of potential habitat for this species. There is a large amount of potential

habitat on lands surrounding the area, and Half Moon WMA may play a role in supporting the regional population of Florida sandhill cranes.

Planned management activities such as prescribed burning and hydrologic restoration should benefit this species. Due to the limited opportunity to manage specifically for this species it is considered a lower priority. No SMA or measurable objective is recommended for this species. The goal for the area is to ensure that ongoing management continues to provide potential nesting and foraging habitat so that cranes continue to be commonly observed.

If nests are detected, management activities should be planned to avoid disturbance ([Section 4.3.6](#)). Other than monitoring and habitat management there is no species management recommended for this species at this time.

Opportunistic monitoring of nesting activity is recommended ([Section 5.2.10](#)). It is unlikely any single management area could independently sustain a population of sandhill cranes. However, by providing suitable forage and nesting sites, the area can fulfill its role in the conservation of the species

3.2.11: Florida Scrub-Jay

The Florida scrub-jay is listed as a threatened species by both the FWC and the USFWS. The species has a low and declining population, high biological and supplemental scores, and was modeled to have a high rate of decline and a decrease in the number of populations on state lands.

Florida scrub-jays are commonly seen on Half Moon WMA. The population in 2008 consists of 8 to 10 family groups. Approximately 40 individuals are being monitored on Half Moon WMA. Over 100 individuals have been banded since 2001. It is believed the areas historically supported 17 family groups. As such, it might be possible to increase the population by 5-8 family groups with continued management of historically occupied habitat.

Ideal habitat for Florida scrub-jays is oak-dominated scrub predominantly 3 to 6 feet tall with an average of < 1 pine per acre. Increased pine densities and decreased distance to forest edge will decrease habitat suitability for scrub-jays by providing cover and perches for predators. Small patches of taller scrub (6-9 feet) cumulatively comprising no more than an acre per territory provide habitat heterogeneity and possibly increased acorn production. Half Moon WMA has no scrub and occupied habitat is scrubby and mesic flatwoods managed with a reduced pine canopy and a scrub oak shrub layer. Models indicate approximately 800 acres of current potential habitat when including mesic flatwoods managed to create a scrubby flatwoods structure and including pasture that occurs proximate to these natural communities. These acres of pasture were added due to the fact the species is currently using this community; however it is a less than optimal community for this species. Only 80 acres of scrubby flatwoods occurred historically on Half Moon WMA, so current management efforts in the mesic flatwoods are necessary to maintain the current population. Literature suggests ~25 acres are needed to support one family group with a minimum of 10 family groups needed to increase the probability of population persistence.

The Florida scrub-jay population on Half Moon WMA contributes to enhanced stability of the regional metapopulation due to its location between several known populations on private and public lands in Citrus, Marion, and Sumter counties. By providing a geographic link between scattered populations in the region, Half Moon WMA contributes to the overall population stability of this species. As this species is management responsive and there is a high level of management opportunity to positively impact scrub-jays, it is considered a high priority species.

To ensure focused management for this priority species, a SMA is recommended ([Section 4.1.3](#)). The goal for this species is to maintain a population of Florida scrub-jays on Half Moon WMA that has the potential to function as part of a larger regional metapopulation. While we believe the WMA is capable of supporting 15-18 jay family groups, factors outside of the land manager's control (i.e., disease, demographics) may cause the number of family groups to drop unexpectedly. The measurable objectives to monitor progress towards the goal are:

- 1) Restore all historic scrubby flatwoods and mesic flatwoods that can be maintained in a "scrubby flatwoods" structure within the SMA to suitable conditions for Florida scrub-jay by 2018, and
- 2) Increase the number of scrub-jay family groups utilizing suitable habitat on Half Moon WMA from 8-10 to 12-15 by 2028.

[Section 4.1.3](#) describes land management considerations, [Section 5.2.4](#) describes monitoring recommendations, and [Section 5.3.1](#) describes research recommendations.

It is unlikely the area can sustain this species in the long-term if suitable habitat for the species is significantly altered on neighboring lands. This emphasizes the need to work cooperatively with other public and private lands in the area that manage and monitor scrub jays ([Sections 6.4 & 7](#)). FWC's HCSS has designated the xeric uplands in the area as a focal area and are attempting to work with private landowners in the area ([Section 6.1.4](#)) which could benefit this species.

3.2.12: Limpkin

The limpkin, a state species of special concern, is occasionally observed on Half Moon WMA, but reproduction has not been documented. No survey effort has been undertaken for this species. This species is dependent on apple snails and freshwater mussels and uses freshwater marshes, swamps, springs and spring runs, and pond and river margins. Limpkins are highly mobile and not dependent on actively managed communities. Territory size at Wakulla Springs (Wakulla County) averaged 5.7 ac \pm 3.7 ac while territory size at Alexander Springs (Lake County) averaged 5.2 ac \pm 1.7 ac. Territory size may vary greatly from year to year in relation to prey abundance and availability and social interaction. Models indicate 428 acres of potential habitat whether looking at current or historic natural communities. It is unknown if this is enough potential

habitat to support a viable limpkin population. However, Half Moon is part of a block of conservation lands along a river system that likely has the potential to support the species long-term.

None of the habitats used by limpkins for nesting or foraging are actively managed, although activities that degrade water quality could adversely impact apple snails and limpkins. Due to the lack of direct management opportunities for limpkins there is low opportunity to impact the species on Half Moon WMA. No SMA or targeted land management is recommended for this species. There is some concern that limpkin populations are declining locally, but no monitoring data is available to confirm current population trends. Planned management to restore natural community structure and function, and any efforts to restore hydrology should allow the area to fulfill its role in the conservation of this species. See [Section 4.3.7](#) for land management considerations, [Section 5.2.5](#) for monitoring information, and [Section 6.3](#) for intra/interagency coordination.

3.2.13: Northern Bobwhite

The northern bobwhite is commonly heard and observed on Half Moon WMA. A popular game species, they have experienced significant range-wide population declines since the 1980s and are the focus of a number of conservation initiatives including UERP.

The northern bobwhite is highly responsive to active management and depends on multiple early-successional habitats that are well interspersed to meet their annual life requirements. They respond well to the creation of edge or ecotone. This species is associated with open canopy forests and grassland communities dominated by warm season grasses, legumes, and patchy bare ground. Weedy areas are used for raising broods and for bugging habitat; shrubs or other thickets are used as roosting habitat or escape cover. The frequent application of prescribed fire (i.e., 2-3 year interval) is important when managing this species. Models indicate 3,009 acres of current potential habitat with a total of 3,247 acres possible after restoration. This amount of potential habitat is enough to support a small, but viable population. While these acreages are similar, much of the current habitat is pasture. Acres in pasture are of marginal value and can be improved with restoration to native groundcover. Management actions that benefit northern bobwhite will carry benefits to other focal species like Bachman's sparrows, brown-headed nuthatches, gopher tortoises, and gopher frogs. A positive response of quail populations from land management can be viewed as a measure of positive gains for other wildlife species.

The ongoing population declines, its popularity as a game bird, and the many conservation initiatives for this species make it a moderate to high priority species. Management actions to improve conditions for this species are well known and the species is easily monitored, therefore the opportunity is high. Land management considerations for northern bobwhite are found in [Section 4.3.8](#). Monitoring recommendations are found in [Section 5.2.6](#). Coordination requirements are found in [Section 6.1.2](#).

Ongoing management of Half Moon WMA's natural communities should increase suitable habitat for northern bobwhite, and therefore no SMA is recommended. The area goal is to increase relative abundance and recreational opportunities associated with northern bobwhite on Half Moon WMA. The measurable objectives are to:

- 1) Complete spring point count surveys to establish a baseline for whistling cocks by 2010, and
- 2) Increase the number of whistling cocks heard on spring surveys by 20% by 2018.

NOTE: a monitoring protocol is being developed for this species. These objectives may be modified to reflect the level of detail the standard protocol will accommodate.

3.2.14: Southeastern American Kestrel

Southeastern American kestrels, a state threatened species, are not typically observed on Half Moon WMA during nesting season. Kestrels are observed occasionally after the nesting season when it is not possible to distinguish between subspecies. Kestrel nest boxes erected in 1998 have not been utilized. Nest box locations may not have been optimal and planning for the future placement of nest boxes will include review of recent research into kestrel nesting habitat preferences.

The current potential habitat model indicates 3,497 acres on the area and 4,048 acres of potential habitat with restoration of historic natural communities. Much of the current potential habitat is pasture which has reduced value to the species. Southeastern American kestrels prefer open habitat types for foraging and snags for nesting or perching. Old fields and low density sandhill forests with scattered clumps of shrubs or brush piles that harbor small mammals, lizards, snakes and other prey are ideal. Closely grazed pasture tends to lack sufficient prey and is marginal habitat for kestrels. Ideally, ground cover height should be heterogeneous and less than 1 ft with patches of bare ground and shrubs interspersed.

The southeastern American kestrel is management responsive and ongoing management activities and restoration efforts should improve habitat for this species. Even though kestrels use pasture, it is suboptimal habitat for the species, and the restoration of sandhill would benefit this species. However, the limitation on habitat restoration due to the cattle lease and popularity of the xeric hammocks will limit availability of optimal habitat.

The southeastern American kestrel is a moderate priority on Half Moon WMA due to its status as threatened, its low and declining population, its high biological score, and the low proportion of populations modeled to persist on state lands. There is good opportunity to improve conditions for this species through ongoing habitat management and the opportunity for providing nest boxes. No SMA is recommended since habitat conditions throughout the area should improve with ongoing management. The area goal is to maintain suitable habitat for the species that eventually results in the species nesting on site. It is unlikely

any single management area could independently sustain a population of southeastern American kestrel. However, by providing suitable forage and nesting sites, the area can fulfill its role in the conservation of the species. Land management considerations for southeastern American kestrel are found in [Section 4.3.9](#). Please see [Section 5.1.1](#) for species management recommendations and [Section 5.2.7](#) for monitoring recommendations. Coordination requirements are found in [Section 6.1.3](#).

3.2.15: Southern Bald Eagle

The southern bald eagle is seen and heard occasionally on Half Moon WMA, and reproduction has been documented on the area. One bald eagle nest is located on Half Moon WMA near the Withlacoochee River but has not been active since 2005. There are a number of active territories near the area on the river and on lakes within the Lake Tsala Apopka chain.

The species uses a number of natural communities and is not considered management dependent, though it does benefit from active management to restore natural communities provided nest protection guidelines are followed. There are currently 5,220 acres of potential habitat based on natural communities on Half Moon WMA, with 3,965 acres potentially available based on historic natural communities.

Given the generalist nature of this species and its high mobility, the opportunity for management on this area to have a significant impact on this species is low. No SMA or measurable objective is recommended. The goal for this species is to ensure continued persistence of this species on the area by continuing to provide suitable habitat for this species on Half Moon WMA. Should an active nest be detected, management efforts around these sites should follow the guidelines of the FWC Bald Eagle Management Plan ([Section 4.3.10](#)). Monitoring recommendations can be found in [Section 5.2.8](#). It is unlikely any single management area could independently sustain a population of bald eagles. However, by providing suitable forage and nesting sites, the area can fulfill its role in the conservation of the species.

3.2.16: Wading Birds

A number of wading bird species are known to forage and potentially nest on Half Moon WMA. The great egret (*Ardea albus*), snowy egret (*Egretta thula*), little blue heron (*Egretta caerulea*), and white ibis (*Eudocimus albus*) are all considered common species, while the wood stork (*Mycteria americana*) and tricolored heron (*Egretta tricolor*) are occasionally seen on Half Moon WMA. The little blue heron has been reported breeding on the area in the past, but not in recent years. Potential habitat models indicate 5,121 acres of current potential habitat with 5,235 acres possible after restoration.

Ongoing natural community management including actions to restore hydrology and the use of prescribed fire in wetlands will benefit these species. Because these species are not management dependant, no SMA or measurable

objective is recommended. The area goal is to keep these species common on the WMA. It is unlikely any but the largest of management areas could independently sustain a population of various wading birds. However, by providing suitable forage and nesting sites, the area can fulfill its role in the conservation of the species.

If nesting is documented, planning for land management activities should ensure protection of these sites ([Sections 4.3.11](#)). Documentation of nesting sites, especially nests of wood storks is recommended ([Section 5.2.10](#)).

3.2.17: Florida Black Bear

The Florida black bear, a state threatened species, occasionally occurs on Half Moon WMA and sightings of bears or their sign have been increasing. However, the area is not in the current primary or secondary range of the species as identified by the FWC Bear Management Plan (2008). Half Moon WMA is part of a complex of public lands that facilitate bear dispersal throughout the Withlacoochee River and Green Swamp corridor. The FWC is currently developing a black bear management plan that may influence future management for the species on the area.

Bears depend on a mosaic of natural communities that produce a variety of foods throughout the year. Habitat in this area, particularly in the hydric hammock along the river, is of high quality. Models indicate 6,900 acres of potential habitat and restoration to historic natural communities could provide 7,700 acres of potential habitat. Some of the ongoing management actions such as saw palmetto reduction and frequent fire in the mesic flatwoods may negatively affect Florida black bears by reducing available denning habitat. However, the same management actions may improve foraging conditions and suitable den sites will likely always be available in fire shadows, along the river corridor and in non-actively managed natural communities. Land management considerations are found in [Section 4.3.12](#).

Because this species has a large home range exceeding acreage on the management area, and the management area is not within the primary or secondary range of the black bear, management opportunity for this species is low. No SMA or measurable objective is designated for this species. It is likely only the largest of management areas can independently sustain a population of Florida black bears. Florida black bears will likely continue to use this area as a dispersal corridor and ongoing management will not adversely affect this use. By retaining quality natural communities upon which this species is dependant, the area will fulfill its' role in the conservation of this species.

3.2.18: Florida Mouse

The Florida mouse was recently documented on Half Moon WMA in management unit 5. Palms have been made to conduct a survey to determine the status of Florida mice on Half Moon WMA. The Florida mouse is considered an obligate commensal of the gopher tortoise, and may not be able to persist on sites

where tortoises are absent. Florida mice have habitat requirements compatible with those of the gopher tortoise, Florida scrub-jays, and other focal and imperiled species. Generally considered to be an inhabitant of sandhill, scrubby flatwoods, and scrub natural communities, they are known to use xeric hammock and pasture that are found in association with these natural communities. Abundance of Florida mice is highest in areas supporting early-successional vegetation shortly after fires. Populations decline as natural communities become more densely vegetated, shadier, and more mesic. It is possible Florida mice have more specific requirements for structure and composition in the ground cover than species such as the gopher tortoise. Research is required to assess these specific habitat needs (Section 5.3.2).

Models indicate 116 acres of potential habitat and 122 acres of potential habitat possible after restoration; however these likely underestimate the actual amount of potential habitat on site. This is sufficient habitat to sustain a population especially if suitable habitat is maintained on adjacent properties.

Monitoring recommendations can be found in [Section 5.2.9](#). Long-term viability of this species will be enhanced if suitable habitat is maintained on neighboring lands. FWC's HCSS has designated the xeric uplands in northwest Sumter and southwest Marion Counties as a focal area and are attempting to work with private landowners in the area ([Section 6.1.4](#)) which could benefit this species.

This species is management responsive and there is good opportunity for management on Half Moon WMA. This state listed species of special concern has a declining population, a high supplemental score and was modeled to have a high rate of decline and a low proportion of populations modeled to persist on public lands; therefore, it is considered a medium to high priority species. Ongoing natural communities' management and management actions to support Florida scrub-jays will benefit this species; therefore no SMA is necessary. The area goal is to establish and/or maintain a viable population on Half Moon WMA. The measurable objectives are:

- 1) Determine the distribution of Florida mouse on Half Moon WMA by completing a baseline trapping survey by 2010, and
- 2) Track changes in distribution by trapping every 5 years within suitable habitat until the WCPR strategy is updated.

If Florida mice are found to be widespread on Half Moon WMA, availability of habitat and sustainability of the population may need to be re-evaluated. By managing the natural communities to provide for the needs of this species, the area will fulfill its role in the conservation of this species.

3.2.19: Sherman's Fox Squirrel

This species is rarely observed on Half Moon WMA, but sightings have become more frequent. The size and status of the population on Half Moon WMA and adjacent properties is unknown. Suitable habitat for fox squirrels includes longleaf pine sandhills or flatwoods with the best habitat in areas with a mixture

of pines and oaks, such as along the edges of longleaf pine savannas and live oak forests. There are currently 2,689 acres of modeled potential habitat based on natural communities on Half Moon WMA, with 3,247 acres modeled to potentially occur following restoration.

The fox squirrel is management responsive and there is good opportunity to improve conditions for this species on Half Moon WMA. This state listed species of special concern has a low and declining population, a high supplemental score and had a low proportion of populations on public lands modeled to persist making the species a moderate priority. However, the small amount of potential habitat, compared to the needs of the species is cause for concern. This species will benefit from ongoing natural community restoration and no SMA is recommended at this time. Because the status of the population is unknown the goal for this species is to improve and maintain habitat for the Sherman's fox squirrel. It is unlikely the management area could independently sustain a population of Sherman's fox squirrel. However, FWC's HCSS has designated the xeric uplands in northwest Sumter and southwest Marion Counties as a focal area and are attempting to work with private landowners in the area ([Section 6.1.4](#)) which could benefit this species.

See [Section 4.3.13](#) for land management considerations, [Section 5.2.10](#) for monitoring recommendations, and [Section 5.3.3](#) for research consideration. By providing suitable forage and nesting sites, the area can fulfill its role in the conservation of the species.

3.2.20: Southeastern Bat

Southeastern bats have not been documented on Half Moon WMA. As Half Moon WMA occurs in proximity to known maternity caves in Citrus and Marion counties, it is likely the species at least forages on the area. While no caves and few large trees that might serve as maternity roosts are available on site, southeastern bats occasionally use culverts, bridges or old abandoned sheds for maternity roosts. There is a bat house on the area which recently was occupied by bats of unknown species. The Withlacoochee River bottomland area and many small wetlands distributed across the area are good foraging sites for bats.

Potential habitat models indicate 2,291 acres available within current natural communities and 2,456 acres of historic natural communities. Southeastern bats use both actively managed and non-actively managed natural communities. Ongoing management within the actively managed communities is beneficial to bats and no SMA is recommended at this time. No specific goal is proposed for this species, but if a maternity roost is detected it will be necessary to reevaluate this species' needs. Coordination with the mammal taxa coordinator to determine what bat species have occupied the bat house is recommended. Management considerations are described in [Section 4.3.14](#). Any concentration of roosting bats that are encountered should be documented ([Section 5.2.10](#)).

By maintaining suitable forage sites, this area will fulfill its' role in the conservation of this species.

3.2.21 Other Imperiled Species

One eastern indigo snake (*Drymarchon corais couperi*) was captured in the 1998 herp survey, but this species has not been documented on the area since. Indigo snakes are a wide-ranging species that use a variety of natural communities found on Half Moon WMA. This species responds well to natural community management that includes prescribed fire. They are commonly associated with the gopher tortoise, frequently using their burrows. Ongoing management of Half Moon WMA is compatible with the needs of the indigo snake and should benefit this species.

Nine rare plant species have been documented on Half Moon WMA. Eight of these species are found in floodplain swamps and mesic or hydric hammocks, which are not actively managed natural communities. However, one species, the giant orchid (*Pteroglossaspis ecristata*), is found in mesic/scrubby flatwoods. The giant orchid is a fire adapted species and as such will benefit from the use of prescribed fire on Half Moon WMA. Appropriate steps will be taken to ensure mechanical treatments do not negatively impact specific sites known to support this species.

Rare plant species documented on Half Moon WMA:

- Pecluma pumula* – plume polypody
- Pecluma ptilodon*- swamp plume polypody
- Lobelia cardinalis*- cardinal flower
- Matalea gonocarpus*- angle pod
- Platanihera flava* - southern rein orchid
- Tillandsia utriculata* - giant air plants
- Pteroglossaspis ecristata* – giant orchid
- Peperomia humilis*- low peperomia
- Pinguicula lutea/caerulea*- yellow/blue butterwort

Section 4: Land Management Actions and Considerations

While 20 focal species were modeled to have potential habitat on the area ([Section 3.1](#)), not all of these species have the same level of management opportunity or need ([Section 3.2](#)). FWC's natural community based management will promote the habitat conditions necessary for most of these species, without the need for further strategic management actions.

When actions over and above natural community management are required, a Strategic Management Area (SMA) may be designated. The designation of SMAs allows for identification of an area in which a specific land or species management action(s) can be taken to facilitate conservation of a species or group of species. SMAs are areas in which specific actions will occur that typically will not occur area-wide. SMAs can be used to:

- Identify the area in which to apply specific land or species management that creates the highest probability for persistence/conservation of a species/suite of

species. These specific actions may aid in restoring, enhancing or maintaining the habitat or population.

- Identify an area in which to focus specific management actions (land management or species management) for the best chance of success on large areas with more restoration/enhancement than can be accomplished in short order. This might be the first or next step in a sequential series of management actions that will increase the likelihood of occupation and/or persistence of a specific species.
- Identify an area that is so critical to the persistence of a species on the area that it warrants identification to ensure protection against negative alteration.
- Focus efforts on restoration/enhancement of a natural community that will benefit a priority species or a group of focal species. The SMA should identify the area in which these actions have the greatest positive impact for the species of interest.
- Identify areas that are more critical for research or monitoring.
- Recommend specific OBVM DCFs in a specific area to benefit a specific species when we would not want to change the DCFs in the natural community area-wide.

The WCPR process resulted in the identification of 3 species for which SMAs were established on Half Moon WMA ([Figure 1](#)). For each SMA, species-specific goals, objectives and strategies were developed to guide management. In this document, goals, objectives and strategies are defined as follows: Goals are broad statements of a condition or accomplishment to be achieved in the future; goals may be unattainable, but provide direction and inspiration. Objectives are a measurable, time-specific statement of results that responds to pre-established goals. Strategies are the actions that will be taken to accomplish a goal or objective, and strategies may be measurable.

The DFCs established via the OBVM process often are a range of values that will accommodate the needs of a number of species. Some species require a more specific range of preferred habitat parameters than those generally applied via OBVM or require habitat parameters that may not have been included in the initial OBVM DCFs. In order to ensure land management efforts positively impact specific species, more specific DFCs in specific natural communities and management units may be suggested in the SMAs ([Section 4.1](#)). When there are new parameters that need to be considered in OBVM, or parameters that need modification that can be applied area-wide, these are identified in [Section 4.2](#).

Some species have specific protective measures or land management considerations that are necessary to ensure their continued use of the property. These are prescribed in [Section 4.3](#).

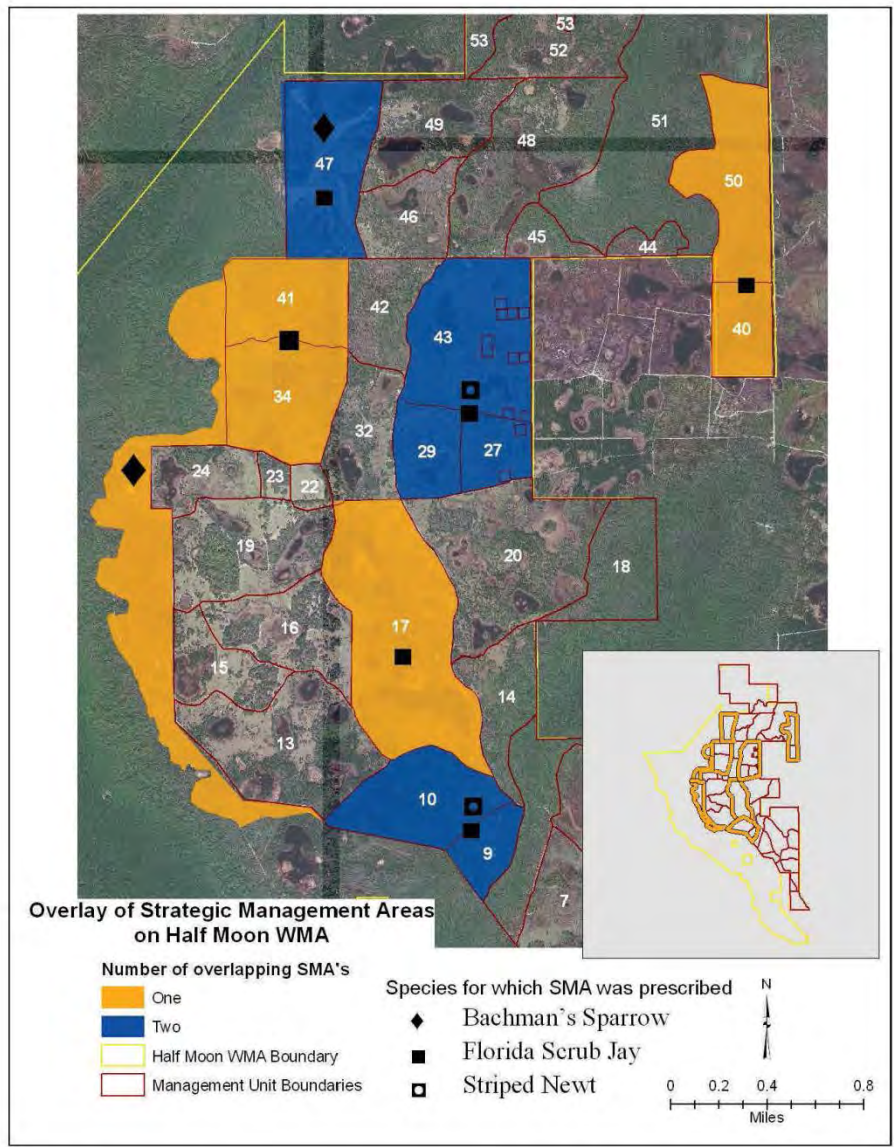


Figure 1. Comprehensive view of management units identified in Strategic Management Areas (SMA) on Half Moon WMA showing overlap of SMAs and species for which actions are prescribed. Colors identify the number of SMAs that overlap the management unit, and symbols represent the species for which an SMA was prescribed. Example: units 9 and 10 identified in blue contains overlap of 2 SMAs; one for the Florida scrub-jay symbolized by ■, and one for the striped newt symbolized by ■.

4.1: Strategic Management Areas

4.1.1: Striped Newt

For breeding, striped newts are dependent on ephemeral wetlands that lack large predatory fish and occur in a larger landscape of open, fire-maintained forests. Due to the loss of habitat to agriculture, intensive silviculture, and development, this is one of the most imperiled amphibian species in Florida. The SMA is intended to focus attention on restoration/enhancement of ephemeral wetlands with the greatest potential to be breeding ponds for the striped newt.

The striped newt was documented on Half Moon WMA in a 1998 drift fence survey, but has not been recorded in subsequent dipnet surveys of potential breeding ponds. FWRI is coordinating a statewide monitoring program for the striped newt and other ephemeral pond-breeding amphibian species. Half Moon WMA is included in an Aquatic Habitat Restoration and Enhancement Section (AHRES) contract that will hire CPI to survey physical conditions and hydrology of ponds on a number of WMAs and make management/restoration recommendations.

The SMA is based on the location of previously captured newts and around xeric uplands and potential breeding ponds within dispersal distance of the xeric uplands. This SMA is subject to re-evaluation based on results of the CPI survey and their corresponding recommendations. If a known breeding pond is found outside of the SMA, the SMA will be revised to include the appropriate area.

Goal: Assess current population status and maintain a viable striped newt population on the area.

Objective 1: Complete assessment of potential breeding ponds and begin planning any necessary hydrologic restoration activities by 2012

Objective 2: Conduct surveys to document breeding in all potential breeding ponds in all years with sufficient rainfall from 2013 through 2018.

Description of the SMA: This SMA focuses on all historically mapped depression marsh and dome swamp within 1,640 ft of sandhill and scrubby flatwoods within management units 9, 10, 27, 29, and 43 and accounts for 161 acres (Figure 2).

Some of the uplands in this SMA are part of the SMA for Florida scrub-jay. Specific management actions implemented for Florida scrub-jay will benefit the striped newt in its terrestrial habitats, as will natural community management that includes the use of prescribed fire. Management actions specific to the striped newt are primarily actions to promote open, emergent herbaceous ephemeral ponds for breeding habitat. Striped newt breeding ponds are typically dominated by maidencane, but other graminoids such as broomsedge (*Andropogon virginicus*), sedges or rushes are acceptable.

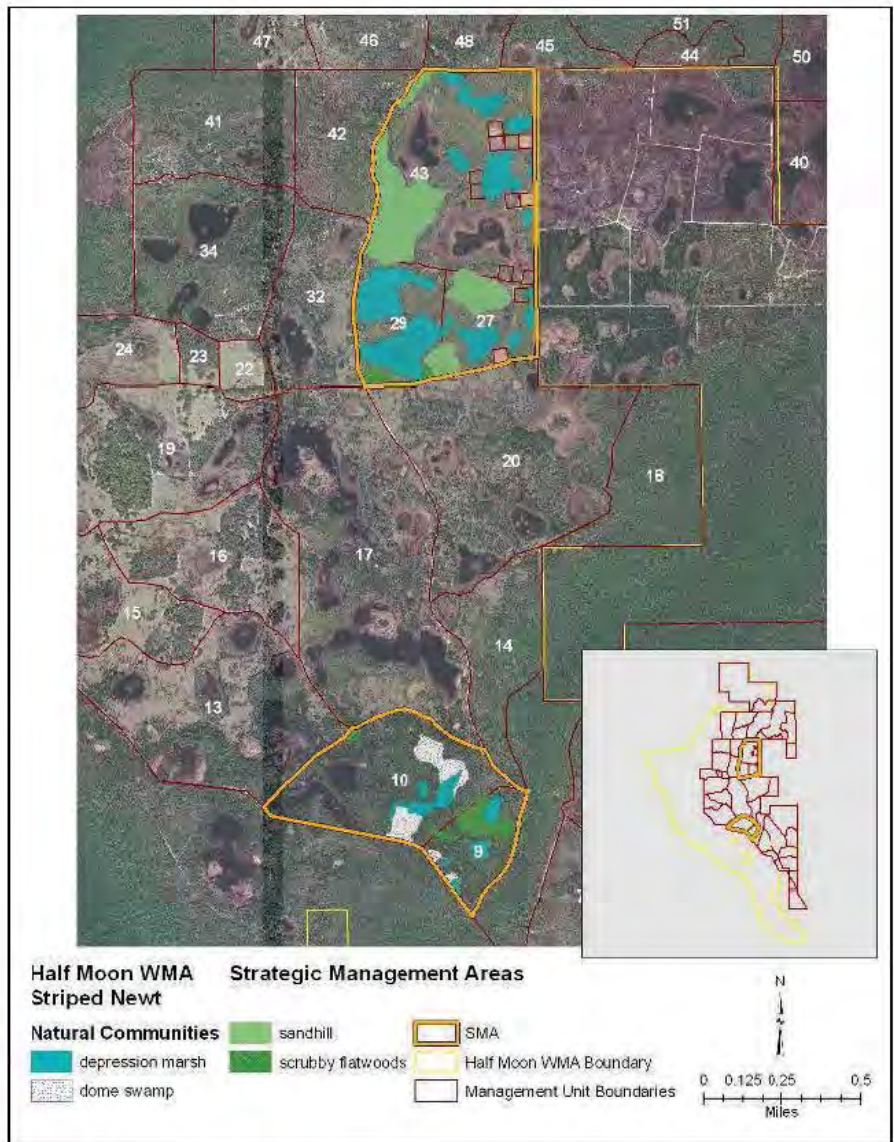


Figure 2. Management units and natural communities in which specific actions are prescribed to benefit the striped newt on Half Moon WMA.

Strategy: FWC's natural community based management and management actions planned for the Florida scrub-jay and gopher tortoise will provide suitable upland habitat for the striped newt. Specific management activities for the striped newt are focused on providing high-quality breeding ponds. This includes ensuring breeding ponds are not altered to enhance fishing opportunity.

When burning uplands in the SMA, every effort should be made to ensure the wetlands and associated ecotone burn. Chemical treatment of woody vegetation should be avoided in a 656 ft buffer due to the sensitivity of amphibians to herbicides. Mechanical disturbances should be avoided in the pond margins. If breeding is documented in a pond, exclusion of cattle should be considered if impacts of grazing threaten the integrity of the pond or ecotone. During dry periods, any pond that has not burned with the surrounding uplands in > 5 years should be burned to prevent development of woody vegetation.

Depression marshes and dome swamps should be added as communities of interest in OBVM. However, these communities should be monitored in accordance with the protocol described below and not via the OBVM process.

Many of Half Moon's ephemeral wetlands are currently included in a project that will evaluate the current condition of these wetlands and provide management recommendations to restore their natural form and function. When these recommendations are available, they will be implemented, pending resource availability. Any striped newt potential breeding pond in the SMA should be monitored for physical and vegetative conditions prior to treatment to determine pre-treatment conditions, and again in the growing season following treatment to determine post treatment conditions. After successful restoration, these communities should be monitored once every 5 years.

A monitoring protocol that standardizes and directs how information is collected needs to be developed prior to the first treatment. The following are suggested minimum parameters to be recorded: presence of predatory fish; width of the grassy ecotone; percent emergent herbaceous ground cover; percent canopy cover and percent shrub cover. The desired condition is predatory fish are absent and the ecotone width is > 16.4 ft. The parameters of interest should be measured within 33 ft of the wetland edge and include:

- percent shrub cover < 50%
- percent canopy cover < 50%
- percent emergent herbaceous cover > 30%.

This strategy is a preliminary recommendation and will be amended when the CPI survey scheduled for FY 09/10 is completed and recommendations from the CPI assessment and report are available. In addition to the CPI survey, a hydrologic assessment of the area needs to be completed, and any hydrologic restoration recommended should be scheduled.

4.1.2: Bachman's Sparrow

The Bachman's sparrow is a management responsive species found in sandhill and mesic flatwoods with open canopies and well-developed native

groundcover. While the natural community management applied on Half Moon WMA will benefit this species, we are designating a SMA to focus groundcover restoration and pine thinning. Management that favors open, mature pine stands with well developed herbaceous groundcover maintained by frequent fire will benefit this species. Use of a site by this species starts to decrease 18 months after fire, so regular fire return intervals is critical to perpetuating this species. Management for this species is compatible with northern bobwhite, gopher tortoise, and a number of other focal and imperiled species. This species is easily monitored with spring point-counts especially when supplemented with the use of a callback tapes to increase response. The Bachman's sparrow is one of a suite of species for which the UERP is developing a standard monitoring protocol for use statewide. The information gathered following this protocol will allow for statewide population trend assessment for these species.

Goal: Maintain a stable or increasing population of Bachman's sparrows that has the potential to function as part of a larger regional population.

Objective 1: Establish the baseline for number of Bachman's sparrows heard on songbird point count routes on Half Moon WMA by 2010.

Objective 2: Increase number of Bachman's sparrows heard on songbird point count routes by 20% by 2018.

Description of the SMA: This SMA focuses on all historically mapped sandhill, scrubby flatwoods, and mesic flatwoods within management unit 47 and SWFWMD management units WMD-2, 3 and 4 and accounts for 352 acres ([Figure 3](#)).

Strategy: To support a viable and growing population of Bachman's sparrows on Half Moon WMA, significant management actions required in addition to natural community management are thinning of pines and restoration of a diverse groundcover. Ideal habitat for Bachman's sparrows contains a well-developed grass and herb community with little midstory and some small pockets of shrub to provide perches. To reflect these ideal habitat conditions, recommended changes to OBVM DFCs for shrub and saw palmetto cover in mesic flatwoods are presented for management units within this SMA ([Section 4.2](#)). No changes to OBVM DFCs are required for sandhill or scrubby flatwoods.

The Bachman's sparrow has been detected in the SWFWMD management units, but is unlikely to use management unit 47 currently due to the lack of pine overstory. The SWFWMD management units are slated for groundcover restoration and currently have some of the more extensive and mature pine stands providing a good opportunity to improve habitat for Bachman's sparrow quickly. Management unit 47 is a long-term restoration project but will eventually provide additional habitat.

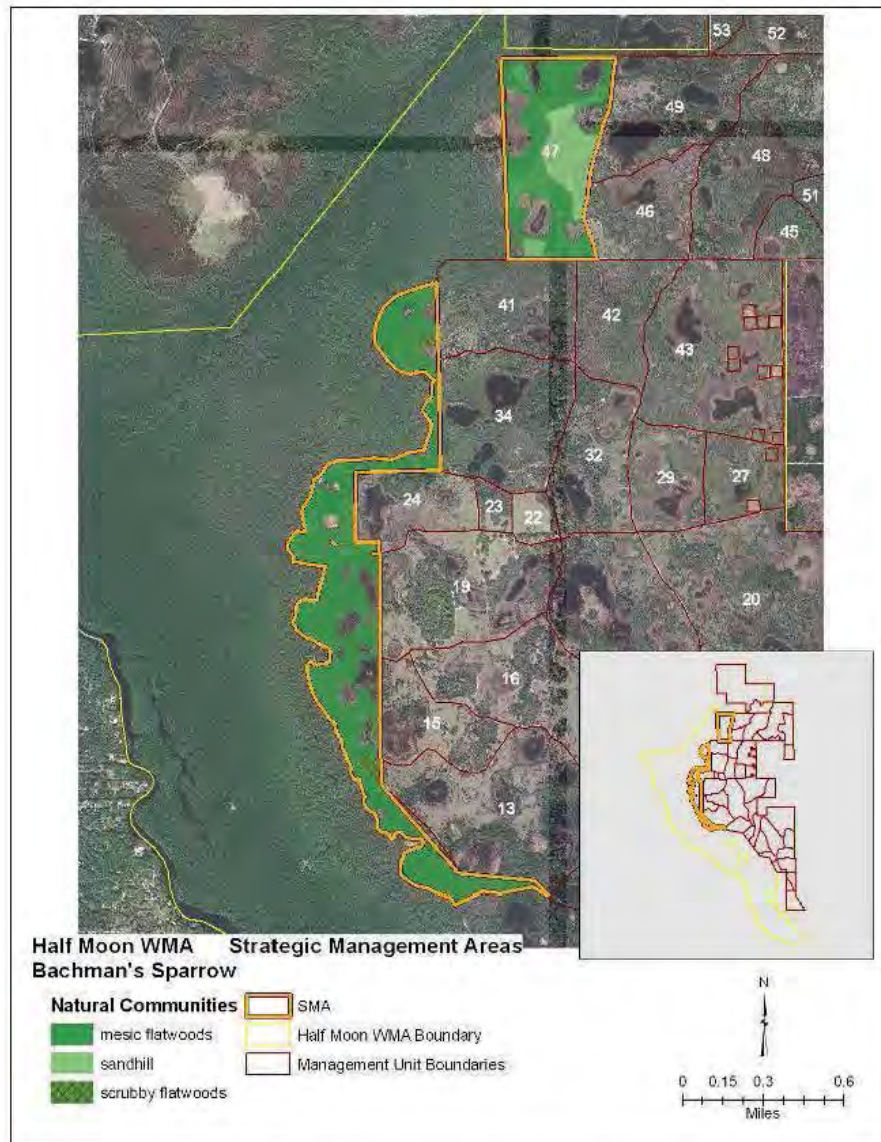


Figure 3. Management units and natural communities in which specific actions are prescribed to benefit the Bachman's sparrow on Half Moon WMA

Mesic flatwoods within the SMA identified for Bachman's sparrows need to be thinned to a basal area of 30-40 ft²/acres. Prescribed fire has been applied since management authority was obtained from SWFWMD and the fire return interval should be 2-3 years. The combination of growing and dormant season fire should be used to reduce excess fuels and shrub cover and increase herbaceous groundcover. Growing season fire is preferred, but dormant season fire can be used to maintain fire return interval if conditions are not suitable during the growing season. Part of this SMA has received an herbicide treatment in preparation for groundcover restoration. In areas not currently part of the groundcover restoration effort, the understory should be maintained primarily with fire. The use of roller chopping may be necessary particularly in areas where saw palmetto is the dominant shrub and exceeds 30% in coverage. Small unchopped areas should be left by applying a "sloppy chop" to provide the necessary shrub patches for singing male perches. Roller chopping should be conducted during the dormant season to minimize adverse effects on gopher tortoises and to provide ideal conditions to follow the treatment with a growing season burn.

Restoration activities planned in management unit 47 consist of native ground cover restoration and eventual planting of longleaf pine. Benefits to Bachman's sparrow in this management unit will be realized in the long-term, but many species will accrue benefit during the restoration process.

Monitoring recommendations that will be used to determine progress toward objectives are described in [Section 5.2.5](#).

4.1.3: Florida Scrub-Jay

This SMA contains scrubby flatwoods and surrounding areas of mesic flatwoods that can be managed with a vegetative structure similar to scrubby flatwoods ([Figure 4](#)). Due to the priority of maintaining this species, it is important to maximize potential habitat for this species which is why we are choosing to continue to manage some of the drier mesic flatwoods as scrubby flatwoods. The SMA was designated to focus efforts towards maximizing habitat for this species.

This SMA includes restored areas of occupied habitat and areas where restoration activities will provide suitable habitat for new territories. Occupied habitat and records of formerly occupied habitats suggest that the carrying capacity for Florida scrub-jays on Half Moon WMA is 15-18 family groups with restoration of all historically occupied habitats. It is believed that restoration and continued management of natural communities within the SMA should move the scrub-jay population closer to the carrying capacity. However, if the scrub-jay population on Half Moon WMA drops consistently within 5 years of restoring all suitable habitat to the appropriate condition, more direct species management actions to ensure jay persistence should be considered.

The Florida scrub-jay population on Half Moon WMA contributes to enhanced stability of the regional metapopulation due to its location between several known populations on private and public lands in Citrus, Hernando,

Marion, and Sumter counties. By providing a geographic link between scattered populations in the region, Half Moon WMA contributes to the overall population stability of this species. Management actions taken to improve habitat for the Florida scrub-jay should not adversely impact other focal species on the WMA and will likely benefit species including the Florida mouse, northern bobwhite quail and gopher tortoise, and a number of species that depend on healthy scrubby flatwoods.

Goal: Establish and maintain a Florida scrub-jay population of > 10 family groups that can function as part of the larger regional metapopulation.

Objective 1: Restore all historic scrubby flatwoods and mesic flatwoods that can be maintained in a “scrubby” structure within the SMA to suitable conditions for Florida scrub-jay by 2018.

Objective 2: Increase the number of scrub-jay family groups utilizing suitable habitat on Half Moon WMA from 8-10 to 12-15 by 2028.

Description of the SMA: This SMA focuses on all historically mapped scrubby flatwoods and adjacent mesic flatwoods that can be managed as scrubby flatwoods within management units 9, 10, 17, 27, 29, 34, 40, 41, 43, 47, and 50. These natural communities in the management units account for approximately 310 acres (Figure 4). As jays use a number of other communities when found in association with these communities, the actual acres of usable habitat will be greater than 310 acres. Currently all management units are occupied by Florida scrub-jays except units 9, 10, and 17. These unoccupied units will be the focus of restoration efforts to improve habitat suitability. Management unit 47 has only recently been occupied by jays and also will require restoration to ensure continued occupation. The rest of the management units are currently in maintenance condition and management activities will focus on prescribed burning and mechanical treatments to ensure continued occupation.

Strategy: The continuation of ongoing management activities in occupied habitat will be required to maintain and enhance the scrub-jay population on Half Moon WMA. Implementation of restoration activities to enhance currently unused potential habitat will create additional habitat. All scrubby flatwoods and surrounding mesic flatwoods within the SMA that can be maintained in a more scrubby structure will be managed for Florida scrub-jays. Mesic flatwoods that occur on soils that are too moist and fertile to be managed as scrubby flatwoods will continue to be maintained in an open condition via the use of prescribed fire. An open forest structure will allow jays to forage in these areas and will prevent these areas from becoming barriers to jay dispersal. This will be particularly important for bringing jays to management units that are being restored and are currently unoccupied. Current OBVM DFCs for scrubby flatwoods are adequate for Florida scrub-jay habitat for most parameters, but the bare ground value should be increased. Mesic flatwoods that are being managed for jays should be

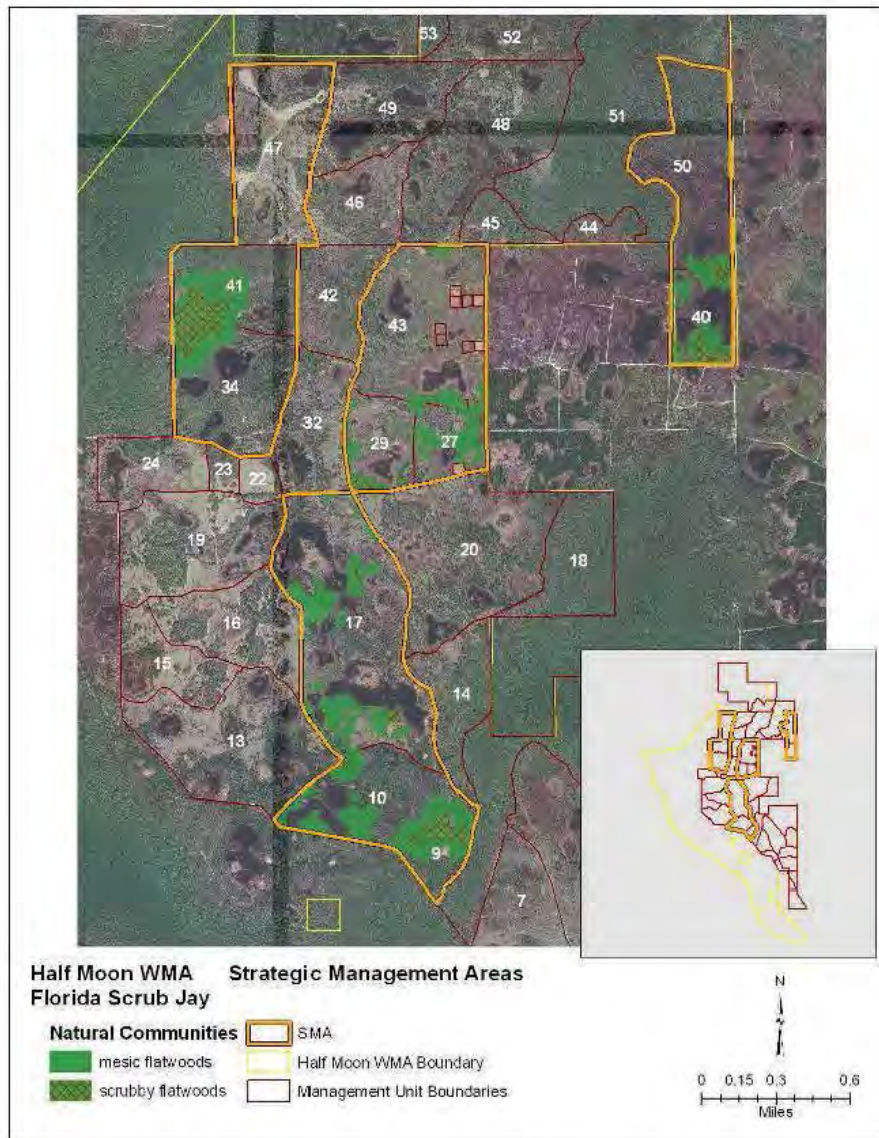


Figure 4. Management units and natural communities in which specific actions are prescribed to benefit the Florida scrub jay on Half Moon WMA.

identified and OBVM sampling points within these areas should be assessed using scrubby flatwoods DFCs ([Section 4.2](#)).

Growing season burns are preferred but dormant season burns should be used to ensure fire frequency is maintained when conditions do not permit fire in the growing season. The current average fire return interval is 3 years. This is a more intensive fire return interval than is generally applied to scrub lands managed for Florida scrub-jays but in this area soil moisture and fertility are higher than that found in scrub. Vegetative response in these scrubby flatwoods and especially in the transition to mesic flatwoods requires frequent fire to ensure that shrub height, density, and palmetto cover stay within acceptable limits. Frequent fires will also help manage pine regeneration to ensure that canopy cover does not become too high.

To ensure sufficient nesting and roosting cover is always available and to maintain adequate mast production, it is important to achieve a mosaic burn pattern that leaves unburned patches of oaks within the management unit. Acorn production in scrub oaks is often limited in the first 3 years after a fire and peaks 4-7 years after fire. As such, it is necessary to retain some of these productive oaks within each territory. This can be achieved by using firing technique to moderate intensity, burning with higher humidity and not “burning out” fire shadows and other unburned patches. When burning the mesic flatwoods adjacent to scrubby flatwoods within the management units, adjusting firing techniques will provide for the frequent fire needed for maintenance of the mesic flatwoods while maintaining mosaic habitat conditions in the scrubby flatwoods necessary for the scrub-jay.

Roller choppers, feller-bunchers and tree mowers have been used for restoration in the SMA and should be used in the future as necessary. These mechanical treatments are particularly useful in areas where herbaceous fuels are inadequate to allow fire to achieve the desired control on shrub height and density. However, the goal is to create habitat conditions that can in the future be maintained via the use of prescribed fire without having to rely on mechanical treatments within units. If necessary, mechanical treatments can be used to ensure that bare soil is available for acorn caching. This includes disking of firebreaks and mechanical disturbance from roller chopping. However, the preferred method of generating bare soil patches is burning brush piles. Disking can be done specifically for the purpose of creating patches of bare soil if there will be limited negative impacts to desired ground cover or imperiled plants. Any disking or soil disturbance to maintain bare soil patches should be accomplished in April-May to avoid disturbing caches and should avoid known occurrences of giant orchid or other listed plants.

Monitoring recommendations to determine progress toward the objectives are described in [Section 5.2.4](#).

4.2: Objective-Based Vegetation Management Considerations

Objective-Based Vegetation Management (OBVM) will be used to monitor progress towards Desired Future Conditions (DFCs) of various natural community

parameters (Table 2). As such, OBVM will be effective in monitoring progress towards land management strategies. Objective-Based Vegetation Managements DFCs were designed to target a range in values for various habitat parameters within actively managed communities. However, some focal species require a more restricted range in habitat parameters than is reflected in the DFCs. Therefore, it may be necessary to modify a DCF area-wide to reflect the needs of the focal species. When SMAs are designated, it may be necessary to focus the range of DFCs for select actively managed communities in specific management units to provide ideal habitat conditions outlined in the strategy for each SMA. In cases where focal species share the same management units and natural communities within their particular SMA, any suggested changes to DFCs within a management unit encompass the range in preferred habitat parameters for these species. This range of habitat parameter values will encourage a shifting mosaic of habitats at differing successional stages resulting in a heterogeneous landscape that provides suitable habitat to many species. Additionally, if habitat parameters important to a particular species are not currently monitored as part of OBVM, suggestions are made as to which parameters should be added.

Table 2. Desired Future Conditions for specific vegetative parameters in actively managed natural communities at Half Moon WMA as identified via the OBVM workshop process.

Mesic Flatwoods

- Basal Area Pine: ≤ 60 sq. ft.
- Average Max. Shrub Height: ≤ 5 ft.
- Shrub Cover: $\leq 75\%$
- Palmetto Cover: $\leq 50\%$
- Herb. Cover: $\geq 40\%$
- Exotics Cover: 0%
- Weedy Cover: $\leq 20\%$

Sandhill

- Basal Area Longleaf Pine: ≤ 50 sq. ft.
- Hardwood Stems > 6 ft.: ≤ 20 /acres
- Shrub Cover: $\leq 30\%$
- Palmetto Cover: $\leq 30\%$
- Herbaceous Cover: $\geq 40\%$
- Wiry Graminoid Cover: $\leq 10\%$
- Exotics Cover: 0%
- Weedy Cover: $\leq 10\%$

Scrubby Flatwoods

- Canopy Cover: $\leq 20\%$
- Average Max. Shrub Height: ≤ 10 ft.
- Shrub Cover: $\leq 75\%$
- Palmetto Cover: $\leq 30\%$
- Herbaceous Cover: $\geq 20\%$
- Wiry Graminoid Cover: $\geq 15\%$
- Bare ground $\geq 5\%$
- Exotics Cover: 0%
- Weedy Cover: $\leq 20\%$

4.2.1: Modifications to Desired Future Conditions

Mesic Flatwoods

% Shrub Cover and % Palmetto Cover

MU WMD-2,3,4:

Shrub Cover (%) change from ≤ 75 to < 30

Palmetto Cover (%) change from ≤ 50 to < 30

Justification: These management units are where we intend to focus efforts to improve conditions for the Bachman's sparrow. By decreasing the acceptable range of percent shrub cover and percent palmetto cover, we will move towards conditions that are more desirable for this species, thereby increasing the possibility of successfully accomplishing species specific objectives.

All parameters

MU 9, 10, 17, 27, 29, 34, 40, 41: drier mesic flatwoods in these units should be evaluated using the scrubby flatwoods DFC.

Justification: The drier mesic flatwoods in these management units are being managed as scrubby flatwoods to maximize the potential habitat for the scrub-jay and therefore the scrubby flatwoods DFC are the appropriate measure for this area.

Scrubby Flatwoods

% bare ground

MU 9, 10, 17, 27, 29, 34, 40, 41: change from ≥ 5 to $> 10\%$

Justification: The Florida scrub-jay is dependant on availability of bare ground for caching acorns. Increasing the value for this parameter will better reflect the needs of this priority species.

Mesic Flatwoods, Scrubby Flatwoods and Sandhill

Snags ≥ 5 inch DBH per acre (New parameter to be added)

All Management Units: >1 snags/acre

Justification: The brown-headed nuthatch and southeastern American kestrel are dependant on the availability of snags for nesting. Adding this parameter will allow OBVM monitoring to track the availability of this important resource.

4.2.2: Addition of Communities of Interest

The OBVM process allows for 2 levels of vegetation sampling. Plant community level sampling occurs once every 5 years for natural communities identified as actively managed and those identified as communities of interest. This differs from the management unit level monitoring that occurs 2 years post-treatment. Sandhill, mesic flatwoods and scrubby flatwoods were the natural communities identified as actively managed on Half Moon WMA (Table 1). At

the time of the OBVM workshop, no communities of interest were identified. Through the WCPR process, we identified the need to designate depressional wetlands that might serve as breeding ponds for the striped newt to the list of communities of interest. As such, within management units 9, 10, 27, 29, and 43 (Figure 2), any basin marsh, depression marsh, and dome swamp should be considered a community of interest. However, monitoring in these communities should be done in accordance with the monitoring protocol prescribed in the striped newt SMA (Section 4.1.1) and not via the OBVM process. This protocol including the parameters to be measured and the desired future conditions should be developed in consultation with species experts.

4.3: Further Land Management Considerations

The designation of SMAs directs immediate attention to critical needs for focal species that have high need and opportunity. This approach ensures that these species' critical needs are met, but should not preclude necessary management for other focal and imperiled species. It is commonly believed that most species will likely benefit from management that restores the natural structure and function of natural communities they use. However, for some species, specific management recommendations and precautions are necessary to ensure the continued suitability of the area for the species. The following recommendations should help ensure Half Moon WMA continues to fulfill its role in the conservation of these species.

4.3.1. Gopher Frog

This species frequently moves between wetland breeding ponds and adjacent uplands. Firebreaks should not be placed along wetland ecotones because they can alter the herbaceous component of pond margins. Gopher frogs prefer these grassy ecotones during their movements to and from uplands.

Prescribed fire should be used as the primary tool to remove shrubs and other thick vegetation from pond margins; mechanical and chemical treatments should be used sparingly to reduce effects on this species. Off-road vehicle (ORV) use can damage hardpans and shorten hydroperiods, effectively reducing the suitability of a site as a breeding location. Currently, ORV use is not permitted on this area. Due to the importance of retaining potential breeding ponds in good condition, the prohibition on ORV should be continued. Silvicultural activities (i.e., timber cutting) around known or potential breeding ponds should focus on selective thinning and natural regeneration enhanced by prescribed fire. If trampling by cattle is documented to alter the vegetation in the ecotone of breeding ponds, measures should be taken to restore the ecotone and prevent future degradation.

4.3.2. Gopher Tortoise

Current prescribed burning efforts are ideal for the maintenance of gopher tortoise habitat and should continue. Growing season fire is preferred but dormant

season burning can be used to maintain fire frequency when conditions are not suitable during the growing season. Fire is the preferred tool for manipulating vegetation for this species. When fire is not sufficient to promote the preferred habitat parameters, mechanical treatments can be used. The timing of roller-chopping should, whenever appropriate, occur during the dormant season to minimize negative impacts to gopher tortoises. This species is less active and spends more time in burrows during the winter months. Roller-chopping at this time will be less likely to crush or otherwise harm foraging tortoises.

When basal area gets too high and creates a closed canopy, this impacts groundcover plants the gopher tortoise depends on. When this occurs, timber thinning should be used to open the canopy and increase light penetration to the groundcover. After thinning, it will be possible to use a combination of roller-chopping and prescribed fire to reduce and manage palmetto in stands that have excessive palmetto density. Thinning, chopping, and burning in the mesic flatwoods will complement efforts to reduce dispersal barriers to the Florida scrub-jay, improve conditions for Bachman's sparrow and a host of other species dependant on this natural community structure.

Fire in conjunction with mechanical and chemical treatments should be used to restore small patches of xeric hammock to a sandhill community wherever possible and sandhill was the historic community. Directing fire into these hammocks from adjacent communities will begin the process of eroding the hardwood canopy and stimulating the recovery of herbaceous ground cover. Where appropriate and compatible with other management needs, roads or firebreaks that prevent fire from moving from flatwoods into the edges of xeric hammock should be eliminated. Under certain conditions, it may be appropriate to take advantage of winds and low humidity conditions to aggressively run fires into hammocks. Residual longleaf pines and native groundcover within these hammocks should be protected to serve as fine fuel and seed sources. Canopy gaps can be created using mechanical (tree cutter, felling) or chemical treatments (hack and squirt, spot, or grid treatment with hexazinone). Removal efforts should target water oak (*Quercus nigra*), laurel oak, and sweet gum (*Liquidambar styraciflua*). If the groundcover does not respond, there may be a need to seed native groundcover using appropriate restoration techniques.

4.3.3: American Swallow-Tailed Kite

Because swallow-tailed kites exhibit high nest site fidelity, known nest sites should be protected from disturbance and alteration, and all of the tallest pines in the area of nest sites should be retained. When possible, kite nesting areas should be allowed to have a higher shrub height and density than surrounding areas. Whenever signs of swallow-tailed kite nesting (e.g., carrying nesting material, aggregates of 3 or more birds in one area on a regular basis) are encountered, the location should be documented and an effort to locate the nest should be made. Meyer and Collopy (1995) describe how to locate nests.

4.3.4: *Brown-Headed Nuthatch*

This species has not been documented on the area and current conditions are not optimal. Ongoing efforts will continue to move much of Half Moon WMA towards a forest structure more suitable for this species. As this species is dependent on the occurrence of snags for nest sites, an effort should be made to retain snags during timber thinning operations and mechanical treatments. When conducting prescribed burns, evaluate the impact of burning on snags to ensure consumed snags are being replaced by new snags. If there is a net loss of snags during prescribed fire, management efforts should focus on protecting snags or taking actions to create new snags. Sandhill restoration would greatly increase the future potential of this area for this species.

4.3.5: *Cooper's Hawk*

During the nesting season (April-July in Florida), the Cooper's hawk is secretive and intolerant of human disturbance around the nest site. Males show a strong fidelity to traditional territories. For this reason, whenever possible, known nesting sites should be protected from human disturbance (e.g., prescribed fire, timber thinning, mechanical treatments) by maintaining a 50-ft buffer around the nest during the nesting season, and avoiding heavy alteration of the nesting location. Whenever signs of Cooper's hawk nesting (e.g., carrying nesting material, aggressive dive bombing) are encountered, the location should be documented and efforts made to locate the nest.

4.3.6: *Florida Sandhill Crane*

Florida sandhill cranes will benefit from the reduction of heavy shrub cover around pond edges from prescribed fire, which is planned within the striped newt SMA and elsewhere through natural community management. During the crane nesting season (January-June) ponds should be checked for nests prior to any prescribed burning or hydrological restoration to avoid destroying nests. When nests are detected, they should be documented and protected by a 400-ft buffer.

4.3.7: *Limpkin*

Timber harvests should strictly observe BMPs for protecting streams and spring runs and soil disturbance should be avoided if there is a risk of impacting streams or spring runs. As exotic invasive aquatic plants can have a negative impact on apple snails, any occurrence of these species on the area should be documented and reported to the Invasive Plant Management Section ([Section 6.1.5](#)). If detected early enough it may be possible to eradicate invasive exotic plants before a population becomes established.

4.3.8: Northern Bobwhite

The northern bobwhite will benefit from the natural community management planned on Half Moon WMA. Specific actions directed to northern bobwhite management on Half Moon WMA will apply to the edges of pasture areas where the sod-forming grasses are encroaching upon native groundcover or groundcover restoration efforts. These edges or ecotones provide an opportunity to use light disking during late winter to early spring. This activity will break up the sod and encourage annual weeds which will add diversity to the plant community and provide areas of bare soil with low overhead cover that are required for northern bobwhite broods. Edges should be disked in strips on a 2 - 3 year rotation. Where this activity occurs in scrub-jay territories it will provide additional caching areas for jays. If scrub jays have used these areas to cache acorns, disking should be delayed until April/May to avoid detrimental impacts to jays. The added diversity of these weedy strips also will benefit gopher tortoises and Bachman's sparrows.

4.3.9: Southeastern American Kestrel

This species is dependent on the occurrence of open upland habitats that contain a number of snags for nest sites. While ongoing management will encourage the open foraging condition this species requires, an effort should be made to retain snags during timber thinning and mechanical vegetation treatment operations. When conducting prescribed burns, an attempt should be made to evaluate the impact of burning on snags to ensure consumed snags are being replaced by new snags. If there is a net loss of snags during prescribed fire, managers should consider taking efforts to protect snags or taking actions to create new snags. If nesting is documented, minimize the amount of mechanical activity within 500 feet of the nest during nesting season, and protect the snag from fire. Restoration of xeric hammock to historic sandhill would benefit this species.

4.3.10: Southern Bald Eagle

State and federal law requires protection of bald eagles, including avoiding disturbance of nesting eagles. Managers must consider the management guidelines available at: http://myfwc.com/imperiledspecies/plans/Eagle_Plan_April_2008.pdf (or any subsequent version) when planning activities within 660 ft of known eagle nests. Any new nests that are located should be documented and reported. As this species is surveyed annually on a statewide basis, the bald eagle database coordinator will be contacted annually to request status of current nests and if any new nests are detected via the survey.

4.3.11: *Wading Birds*

It is possible that ongoing actions (e.g., prescribed fire, timber harvest) could have negative impacts on wading birds if the needs of the species are not considered during the planning of these activities. The potential to have negative impacts on these species can be reduced by taking actions to avoid disturbing colonies of nesting wading birds. This is accomplished by providing a 330-ft buffer around colonies during nesting season.

Wood storks have been observed on the area and are known to nest nearby. Should a wood stork colony become established on the area, habitat conservation guidelines are available at:

<http://www.fws.gov/northflorida/WoodStorks/Documents/Wood-stork-habitat-guidelines-1990.pdf> (or any subsequent version).

4.3.12: *Florida Black Bear*

Bears require areas of dense vegetation for escape and den cover. Efforts to restore natural communities will result in a more open-structured landscape with reduced tree density and lower shrub height. However, the non-actively managed natural communities along the river as well as the number of and interspersed wetland habitats associated with managed natural communities will ensure this area always provides suitable bear habitat. While denning on Half Moon WMA is infrequent, plan to avoid mechanical treatments of suspected den sites during denning season (December – April). These efforts will ensure Half Moon WMA continues to serve its role in the conservation of this wide-ranging species.

4.3.13: *Sherman's Fox Squirrel*

As habitat restoration occurs on Half Moon WMA, it is likely the area will become more suitable for fox squirrels as the area historically had > 3,000 acres of fox squirrel habitat. To ensure the area reaches its potential for fox squirrels, prescribed fire and thinning should continue to create an open forest structure. Scrub-jay based land management is compatible with fox squirrel needs as both species require acorns. As fox squirrels require an oak component, some oaks should be retained in appropriate sites (i.e. fire shadows) during natural community restoration. Ideally, a variety of oak species in a range of age classes should be retained, but not to the extent this interferes with other species needs and natural community management. Where appropriate, continue to plant longleaf pine in low densities when conducting reforestation.

4.3.14: *Southeastern Bat*

Large hollow trees, particularly hardwoods or cypress in the hydric hammock are potential roost sites and should be protected. Many bats roost in leaf litter on the ground on extremely cold nights and some bat experts recommend

delaying prescribed fire on extremely cold mornings until the air temperatures have warmed sufficiently for the bats to become active.

Section 5: Species Management Opportunities

The focal species approach taken here represents a science-based approach to ecosystem management. Though this method relies on a suite of individual species, land management actions focused on these species directly benefit associated species. However, for some species land management actions alone are insufficient in aiding recovery. Species that are not present on a site and have limited dispersal capabilities are unlikely to occupy a site without re-introduction once habitat restoration is complete. Additionally, species that are currently present at low densities, have low reproduction potential, or have other limitations that inhibit recovery may require species specific management. This section provides species management recommendations ([Section 5.1](#)) as well as monitoring recommendations ([Section 5.2](#)) to assess species response to management and to determine the need for additional species management. Any research necessary to guide future management is suggested in [Section 5.3](#).

5.1: Species Management

Species management as used here refers to non-monitoring actions taken for a specific species. It can include actions such as translocation, restocking, installing artificial cavities, etc. Monitoring related actions, including banding or tagging, will be covered in [Section 5.2](#). Most land management actions, such as prescribed fire or mechanical treatments, are covered in [Section 4](#).

5.1.1: Southeastern American Kestrel

Southeastern American kestrel nest boxes have previously been installed on Half Moon WMA, but have not been used by nesting southeastern American kestrels. These boxes are generally in poor repair and are no longer being maintained. FWRI is currently implementing a statewide effort to erect and monitor southeastern American kestrel nest boxes and collect data on habitat structure around these boxes to gain a greater understanding of preferred nesting habitat. New nest boxes should be erected, maintained, and monitored in coordination with this project. The number and location of boxes and timing of installation should be coordinated with FWRI in order to meet the goals of this study.

5.2: Species Monitoring

Monitoring is critical to evaluating the impact of the management actions described in this strategy. While we are unable to monitor all of the focal species on Half Moon WMA, the recommended monitoring will assess species in all actively managed communities and includes opportunistic monitoring for uncommon or rare species. Data collected will be reported to the regional conservation biologist for inclusion in the

appropriate database developed for the WCPR program. Monitoring data will be made available to cooperating agencies and organizations such as the Florida Natural Areas Inventory (FNAI) (Sections 6.1.3, 6.4, 6.5).

This section provides the list of monitoring that is recommended for the area, and provides the purpose for the monitoring. The FWC is in the process of standardizing monitoring protocol for a number of these species. When protocols are finalized, they will be implemented in accordance with the timeframe described in this Strategy.

5.2.1: Gopher Frog Breeding Pond Call Monitoring

The purpose of frog call monitoring is to document presence/absence and relative distribution of frog calling activity on the area. The monitoring will provide a rough measure of relative abundance and allow for coarse trend analysis, but is not intended to provide population estimation or even density estimation. Monitoring will follow standardized protocol being developed for the species which is based on the North American Amphibian Monitoring Program, but focuses on the gopher frog rather than identifying all calling frogs.

5.2.2: Striped Newt Dipnet Monitoring

The purpose for monitoring these pond breeding obligates is to document breeding ponds and to monitor use of these ponds over time. Surveys should determine presence/absence only and will not be of sufficient intensity to detect changes in relative abundance.

Surveys are conducted in years with sufficient rainfall to ensure water remains in ponds during late winter through early spring. Using the methodology and data sheets developed by the FWRI Amphibian and Reptile Research Scientist, timed dip net searches of ponds are conducted to determine if the species is present. This protocol will provide information on the striped newt and will provide some information on gopher frog use of these ponds. If both species are recorded prior to the end of allotted search time the search is ended. Other captured species are documented. Data should be reported to by the FWRI Amphibian and Reptile Research Scientist for inclusion in the database he has developed for the statewide monitoring effort.

This monitoring effort can be supported periodically by more intensive drift fence surveys. Drift fence surveys following standard protocol are intended to collect presence/absence information on a broad range of species, and should be repeated once every 10 years, providing resources are available.

5.2.3: Gopher Tortoise Monitoring

The purpose of gopher tortoise monitoring is to track the relative abundance of the species over time and to determine if the population objective is being met. Surveys will be accomplished using well established transect search methods for estimating population.

The original survey conducted in 2008 by FNAI provides a baseline and it is recommended that the area manager contract to repeat gopher tortoise survey every 5 years using the methodology employed by FNAI. This will require that funds are requested and budgeted every 5 years to conduct the survey. Data will be reported to the gopher tortoise conservation coordinator ([section 6.1.1](#)).

5.2.4: Florida Scrub-Jay Monitoring

The monitoring goal is to collect census data on 100% of the population by observing all individuals previously banded and banding all fledglings and any adult migrants annually.

Standard methods for surveying, trapping and banding should continue to be used in this effort. Unoccupied potential habitat should be surveyed using call response methods to determine if new territories are being established.

Data will be reported to the Florida scrub-jay coordinator ([section 6.1.1](#)) and to The Nature Conservancy Jay Watch Program coordinator ([section 6.4](#)) for inclusion in their annual status report.

5.2.5: Limpkin Monitoring

The purpose of monitoring is to establish a baseline and monitor relative abundance over time. Surveys on Mill Creek using broadcast calls to elicit vocalizations should be completed during March of each year following a protocol adapted from the North American Marshbird Monitoring Program: http://www.fws.gov/birds/waterbirds/monitoring/conway_and_nadeau_SSP_mars_h_bird_final_report.pdf. FWC is currently developing a standard protocol for monitoring this species. When this protocol is available, it will be used.

5.2.6: Northern Bobwhite and Songbird Monitoring

Monitoring for northern bobwhite, Bachman's sparrow, brown-headed nuthatch, and other grassland birds is intended to establish a baseline and track relative abundance over time.

Surveys will be spring point counts using a distance sampling methodology that is currently being developed for the UERP to ensure consistency with surveys being conducted statewide on UERP cooperators.

Data collected will be reported to the regional conservation biologist for inclusion in the appropriate database developed for the WCPR program. Northern bobwhite data will be forwarded to the small game coordinator and the UERP coordinator if requested.

If more vigorous information on Bachman's sparrow is needed, the UERP point count methodology can be supplemented with the use of call back tapes to elicit response from this species.

5.2.7: Southeastern American Kestrel Monitoring

Southeastern American kestrel monitoring will initially be conducted by FWRI staff implementing a study to determine the range and nesting habitat preferences of kestrels in Florida. Kestrel monitoring will determine if southeastern American kestrels nest on Half Moon WMA. New nest boxes, if required, need to be installed in coordination with FWRI staff and will be monitored initially by FWRI staff. Area staff will need to assume annual nest box checks and maintenance at the conclusion of the study.

5.2.8: Southern Bald Eagle Monitoring

The purpose of monitoring southern bald eagles is to document active nests on the WMA and to ensure that proper buffers are maintained around nests. Statewide aerial surveys of known nest are conducted annually and new nest are documented during these surveys. These aerial surveys are expected to continue, but it is possible that reduced funding may require these surveys to be limited to sub-sampling according to the FWC Bald Eagle Management Plan (http://myfwc.com/imperiledspecies/plans/Eagle_Plan_April_2008.pdf). To ensure that the status of southern bald eagles on Half Moon WMA are monitored visual inspection of known nest sites during the nesting season and opportunistic observations of eagles during the nesting season will be documented. Nests will be reported to the statewide bald eagle coordinator ([Section 6.1.3](#)).

5.2.9: Florida Mouse Monitoring

A Florida mouse was recently documented near the check station on Half Moon WMA. A survey of potential Florida mouse habitat to establish presence/absence and the extent of distribution on the WMA should be conducted. This survey will be conducted using the protocol established by the Species Conservation Planning Section Mammalian Taxa Coordinator. Follow up surveys to confirm presence/absence should be conducted periodically, on a 3 – 5 year basis, pending availability of resources.

5.2.10: Opportunistic Monitoring

Opportunistic monitoring is the process of recording important information as it is encountered. The purpose of opportunistic monitoring is to document the presence of specific species. It does not provide population estimation or even trend analysis. With limited resources, it is not efficient to conduct a survey specifically looking for nests of Cooper's hawks or American swallow-tailed kites on an area the size of Half Moon WMA. However, if encountered while conducting other tasks, the location of nest trees should be recorded using GPS for the American swallow-tailed kite, Cooper's hawk, and southern bald eagle so they can be adequately protected. Additionally, there are a number of focal species that are not known to be currently present on the area,

and it would be inefficient to conduct intense surveys for these species. As such, the presence of Florida pine snakes, brown-headed nuthatches, Florida mottled duck nests, Florida sandhill cranes, Florida black bears, and Sherman's fox squirrels or any imperiled species should be documented if they are encountered. Documented presence of any of these species could trigger more intensive population monitoring. Documentation of opportunistic sightings including approximate lat/long, number of individuals, behavior, and habitat type should be forwarded to the regional conservation biologist.

5.3: Species Research Needs

Species management recommendations in other sections of this document are based on the most current information regarding management strategies for a given species. However, cases arise when little or no information is available to guide management. This section outlines research needs identified through the WCPR process.

5.3.1: *Florida Scrub-Jay*

On Half Moon WMA, Florida scrub-jays occupy scrubby flatwoods and some mesic flatwoods managed to maintain a "scrubby" structure. These natural communities differ from the scrub habitats that are traditionally considered to be optimal habitat. It is likely that the demographics, home ranges, and reproductive parameters of populations in this habitat differ from populations in scrub. Research is needed to evaluate scrub-jay use of these habitats and to ensure that managers are adequately addressing the needs of scrub-jays in these natural communities.

5.3.2: *Development of Desired Future Conditions for Florida Mouse*

Currently, there is little information on optimal habitat conditions for the Florida mouse. While xeric habitats maintained with frequent fire, some oak mast production, and gopher tortoise burrows are considered high quality habitat, there is a need for defining preferred vegetative parameters (e.g. composition of ground cover species, % ground cover, % shrub cover) for this species. Research regarding these habitat preferences will provide information to be used in managing habitat occupied by Florida mice.

5.3.3: *Development of Desired Future Conditions for Sherman's Fox Squirrels*

Currently, there is little information on optimal habitat conditions for Sherman's fox squirrel. While upland pine and mixed pine-hardwood habitats maintained with frequent fire, a variety of oaks, and open park-like structure are considered high quality habitat, there is a need for defining preferred vegetative parameters (e.g. composition and juxtaposition of tree species, % ground cover, % shrub cover) for this species. Research regarding these habitat preferences will

provide managers guidance in managing habitat occupied by Sherman's fox squirrel.

Section 6: Intra/Inter Agency Coordination

Throughout the WCPR process many recommendations were made regarding possible management strategies for focal species. Most proposed management actions can be handled by THCR staff; however, cases arise when coordination with other sections in FWC or other agencies is necessary or would increase efficiency. This section identifies cases in which coordination is necessary outside of THCR, identifies the entity with which to coordinate, and provides position contacts for these entities.

An attempt is made to provide the name, position and contact information for the people holding the position when this Strategy was drafted. As positions experience turnover, when in doubt, contact the current Section Leader /supervisor to determine the appropriate individual.

6.1: Florida Fish & Wildlife Conservation Commission

6.1.1: Species Conservation Planning Section

Monitoring animal populations on a WMA gives managers a way to gauge animal response to management. If this information is not shared with others, valuable data that can be used to assess statewide conservation efforts often is lost. Therefore, monitoring data should be shared with the appropriate taxa coordinator and program coordinator for species in which conservation initiatives or other management programs have been developed. Additionally, staff of the FWC is authorized to handle federally listed species if it is done consistent with the requirements of the agency's Endangered Species Act Section 6 Cooperative Agreement. To meet these requirements, reporting as outlined in the Agreement will be provided to the agency's Endangered Species Coordinator. Please note some contacts will also be covered under [Section 6.1.4 FWRI](#).

Contacts:

Robin Boughton, Avian Taxa Coordinator, (352) 732-1225
Melissa Tucker, Mammalian Taxa Coordinator, (386) 758-5767 ext 114
Bill Turner, Herpetofauna Taxa Coordinator, (850) 410-0656 ext 17331
Terry Doonan, Regional Non-game Biologist, (386) 758-5767 ext 110
Brad Gruver, Endangered Species Coordinator, (850) 488-3831
Deborah Burr, Gopher Tortoise Conservation Coordinator, (850) 410-0656 ext 17331
Craig Faulhaber, Scrub-Jay Conservation Coordinator, (352) 732-1225

6.1.2: Hunting & Game Management

Staff should receive training to implement the monitoring protocol for northern bobwhite, grassland songbirds and other upland species that is being

developed for monitoring state lands participating in UERP. The small game coordinator is the current contact for this program.

Contact:

Chuck McKelvy, Small Game Coordinator (850) 342-0256

6.1.3: Fish & Wildlife Research Institute

FWRI is currently coordinating monitoring and research efforts on southeastern American kestrels and striped newts. Cooperation with these efforts is critical to our success on Half Moon WMA as well as statewide as an agency.

Additionally, any new information on bald eagle nests should be forwarded to the bald eagle database coordinator.

Contacts:

Tim O'Meara, section leader, (850) 488-3831

Karl Miller, Avian Ecologist, (352) 955-2081 x104

Janell Brush, Bald Eagle Database Coordinator, (352) 955-2081 x111

Herp Researcher, Kevin Enge, (352) 955-2081 x121

6.1.4: Habitat Conservation Scientific Services Section (HCSS)

For many focal species, habitat on adjacent private lands is necessary for maintaining a viable population and/or providing for dispersal into or out of the local population. When area staff interacts with adjacent land owners or managers they should make them aware of the opportunity for technical assistance from HCSS staff. Also, HCSS staff is the point of contact for private landowners interested in financial assistance programs offered by the United States Department of Agriculture (USDA) and United States Fish and Wildlife Service (USFWS).

Contact:

Mark Asleson, Northeast Region HCSS Biologist, (352) 732-1229

6.1.5: Invasive Plant Management Section

The FWC Invasive Plant Management Section provides technical and financial assistance assist in the control of invasive exotic plants to area staff.

Contact:

Southwest Florida Field Office, Inverness, (352) 726-8622

6.2: Division of Forestry (DOF)

DOF administers the timber contracts for all thinning operations on Half Moon WMA, authorizes prescribed burns and assists on escapes. Efforts should be made to continue to coordinate with DOF's State Lands Forester on timber management issues.

Contacts:

Butch Mallet, State Lands Forester, office: (352) 592-5696, cell: (850) 228-7809
(Timber contracts)
DOF Dispatch Office (352) 754-6757(Burn authorizations and escapes)

6.3: Southwest Florida Water Management District

Water quality is very important for species such as wading birds and limpkins that are dependent on aquatic resources. Data pertaining to water quality in the Withlacoochee River should be sought from the SWFWMD to monitor any changes that could potentially affect species that use aquatic resources.

Contact:

Joel DeAngelis, Senior Land Management Specialist, (352) 754-4468

6.4: The Nature Conservancy, Jay Watch Program

The Nature Conservancy has organized and coordinates a citizen-science program to monitor Florida scrub-jays throughout the state using a standardized protocol. The coordinator of Jay Watch issues an annual report on the status of Florida scrub-jays. The Jay Watch coordinator is interested in including data collected by FWC and other public land managers to give the most complete picture possible. As such the regional conservation biologist will provide Jay Watch with the results of scrub-jay monitoring on Half Moon.

Contact:

Cheryl Millet, Biologist, (863) 635-7506 Ext. 205 cmillet@tnc.org

6.5: Florida Natural Areas Inventory (FNAI)

The FNAI maintains a database of documented sightings of rare plants and animals which are used in a number of habitat modeling procedures as well as for environmental planning and regulatory purposes by all Florida agencies responsible for natural resource protection and management. As such the regional conservation biologist will supply all reported documentation of rare species as well as survey results to FNAI for inclusion in their databases.

Contact:

Dan Hipes, Chief Scientist, (850) 224-8207

Section 7: Beyond the Boundaries Considerations

There is enough potential habitat (with restoration) to support many of Half Moon WMA's focal species, and Half Moon WMA is part of a network of conservation lands that will help ensure the continued existence of many of the wide ranging focal species. The optimal management boundary identified for the area encompasses all important habitat for focal species, including the lands identified as Strategic Habitat Conservation Areas for the Florida mouse, striped newt and Florida scrub-jay. However, it is unlikely all property identified in the optimal boundary will be acquired.

While Half Moon WMA and the current condition and management of neighboring lands provides an opportunity to further the conservation of many focal and imperiled species, significant changes in management or land use beyond the boundaries may have significant impact on some species. Species that require large home ranges or are dependent on dispersal for maintaining a population are particularly affected by adjacent land management. Many of the species that inhabit xeric uplands are dependant on the availability of suitable habitat on adjacent private lands. As such, the actions of adjacent landowners will determine if some of these focal species will persist on Half Moon WMA. Area staff should make every effort to cooperate on the conservation of focal species with adjacent private landowners. This includes coordinating with HCSS to ensure willing private landowners get the proper technical assistance and are informed of incentive programs to encourage conservation based management. The private lands adjacent to Half Moon WMA are in a sandhill focal area designated by HCSS as a high priority area for their efforts, and HCSS has ongoing projects with private landowners northeast of the area. Fostering a positive relationship with neighboring landowners may increase the willingness of the landowner to become a partner in conservation based land management. Such partnerships are critical to the long-term persistence of species like the Florida pine snake, Sherman's fox squirrel, striped newt, Florida mouse and Florida scrub-jay on Half Moon WMA.

Document Map

Species	Species objective	Land management actions	Species management actions	Species monitoring	Research needs	Intra/inter agency coordination
Gopher frog	3.2.1	4.3.1		5.2.1		
Striped newt	3.2.2	4.1.1		5.2.2		6.1.3
Florida pine snake				5.2.10		6.1.4
Gopher tortoise	3.2.4	4.3.2		5.2.3		6.1.1
American swallow-tailed kite		4.3.3		5.2.10		
Bachman's sparrow	3.2.6	4.1.2		5.2.6		
Brown-headed nuthatch		4.3.4		5.2.6		
Cooper's hawk		4.3.5		5.2.10		
Florida mottled duck				5.2.10		
Florida sandhill crane		4.3.6		5.2.10		
Florida scrub-jay	3.2.11	4.1.3		5.2.4	5.3.1	6.1.4 , 6.4
Limpkin		4.3.7		5.2.5		6.1.5 , 6.3
Northern bobwhite	3.2.13	4.3.8		5.2.6		6.1.2
Southeastern American kestrel		4.3.9	5.1.1	5.2.7		6.1.3
Southern bald eagle		4.3.10		5.2.8		6.1.4
Wading birds		4.3.11		5.2.10		
Florida black bear		4.3.12		5.2.10		
Florida mouse	3.2.18			5.2.9	5.3.2	6.1.4
Sherman's fox squirrel		4.3.13		5.2.10	5.3.3	6.1.4
Southeastern bat		4.3.14		5.2.10		

13.12 Recreation Master Plan

Recreation Master Plan for Half Moon Wildlife Management Area



Florida Fish and Wildlife Conservation Commission



April, 2007

DRAFT HALF MOON WMA RECREATION MASTER PLAN

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I. Introduction

Purpose of the Recreation Management Plan

The purpose of this Recreation Master Plan (RMP) is to serve as a guide for providing recreational experiences focused on wildlife viewing and nature study on Half Moon Wildlife Management Area (HMWMA). The plan contains specific recommendations for recreational enhancements and interpretive products and programs. It also provides guidelines for monitoring recreation-related use to avoid negative resource impacts and to ensure satisfactory visitor experiences.

In the RMP for HMWMA, emphasis is placed on integrating recreation and interpretive planning. Using this approach, the type of recreational experience offered and the location of recreation amenities provided, are strongly influenced by the interpretive goals for the area. Recreation opportunities thus become a means to an end - reaching visitors with important concepts about an area's natural resources, plant communities, wildlife and wildlife management.

Location of HMWMA

Half Moon Wildlife Management Area (HMWMA) lies in the northwest corner of Sumter County in central Florida (Figure 1). The entrance to Half Moon is located at the north end of CR 247, off SR 44 between Inverness and Wildwood. It is approximately 7 miles west of I-75 and the turnpike and 25 miles south of Ocala. Metropolitan areas within 70 miles include Orlando, Tampa and Gainesville. The current acreage is 9,480, which includes 4,021 acres leased from Southwest Florida Water Management District (SWFWMD).

Acquisition Purpose and Management Directive

The primary objectives of the purchase were to preserve the water quality of the Withlacoochee River, Gum Slough, and their proximal tributaries; and to establish a wildlife management area. FWC has been directed 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." Multiple use concepts guide management strategies on HMWMA. Presently the primary uses include wildlife habitat management and natural resource-based recreation.

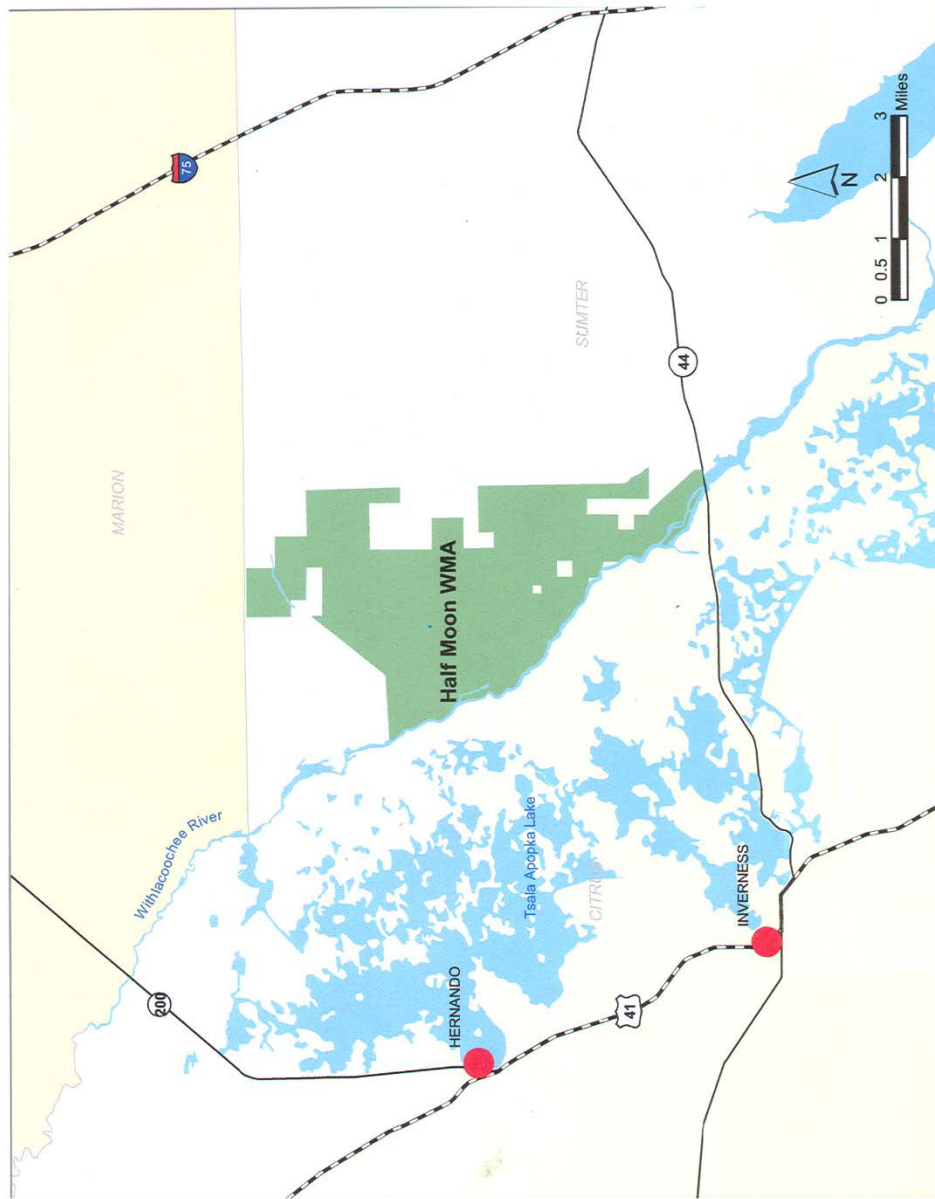


Figure 1. HMWMA Location

Map 1: FNAI Natural Communities

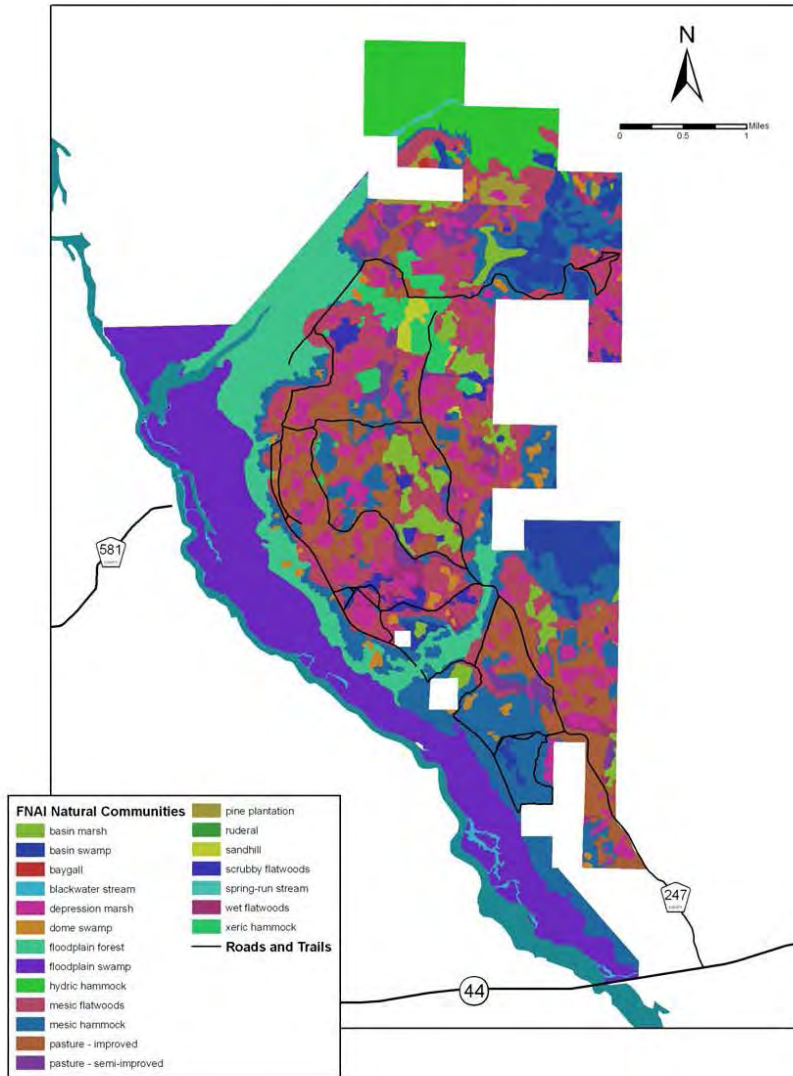


Figure 2. Natural Communities on HMWMA.

II. Resource Inventory

Natural Communities

HMWMA is a former ranch composed of a mosaic of 19 different natural communities including swamps, freshwater marshes, flatwoods, hammocks, and improved pasture with a split between wetlands and uplands of 45% to 55% (Figure 2). The mesic flatwoods, mesic hammock, and pasture dominate the upland acreage while the floodplain swamps and forests associated with the Withlacoochee River, Mill Creek, and Gum Slough dominate in the wetlands.

Natural Community	Acreage
Basin Marsh	295
Basin Swamp	442
Baygall	4
Blackwater Stream	177
Depression Marsh	715
Dome Swamp	121
Floodplain Forest	904
Floodplain Swamp	1762
Hydric Hammock	575
Mesic Flatwoods	1351
Mesic Hammock	1445
Pasture – Improved	1021
Pasture – Semi-improved	245
Pine Plantation	62
Ruderal	2
Sandhill	44
Scrubby Flatwoods	127
Spring-run Stream	15
Wet Flatwoods	110
Xeric Hammock	200

Basin Marsh and Depression Marsh: These communities are found interspersed among the upland areas to the east of the riverine wetlands and feature an herbaceous groundcover consisting of maidencane (*Panicum hemitomon*), sawgrass (*Cladium jamaicense*), bulrushes (*Scirpus* spp.), and sand cordgrass (*Spartina bakeri*) as well as common arrowhead (*Sagittaria latifolia*), pickerelweed (*Pontederia cordata*) and St. Andrew’s cross (*Hypericum hypericoides*). Areas of deeper water support floating bladderwort (*Utricularia inflata*), marsh pennywort (*Hydrocotyle umbellata*), and white waterlily (*Nymphaea odorata*). The primary differentiation between the two communities is size and the underlying topography, with basin marshes being larger and often found in areas formerly covered with lakes or ponds.

Basin Swamp: Basin swamps are found along the eastern side of HMWMA in the areas near where Gum Slough and Mill Creek originate. Common species include black gum (*Nyssa sylvatica*), red maple (*Acer rubrum*), buttonbush (*Cephalanthus occidentalis*), and Carolina willow (*Salix caroliniana*).

Baygall: A very small area of baygall community is found in the northern part of HMWMA between Gum Slough and a series of depression marshes. This community features a dense canopy of sweetbay and swamp red bay with an open understory of dahoon holly (*Ilex cassine*), fetterbush (*Lyonia lucida*), wax myrtle (*Myrica cerifera*), and Virginia chain fern (*Woodwardia virginica*).

Blackwater Stream: The Withlacoochee River is classified as a blackwater stream, characterized by tannic water and little to no submerged vegetation due to the lack of sunlight through the dark water.

Dome Swamp: Dome swamps are scattered throughout HMWMA. Named for the domed profile resulting from smaller trees growing in shallower water along the edges of the depression they grow in, primary canopy species are pond cypress (*Taxodium ascendens*) and black gum (*Nyssa sylvatica*). An open understory consists of red maple (*Acer rubrum*), sweetbay (*Magnolia virginiana*), and swamp red bay (*Persea palustris*) with a sparse growth of herbaceous species often growing on tussocks formed around the buttressed bases of the canopy trees.

Floodplain Forest: This community is located along the riverine systems between the floodplain swamp and mesic hammock communities characterized by American elm (*Ulmus Americana*), dwarf palmetto (*Sabal minor*), sweetgum (*Liquidambar styraciflua*), and red maple (*Acer rubrum*) under an overstory of mixed mesophytic hardwoods.

Floodplain Swamp: Floodplain swamp is found along the creeks and the Withlacoochee River and is the most common natural community on HMWMA in terms of acreage. Common species include an overstory of bald cypress (*Taxodium distichum*) and black gum (*Nyssa sylvatica*) with a sparse understory and groundcover of red maple (*Acer rubrum*), ironwood (*Carpinus caroliniana*) and Virginia chain fern (*Woodwardia virginica*).

Hydric Hammock: This community is found in the extreme northern part of HMWMA near the origin of Gum Slough in an area of limestone outcropping. While hydric hammocks are infrequently flooded the soils are normally saturated which contributes to a relatively sparse understory often dominated by palms and ferns such as saw palmetto (*Serenoa repens*), dwarf palmetto (*Sabal minor*), and royal fern (*Osmunda regalis*). Above this is a canopy of cabbage palm (*Sabal palmetto*) and laurel oak (*Quercus laurifolia*).

Mesic Flatwoods: Located on flat, poorly drained areas mesic flatwoods typically feature an open canopy of longleaf pine (*Pinus palustris*) with little to no understory and a dense groundcover of saw palmetto (*Serenoa repens*), gallberry (*Ilex glabra*), and tarflower (*Befaria racemosa*) as well as threeawns (*Aristida* spp.), blazing star (*Liatris* spp.), and paintbrush (*Carphephorus* spp.).

Mesic Hammock: Mesic hammock is the most common upland natural community on HMWMA in terms of acreage and is found throughout the WMA upslope of the floodplain forest, along wetland margins and in association with limestone outcroppings. Live oak (*Quercus virginiana*), water oak (*Quercus nigra*), and southern magnolia (*Magnolia grandiflora*) are common overstory species with cabbage palm (*Sabal palmetto*), ironwood (*Carpinus caroliniana*), American elm (*Ulmus americana*), and sweetgum (*Liquidambar styraciflua*) in the midstory. The understory includes dwarf palmetto (*Sabal minor*), saw palmetto (*Serenoa repens*) and coralbean (*Erythrina herbacea*). Epiphytes are common in this community with resurrection fern (*Polypodium polypodioides*) and Spanish moss (*Tillandsia usneoides*) on many of the canopy trees. There are also several rare plants found in the mesic hammocks including plume polypody (*Pecluma pumila*), swamp plume polypody (*Pecluma ptilodon*), as well as terrestrial peperomia (*Peperomia humilis*), and anglepod (*Matelea gonocarpos*).

Sandhill: Small areas of sandhill remain in the northwestern portion of HMWMA. While much of it has been altered it is thought that this community never covered more than 150 acres of the WMA. Overstory is sparse canopy of longleaf pine (*Pinus palustris*) with a midstory of turkey oak (*Quercus laevis*), bluejack oak (*Quercus incana*) and sand post oak (*Quercus margaretta*). The understory includes threeawns (*Aristida* spp.), bracken fern (*Pteridium aquilinum*), lopsided indiangrass (*Sorghastrum secundum*), prickly-pear cactus (*Opuntia humifusa*), and gopher apple (*Licania michauxii*).

Scrubby Flatwoods: Characterized by a sparse overstory of longleaf pine (*Pinus palustris*) with an understory of saw palmetto (*Serenoa repens*) and scattered clumps of xerophytic oaks including sand live oak (*Quercus geminata*) and myrtle oak (*Quercus myrtifolia*). Other characteristic species include gallberry (*Ilex glabra*), rusty lyonia (*Lyonia ferruginea*), tarflower (*Befaria racemosa*), threeawns (*Aristida* spp.), and blazing star (*Liatris spicata*).

Spring-run Stream: Gum Slough is a spring-run stream fed by Gum Spring. Clear water with a sand bottom is characteristic of this riverine system.

Wet Flatwoods: Wet flatwoods are typically found on flat, poorly drained areas where mesic and scrubby flatwoods transition to depression and basin marshes. Similar in aspect to mesic flatwoods, wet flatwoods are inundated for 1 month or more.

Xeric Hammock: Most of the xeric hammock on HMWMA is found on higher elevations in the northern half of the WMA. Many of the areas were originally sandhill but have succeeded to xeric hammock in the absence of fire. Typical overstory and midstory species include live oak (*Quercus virginiana*), laurel oak (*Quercus laurifolia*), longleaf pine (*Pinus palustris*), pignut hickory (*Carya glabra*), and cabbage palm (*Sabal palmetto*). Understory species include Adam's needle (*Yucca filamentosa*), broomsedge (*Andropogon virginicus*), yaupon holly (*Ilex vomitoria*), and threeawns (*Aristida* spp.).

Pasture: Created for cattle and other agricultural uses primarily in areas formerly covered by mesic flatwoods and scrubby flatwoods. The dominant species of this community is bahia

grass (Paspalum notatum) with occasional areas of pangola grass (Digitaria eriantha). In the absence of active management for agricultural purposes, species native to the original natural communities have begun to return and HMWMA has an active groundcover restoration program to recover these areas.

Pine Plantation: Like many of the pastures, the pine plantations were created on former mesic flatwoods sites. Currently slash pine (Pinus elliottii) with little or no understory or groundcover, these areas will be restored to their original natural community over time.

Wildlife

A wide variety of terrestrial vertebrates can be found on HMWMA, perhaps due to both the diversity and interspersed vegetation types. Interspersed community types results in many ecotonal areas. The ecotones attract many species as they provide easy access to two or more vegetative types.

Especially rare or unique species

Wood stork
American alligator
Bald eagle
Sherman's fox squirrel
Gopher tortoise
Gopher frog
Little blue heron
Southeastern American kestrel
Snowy egret
Eastern indigo snake
White ibis
Florida scrub-jay
Florida sandhill crane

Species of particular interest to visitors

Swallowtail kite
Florida scrub-jay
Eastern bluebird
Florida sandhill crane

Scenic Resources

Half Moon is a very diverse landscape (old pastures, oak hammocks, freshwater marshes, oak scrub, cypress swamp, flatwoods), which contributes to its visual interest. Existing trails and roads provide several scenic vistas over freshwater marshes. Other scenic destinations include Mill Creek and Gum Slough (both beautiful spring fed streams and tributaries of the Withlacoochee River), giant live oaks on the southern loop (Wall Road) measuring >2m in diameter, and the canopied logging tram in the floodplain forest along the Withlacoochee River.

Cultural Resources

No prehistoric archaeological sites are recorded for the area. The area may be part of a cultural void resulting from the lack of uplands immediately adjacent to a lake or river. Where this physiographic juxtaposition does exist, as on the west bank of the Withlacoochee River directly across from HMWMA, the density of archaeological sites is high.

The Division of Historic Resources lists five historic sites in the Florida Master Site File for HMWMA. Four of these are former homestead sites (Hodge Place, Welch Place, McKinney Place, Unnamed former house) and one is a cemetery (Alto Cemetery). The McKinney house was the last homestead on the area. It was settled about 1916. Open pastures, where the McKinney's cattle once grazed, still exist close to the old homestead. Many of the headstones that mark the graves in the Alto Cemetery are those of infants and small children, a reminder of the harsh life experienced by Florida's early pioneers.

Located in the Withlacoochee River floodplain forest is an old logging tram which was built in the early 1900's by Cummer Sons Cypress Company. The tram supported a railroad track which was used to transport logs to the Lacochee sawmill in Pascoe County. The sawmill operated from 1923 until the mid 1960's when the region's cypress trees were depleted.

Resource Management

FWC has initiated an objective-based approach to habitat management on HMWMA. This approach includes delineation of management units based on plant community type, determination of management objectives for those units, and regular plant community monitoring.

HMWMA staff intend to restore disturbed or altered natural communities primarily using prescribed fire along with mechanical treatment where appropriate. There are a total of 37 burn units, each averaging 102 acres in size utilizing combinations of natural firebreaks and existing roads and firelines.

Pinelands are being managed to restore herbaceous groundcover and longleaf pine as the dominant tree species. Native understory species will be restored in bahia grass pastures. Scrub management is aimed at maintaining conditions that are beneficial to Florida scrub-jays, which in turn benefits other early-successional scrub endemics. The ideal habitat for scrub-

jays includes patches of bare sand and oaks that are 3 to 10 tall – conditions described by the area manager as “easy to walk through but hard to see through.”

Approximately 200 acres of wildlife openings, food plots and dove fields will be maintained on previously disturbed sites.

Selected ditches and canals that were used to drain area wetlands in the past will be filled with soil to approximate historic hydroperiods.

III. Interpretation

Interpretive Themes

Interpretive themes are categorized as primary and secondary. All interpretive materials revolve around one or two primary themes, which allow visitors to understand and remember important messages. Primary themes also help set visitor experience goals and priorities and are considered in the design of amenities offered to nature-based recreationists. Secondary themes expand upon primary themes.

Primary Interpretive Themes

Theme 1: FWC management at HMWMA seeks to protect the water quality in the Withlacoochee River watershed and the underlying Floridan aquifer.

Discussion: HMWMA borders the Withlacoochee River. Freshwater wetlands comprise 40 percent of its acreage. Limestone outcroppings and springs indicate that the Floridan aquifer is close to the surface. Sloughs, streams and numerous marshes and swamps connect either directly to the river or to the aquifer. The uplands on Half Moon act as a natural filtration system, cleaning surface water that flows directly into creeks, sloughs, and the Withlacoochee River, or into the aquifer.

Theme 2: Management is not a “one-size fits all” process. FWC uses management regimes that are tailor-made for each site, species, and habitat.

Discussion: FWC biologists use techniques such as prescribed fire, mechanical treatment, and natural community restoration to benefit wildlife, such as the rare Florida scrub-jay, and to protect the water quality in adjacent wetlands.

Secondary Interpretive Themes

Theme 3: FWC management at HMWMA takes into account prior land uses, which include extensive cypress logging in the river floodplain, cattle ranching on the uplands, and human settlement.

Discussion: This inherited set of conditions dictates some of the management efforts at Half Moon. Pastures used for cattle grazing are being converted to native grasses or are restored to

scrub and pine flatwoods. Some manmade canals and ditches are being filled in to restore natural water retention and flow through the property. Homesteads, cemeteries, and logging tram roads are preserved as historical markers and interpretive exhibits.

Visitor Experience Goals

At HMWMA, the FWC will provide opportunities for visitors to:

1. Become oriented to and participate in a range of recreational activities on HMWMA and adjoining natural areas while:
 - becoming acquainted with wildlife and natural plant communities on the HMWMA and
 - understanding HMWMA's natural, cultural and commercial history, in context with the history and prehistory of Florida.
2. Learn information and stories associated with major interpretive themes, and other related information, through interpretive materials accompanying welcome kiosks, trails, and wildlife viewing facilities.
3. Have an enjoyable recreational experience without impairing the natural and cultural values of the site. In terms of wildlife viewing, FWC's goal will be to facilitate positive, memorable experiences that keep wildlife disturbances to a minimum.
4. Understand the management role and goals of the FWC on HMWMA.

IV. Recreation Assessment

Appropriate Recreational Uses on HMWMA

HMWMA lands and waters offer opportunities for a variety of high quality wildlife focused recreation. Based on the approved uses and activities as stated in the 2001-2006 Conceptual Management Plan, the analysis of existing resources and uses, and the interpretive themes developed for the area, the following activities should be continued and enhanced on HMWMA:

- Hunting
- Fishing
- Wildlife viewing
- Nature study
- Photography
- Hiking
- Biking
- Horseback riding
- Picnicking

These activities will be managed to provide high quality, uncrowded outdoor experiences. An effort will be made to identify possible incompatibilities among user groups and resolve them through spatial or temporal separation if need be. Interpretive programs for natural and cultural resources will include informational signs and kiosks and printed interpretive materials. The interface between recreational and other human use activities and wildlife habitat concerns will be managed to provide adequate protection for sensitive or listed species and their habitats.

Future Recreation Demands and Needs

The 2000 Florida Statewide Comprehensive Outdoor Recreation Plan (SCORP) indicates that saltwater and freshwater beach activities and bicycle riding are currently the most popular resource-based activities in the Withlacoochee Region. The plan identified a need for resources and facilities to meet a regional demand for bicycle trails through 2010.

Future land use and development patterns in the region will certainly have implications for recreation planning on HMWMA. Population will increase substantially in the future as the The Villages of Sumter and Tri County Villages are constructed some 12 miles to the east of HMWMA. By 2014, these mixed use retirement communities are expected to have a population of more than 100,000. An additional 100,000 residents are expected to settle in the surrounding tri-county area of North Lake, North Sumter and South Marion Counties by that time.

Although HMWMA has not seen much increase in visitor use over the last ten years, this may change in the future as the region continues to grow.

Existing Recreational Use and Facilities

The purpose of this section is to identify and describe the existing recreational uses and facilities on HMWMA and to provide recommendations for achieving visitor experience goals and for meeting future recreation demands and needs. Maps with the locations of existing site features and facilities are provided in Figures 3 and 4.

Public Access/Entrances:

Half Moon has only one entrance, located at the terminus of CR 247. There is a large kiosk, a sign in box, and a picnic table at the entrance. Vehicles are not allowed inside the gate except on hunting and scouting days. Visitors must park along the right-of-way just outside of the gate in a designated parking area.

There are approximately 10 miles of improved roads on the area. Most are stabilized with limerock, making them accessible by two-wheel drive vehicles.

The entrance could be improved with the addition of an area map and interpretive panels in the kiosk and a covered picnic shelter. The kiosk is relatively new and in good shape. When the

kiosk reaches the end of its useful life, it is recommended that it be replaced with the standard FWC model as described in the ORS design manual.

Half Moon is used regularly by horseback riders so the construction of a parking area that would accommodate trucks with horse trailers would be beneficial.

The location of the entrance presents a challenge for visitors (especially those on foot) in terms of its distance to some of the best wildlife viewing destinations. For example, from the entrance it is approximately 1 mile to the logging tram, 2 miles to Mill Creek, 2.5 miles to the viewing platform, and 3.5 to 4 miles for the best chance to see scrub-jays.

Hunting:

With a stable deer population estimated at 60 per square mile, HMWMA offers excellent deer hunting opportunities. Turkey, wild hog, and small game hunting are good. Approximately 200 acres of wildlife openings exist. Food plots and dove fields are planned for previously disturbed sites.

For the 2005-06 season 37 hunt days and 10 scouting days were offered for the following hunt types:

Archery: October 7-9 and 14-16
Muzzleloading Gun: October 28-30
General Gun: November 12-14 and 18-20
Small Game: December 2-4, 9-11 and 16-18
General Gun Hog: January 14-15 and 21-22
Spring Turkey: March 24-26, March 31-April 2 and April 7-9

Quotas limiting the number of hunters accessing the area during certain hunting seasons are employed as necessary in order to provide a safe, high-quality hunting experience. Quota permit information for the 2005-06 season is listed below.

Archery and Muzzle loading: 75, no-cost, special quota permits
General Gun: 75, no-cost, regular quota permits
Small Game: 50, no-cost, daily quota permits
General Gun Hog: 50, no-cost, daily quota permits
Spring Turkey: 30, no-cost spring turkey quota permits

Most hunting occurs during the general gun season with small game season never reaching capacity. Hunting is generally consistent across the property with no "hot spots".

Hunting with dogs is prohibited except bird dogs and dogs with a shoulder height of 15 inches or less during the small game season. Equestrian activities are not permitted during most hunt periods.

There is one check station on the property. It's located at the office, approximately 1 mile north of the entrance. The only public restroom facility on the area is located here.

All other uses, except for horseback riding during big game and turkey hunts, are allowed on the area during hunting.

Hunt days and allowed uses during hunts should be clearly communicated at the area entrance.

Fishing

Bass, sunfish and catfish can be caught from the 15 ponds on HMWMA, most of which were dug to provide water for cattle when the area was privately owned. Fishing is allowed all year, but very few people fish because the ponds are not accessible by car (except on hunting and scouting days) and most ponds are located far from the entrance.

A fishing dock was recently constructed on an excavated pond at the edge of a basin marsh. The structure is little used by anglers because of its distance (approximately 2.5 miles) from the area entrance.

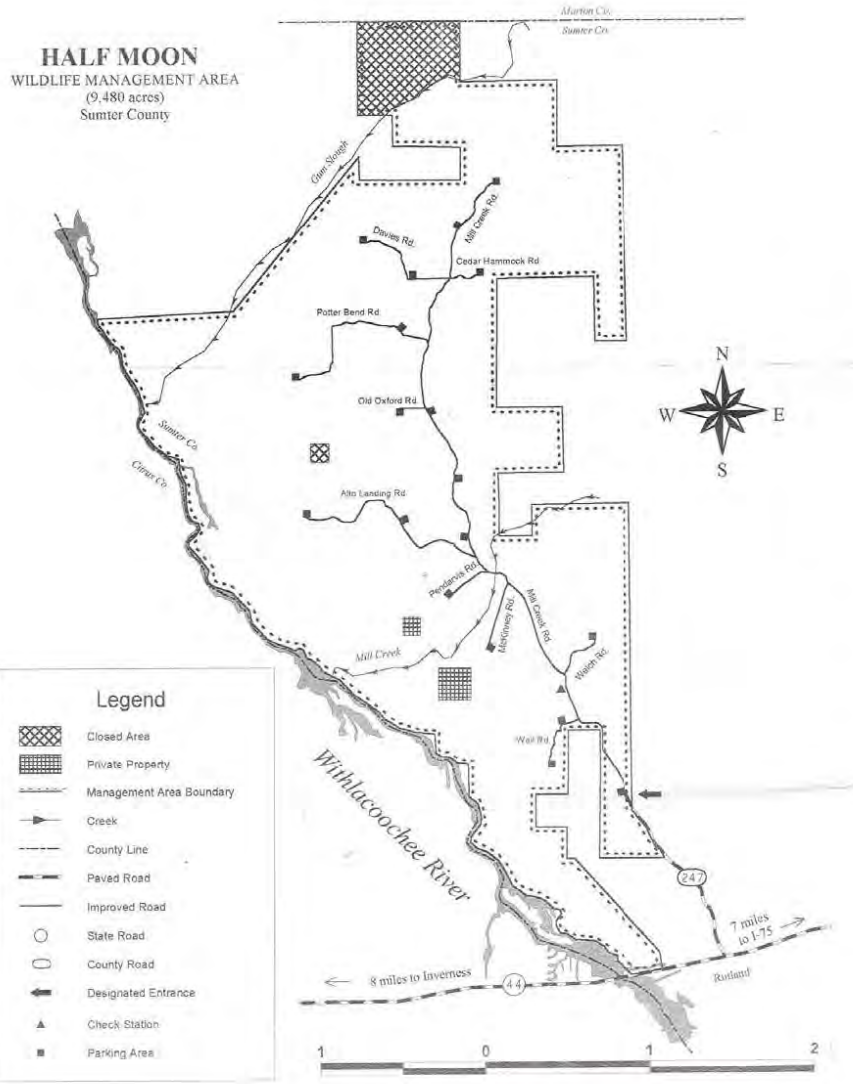


Figure 3. Existing Roads on HMWMA

Wildlife Viewing and Nature Study

The interspersed vegetation types on Half Moon attract species that use two or more natural communities, resulting in a rich diversity of terrestrial vertebrates. Migratory warblers are abundant in March and April and also during fall migration. A viewing deck/fishing dock can be accessed 2.5 miles inside the area on Mill Creek Road. It provides opportunities for viewing a variety of wading birds and waterfowl that frequent the adjacent basin marsh. The structure surrounds an excavated pond on the edge of the marsh where alligators are frequently observed sunning on mats of floating vegetation.

Bluebirds can be viewed in the pasture areas most times of the year with a peak during the winter months. Swallow-tailed kites can be seen during migrations. Scrub-jays occur sparingly on HMWMA. They can be viewed in the scrubby flatwoods areas and peripheral mesic flatwoods, particularly on the northern portion of the property. The area is not on the Great Florida Birding Trail due to the limited access.

The construction of additional viewing structures should be weighed in terms of visitor access. There may be an opportunity to construct an interpretive trail and a blind in the corner of land just to the south and west of the entrance. Otherwise, since most of the best viewing destinations are so far from the entrance, additional viewing structures may not see much use.

Hiking/Biking/Horseback Riding

Hiking, biking, and horseback riding are allowed on HMWMA's multiple-use trail system with some restrictions. The designated trails, adapted from the roads and trams, form a figure-8 with one embedded loop inside each half of the 8 (Figure 4). This nested system provides trail options for users with different interests and abilities. The northern part of the 8 is multi-use, and the southern part is exclusively for hiking. Equestrian use is not allowed on hunt days, except during small game season. Visitation is low throughout the year and no conflicts have been reported between various trail users. Most of the trails are maintained on existing two-track roads. Trails and roads are thoroughly marked with wayfinding signs.

It is recommended that the existing pattern of trails be maintained with some modifications at confusing locations.

The shaded tram in the floodplain forest is an attractive destination. Approximately 1.5 miles north of Wall Road, Mill Creek bisects the tram. At this point, northbound hikers must detour via McKinney Road to the bridge on Mill Creek Road then head west on Pendarvis Road to get back on the tram. A pedestrian bridge constructed over Mill Creek would improve access to the property by foot and enhance the overall experience of hiking the tram.

There is an opportunity to create a short (approximately 1 mile) interpretive loop trail just south of the entrance. Such a trail would provide hikers easy access to a variety of plant communities (mesic hammock, freshwater marsh, cypress swamp, and pasture) and wildlife viewing opportunities.

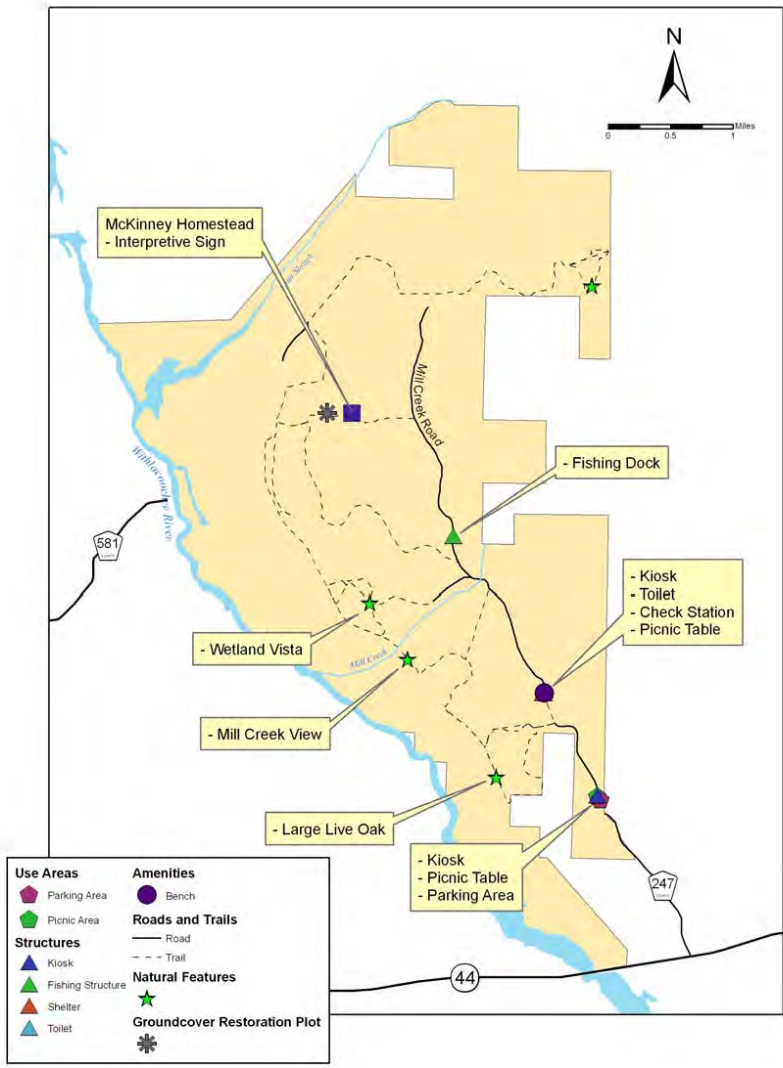


Figure 4. Existing Facilities, Roads and Trails on HMWMA

Aside from a bench at the check station and a picnic table at the entrance, there are no trail amenities. Recommended trail enhancements include the construction of an equestrian parking area (outside of the main gate), the installation of hitching posts, mounting blocks, bike racks, benches and picnic tables at appropriate locations. FWC will consider installing appropriate water sources for horses at suitable sites on the area in the future. The existing trail map will be incorporated into an area guide to better describe the variety of trail options and experiences on the area.

Paddling

HMWMA is located along the Withlacoochee River, which is a state-designated paddling trail. Paddling opportunities are available on the Withlacoochee River and Gum Slough. However, no access is available from the management area.

Camping:

Camping is not allowed on HMWMA.

Recreation Management Zones

Recreation studies demonstrate that visitors come to recreate on public lands with many different expectations (NPS, 1997). Providing a variety of settings allows visitors to select the type of experience they desire, simplifies management and reduces conflicts between visitors who are seeking different types of experiences. The zones delineated by the planning team are provided on Figure 5. Each zone is described below in terms of the type of experience it offers, the natural resources related to the experience and the level of management required.

Semi-primitive Zone

The semi-primitive zone provides a sense of being immersed in a natural landscape with opportunities for solitude. Observation structures, boardwalks, interpretative signs, and unpaved trails are the types of recreational facilities that are appropriate in this zone. A moderate level of management is provided for resource protection and safety.

The primary community types that visitors will experience in the semi-primitive zone on HMWMA are flatwoods, marshes, hardwood hammocks, and floodplain swamps and forests. Here they can learn about the complex relationship of upland and wetland communities in providing critical habitat to many species of wildlife. Throughout the area, visitors will be able to see the process of natural community restoration through ecological management.

Developed Zone

Developed zones are areas with visitor facilities such as parking, picnicking and toilets. The visitor's experience in this zone is highly social. Trails may be paved or hardened for access

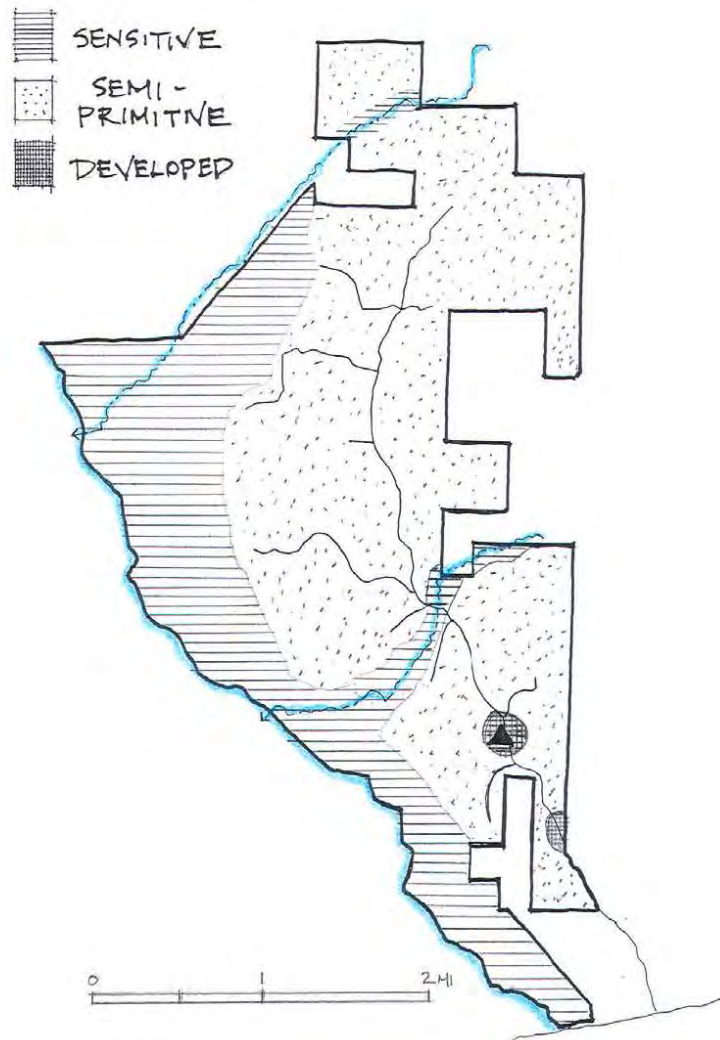


Figure 5. HMWMA Recreation Management Zones

by people with disabilities. Visitors and facilities are intensively managed in this zone for resource protection and safety purposes. Staff should monitor visitor behavior and attend to maintenance needs. The most intensive interpretation is provided in the developed zone. This is the most appropriate zone for building construction. Currently, the entrance and office/check station areas are the most developed visitor contact zone on HMWMA.

Sensitive Resource Protection Zone

Sensitive resource protection zones encompass areas with fragile habitats, rare and endangered species, archaeological/historical sites, and steep slopes. This zone can support little visitor impact. Only limited and strictly controlled access should be allowed for interpretation purposes.

The forested wetlands in the Withlacoochee floodplain comprise the primary sensitive zone on HMWMA. Other sensitive zones include the Gum Slough and Mill Creek corridors, marsh edges, caves (dissolution holes), old homesites, and the Alto Cemetery.

V. Recreation Prescriptions

Proposed Visitor Experiences and Recreation Facilities

The following narrative describes the overall experience that is intended for visitors to HMWMA. A conceptual site plan for proposed recreation facilities is provided in Figure 6.

When visitors arrive at the main entrance, they can stop at the information kiosk to review the large area map and learn about all of the recreational opportunities available on the area, including hunting, fishing, wildlife viewing, hiking, biking, and horseback riding. Area bird lists, hunt brochures and recreational guides will be available for the taking and interpretive panels will provide information about area wildlife, habitats and FWC management.

From this entrance, visitors can hike, bike or horseback ride on more than 12 miles of trails and roads to experience the rich mosaic of pastures, flatwoods, marshes, hardwood hammocks, and floodplain swamps and forests. The system of nested loop trails allows visitors to choose a trail experience based on available time, interest, and ability.

A short interpretive loop trail beginning at the area entrance provides visitors with quick access to a variety of plant communities (mesic hammock, freshwater marsh, cypress swamp, and pasture) and wildlife viewing opportunities.

The portion of the trail system on the old logging tram in the Withlacoochee River floodplain provides access to the cool, shady interior of a beautiful forested wetland which is alive with the sights and sounds of songbirds for much of the year. Visitors can hike the entire four mile length or take in shorter segments as part of one of the trail loops.

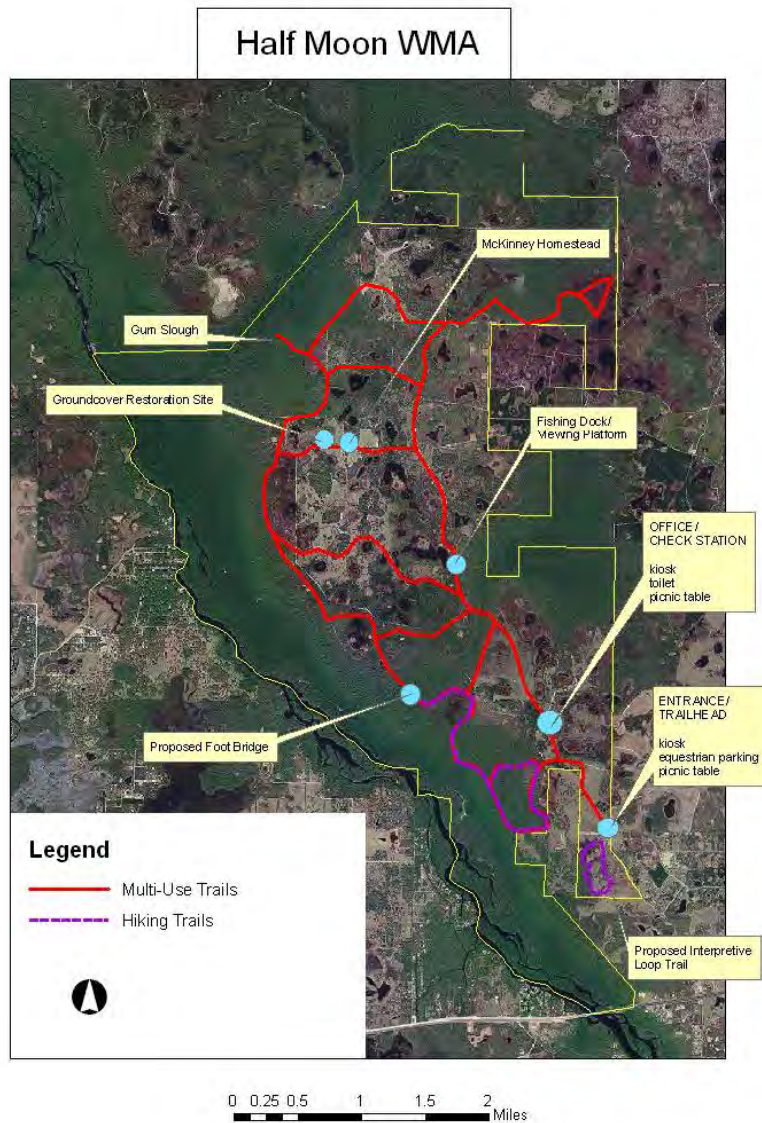


Figure 6. HMWMA Conceptual Site Plan.

Providing a contrast to the pine flatwoods and hardwood hammocks are the numerous freshwater marshes interspersed throughout the uplands. The viewing platform/fishing dock, just off Mill Creek Road approximately 2.5 miles north of the main entrance, provide visitors with the opportunity to see wading birds, waterfowl and alligators.

While the scrub jay population on the area is relatively small, visitors sometimes spot these gregarious birds in the scrubby flatwoods and oak scrub on the north side of the property in the vicinity of Potter Bend Road.

Recommended Nature-Based Recreation Goals and Objectives

Careful design and placement of recreational facilities can provide desirable visitor experiences and minimize impacts to the natural and cultural resources of the area. All planning and implementation should be done in accordance with guidelines in Appendix 1. A conceptual site plan for proposed recreation facilities is provided in Figure 6.

Goal A. Orient visitors to the area and its recreation opportunities and provide interpretive information

1. Develop area recreation guide with a high quality map and information about available recreation opportunities.
2. Stock recreation guide, hunt brochure and bird list in brochure racks at entrance kiosk.
3. Install area map and interpretive information about area wildlife, plant communities, and FWC's management role in the entrance kiosk.
4. Develop and install new interpretive and wayfinding signs at appropriate locations (as described in the sign plan, Appendix 3).
5. Maintain up-to-date information about the area on the FWC website.
6. Install rail mounted panels on the viewing platform/fishing dock to interpret the adjacent basin marsh and dependent wildlife.
7. Install interpretive panels on the proposed interpretive loop trail south of the area entrance.

Goal B: Enhance the existing recreational trail opportunities

1. Revise the existing loop trail system, as necessary, to enhance wildlife viewing opportunities and the overall interpretive program.
2. Create a short interpretive loop trail south of the area entrance.
3. Revise the area hiking trail guide and incorporate it into the area recreation guide.
4. Improve parking at the area entrance to accommodate trucks with horse trailers.
5. Install amenities such as hitching posts, benches, bike racks, and picnic tables at appropriate locations.

Goal C. Renovate facilities and develop new wildlife viewing/recreation opportunities on HMWMA

1. Replace existing kiosks with an ORS standard models when they fall into disrepair.
2. Determine appropriate locations for viewing facilities such as blinds and platforms.

Goal D: Direct and manage recreational use to minimize negative resource impacts and maximize visitor satisfaction

1. Implement a monitoring strategy to assess resource impacts and institute corrective management actions if indicators begin to approach standards.
2. Collect and evaluate information about visitor use and satisfaction:
 - Number of visitors to the area and patterns of visitation
 - User group conflicts
 - Origin and length of stay
 - Motivations for visiting and preferred experiences
 - What they already know about the area, and primary interpretive themes

Goal E. Coordinate with local, state and federal agencies and organizations when planning and implementing nature-based recreation opportunities and enhancements

1. Coordinate with SWFWMD for all trail enhancements on their property.

B. Challenges and Strategies

There are numerous challenges facing the effective implementation and management of nature-based recreation opportunities on the HMWMA. Challenges and proposed strategies to address them are discussed in this section.

Challenges:

- Limited vehicular access to the interior restricts wildlife viewing opportunities.
- As the regional population continues to expand, recreational use on the area may increase in volume which may impact resources. Sensitive plant communities, wildlife habitats, and historical sites could be adversely affected from soil disturbances resulting from inappropriate hiking, biking and horseback riding activities.
- As recreational use increases in volume conflicts among user groups may occur.

Strategies:

- Assess the feasibility of providing year-round vehicular access to an interior trailhead to provide a variety of trail use opportunities and options for wildlife viewing.
- Provide an easily-accessible short interpretive loop south of the entrance gate.
- Avoid sensitive environments when planning for recreational uses. Always provide environmental protection information in all interpretive materials. Periodically monitor all recreational uses for environmental impacts and implement corrective actions when and where necessary.
- Provide a range of recreational opportunities in a variety of settings to avoid user conflicts as much as possible.
- Display hunting information (days and times) at all entrances to help all users make choices as to when to visit.

C. Work Plans

As annual work plans and budgets are developed for HMWMA, Recreation Services staff will assist the area manager with trail maintenance and with cost estimating, design and construction of nature-based recreation related structures. Recreation Services staff will design interpretive materials for the areas in consultation with management area staff.

D. Monitoring and Management of Recreation Facilities

Measurable indicators for monitoring key aspects of the visitor's experience and resources at HMWMA are described in Appendix 2. Standards represent the point at which visitor experience and resource conditions become unacceptable. Indicators should be monitored for each zone, and when necessary, management actions taken to ensure that visitor use and resource impacts remain within the established standards.

References

Florida Fish and Wildlife Conservation Commission. A Conceptual Management Plan for Half Moon Wildlife Management Area (2004-2009).

National Park Service. 1997. The Visitor Experience and Resource Protection (VERP) Framework: A Handbook for Planners and Managers.

Perdue, Henry S. 2006. Hospital Tax: Yes, No, or Maybe? An Analysis of the Need and the Means to Expand TVRH. <http://perdues.com/hospital-tax.htm>

Future Land Use. Chapter 7. Sumter County Comprehensive Plan. 2005

Appendix 1

Recreation and Wildlife Viewing Facilities Design Guidelines

- **Entrances**
Should welcome visitors to the area, identify the Commission, describe the range of potential experiences on the area, describe the wildlife viewing experiences by season, time of day or wildlife event.
- **Viewing structures**
Structures should include wildlife identification or other interpretive information. The structure should be surrounded by and focused on wildlife and habitat, rather than being the focus itself. For towers, each level should focus visitor attention to a different habitat or feature.
- **Trails**
Trails should be described at the trailhead with length or time required. If the focus is wildlife viewing, include best seasons. Interpretive panels or brochure stops should be well-spaced and focused by season and should not exceed ½ to ¾ of a mile.

General considerations in developing facilities:

- Locate recreation facilities on previously disturbed properties wherever possible.
- Preserve a sense of solitude and limit impact on natural resources by concentrating recreation uses in small “developed” zones and along existing road/trail corridors.
- Site facilities and design trails to minimize user conflicts.
- Avoid sensitive areas such as wetlands and route trails to avoid fragmenting habitat.
- Consider physical characteristics and the historical and natural character of the location.
- Adapt parking lots, buildings, and other physical developments to existing topography.
- Retain on-site surface water run-off generated by development.
- Use porous pavements where surface hardening is required.
- Consider sewage disposal needs.
- Use native plants representative of the area for all landscaping.
- Design and build trails and observation structures to avoid disturbing wildlife and to minimize negative impacts such as erosion.
- Use elevated boardwalks in wet areas and swamps and walkovers to protect other sensitive areas.
- Incorporate wildlife viewing ethics into all interpretive materials.
- Incorporate interpretive themes into all brochures, trail guides and other materials produced to support recreation opportunities.
- Install interpretive signs and panels as appropriate at all recreation facilities.
- Route trails to interpret restoration and wildlife management activities.
- Insure interpretation of highly desired species viewable on the area.

Universal Access

Nature-based recreation facilities and programs must be developed and implemented in compliance with the Americans with Disabilities Act. All facilities in developed zones should be universally accessible. Recreation facilities in semi-primitive or primitive zones should be planned to be accessible to the degree possible except where:

- compliance will cause harm to cultural, historic or religious sites or significant natural features or characteristics
- compliance will substantially alter the nature of the setting or purpose of the facility or portion of the facility
- compliance would require construction methods or materials prohibited by federal, state or local regulations or statutes, or compliance would not be feasible due to terrain or prevailing construction practices.

Appendix 2

Management and Monitoring

Recreation Facility Monitoring Protocol Florida Fish and Wildlife Conservation Commission Office of Recreation Services

Introduction

In order to better plan and manage recreation opportunities on lands managed by the Florida Fish and Wildlife Conservation Commission (FWC), FWC's Office of Recreation Services has developed a monitoring program for recreation-related facilities and infrastructure. Using both qualitative and semi-quantitative methods this program will encompass trails, signs, wildlife viewing structures and other facilities. Data obtained through this program will help FWC better plan, construct, and maintain facilities to provide the recreation experiences that are meaningful, enjoyable, and safe.

Materials

Digital camera
Tripod
Kaidan panoramic photo mount
VRWorx, or other software for creating panoramic photos
Monitoring forms
Tape measure
Compass
GPS (loaded with waypoints for monitoring points)
Hand tools for checking structure hardware

Monitoring Procedures

Photopoints

Photopoints should be recorded with GPS, which can also be used to navigate back to the photopoint location on future monitoring visits. A description of the location should be recorded to ensure maximum accuracy in relocating the photopoint.

Trails

Trails are monitored with a panoramic photopoint at the trailhead and every mile for trails over 2 miles and every ½ mile for trails 2 miles and less. Additional photopoints may be needed for problem areas encountered on the trail. Photopoints are centered in the trail tread.

Assemble the panoramic photo gear and set the tripod over the photopoint, making sure the panoramic head is level. Standard photopoint height is 60" to the center of the camera lens

while mounted on the panoramic mount. This may be modified for some photopoints depending on surrounding vegetation or other considerations, but the new height should be recorded and used each time that photopoint is taken. The easiest way to set the height is to assemble the tripod, panoramic mount, and camera on level ground, adjust the legs to their full length and adjust the center column to achieve the proper lens height. The center column can be marked with a permanent marker, tape, or scored with a small file or engraver and each mark should be labeled with the height and camera model. This will have to be done for each different camera that will be used for photopoints, although it is preferable that the same camera be used for all photopoints.

Cameras should be set to full wide zoom, landscape mode if available, with flash off. All photopoints begin with the detent closest to due north and continue in a clockwise direction. A log should be kept to record the photo numbers and their corresponding photopoint.

After downloading the images they should be processed into a flat panorama (a digital image composed of all of the photos for a particular photopoint). These panoramas along with the component images should be kept in a central location organized by WMA, photopoint Number, and photopoint date.

Use areas

Use areas have 2 photopoints. One is a panoramic photo taken at the center of the use area which follows the procedure for trail photopoints. The other is a single photo taken from the perimeter of the area. The compass bearing of the photo should be recorded and used for all subsequent photos taken at that photopoint.

Structures

Structures have a single photopoint. This is a single photo and the compass bearing of the photo should be recorded and used for all subsequent photos taken at that photopoint. If desired, a panoramic photo can be taken to represent the view from the structure (such as the top of a tower).

Physical inspections

- Check for presence or absence (smaller amenities such as fire rings and benches)
- Check for proper location (smaller amenities such as fire rings and benches)
- Inspect for damage (signs and structures)
- Check hardware and tighten or replace if necessary (signs and structures)

Trails should be traversed in their entirety, either on foot for shorter trails or by vehicle for longer trails. Trouble spots (erosion, trail braiding, shortcuts, litter, excess vegetation encroachment, etc.) should be recorded by GPS and noted on the monitoring form.

Monitoring Forms and Record Keeping

Monitoring forms are completed in the field. This can be done electronically using the Recon field computer or manually. If done manually they should be transferred to an electronic version by filling out the form on computer. Completed electronic forms are then placed in the appropriate location on the Project Management Site for that WMA along with any relevant GPS data (converted to Shapefile), photographs, photopoints, and other notes.

Any issues that need attention should be entered into the “Issues” section of the Project Management Site for that WMA which will generate a notification to the project manager (in most cases the Recreation Planner for that area) and Section Coordinator. The project manager is responsible for ensuring the issue is brought to the attention of the appropriate personnel outside of ORS if necessary and ensuring that once resolved the issue entry is closed out.

Trail Monitoring Form

Observer: _____ Date: _____

Site: _____

LITTER IMPACTS:

- 1 = None
- 2 = Very Little (small, isolated pieces of litter)
- 3 = Some (frequent small pieces or isolated large pieces of litter)
- 4 = Extensive (small areas used for trash dumping or multiple areas of high litter concentration)
- 5 = Very Extensive (large areas used for trash dumping)

Problem area locations/comments:

STRUCTURE DAMAGE (signs, boardwalks, bridges, benches, blinds, towers, platforms, etc.):

- 1 = None
- 2 = Very Little (dirty, crooked, loose bolts, etc.)
- 3 = Some (minor wood repair, graffiti)
- 4 = Extensive (hazardous damage)
- 5 = Very Extensive (structure is ruined or missing)

FILL OUT A STRUCTURE DAMAGE FORM FOR ANY STRUCTURE THAT RANKS "2" OR HIGHER.

List of trail-related structures with rankings:

EROSION PROBLEMS

- 1 = Very Little
- 2 = Some: Tree roots or standing water evident
- 3 = Moderate: Exposed roots/rocks but little evidence of widening, some patches of exposed soil.
- 4 = Extensive: Many tree roots exposed, many spots of exposed soil, ruts and/or trail widening.

Problem area locations/comments:

CORRIDOR CONDITION

- 1 = Within standards (minimal vegetation encroachment)
- 2 = Exceeds standards (trail needs some mowing/lopping/chain sawing, blowdown obstructions)
- 3 = Unacceptable (trail is generally overgrown and difficult to find)

If there were problem areas, please describe condition and exact location:

PHOTOPOINT INFORMATION

All photopoints should be taken with a lens height of 60", the flash set to "off", and no zoom. All panoramic photopoints start with a photo taken towards north, then continue in a clockwise direction.

New photopoints taken (photopoint type, coordinates, location description, lens azimuth, image numbers)

Existing photopoints taken (Photopoint Number, image numbers)

Use Area Monitoring Form

Observer: _____ **Date:** _____

Site: _____

LITTER IMPACTS:

- 1 = None
- 2 = Very Little (small, isolated pieces of litter)
- 3 = Some (frequent small pieces or isolated large pieces of litter)
- 4 = Extensive (small areas used for trash dumping or multiple areas of high litter concentration)
- 5 = Very Extensive (large areas used for trash dumping)

Comments:

STRUCTURE DAMAGE (shelters, picnic tables, kiosks, trash cans, signs, grills, benches, etc.):

- 1 = None 2 = Very Little (dirty, crooked, loose bolts, etc.)
- 3 = Some (minor wood repair, graffiti) 4 = Extensive (hazardous damage)
- 5 = Very Extensive (structure is ruined)

FILL OUT A STRUCTURE DAMAGE FORM FOR ANY STRUCTURE THAT RANKS "2" OR HIGHER.

List of use-area structures with rankings:

EROSION PROBLEMS

- 1 = Very little
- 2 = Some: tree roots or standing water evident
- 3 = Moderate: exposed roots/rocks but little evidence of widening, some patches of exposed soil.
- 4 = Extensive: many tree roots exposed, many spots of exposed soil, ruts and/or trail widening.

Problem area locations/Comments:

PHOTOPOINT INFORMATION

*All photopoints should be taken with a lens height of 60", the flash set to "off", and no zoom
All panoramic photopoints start with a photo taken towards north, then continue in a clockwise
direction.*

**New photopoints taken (photopoint type, coordinates, location description, lens azimuth,
image numbers)**

Existing photopoints taken (photopoint Number, image numbers)

Structure Damage Reporting Form

Observer: _____ Date: _____

Site: _____

Structure name/type: _____

Structure location (written description, coordinates): _____

Please rate and explain the extent of the damage in the following areas, where...

- 1=Minimal (no maintenance needed)
- 2=Moderate (maintenance recommended)
- 3=Severe (maintenance imperative)

TAKE CLOSE-UP PHOTOS OF ALL REPORTED DAMAGE

Cleanliness (graffiti, mildew, debris build-up, odor, etc.)

Structural Integrity (crooked, wobbly, or leaning)

Wood condition (rotten, vandalized)

Hardware (rusty, loose, missing)

Other (please describe)

WMA Visit Checklist

- Trail maintenance needs
- Sign maintenance needs
- Structure maintenance needs
- Day-use area condition/maintenance needs
- Sufficient ORS publications in field office
- Brochure boxes adequately stocked
- Hunting calendar posted and up-to-date
- Users encountered on area (number, activity, address for future surveys)
- Geocaches inspected
- Manager concerns
- New ideas for area enhancement

Appendix 3

HMWMA Sign Plan

[Draft to be Developed]

Map and Interpretive Panels

Main entrance:

Existing check station kiosk:

Interpretive loop trail south of main entrance:

Wildlife Viewing Platform/Fishing Dock:

McKinney Homesite:

Alto Cemetery:

Scrub Jay Area:

Mill Creek Pedestrian Bridge (proposed):

Wayfinding Signs

Area Road Signs: These are relatively new and in good condition. Replace with ORS standard signage when necessary.

Existing Trail Markers:

Appendix 4

Work Plan for Nature-Based Recreation Enhancements

Based on the prioritization of the goals and objectives listed above, the following list of projects and tasks has been ordered in terms of short and long term completion timeframes.

1. Tasks 2006-07

- Plan recreation information to be posted at visitor contact points
- Design and construct interpretive loop trail south of area entrance
- Plan interpretive information that will be posted on trails and facilities
- Determine the appropriateness of constructing a wildlife viewing blind along the interpretive trail south of area entrance

2. Tasks 2007-08

- Produce recreation information to be posted at visitor contact points
- Produce interpretive information that will be posted on trails and facilities
- Conduct a meeting with Southwest Florida Water Management District to determine the permit requirements for pedestrian bridges over Mill Creek and other gaps in the old logging tram
- Design, permit and construct new parking area at entrance

3. Long-Term Completion and Ongoing Tasks

- Construct wildlife viewing blind along interpretive loop trail south of area entrance if determined appropriate
- Assess the feasibility of providing year-round vehicular access to an interior trailhead if warranted by future demand and need.
- Construct pedestrian bridges over Mill Creek and tram breaks/blowouts if warranted by future demand and need
- Construct ORS standard kiosks when existing kiosks need to be replaced
- Install ORS standard wayfinding signage when existing signage needs to be replaced
- Implement a monitoring strategy to assess resource impacts and institute corrective management actions if indicators begin to approach standards
- Collect and evaluate information about visitor use and satisfaction

Appendix 5

Comments from the Half Moon WMA Recreation Stakeholder Meeting Lake Panasofkee Recreation Center 3/7/2007

List of Attendees: Bill King, Harry Hitson, John White, Jerry Brannen, Meg Minor, Ken Gasaway, Ester Gasaway, Ron Duhs, Kathy Johnson, Mary Dowdell, Ken Hensley, Kathy Indelicato, Enza Indelicato, Judy Smith.

The Half Moon WMA Recreation Stakeholder Meeting was held at the Lake Panasofkee Recreation Center with 14 stakeholders as listed above representing a variety of interest groups. A synopsis of concerns, comments, and issues raised by those present is summarized below and categorized as follows:

1. Will be incorporated into the 2007 recreation master plan and implemented as part of the next 5 year work plan.

Install hitching posts at the north and south ends of the property and at the fishing/viewing dock. *The request for installing water troughs at these locations cannot be accommodated because of the possibility that disease can be spread from those sources. FWC will consider installing appropriate water sources at suitable sites in the future.*

Improve check station area for picnicking. This is a place where people congregate.

Install a picnic table at the fish pond.

Improve trail blazing on property.

Improve wayfinding signage to Gum Slough.

Include web links on interpretive material so that interested visitors can find more related information.

Post burn times at entrance.

Interpret burning so that visitors will come to understand and appreciate value of fire.

Post hunt calendar at entrance to help prevent possible hunter / non-hunter conflicts.

2. Will be considered in future plans and may be implemented if determined to be necessary and feasible.

Install additional environmentally-friendly toilets at suitable locations on the property.

Open tram for horses and bikes on south side of Mill Creek.

Revise the auto access policy to allow more days open to autos. *This recommendation was countered by other stakeholders who felt that the current auto access policy should be maintained.*

Improve wayfinding signage to the proposed Mill Creek Bridge if it is constructed.

Install bridges over Mill Creek and all breaches in tram to enhance the hiking experience. *The stakeholder who made this recommendation pointed out that such improvements would detract from the existing natural/primitive experience.*

3. These are important topics the FWC may consider in different venues but they are outside the scope of this recreation master plan.

Treat the check station termites.

Prescribed burning should be better planned.

Require all visitors to pay an entrance fee.

Create a Citizen Support Organization (Friends Group) for Half Moon WMA.

Improve the fish pond for fishing. *This recommendation is currently being implemented by area staff.*

13.13 Timber Assessment

Half Moon Wildlife Management Area

Timber Management Assessment

Prepared By:
Butch Mallett
Senior Forester
Florida Division of Forestry

January 3, 2000

HISTORY

The land now included in the Half Moon Wildlife Management Area (HMWMA) has changed greatly since European settlement of the area in the early to mid 1800's. Almost all of the native longleaf pine timber was cut for lumber. Only trees too small to cut for timber were left to regenerate the forest. Also left uncut were the slash, loblolly and pond pines that grew in inaccessible wet areas. Seedling slash pine, loblolly pine and pond pine are easily killed by fire. It is likely that lightning induced wildfires frequently burned over most of what is now HMWMA. That is why these three species were primarily confined to wetter sites.

Beginning in the late 1920's, wildfires were aggressively fought and extinguished. Longleaf pine seeds need bare mineral soil to germinate and survive. Burning of accumulated leaf litter normally provides the bare soil. Exclusion of fire from these lands and the subsequent buildup of organic matter on the soil inhibited longleaf pine regeneration. Conversely, fire suppression allowed the other pines to become more firmly established in areas close to their seed source.

Portions of the palmetto flatwoods were cleared of all vegetation and cultivated. Later, those same fields and others were turned into improved pastures for cattle production. From March of 1992 through February of 1998, the Florida Fish and Wildlife Conservation Commission (FWC) planted 170 acres of improved pasture with longleaf pine seedlings. Survival rates have been mixed; however, most have been less than 50%. Presently there are approximately 1,000 acres of open pasture remaining in the HMWMA. Close to 150 acres of these disturbed sites are being mowed to maintain wildlife openings.

The result of all of the above-mentioned activities is a landscape that has scattered stands of pine timber. There is, however, one overstocked slash pine plantation covering approximately 150 acres on the north end of the tract. It needs thinning in the very near future to improve stand vigor and lessen the likelihood of serious insect or disease attack. There are also a few small strands of mixed slash, loblolly and pond pine that either need thinning, sanitation cuts, or group selection harvests and replanting to longleaf pine.

Local resource managers have done an excellent job of identifying and designating burn (prescribed fire) units on HMWMA. However, acreage figures for Florida Natural Area Inventory (FNAI) natural community types as related to their management needs is not currently available. A timber stand description is needed that groups areas within the tract into stands of similar species composition, age, stocking levels, growth and management needs. Information

necessary for proper wildlife and ecosystem management is also gathered and compiled in this process. For proper planning and management of the timber resource, this should be completed within the next five years.

RESTORATION AND SILVICULTURAL MANAGEMENT GUIDELINES

OBJECTIVES

The primary goal of HMWMA is to provide public outdoor recreational opportunities while conserving and protecting natural and historic resources. As part of this goal, the reestablishment of native ecosystems is a high priority. Timber management is a valuable tool in the restoration and maintenance of forested ecosystems.

Efforts will be made to reestablish native species at densities and compositions believed to have existed prior to site alteration. Historically, longleaf was the most prevalent pine species in many areas due to the frequency of wildfires. Planting of longleaf pine seedlings in existing openings will help reintroduce this valuable species to these disturbed mesic flatland communities. Likewise, group selection cuts in offsite slash/loblolly/pond pine stands will provide opportunities to reestablish longleaf pine along with the added benefit of creating wildlife openings.

Frequent, low to medium intensity fires must be used to maintain these communities in a healthy condition. In areas not subject to prolonged flooding, longleaf is the most desirable of the pine tree species to be planted to assure a vigorous ecosystem. These hardy pine seedlings can be prescribed burned within one to two years after planting without suffering severe losses. This ability to withstand fire at a very young age differentiates longleaf from other pine species. Slash and loblolly pine regeneration must be protected from fire for up to 10 years or more depending on fuel loading. This delay in reintroducing fire can have a negative impact on fire dependent plants and animals from the ecosystem. Planting longleaf pine seedlings helps minimize disruption of the prescribed fire cycle.

Natural regeneration of pine stands will be encouraged whenever possible. However, an inadequate seed source will likely require artificial regeneration in most instances. Longleaf pine seedlings occur naturally in dense stands that are thinned out over a period of years by fire or competition for growing space. To simulate this process, longleaf pine seedlings are densely planted at 600 to 726 trees per acre and later thinned out through timber harvests when they get too crowded. Planting them in improved pastures has the added benefit of helping to shade out the nonnative grasses. When the trees are thinned out, native ground cover can be more easily reestablished. Longleaf pine seedlings from a nearby Withlacoochee State Forest seed source are available from the Division of Forestry's Andrews Nursery in Chiefland.

EXISTING CONDITIONS AND MANAGEMENT PRESCRIPTIONS

Exact acreage figures for each forest or community type are unavailable at this time. A comprehensive timber stand description is needed to provide these numbers. The following are general observations and management options for various stands observed on HMWMA.

Improved Pastures - Most of the improved pastures were created in former mesic or scrubby flatwoods communities. Small portions of these pasturelands are being mowed to maintain them as wildlife openings. This leaves many acres of non-native grasses that will not be perpetuated. Some of these pastures have oaks and wax myrtles encroaching. Other blocks are relatively open.

Longleaf pine seedlings should be planted in areas between wildlife openings and along roads as a visual screen (with breaks for wildlife viewing). They should also be planted in narrow, meandering strips on the edges of wildlife openings adjacent to existing stands of other pines to reintroduce longleaf to those ecosystems. Blocks with previously established oaks may have pine seedlings planted in the larger openings where competition for sunlight will not be a problem.

Stands with scrub oak, wax myrtle and saw palmetto encroachment that are not going to be managed for scrub jay habitat may need a single pass with a straight roller-drum chopper. This, followed by a growing season prescribed burn, will usually allow longleaf pine seedlings to be successfully planted.

To successfully plant longleaf pine seedlings in improved pasture, the sod must be removed or killed in a zone wide enough to eliminate competition for soil moisture. Past planting failures were likely due to inadequate site preparation combined with droughty soil moisture conditions. Containerized (tubeling) seedlings may be substituted for bareroot in any of the following prescriptions. Using tubelings extends the planting season to include July and August as well as December and January. However, the cost is approximately two times as much as bareroot seedlings. Also, contract hand planting is difficult to arrange and up to twice as expensive as machine planting.

Restoration Alternatives

- Allow strips (18” to 36” wide by 12' apart) of sod to be harvested by a commercial operator. Plant bareroot or containerized longleaf pine seedlings at approximately 5' X 12' spacing (726 trees per acre). It is likely that a sod cutter would require the grass to be mowed, fertilized and possibly herbicided for two years prior to cutting. This method would delay the planting of seedlings (planting may be difficult to accomplish anyway without at least 18 to 24 months of lead-time). Killing of the woody brush by herbicide application and mowing would have a negative impact on wildlife cover over the short term. However, the sale of sod should produce some income to be used for other management needs, ensure that the seedling and planting expenses are not wasted and allow native species to be more quickly established. Research should be done as to the ability of sod cutting machines to cut a curved swath (will be necessary if seedlings are to be planted in a meandering fashion). Approximate cost - \$100 per acre (no herbicide)
- Herbicide meandering strips approximately 24” wide by 12' apart using Roundup or other grass killer. Plant as above. This site prep method can be expensive (currently up to \$50 per acre), but it helps insure greater survival of expensive seedlings than with no site

preparation. Approximate total cost - \$150 per acre.

- Scalp meandering strips approximately 24” wide by 12’ apart. Scarring of the land can be kept to a minimum if the scalper is set to a depth of no more than 2” to 3”. This will retard the sod, but not disturb too much soil. Plant as above. Scalping is the preferred method of tree planting where depth of sod, soil moisture and vegetative competition is a concern. Approximate total cost - \$150 per acre.
- Care should be exercised to maintain cattle at reasonable levels until stands are well established. It would be best to exclude all cows until the seedlings are in the grass stage. Some cattle rubbing damage has been observed in advanced seedling stands. However, the current low cow-stocking rate seems to be keeping breakage and bending to acceptable levels. Consult the Natural Resource Conservation Service (NRCS) for recommendations.
- The number of surviving seedlings should be determined after the first and second growing seasons. If survival rates are less than 50%, a decision will have to be made whether re-planting is necessary. Is it better to fill in the holes in the stand through supplemental planting or to live with lower tree densities through the first thinning? The answer will depend on the total number of seedlings surviving and their spatial arrangement. Large holes in a stand lend themselves to replanting.

Thinning Alternatives

- To maintain healthy, vigorously growing trees and assuming 50% or greater survival, the planted longleaf pines should be thinned to 70 - 80 sq. ft. of basal area per acre (BA) in 15 to 25 years. The first thinning should be initiated when the live crown in a majority of dominant and co-dominant trees has been reduced to approximately 1/3 of their total height. This will help insure a healthy stand of trees, open up the canopy, and allow sunlight to reach the forest floor. The added sunlight and disturbance promote wildlife forage production. Stands should continue to be thinned back to 70 - 80 sq. ft. BA each time they reach 100 sq. ft. or more.

Pine Stands - Most of the pine stands average less than 30 square feet of basal area per acre (sq. ft. BA). They consist of varying mixtures of slash, loblolly and pond pines. Due to past harvesting practices and fire exclusion, these species have encroached into mesic flatland communities formerly predominated by longleaf pine. Over the long term, none of these species will successfully regenerate itself with the reintroduction of a three to five-year fire cycle. In these stands, it is desirable to maintain some older growth pine for wildlife and aesthetic reasons. However, it is also necessary to reintroduce longleaf pine into the fire dependent communities.

Restoration Alternatives

- Upland stands of mixed slash, loblolly, and pond pines should be burned at least once

during the dormant season prior to receiving any other treatment. Next, a thinning from below is recommended to remove most of the loblolly pine; all of the pond pine; and any diseased, suppressed, overcrowded and overtopped slash pine. Residual longleaf pine should be left. Harvesting all trees (except longleaf) on up to 25% of the remaining stand should create scattered one to five-acre holes in the stand. Allow the stand to sit through at least one summer growing season following the harvest. A single pass with a roller drum chopper may be necessary to reduce the saw palmetto competition. Prescribe burn the tract to remove logging slash and help reduce vegetative competition. Meander plant bareroot longleaf pine seedlings (as above) using a combination scalper/rough-woods tree planter in December or January. Use prescribed fire again as soon as a majority of the seedlings are in the grass stage. The next burn should be undertaken when the majority of the regeneration is waist high. Use extreme caution when conducting this burn to prevent excessive mortality. Make sure there is adequate soil moisture to the seedlings protect fine roots. If fuel loads have built up to heavy levels, a cool night burn may be needed to safely reduce them. Once the longleaf are at least 10' tall, resume a normal three to five year prescribed fire regime. This type of harvest operation will create wildlife openings, maintain older growth pine timber, and provide for reintroduction of longleaf pine into the ecosystem. Stands should be revisited for thinning and cutting of openings every 10 to 20 years until most of the area has been regenerated with longleaf pine. Approximate establishment cost: roller drum chopping \$50/acre : rough woods planter - \$50/acre : seedlings - \$50/acre or a total of \$150 per acre.

- An alternative to creating scattered holes in these understocked areas is to harvest most of the existing pine (with the exception of longleaf) in each stand at one time. Leave 10 to 20% of primarily slash and longleaf pine in islands for height diversity. Then, replant with longleaf seedlings as stated above. This option would speed up return of longleaf to the ecosystem. It may be the only economically feasible solution in severely understocked stands. However, it would limit the ability to create wildlife openings at regular intervals.
- Some stands have less than 10 square feet BA of pine timber per acre. These stands need to be prescribed burned at least twice. In areas of dense understory, a single pass with a straight roller drum chopper may be necessary a month or two prior to the last burn. The final prescribed burn should be conducted in the lightning season if the site was not chopped. Then, meander plant longleaf pine seedlings using a rough-woods scalper/planter as above.

Thinning Alternatives

- Lower initial planting densities and poorer survival rates will result in fewer trees per acre in rough woods planting sites. Therefore, stocking levels will not be as high as pasture plantings. Larger tree diameters will be attained sooner, but crown closure and loss will not occur as quickly. Therefore, these stands will probably not require thinning until 20 to 25 years of age. Again, the first thinning is needed when the live crown in a majority of dominant and co-dominant trees has been reduced to approximately 1/3 of

their total height. This will help ensure a healthy stand of trees, open up the canopy, and allow sunlight to reach the forest floor, which promotes wildlife forage.

Slash Pine Plantation – The only stand of planted pine on HMWMA is an approximately 150-acre block that was purchased after the original acquisition. It was planted on a heavily prepared site that originally would have had longleaf pine growing on it. The ultimate goal should be to reestablish longleaf as the predominant tree species in this stand.

The slash pine is approximately 30 years old, has never been thinned, and has 120 sq. ft. BA or more. As a result, the percent of live crown in dominant and codominant trees has been reduced to less than 25% and diameter growth has slowed down. Thinning stands of slash pine that have already lost their active growth does not usually lead to improved performance. However, reducing the BA to 60 – 70 sq. ft. per acre, whenever it reaches 100 sq. ft. or more, will maintain the health of the stand until 80 to 120 years of age.

Thinning Schedule – A series of group selection cuts should be used to reestablish longleaf in this stand while avoiding a large clearcut. To accomplish the group selection harvest, on no more than 25% of the 150 acres, cut all slash pine trees in two to five acre irregular shaped blocks. These openings in the canopy must be at least two chains (132 feet) wide to provide adequate sunlight for longleaf seedling growth. In the rest of the stand, reduce the BA to 60 to 70 sq. ft. per acre first by removing all diseased and suppressed trees. Then, thin the remaining dominant and codominant trees to alleviate crown overcrowding. Repeat this operation once the BA exceeds 100 sq. ft. per acre. At the current rate of growth, this may dictate a 15 to 20 year or more cutting cycle.

Restoration - Randomly plant 600 to 726 bareroot or containerized longleaf seedlings per acre (as above) in the group selection openings. Follow the prescribed burning schedule as previously outlined for longleaf plantings. By the time the remnant stand of slash pine is ready to be thinned again, it is likely that the young longleaf will also need thinning. This should take 15 to 20 years. At that time, new group selection openings should be cut and replanted with longleaf seedlings. Replanting may no longer be necessary after the third or fourth cut. Depending on the cone producing ability of the original longleaf plantings, they should be able to naturally reseed the openings. As soon as they can produce a seed crop, the number of openings should be reduced so that no more than five to ten percent of the total stand acreage is cleared per cutting cycle. This will ensure a steady flow of mixed timber products and new wildlife openings forever. The result of this type of harvest will be an uneven-aged stand of mixed longleaf and slash pine that tolerates prescribed fire well. Wildlife will benefit from the periodic cutting of openings in the canopy and the ability to maintain a frequent burning schedule.

Mixed Premerchantable, Pulpwood, and Small Sawtimber Stands - Although few of these stands exist on HMWMA at the present, the ones that are there should not be ignored. Stands with basal area exceeding 100 square feet per acre are scattered across the area. They often occur in strands adjacent to flatwoods/prairie lakes or improved pastures. Most are slash pine, loblolly pine, or a combination of both.

Thinning Schedule - These stands should be thinned to approximately 60 sq. ft. of BA. Remove diseased, deformed, suppressed, and overcrowded trees to achieve the proper stocking. It is likely that these stands will have to be sold together to make them attractive on the timber market. Stands will probably need revisiting and additional thinning at 10 to 20 year intervals.

Thinning these stands will produce current revenue and ensure future income to be used for other resource management objectives. At the same time, the heavy equipment used in logging helps reduce the understory rough. This disturbance makes prescribed burning easier and safer. It also improves wildlife forage production.

Scrubby Flatwoods - A few stands, comprising a total of 550 acres, are being managed for scrub jays. These areas have very scattered longleaf pine with BA of less than 10 sq. ft. To minimize raptor perches, the overstory pines may be removed as necessary and not replanted.

Salvage Sales - On occasion, small volumes of wood may need to be removed due to fire, windstorm, insect or other damage. The decision whether or not to harvest the affected timber will depend on the threat to the surrounding stands and the volume/value of the trees involved. For example, small, isolated lightning-strike beetle kills are a natural part of a healthy ecosystem and normally would not be cut. However, if a drought caused the insect infestation to spread, the infected trees and a buffer zone might have to be removed.

SUMMARY

Saleable timber is a byproduct of good ecosystem management. Carefully designed timber harvests create openings in the tree canopy allowing sunlight to reach the forest floor, promoting herbaceous growth. These clearings and their ecotones are favorite spots used by wildlife for feeding, resting, mating, nesting and rearing of offspring. Mechanical equipment involved in timber harvests helps reduce dense understory vegetation such as palmetto, gallberry and undesirable hardwoods. This fuel reduction makes the introduction of prescribed fire easier, safer and more effective. Income from forest product sales may be used for land management and resource restoration needs as general revenue funds become more difficult to secure.

**13.14 Land Management Uniform Accounting Council Categories -
FWC Operation Plan Fiscal Year 2013 - 2014**

Land Management Uniform Accounting Council Categories and Subcategories

1. Resource Management

- a. Exotic Species Control. -- Invasive exotic plant and animal removal activities and costs for inventorying, planning, preparing, executing, evaluating, monitoring and reporting. Also includes equipment, chemicals, protective clothing and supplies. Includes nuisance native feral animal and plant control.
- b. Prescribed Burning. -- Prescribed burning activities and costs for assessing, planning, preparing, executing, evaluating and reporting. Also includes equipment, protective clothing and supplies.
- c. Cultural Resource Management. -- Management activities and costs for assessing, planning, executing, evaluating and reporting, and for all maintenance, restoration or monitoring activities for prehistoric and historic sites, features and collection objects.
- d. Timber Management. -- Activities and costs related to the establishment of a stand of potentially merchantable timber, harvest of merchantable timber, and cultural treatments intended primarily to improve the growth and overall health of a stand of merchantable timber. Also includes activities and costs related to the cutting of merchantable timber in natural community and habitat restoration projects.
- e. Hydrological Management. -- Hydrological management and restoration activities and costs for assessing, monitoring, planning, preparing, executing, evaluating and reporting. Includes water level management, repair, removal or back-filling of ditches, canals, berms and dams. Also includes water quality and water quantity monitoring.
- f. Other. -- All other resource management activities and costs not captured in other specific subcategories. Examples include natural community and habitat restoration through other techniques; plant, animal or biological community survey, monitoring and research; listed species management; technical assistance; and evaluating and commenting on resource impacts to parks.

2. Administration

- a. Central Office/Headquarters. -- Headquarters units conducting general administration of land under management by the agency. Includes upper management direction, administration and fiscal, budget, personnel, purchasing and record keeping required for operations oversight and specific programs. Includes all duties unless they specifically relate to other categories or subcategories.
- b. Districts/Regions. -- Sub-state administrative districts or regions conducting general administration of the properties under their management. Includes all duties, unless they specifically relate to other categories or subcategories.

General operating costs of district or region administrative facilities are included.

- c. Units/Projects. -- Conducting general administration duties at a specific management unit (state park, state forest, state wildlife management area, etc.). Includes supervisory duties, fiscal and record keeping duties, and any other duties that do not specifically relate to other categories or subcategories. General operating costs for the property, such as utilities, telephones and garbage collection, are included.

3. Support

- a. Land Management Planning. -- Developing land management plans required by Sec. 253.034, F.S. Includes researching and compiling plan information, materials and maps, coordinating planning activities, conducting review activities (internal reviews, public meetings, advisory group meetings, ARC, etc.), and promulgating draft plans and final plans.
- b. Land Management Reviews. -- Planning, organizing and conducting land management reviews by teams created under Sec. 259.036, F.S. Includes preparing and responding to land management review reports. Also includes similar work conducted as part of internal agency land management reviews.
- c. Training/Staff Development. -- Staff training and development costs incurred in any facet of the agency's land management activities.
- d. Vehicle Purchase. -- Acquisition of any vehicle purchased primarily for land management purposes or to support any category of land management activity by the agency.
- e. Vehicle Operation and Maintenance. -- Costs of operating and upkeep of any vehicle used by the agency to support any category of land management activity.
- f. Other. -- Any other support activity or cost not captured by other categories or subcategories.

4. Capital Improvements

- a. New Facility Construction. -- Use of Fixed Capital Outlay (FCO) or other budget authority for all new facility design and construction activities. Includes new roads, parking and all other infrastructure.
- b. Facility Maintenance. -- Use of Fixed Capital Outlay (FCO) or other budget authority for all repairs or renovations to existing facilities, roads or other infrastructure. Also includes ADA accessibility improvements and renovations.

5. Visitor Services/Recreation

- a. Information/Education Programs. -- Interpretive, environmental education and marketing programs that explain or promote the agency's mission or instill in visitors an understanding and appreciation for Florida's natural and cultural resources and their proper use and care. Includes signs, brochures, maps and other public information materials that are produced or disseminated.
- b. Operations. -- Includes the non-administrative and non-support costs involved in providing public access to lands. Includes all actions required to manage visitor activities in a way to ensure safe and enjoyable use by the public. Includes routine maintenance, cleaning and other work required to provide safe and efficient utilization of facilities and resources that support visitor use and recreation. Includes protection activities required by staff to safeguard natural and cultural resources, facilities, material, staff and visitors.

6. Law Enforcement

The provision of all activities for enforcing criminal, conservation and boating laws on land, freshwater and marine environments and all costs associated with these services. Includes the provision of uniform patrol. Includes overt and covert criminal investigations. Includes regulation of commercial wildlife trade. Also includes the direction and administration of all law enforcement programs and activities, and all associated costs.

Land Management Uniform Accounting Council Categories and FWC Activity Codes

Resource Management

Exotic Species Control

- 210 Exotic species control
- 211 Exotic plant control (mechanical)
- 212 Exotic plant control (chemical)

Prescribed Burning

- 205 Prescribed burning
- 206 Prescribed burning C growing season (April 1 to September 30)
- 207 Prescribed burning C dormant season (October 1 to March 31)
- 208 Firebreaks

Cultural Resource Management

- 201 Cultural resource management

Timber Management

- 202 Timber management

Hydrological Management

- 215 Hydrology management
- 216 Dams, dikes, levees
- 217 Canals
- 218 Water level management
- 194 Lake restoration

Other

- 185 GIS
- 186 Biometrics

200	RESOURCE MANAGEMENT
203	Tree and shrub planting
213	Wildlife management
214	Listed Species management
219	Upland restoration
282	Herbaceous seeding
283	Clearings
289	Native vegetation management (mechanical)
290	Native vegetation management (chemical)
221	Animal surveys
228	Inland aerial surveys
235	Vegetation and plant surveys
250	MONITORING AND ASSESSMENTS
252	Biomedical monitoring
253	Ecological monitoring
256	Habitat monitoring analysis
263	Nest box monitoring
264	Population demographics
295	Biological data collection, analysis, and reporting
275	Permits and authorizations
276	Commission rule development and review
277	Relocation
278	CITES tags
281	Other resource management
284	Feeding/watering
285	Nest structures
286	Population control
287	Stocking enhancements/population augmentation
288	Nuisance animal complaints
293	Mortality investigations
294	Program coordination and implementation C inter- and intra-agency coordination and program implementation at the section, bureau, or division level
296	Habitat protection technical assistance
750	URTD assessment
789	Site Preparation – GCR
790	Irrigation – GCR
791	Seed Collection – Hand
792	Seed Collection – Mechanical
793	Herbicide Maintenance Treatment

Administration

Central Office/Headquarters

100	ADMINISTRATION C administrative tasks, including preparation of forms, word processing, photocopying, filing, and other clerical/secretarial duties.
104	Budget/purchasing/accounting

Support

Land Management Planning

- 103 Meetings C includes workshops, conferences, staff, and other meetings.
- 204 Resource planning

Land Management Reviews

- 209 Land Management Reviews
- 101 Project inspection C field inspections of projects.

Training/Staff Development

150 PERSONNEL MANAGEMENT C recruitment, hiring, training, counseling, and supervising.

Vehicle Purchase

- 128 New Vehicle and Equipment Purchase

Vehicle Operation and Maintenance

- 923 FEM C vehicles/equipment

Other

- 140 REPORT WRITING/EDITING/MANUSCRIPT PREPARATION
- 141 Grant applications
- 180 SYSTEMS ADMINISTRATION AND MANAGEMENT
- 182 Data management
- 184 Metadata development and management
- 187 IT
- 188 Web development
- 721 Geospatial analysis techniques
- 191 Stamp design coordination
- 226 Human dimensions surveys

Capitol Improvements

New Facility Construction

- 910 New facility construction C buildings/structures
- 912 New construction C roads/bridges
- 913 New construction C trails
- 914 New construction C fences

Facility Maintenance

- 920 Facility and equipment maintenance (FEM) C buildings/structures
- 921 FEM C utilities
- 922 FEM C custodial functions
- 925 FEM C boating access
- 926 FEM C roads/bridges
- 927 FEM C trails
- 928 FEM C fences

Visitor Services/Recreation

Information/Education Programs

- 145 Technical bulletin

Operations

- 311 Boundary signs
- 312 Informational signs
- 320 Outreach and education C attending or developing educational or informational materials or events for the public
- 327 Becoming an Outdoor Woman C enhancement
- 331 Wings Over Florida

- 339 Range safety operations
- 341 Public use administration (hunting)
- 342 Public use administration (non-hunting)
- 350 Customer service support C disseminating written or verbal information or assistance to the public
- 700 STUDIES
- 740 EVALUATIONS AND ASSESSMENTS

Law Enforcement

FWC Activity Code Numeric Listing

- 100 ADMINISTRATION C administrative tasks, including preparation of forms, word processing, photocopying, filing, and other clerical/secretarial duties.
- 101 Project inspection C field inspections of projects.
- 103 Meetings C includes workshops, conferences, staff, and other meetings.
- 104 Budget/purchasing/accounting
- 128 New Vehicle and Equipment Purchase
- 140 REPORT WRITING/EDITING/MANUSCRIPT PREPARATION
- 141 Grant applications
- 145 Technical bulletin
- 150 PERSONNEL MANAGEMENT C recruitment, hiring, training, counseling, and supervising.
- 180 SYSTEMS ADMINISTRATION AND MANAGEMENT
- 182 Data management
- 184 Metadata development and management
- 185 GIS
- 186 Biometrics
- 187 IT
- 188 Web development
- 191 Stamp design coordination
- 194 Lake restoration
- 200 RESOURCE MANAGEMENT
- 201 Cultural resource management
- 202 Timber management
- 203 Tree and shrub planting
- 204 Resource planning
- 205 Prescribed burning
- 206 Prescribed burning C growing season (April 1 to September 30)
- 207 Prescribed burning C dormant season (October 1 to March 31)
- 208 Firebreaks
- 209 Land Management Reviews
- 210 Exotic species control
- 211 Exotic plant control (mechanical)
- 212 Exotic plant control (chemical)
- 213 Wildlife management
- 214 Listed Species management
- 215 Hydrology management
- 216 Dams, dikes, levees

217	Canals
218	Water level management
219	Upland restoration
221	Animal surveys
226	Human dimensions surveys
228	Inland aerial surveys
235	Vegetation and plant surveys
250	MONITORING AND ASSESSMENTS
252	Biomedical monitoring
253	Ecological monitoring
256	Habitat monitoring analysis
263	Nest box monitoring
264	Population demographics
275	Permits and authorizations
276	Commission rule development and review
277	Relocation
278	CITES tags
281	Other resource management
282	Herbaceous seeding
283	Clearings
284	Feeding/watering
285	Nest structures
286	Population control
287	Stocking enhancements/population augmentation
288	Nuisance animal complaints
289	Native vegetation management (mechanical)
290	Native vegetation management (chemical)
293	Mortality investigations
294	Program coordination and implementation C inter- and intra-agency coordination and program implementation at the section, bureau, or division level
295	Biological data collection, analysis, and reporting
296	Habitat protection technical assistance
311	Boundary signs
312	Informational signs
320	Outreach and education C attending or developing educational or informational materials or events for the public
327	Becoming an Outdoor Woman C enhancement
331	Wings Over Florida
339	Range safety operations
341	Public use administration (hunting)
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700	STUDIES
721	Geospatial analysis techniques 740EVALUATIONS AND ASSESSMENTS
750	URTD assessment
789	Site Preparation – GCR
790	Irrigation – GCR
791	Seed Collection – Hand

- 792 Seed Collection – Mechanical
- 793 Herbicide Maintenance Treatment
- 910 New facility construction C buildings/structures
- 912 New construction C roads/bridges
- 913 New construction C trails
- 914 New construction C fences
- 920 Facility and equipment maintenance (FEM) C buildings/structures
- 921 FEM C utilities
- 922 FEM C custodial functions
- 923 FEM C vehicles/equipment
- 925 FEM C boating access
- 926 FEM C roads/bridges
- 927 FEM C trails
- 928 FEM C fences

Half Moon WMA Operational Plan Cost Estimate - Fiscal year 2013 - 2014

Activity	Title	Staff Days	Salary	FuelCost	Other	Total
101	Project inspection	3	\$601.32	\$39.72	\$0.00	\$641.04
103	Meetings	10	\$2,004.40	\$132.40	\$1,800.00	\$3,936.80
104	Budget/purchasing/accounting	7	\$1,403.08	\$92.68	\$0.00	\$1,495.76
128	New Vehicle and Equipment Purchases	0	\$0.00	\$0.00	\$0.00	\$0.00
140	Report writing/editing/manuscript preparation	8	\$1,603.52	\$105.92	\$0.00	\$1,709.44
150	Personnel management	10	\$2,004.40	\$132.40	\$0.00	\$2,136.80
182	Data management	90	\$18,039.60	\$1,191.60	\$775.00	\$20,006.20
185	GIS	4	\$801.76	\$52.96	\$0.00	\$854.72
201	Cultural resource management	1	\$200.44	\$13.24	\$0.00	\$213.68
203	Tree and shrub planting	0	\$0.00	\$0.00	\$0.00	\$0.00
204	Resource planning	10	\$2,004.40	\$132.40	\$0.00	\$2,136.80
206	Prescribed burning - growing season	20	\$4,008.80	\$264.80	\$800.00	\$5,073.60
207	Prescribed burning - dormant season	30	\$6,013.20	\$397.20	\$400.00	\$6,810.40
208	Firebreaks	20	\$4,008.80	\$264.80	\$0.00	\$4,273.60
211	Exotic plant control (mechanical)	15	\$3,006.60	\$198.60	\$6,000.00	\$9,205.20
212	Exotic plant control (chemical)	20	\$4,008.80	\$264.80	\$3,000.00	\$7,273.60
218	Water level management	0	\$0.00	\$0.00	\$0.00	\$0.00
219	Upland restoration	56	\$11,224.64	\$741.44	\$3,000.00	\$14,966.08
221	Animal surveys	67	\$13,429.48	\$887.08	\$5,000.00	\$19,316.56
235	Vegetation and plant surveys	5	\$1,002.20	\$66.20	\$0.00	\$1,068.40
263	Nest box monitoring	5	\$1,002.20	\$66.20	\$0.00	\$1,068.40
281	Other resource management	1	\$200.44	\$13.24	\$0.00	\$213.68
282	Herbaceous seeding	6	\$1,202.64	\$79.44	\$3,000.00	\$4,282.08
283	Clearings	0	\$0.00	\$0.00	\$0.00	\$0.00
285	Nest structures	0	\$0.00	\$0.00	\$0.00	\$0.00
289	Native vegetation management (mechanical)	30	\$6,013.20	\$397.20	\$19,000.00	\$25,410.40

Half Moon WMA Operational Plan Cost Estimate - Fiscal year 2013 - 2014

Activity	Title	Staff Days	Salary	FuelCost	Other	Total
290	Native vegetation management (chemical)	17	\$3,407.48	\$225.08	\$4,000.00	\$7,632.56
294	Program coordination and implementation	25	\$5,011.00	\$331.00	\$0.00	\$5,342.00
295	Biological data collection, analysis, and reporting	18	\$3,607.92	\$238.32	\$10,500.00	\$14,346.24
311	Boundary signs	1	\$200.44	\$13.24	\$0.00	\$213.68
312	Informational signs	3	\$601.32	\$39.72	\$800.00	\$1,441.04
320	Outreach and education	7	\$1,403.08	\$92.68	\$0.00	\$1,495.76
341	Public use administration (hunting)	40	\$8,017.60	\$529.60	\$925.00	\$9,472.20
342	Public use administration (non-hunting)	27	\$5,411.88	\$357.48	\$7,000.00	\$12,769.36
350	Customer service support	4	\$801.76	\$52.96	\$0.00	\$854.72
910	New facility construction -- buildings/structures	0	\$0.00	\$0.00	\$0.00	\$0.00
912	New construction -- roads/bridges	3	\$601.32	\$39.72	\$20,000.00	\$20,641.04
914	New construction -- fences	0	\$0.00	\$0.00	\$0.00	\$0.00
920	FEM -- buildings/structures	11	\$2,204.84	\$145.64	\$2,000.00	\$4,350.48
921	FEM -- utilities	1	\$200.44	\$13.24	\$1,500.00	\$1,713.68
922	FEM -- custodial functions	2	\$400.88	\$26.48	\$0.00	\$427.36
923	FEM -- vehicles/equipment	40	\$8,017.60	\$529.60	\$7,000.00	\$15,547.20
926	FEM -- roads/bridges	24	\$4,810.56	\$317.76	\$2,000.00	\$7,128.32
927	FEM -- trails	10	\$2,004.40	\$132.40	\$0.00	\$2,136.80
928	FEM -- fences	6	\$1,202.64	\$79.44	\$0.00	\$1,282.08
All	totals	657	\$131,689.08	\$8,698.68	\$98,500.00	\$238,887.76

13.15 Arthropod Control Plan



CHARLES H. BRONSON
COMMISSIONER

Florida Department of Agriculture and Consumer Services
Division of Agricultural Environmental Services

ARTHROPOD MANAGEMENT PLAN - PUBLIC LANDS

Chapters 388.4111, F.S. and 5E-13.042(4)(b), F.A.C.
Telephone: (850) 922-7011

For use in documenting an Arthropod control plan for lands designated by the State of Florida or any political subdivision thereof as being environmentally sensitive and biologically highly productive therein.

Name of Designated Land:
Half Moon Wildlife Management Area

Is Control Work Necessary: Yes No

Location:
1231 Prairie Lakes Road, Kenansville, FL 34739, Osceola County

Land Management Agency:
Florida Fish and Wildlife Conservation Commission

Are Arthropod Surveillance Activities Necessary? Yes No
If "Yes", please explain:

Which Surveillance Techniques Are Proposed?
Please Check All That Apply:

- Landing Rate Counts
- Light Traps
- Sentinel Chickens
- Citizen Complaints
- Larval Dips
- Other

If "Other", please explain:
None at this time.

Arthropod Species for Which Control is Proposed:
None

Proposed Larval Control:
None

Proposed larval monitoring procedure:
Are post treatment counts being obtained: Yes No

Biological Control of Larvae: None

Might predacious fish be stocked: Yes No
Other biological controls that might be used:

Material to be Used for Larvaciding Applications:

(Please Check All That Apply.)

- Bti
- Bs
- Methoprene
- Non-Petroleum Surface Film
- Other, please specify:

Please specify the following for each larvacide:

Chemical or Common name:

Ground Aerial

Rate of application:

Method of application:

Proposed Adult Mosquito Control: None

Aerial adulticiding Yes No

Ground adulticiding Yes No

Please specify the following for each adulticide:

Chemical or common name:

Rate of application:

Method of application:

Proposed Modifications for Public Health Emergency Control: Arthropod control agency may request special exception to this plan during a threat to public or animal health declared by State Health Officer or Commissioner of Agriculture.

Proposed Notification Procedure for Control Activities:
None

Records:

Are records being kept in accordance with Chapter 388, F.S.:

Yes No

Records Location:

How long are records maintained:

Vegetation Modification: None

What trimming or altering of vegetation to conduct surveillance or treatment is proposed?
None

Proposed Land Modifications: None

Is any land modification, i.e., rotary ditching, proposed:
No

Include proposed operational schedules for water fluctuations:
NA

List any periodic restrictions, as applicable, for example peak fish spawning times.
NA

Proposed Modification of Aquatic Vegetation:
None

Land Manager Comments:
No vegetation modifications will be done for arthropod control.

Arthropod Control Agency Comments:
At this time, we do not need to conduct any arthropod control on the Three Lakes WMA.

Signature on file	Date on file
_____ Signature of Lands Manager or Representative	_____ Date
Signature on file	Date on file
_____ Signature of Mosquito Control Director / Manager	_____ Date

13.16 Sumter County Letter of Compliance with Local Government Comprehensive Plan

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**PENDING SUMPTER COUNTY REVIEW FOR COMPLIANCE WITH
COUNTY COMPREHENSIVE PLAN**

COMPLIANCE APPROVAL LETTER