A Management Plan for

Chassahowitzka

Wildlife Management Area

2015 - 2025

Hernando County, Florida

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

A Management Plan
for
Chassahowitzka Wildlife Management Area

Hernando County, Florida

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

September 2014

Approved Thomas H. Eason

Thomas Eason
Director, Division of Habitat and Species Conservation

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PENDING DEP APPROVAL LETTER

LAND MANAGEMENT PLAN EXECUTIVE SUMMARY

Lead Agency: Florida Fish and Wildlife Conservation Commission (FWC)
Common Name of Property: Chassahowitzka Wildlife Management Area
Location: Hernando County, Florida
Acreage Total: 24,423 acres
Acreage Breakdown:

Landcover Classification	Acres	Percent of Area	Landcover Classification	Acres	Percent of Area
Hydric hammock	15,577	57%	Pasture - improved	66	<1%
Sandhill	4,137	15%	Scrubby flatwoods	36	<1%
Mesic flatwoods	1,934	7%	Restoration - scrub	28	<1%
Basin swamp	1,384	5%	Restoration - wet flatwoods	21	<1%
Pine plantation	681	2%	Spring-run stream	17	<1%
Basin marsh	556	2%	Artificial pond	14	<1%
Restoration sandhill	534	2%	Restoration - scrubby flatwoods	13	<1%
Scrub	431	2%	Tidal creek	12	<1%
Mesic hammock	355	1%	Utility corridor	10	<1%
Dome swamp	337	1%	Developed	10	<1%
Depression marsh	305	1%	Spoil area	8	<1%
Xeric hammock	284	1%	Wet prairie	7	<1%
Wet flatwoods	242	1%	Clearing/regeneration	5	<1%
Restoration - mesic flatwoods	211	1%	Bottomland forest	4	<1%
Salt marsh	156	1%	Borrow area	3	<1%
Baygall	143	1%	Sinkhole lake	2	<1%

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

Lease/Management Agreement No.: 3586 (Appendix 13.1)
Use: Single _____ Management Responsibilities: resource protection, law enforcement
Multiple X Agency FWC
Designated Land Use: Wildlife Management Area
Sublease (s): None
Encumbrances: Inholding access and utility easements, water monitoring access agreement, billboard maintenance access easement (Section 1.6).
Type Acquisition: Fish and Wildlife Habitat Program
Unique Features: Natural: Significant expanse of hardwood swamp forest and other natural communities; springs, sink holes, and aquatic caves.
Archaeological/Historical: 27 cultural and historic sites listed in DHR Florida Master Site File
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: 4,334 acres (43 parcels) on FWC Additions and Inholdings list; 12,540 acres remaining in the Annutteliga Hammock Florida Forever Project (Figure 11).
Surplus Lands/Acreage: None
Public Involvement: Management Advisory Group stakeholder meeting and Public Hearing (Appendix 13.3)

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	3, 6
3	Degree of title interest held by the Board, including reservations and encumbrances such as leases.	18-2.021	7
4	The legal description and acreage of the property.	18-2.018 & 18-2.021	1, 2, 128
5	A map showing the approximate location and boundaries of the property, and the location of any structures or improvements to the property.	18-2.018 & 18-2.021	4, 5, 9, 87
6	An **assessment** as to whether the property, or any portion, should be declared surplus. *Provide Information regarding **assessment and analysis** in the plan, and provide **corresponding map**.*	18-2.021	62
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. *Please clearly indicate parcels on a map.*	18-2.021	86-90
8	Identification of adjacent land uses that conflict with the planned use of the property, if any.	18-2.021	8
9	A statement of the purpose for which the lands were acquired, the projected use or uses as defined in 253.034 and the statutory authority for such use or uses.	259.032(10)	3
10	Proximity of property to other significant State, local or federal land or water resources.	18-2.021	8-12

Section B: Use Items

Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
11	The designated single use or multiple use management for the property, including use by other managing entities.	18-2.018 & 18-2.021	60
12	A description of past and existing uses, including any unauthorized uses of the property.	18-2.018 & 18-2.021	58-60
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	61
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	7, 90
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	85
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	90

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)	61
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	125
19	Letter of compliance from the local government stating that the LMP is in compliance with the Local Government Comprehensive Plan.	BOT requirement	683
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	62
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	61
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	84
23	A statement regarding incompatible use in reference to Ch. 253.034(10).	253.034(10)	3

*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	12
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)	449

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. *Include the advisory group members and their affiliations, as well as the date and location of the advisory group meeting.*	259.032(10)	12
27	Summary of comments and concerns expressed by the advisory group for parcels over 160 acres	18-2.021	437
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. *Include a copy of each County's advertisements and announcements (meeting minutes will suffice to indicate an announcement) in the management plan.*	253.034(5) & 259.032(10)	436
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. *Include manager's replies to the team's findings and recommendations.*	259.036	67, 453
30	Summary of comments and concerns expressed by the management review team, if required by Section 259.036, F.S.	18-2.021	453
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	453

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. *Use brief descriptions and include USDA maps when available.*	18-2.021	15-18
33	Insert FNAI based natural community maps when available.	ARC consensus	19
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	13, 27, 54
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	13, 27, 54
36	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding beaches and dunes.	18-2.021	57
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	15

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	36
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	49-51
40	The identification or resources on the property that are listed in the Natural Areas Inventory. *Include letter from FNAI or consultant where appropriate.*	18-2.021	51, 53, 476
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)	67-121
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.	↓	67-121
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.		95-106
42-C.	The associated measurable objectives to achieve the goals.		95-106
42-D.	The related activities that are to be performed to meet the land management objectives and their associated measures. *Include fire management plans - they can be in plan body or an appendix.*		67-121, 492
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.		121-123, 656-666
43	***Quantitative data description of the land regarding an inventory of forest and other natural resources and associated acreage. *See footnote.*	253.034(5)	20
44	Sustainable Forest Management, including implementation of prescribed fire management		
44-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).		67-121
44-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).	18-2.021, 253.034(5) & 259.032(10) ↓	95-106
44-C.	Measurable objectives (see requirement for #42-C).		95-106
44-D.	Related activities (see requirement for #42-D).		67-121, 492
44-E.	Budgets (see requirement for #42-E).		121-123, 656-666
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).	↓	67-121

45-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		95-106
45-C.	Measurable objectives (see requirement for #42-C).		95-106
45-D.	Related activities (see requirement for #42-D).		67-121
45-E.	Budgets (see requirement for #42-E).		121-123, 656-666
46	***Quantitative data description of the land regarding an inventory of exotic and invasive plants and associated acreage. *See footnote.*	253.034(5)	20, 26-27
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	678
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).	↓	67-121
48-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		95-106
48-C.	Measurable objectives (see requirement for #42-C).		95-106
48-D.	Related activities (see requirement for #42-D).		67-121
48-E.	Budgets (see requirement for #42-E).		121-123, 656-666

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. *If yes, provide a list of the appropriate managing agencies that have been notified of the proposed plan.*	18-2.018 & 18-2.021	12, 54
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	54-57
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	15-35
52	***Quantitative description of the land regarding an inventory of hydrological features and associated acreage. *See footnote.*	253.034(5)	54-57
53	Hydrological Preservation and Restoration	259.032(10) & 253.034(5)	
53-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	67-121
53-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		95-106
53-C.	Measurable objectives (see requirement for #42-C).		95-106

53-D.	Related activities (see requirement for #42-D).		67-121
53-E.	Budgets (see requirement for #42-E).		

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. *Include maps of all cultural resources except Native American sites, unless such sites are major points of interest that are open to public visitation.*	18-2.018, 18-2.021 & per DHR's request	57, 479
55	***Quantitative data description of the land regarding an inventory of significant land, cultural or historical features and associated acreage.	253.034(5)	57, 479
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	85
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).	↓	67-121
57-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		95-106
57-C.	Measurable objectives (see requirement for #42-C).		95-106
57-D.	Related activities (see requirement for #42-D).		67-121
57-E.	Budgets (see requirement for #42-E).		121-123, 656-666

**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. *See footnote.*	253.034(5)	85-87
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).	↓	67-121
59-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		95-106
59-C.	Measurable objectives (see requirement for #42-C).		95-106
59-D.	Related activities (see requirement for #42-D).		67-121
59-E.	Budgets (see requirement for #42-E).		121, 123, 656-666
60	*** Quantitative data description of the land regarding an inventory of recreational facilities and associated acreage.	253.034(5)	85-87
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).	↓	67-121
61-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		95-106
61-C.	Measurable objectives (see requirement for #42-C).		95-106
61-D.	Related activities (see requirement for #42-D).		67-121
61-E.	Budgets (see requirement for #42-E).		121-123, 656-666

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	iv
63	Place the Executive Summary at the front of the LMP. Include a physical description of the land.	ARC and 253.034(5)	iii
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	62
65	Key management activities necessary to achieve the desired outcomes regarding other appropriate resource management.	259.032(10)	67-121
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)	121-123, 656-666
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)	121-123, 656-666
68	A statement of gross income generated, net income and expenses.	18-2.018	121-123, 656-666

*** = The referenced inventories shall be of such detail that objective measures and benchmarks can be established for each tract of land and monitored during the lifetime of the plan. All quantitative data collected shall be aggregated, standardized, collected, and presented in an electronic format to allow for uniform management reporting and analysis. The information collected by the DEP pursuant to s. 253.0325(2) shall be available to the land manager and his or her assignee.

Table of Contents

Table of Figures

Table of Tables

1 Introduction and General Information

Forming the southern link of a nearly unbroken crescent of public conservation lands stretching 200 miles from Pasco County to the Apalachicola River, the Chassahowitzka Wildlife Management Area (CWMA) conserves one of the largest coastal hardwood swamp forests along the Gulf of Mexico, south of the Suwannee River. Together with its intact and functioning freshwater, tidal and spring system communities, it provides significant watershed and water quality protection and important habitat for an array of imperiled and rare wildlife and plant species. Located in Hernando County, Florida, the CWMA is managed by the Florida Fish and Wildlife Conservation Commission (FWC).

Bordered on the west by the Chassahowitzka National Wildlife Refuge (CNWR), a portion of which is established as part of CWMA, this 34,597 acre conservation area contains diverse natural communities that sustain a large variety of wildlife species. Extensive hardwood swamps in association with uplands creates good habitat conditions for wildlife and allows for seasonal movement of animals in response to fluctuating water levels and food supplies. The CWMA contributes to the conservation of an array of imperiled and other native wildlife including the Florida black bear, gopher tortoise, Florida mouse, Eastern indigo snake, and Sherman's fox squirrel.

The CWMA also provides excellent opportunities for fish and wildlife based public outdoor recreation. Activities include hunting, fishing, wildlife viewing, hiking, bicycling, paddling, scuba-diving, horseback riding, and scenic driving.

1.1 Management Plan Purpose

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

This Management Plan is submitted for review to the Acquisition and Restoration Council (ARC) acting on behalf of the Board of Trustees of the Internal Improvement Trust Fund (Board of Trustees) of the State of Florida through the Florida Department of Environmental Protection's Division of State Lands (DSL), in compliance with paragraph seven of Lease No. 3586 (Appendix 13.1) and pursuant to Chapters 253 and 259, Florida Statutes (FS), and Chapters 18-2 and 18-4, Florida Administrative Code (FAC). Format and content were drafted in accordance with ARC requirements for management plans and the model plan outline provided by the staff of DSL. Terms (Appendix 13.2) used in this

Management Plan describing management activities and associated measurable goals and objectives conform to those developed for the Land Management Uniform Accounting Council Biennial Land Management Operational Report.

1.1.1 FWC Planning Philosophy

The FWC's planning philosophy includes emphasizing management recommendation consensus-building among stakeholders and input from user groups and the general public at the beginning of the planning process. FWC engages stakeholders by convening a Management Advisory Group (MAG) and solicits additional input from user groups and the general public at a public hearing (Appendix 13.3). 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 CWMA Management Plan (Sections 5 - 8).

Further management planning input is received through Land Management Reviews (LMRs) conducted every five years, which includes a review of the previous Management Plan, as well as a field review of CWMA. The LMR report (Section 5.1, Appendix 13.4) 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 CWMA.

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

1.2 Location

The CWMA is composed of 24,423 acres of public conservation land owned by the State of Florida, including approximately 689 acres titled to the Southwest Florida Water Management District (SWFWMD). The remainder of the overall established CWMA is comprised of lands titled to the U.S. Department of the Interior, and managed by the U.S. Fish and Wildlife Service (USFWS). Consequently, no lands within the CNWR are

addressed in this management plan. The CMWA is located in northwest Hernando County approximately 64 miles north of Tampa, Florida and 80 miles west of Orlando, Florida. The lands of CWMA are within multiple sections in Township 21 South, in Ranges 16, 17 and 18 East, in Township 22 south, in Ranges 16 and 17 East, and in Township 23 South, in Range 17 East (Figures 1 and 2). It is bordered on the west by the Gulf of Mexico and on the north by the Hernando/Citrus County line. Approximately two-thirds of the upper eastern boundary is bounded by U.S Highway 19 (US 19) and intermittently, interspersed by several inholdings. Additional, disjunct portions off CWMA are located east of US 19, extending approximately two miles south of the Hernando/Citrus County line. The southern boundary is somewhat irregular, with small parcels located west of US19, and along portions of the Weeki Wachee River south of County Road 550.

1.3 Acquisition

1.3.1 Purpose for Acquisition of the Property

The CWMA was purchased by the State of Florida under the Conservation and Recreation Lands (CARL) program under the Environmentally Endangered Lands (EEL) category as defined in Section 18-003, Florida Administrative Code. One of the qualifications for placing the Chassahowitzka Swamp CARL project in the EEL category was based upon a USFWS determination that recognized the Chassahowitzka ecosystem as a unique wildlife system of national significance. Under the CARL Program, the primary purpose for acquisition of CWMA was to conserve the largest remaining coastal hardwood swamp along the Gulf of Mexico south of the Suwannee River, its intact and functioning freshwater, tidal and spring system communities, and to conserve the diversity of rare and endangered species. Additionally, another primary purpose for acquiring the Chassahowitzka Swamp CARL project was to provide additional public outdoor recreational opportunities for Florida's rapidly increasing population.

Therefore, conservation lands purchased in the EEL category under the CARL program are to be managed for the conservation of unique or significant ecosystems, and the establishment of public uses consistent with resource protection. Resource management practices on the area are designed to address the perpetuation of the swamp, its natural communities and associated wildlife. Strategies for managing the tract include preservation of endangered and threatened species, protection and perpetuation of native flora and fauna, and protection of water quality and natural hydrology. Multiple-use management strategies have been developed incorporating issues and concerns related to wildlife, fisheries and forest management. Provisions for recreational opportunities are considered to be compatible with the original conservation acquisition intent.

Accordingly, the overall management of the CWMA is structured to ensure the protection and ecological integrity of the CWMA's natural and cultural resources, while providing

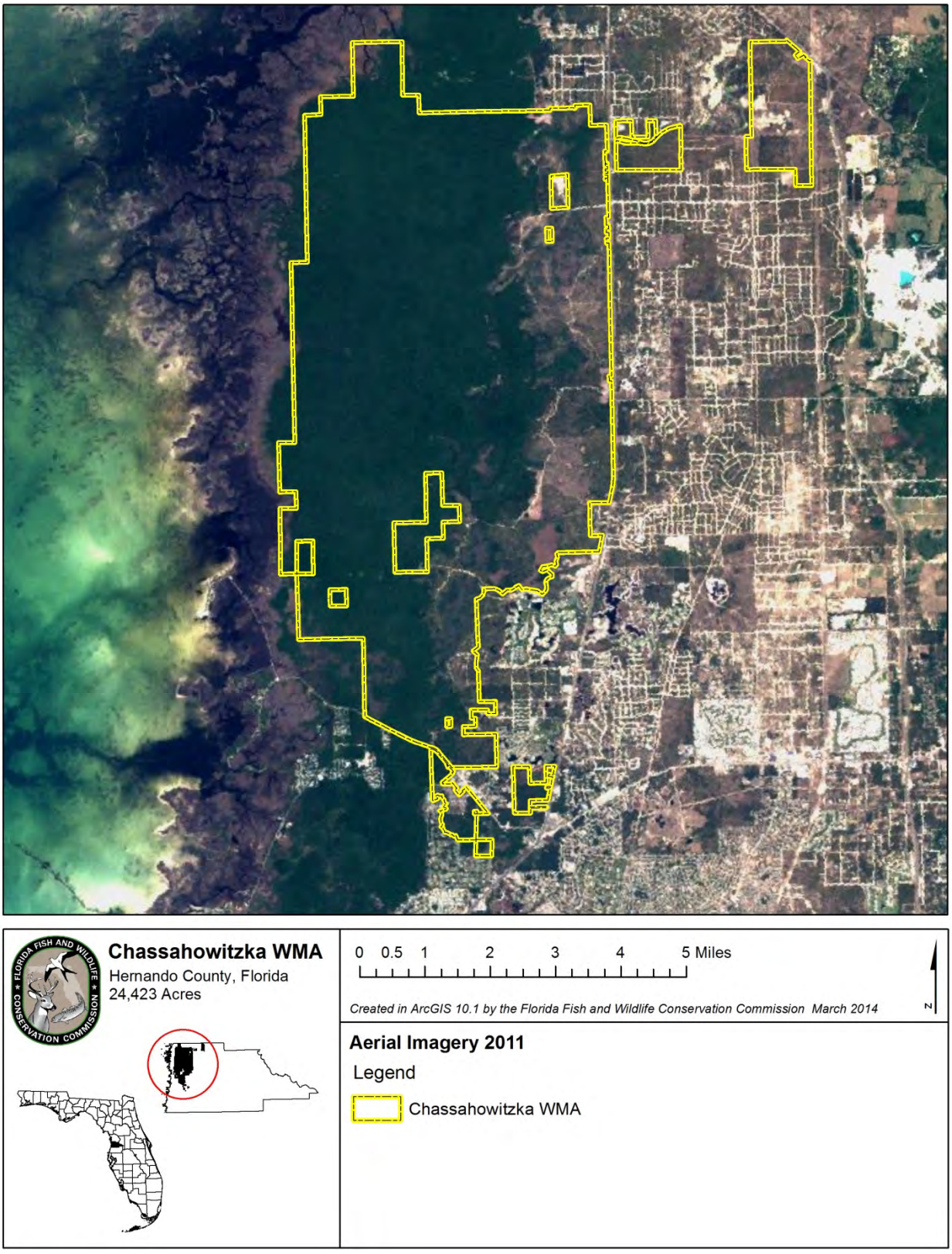


Figure 1. Aerial Imagery 2011

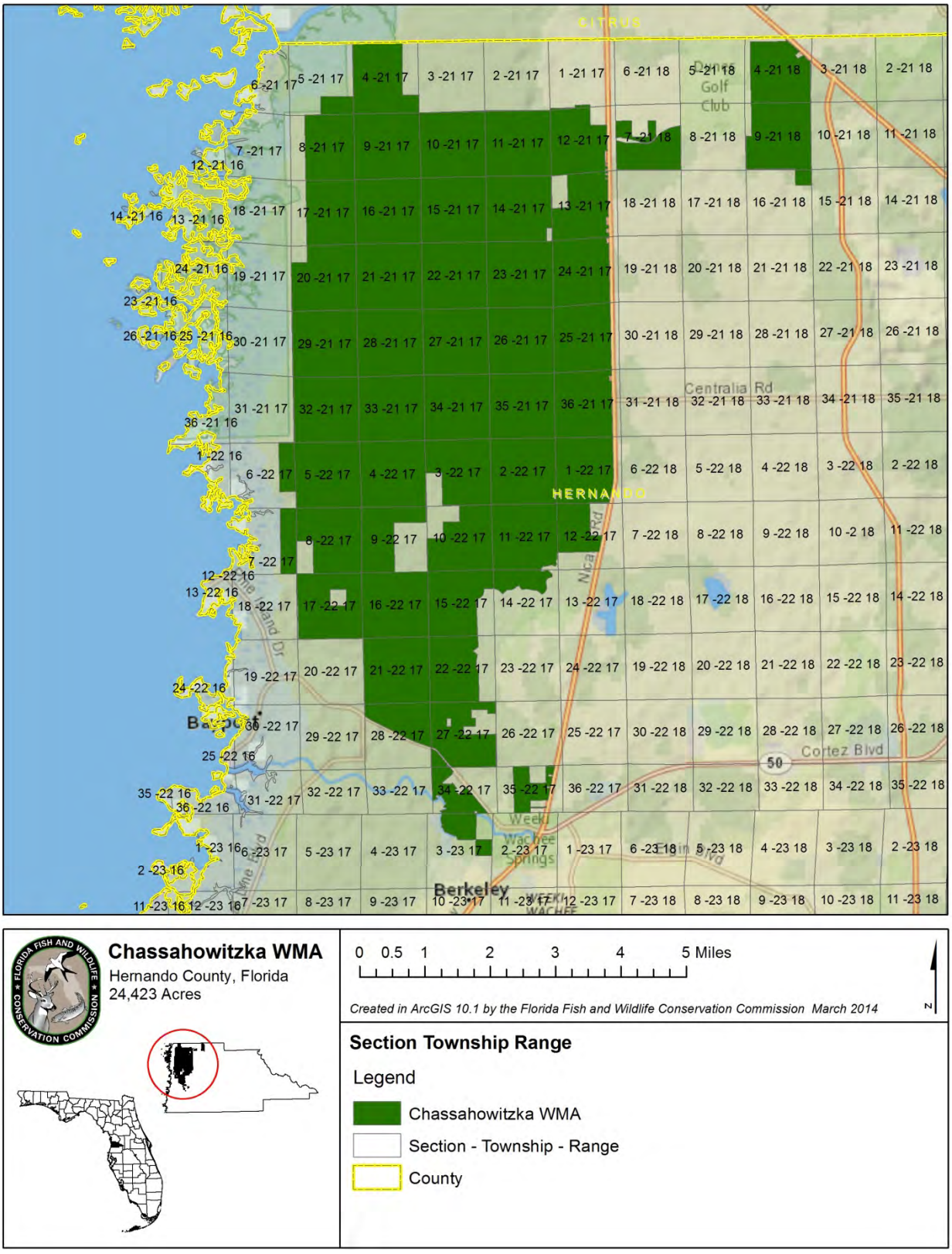


Figure 2. Section Township Range

additional fish and wildlife based public outdoor recreational opportunities for Florida's citizens and visitors. Recreational opportunities offered on CWMA are designed as low-intensity, multiple-use activities, and include hunting, fishing, wildlife viewing, hiking, horseback riding, and bicycling.

1.3.2 Acquisition History

As noted above, the CWMA was purchased by the State of Florida with funds made available from the CARL program, and funds appropriated to FWC as its share of the Preservation 2000 (P-2000) Additions and Inholdings program, as provided from each P-2000 bond series. Primary CARL management responsibility (lead managing agency status) was assigned to the FWC due to the richness and diversity of the fauna associated with the hardwood swamp mosaic of CWMA. The Florida Department of Agriculture and Consumer Services, Florida Forest Service (FFS), was assigned as a cooperating agency, assisting with the management of the timber resources in a manner compatible with preservation of the area's unique characteristics.

The original Chassahowitzka Swamp CARL land acquisition project encompassed lands in both Hernando and Citrus counties. Thirteen private landowners held parcels considered for State acquisition. Lands were acquired in 1985 from the Lykes Brothers, Inc. and the Turner Corporation, the two major landowners within the Chassahowitzka Swamp CARL project boundary. The Lykes Brothers' properties included approximately 7,062 acres that were acquired at a price of $1,370,790 with an additional $394,700 of value transferred between the State and Lykes Brother's, Inc. in a land exchange. Lands purchased from the Turner Corporation included approximately 8,393 acres at a price of $2,090,400.

In 1988, 150 acres were added to the CWMA as part of a mitigation project designed to compensate for the loss of red-cockaded woodpecker habitat in Marion County. Since then, several other tracts have been purchased and added to the management area. Large tracts of lands were acquired from Dr. James Gills, Royal Palm Beach Colony, 19 West Associates, Glen Lakes Partnership and Suncoast Family YWCA. Smaller acquired tracts include those of Boyce, Blackwell, Routman, Underwood and Mizrahi. In 1996, the first tract of the Weeki Wachee First Magnitude Springs conservation project was purchased, and since then several smaller parcels within that project have been acquired and added to the CWMA. The Seville tract, part of the Annutteliga Hammock CARL project, was purchased in 1998.

Acquisition efforts continue for the purchase of additional wetlands along the coast and uplands along US Highway 19. Lands in Citrus County are no longer under review for addition to this project, or have already been purchased by the SWFWMD under the Save Our Rivers program.

1.4 Management Authority

The FWC is the designated lead managing agency for CWMA under the authority granted by Lease Number 3586 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.

1.5 Management Directives

The 50-year Board of Trustees' Lease Agreement Number 3586 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

As State-owned lands, title to CWMA is vested in the Board of Trustees. In April 12, 1985, DSL, acting as staff to the Board of Trustees, entered into Lease Agreement 3586; this 50-year agreement granting FWC management authority for CWMA. To date, Lease Agreement 3586 includes 23 amendments.

Encumbrances include access and utility easements to inholding parcels. These include access to the privately-owned Hernando Sportsman's Club shooting range, as well as several other interior parcels consisting of seven individual ownerships.

Also, in August 1998, an access easement for the purpose of retention pond maintenance was granted by the Board of Trustees to S & D Seville, Ltd. This access easement facilitates maintenance of hydrology and storm water retention along the Seville Parkway, the roadway that provides vehicle access to The Dunes Golf Club, located between two disjunct parcels of CWMA.

In addition, the SWFWMD maintains a Well Monitoring License Agreement, and an associated amendment, with the Board of Trustees for "...the purpose of constructing, operating and maintaining scientific equipment to be used for collecting hydrological and other scientific data." In general, this agreement further grants permissions to SWFWMD to access the 0.0046 acre (< 700 square feet) site to utilize the water monitoring well.

Nissi, Inc. has three easements that provide for the maintenance of advertising billboards along US 19. These easements are rectangular, and each is approximately one acre in size. By mutual agreement with FWC, Nissi, Inc. is authorized to trim trees within these easements for the purpose of maintaining the visibility of the billboard signs from US 19.

Currently, these encumbrances do not pose any significant impediments to the overall management of the area. However, acquisition of the inholdings, with their associated access easements, would enhance general management operations.

1.7 Zoning, Adjacent Land Use, and Future Land Use

The land within CWMA is currently zoned as conservation lands; the parcels comprising CWMA are accordingly listed in the Hernando County Comprehensive Land Use Plan as "Conservation." This designation by Hernando County primarily allows for natural resource conservation and recreational uses. The CWMA is bordered on the north, southwest and west by lands also zoned for conservation.

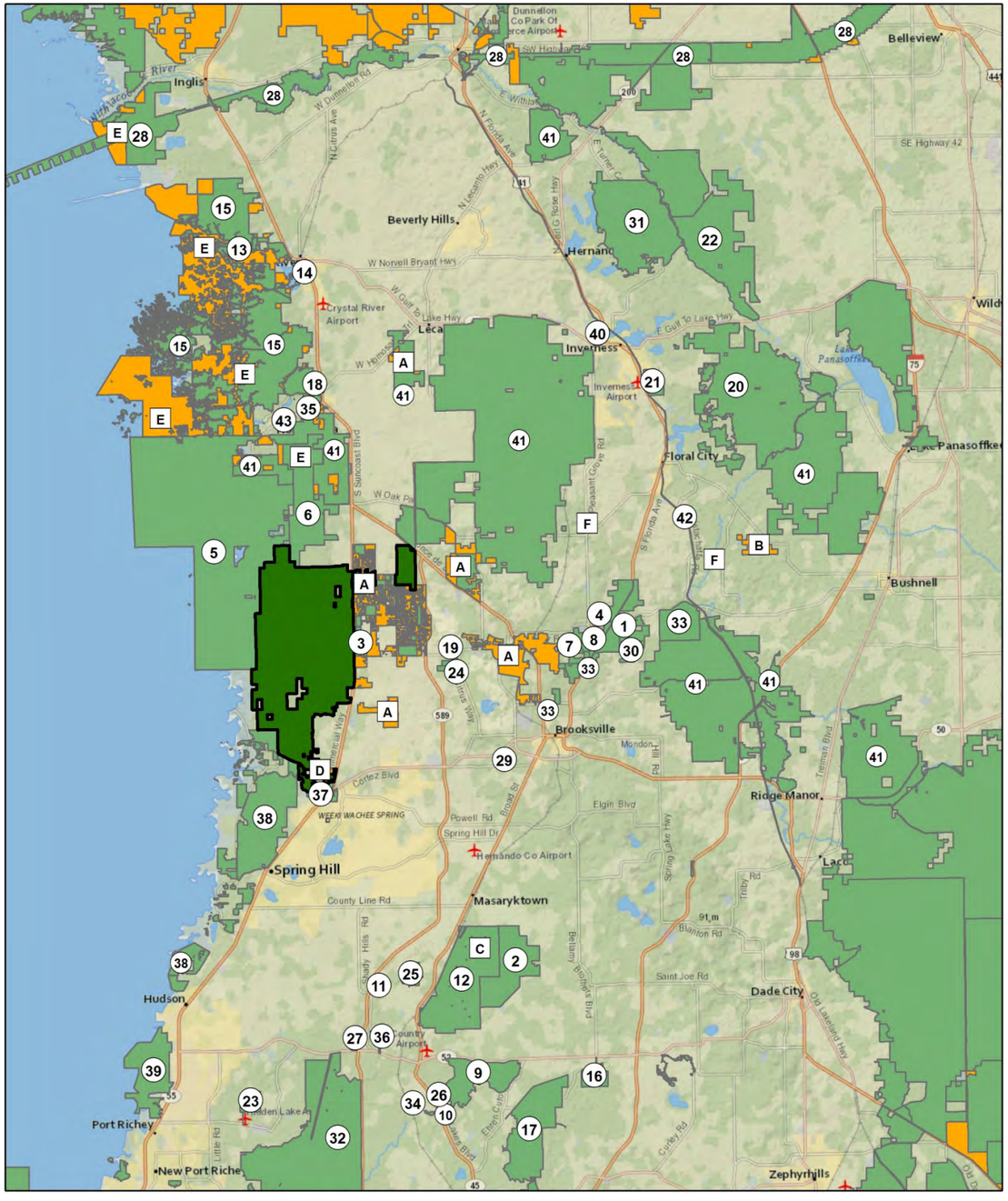
The Florida Land Use Cover and Classification System (FLUCCS 2009) map for Hernando County indicates that land use in the vicinity of CWMA is characterized by agriculture, disturbed land, range land, suburban, transportation/utilities, upland forests, water and wetlands. Current suburban development in the vicinity of CWMA includes commercial, education, recreation, hospitals, light manufacturing, as well as moderate to high density single family homes and mobile homes.

The Hernando County Comprehensive Plan (October 2012) indicates the lands within 10 miles of CWMA have highly mixed Future Land Use designations of city, commercial, conservation, education, industrial, mining, planned development, public facility, recreation, residential, and rural. Anticipated growth within the timeframe of this management plan includes commercial, education, recreation, hospitals, light manufacturing, and mining, as well as continued development of moderate to high density single family homes and mobile homes.

Development of the remaining undeveloped lands within the Annutteliga Hammock Florida Forever Project, and of undeveloped lots along US Highway 19 poses the most significant adjacent land use challenges to the CWMA.

1.8 Proximity to Other Public Conservation Lands

The CWMA is located in proximity to a large number of publicly-owned conservation areas and Florida Forever Projects (Figure 3, Tables 1 and 2). Most of the public conservation lands in the vicinity of CWMA are owned in full-fee-simple by a public entity, though some fall within a less-than-fee ownership classification where the land is owned and being



Conservation Lands

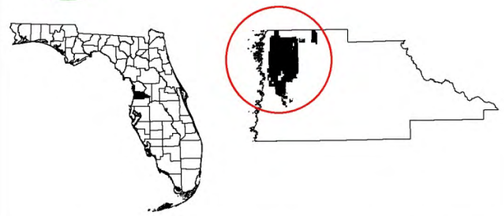
1 Ahhochee Hill Sanctuary
2 Al Bar Ranch
3 Annutteliga Hammock
4 Brooksville Plant Materials Center
5 Chassahowitzka National Wildlife Refuge
6 Chassahowitzka River and Coastal Swamps
7 Chinsegut Hill Conference Center
8 Chinsegut Wildlife and Environmental Area
9 Conner Preserve
10 Connerton Conservation Easement
11 Crews Lake Wilderness Park
12 Cross Bar Ranch Wellfield
13 Crystal River Archaeological State Park
14 Crystal River National Wildlife Refuge
15 Crystal River Preserve State Park
16 Cypress Creek Conservation Easement (SWFWMD)
17 Cypress Creek Flood Detention Area
18 Ellie Schiller Homosassa Springs Wildlife State Park
19 Fickett Hammock Preserve
20 Flying Eagle Ranch
21 Fort Cooper State Park
22 Half Moon Wildlife Management Area
23 Hidden Lake Project
24 Janet Butterfield Brooks Preserve Wildlife and Environmental Area
25 Jumping Gully Preserve
26 Lakeshore Ranch Conservation Easement
27 Lone Star Ranch Conservation Easement
28 Marjorie Harris Carr Cross Florida Greenway
29 Peck Sink Preserve
30 Perry Oldenburg Wildlife and Environmental Area
31 Potts Preserve
32 Starkey Wilderness Preserve
33 Subtropical Agricultural Research Station
34 Tierra Del Sol Preserve
35 Upper Coastal Mitigation Bank
36 Upper Pithlachascotee River Preserve
37 Weeki Wachee Springs State Park
38 Weekiwachee Preserve
39 Werner-Boyce Salt Springs State Park
40 Whispering Pines Park
41 Withlacoochee State Forest
42 Withlacoochee State Trail
43 Yulee Sugar Mill Ruins Historic State Park

Florida Forever Projects

A Annutteliga Hammock
B Battle of Wahoo Swamp
C Crossbar/Al Bar Ranch
D Florida's First Magnitude Springs
E Florida Springs Coastal Greenway
F Southeastern Bat Maternity Caves

Chassahowitzka WMA

Hernando County, Florida
24,423 Acres



Conservation Lands and Florida Forever Projects within 20 miles of Chassahowitzka WMA

Legend

Chassahowitzka WMA
Conservation Land
Florida Forever Project

0 1 2 4 6 8 10 12 Miles

N

Created in ArcGIS 10.1 by the Florida Fish and Wildlife Conservation Commission March 2014

Figure 3. Conservation Lands and Florida Forever Projects

Table 1. Conservation Lands Within 20 Miles of CWMA

Map Symbol	Name	Manager	Acres
1	Ahhochee Hill Sanctuary	Florida Audubon Society, Inc.	276
2	Al Bar Ranch	Pinellas County	4,253
3	Annutteliga Hammock	SWFWMD	2,317
4	Brooksville Plant Materials Center	USDA	170
5	Chassahowitzka National Wildlife Refuge	USFWS	36,426
6	Chassahowitzka River and Coastal Swamps	SWFWMD	5,670
7	Chinsegut Hill Conference Center	University of South Florida	115
8	Chinsegut Wildlife and Environmental Area	FWC	823
9	Conner Preserve	SWFWMD	3,486
10	Connerton Conservation Easement	Pasco County	33
11	Crews Lake Wilderness Park	Pasco County	111
12	Cross Bar Ranch Wellfield	Pinellas County	8,181
13	Crystal River Archaeological State Park	DEP-DRP	61
14	Crystal River National Wildlife Refuge	USFWS	137
15	Crystal River Preserve State Park	DEP-DRP	27,422
16	Cypress Creek Conservation Easement	SWFWMD	792
17	Cypress Creek Flood Detention Area	SWFWMD	7,497
18	Ellie Schiller Homosassa Springs Wildlife State Park	DEP-DRP	201
19	Fickett Hammock Preserve	Hernando County	155
20	Flying Eagle Ranch	SWFWMD	16,441
21	Fort Cooper State Park	DEP-DRP	707
22	Half Moon Wildlife Management Area	FWC	9,650
23	Hidden Lake Project	SWFWMD	589
24	Janet Butterfield Brooks Preserve Wildlife and Environmental Area	FWC	318
25	Jumping Gully Preserve	Pasco County	598

Table 1. Conservation Lands Within 20 Miles of CWMA

Map Symbol	Name	Manager	Acres
26	Lakeshore Ranch Conservation Easement	Pasco County	40
27	Lone Star Ranch Conservation Easement	Pasco County	67
28	Marjorie Harris Carr Cross Florida Greenway	DEP-DRP	71,269
29	Peck Sink Preserve	Hernando County	113
30	Perry Oldenburg Wildlife and Environmental Area	FWC	369
31	Potts Preserve	SWFWMD	9,379
32	Starkey Wilderness Preserve	SWFWMD	19,866
33	Subtropical Agricultural Research Station	USDA	3,743
34	Tierra Del Sol Preserve	Pasco County	118
35	Upper Coastal Mitigation Bank	EarthBalance	149
36	Upper Pithlachascotee River Preserve	Pasco County	127
37	Weeki Wachee Springs State Park	DEP-DRP	538
38	Weekiwachee Preserve	SWFWMD	11,199
39	Werner-Boyce Salt Springs State Park	DEP-DRP	4,004
40	Whispering Pines Park	City of Inverness	296
41	Withlacoochee State Forest	FFS	165,562
42	Withlacoochee State Trail	DEP-DRP	762
43	Yulee Sugar Mill Ruins Historic State Park	DEP-DRP	5

Acronym Key

DEP-DRP - Florida Department of Environmental Protection's Division of Recreation and Parks

FFS - Florida Forest Service

SWFWMD - Southwest Florida Water Management District

USDA - U.S. Department of Agriculture

USFWS - U.S. Fish and Wildlife Service

Table 2. Florida Forever Projects within 20 miles of CWMA

Map Symbol	Name	Project acres remaining
A	Annutteliga Hammock	12,540
B	Battle of Wahoo Swamp	853
C	Crossbar/Al Bar Ranch	12,440
D	Florida's First Magnitude Springs	5,771
E	Florida Springs Coastal Greenway	9,930
F	Southeastern Bat Maternity Caves	591

managed by a private landowner, while a public agency or not-for-profit organization holds a conservation easement and monitoring responsibility on the land.

Along with CWMA, these areas contribute to the conservation of cultural and natural resources within this region of west-central Florida. However, CWMA is not located within any Area of Critical State Concern (Chapter 380.05, F.S.).

1.9 Public Involvement

The FWC conducted a Management Advisory Group (MAG) meeting in Brooksville, Florida on May 16, 2012. This meeting was convened to obtain input from both public and private stakeholders regarding management of CWMA, and a summary of issues and opportunities raised by the MAG, as well as a listing of participants, was developed (Appendix 13.3). Results of this meeting were used by FWC to develop management goals and objectives and to identify opportunities and strategies for inclusion in this management plan. In addition, as required by Chapter 259.032(10) F.S., a public hearing was held in Brooksville, Florida on September 13, 2012 (Appendix 13.3). Furthermore, a website is also maintained for receipt of public input (http://myfwc.com/conservation/terrestrial/management-plans/develop-mps/). Additional testimony and input may be received at a public hearing held by ARC. Input received from all public involvement efforts has been considered in the development of this management plan.

2 Natural and Cultural Resources

2.1 Physiography

2.1.1 Climate

The climate of CWMA is classified as subtropical. Annual mean high and low temperatures are 81.6 and 63.0 degrees Fahrenheit (F), respectively. July and August are the hottest months with mean temperatures of 90.2 degrees F, while January is typically the coolest month with a mean temperature of 50.0 degrees F. Mean annual rainfall is 43.9 inches with June-September being period of highest precipitation.

2.1.2 Topography

The CWMA is characterized by relatively flat topography. The uplands range in elevation from 10 to 20 feet above mean sea level (MSL), with higher elevations associated with low ridge relict coastal dunes. The bottomlands are typically less than 10 feet above MSL.

2.1.3 Geologic Conditions: Hernando County, Florida

(Source: U.S. Department of the Interior, U.S. Geological Survey http://mrdata.usgs.gov/geology/state/fips-unit.php?code=f12053; modified for CWMA by FWC)

Undifferentiated sediments (Pleistocene/Holocene) at the surface cover 4% of Hernando County. Lithology: clay or mud; beach sand; silt; gravel; peat; sand. Much of Florida's surface is covered by a varying thickness of undifferentiated sediments consisting of siliciclastics, organics and freshwater carbonates. Organics occur as plant debris, roots, disseminated organic matrix and beds of peat. Freshwater carbonates, often referred to as marls in the literature, are scattered over much of the State. Sand, silt and clay may be present in limited quantities. These carbonates often contain organics. The dominant fossils in the freshwater carbonates are mollusks.

Undifferentiated sediments (Pliocene/Pleistocene) at the surface cover 13% of Hernando County. Lithology: sand; clay or mud; peat. These sediments are siliciclastics that are separated from undifferentiated Quaternary sediments solely on the basis of elevation. Based on the accepted estimate that the Pleistocene sea levels reached a maximum of approximately 100 feet MSL, these sediments, which occur above 100 feet MSL, are predominantly older than Pleistocene but contain some sediments reworked during the Pleistocene. This unit may include fluvial and aeolian deposits.

Hawthorn Group (Miocene) at the surface covers 25% of Hernando County. Lithology: clay or mud; sand; silt. The undifferentiated Hawthorn Group occurs at or near the surface near the southern flank of the Ocala Platform from Gilchrist County southward to Pasco County with isolated occurrences in Pinellas County. Correlation of these sediments to the

formations of the Hawthorn Group exposed to the east and in the subsurface is uncertain. There is little to no phosphate present in these sediments and fossils are rare. Ages have not been documented, but stratigraphic position suggests inclusion in the Hawthorn Group. These sediments may be residual from the weathering and erosion of the Hawthorn Group. The Hawthorn Group sediments on the Brooksville Ridge are deeply weathered and in some outcrops look like Cypresshead Formation siliciclastics. These sediments are part of the intermediate confining aquifer system and provide an effective aquitard for the Floridan Aquifer System (FAS), except where perforated by karst features. Hard-rock phosphate deposits are associated with the undifferentiated Hawthorn Group sediments on the eastern flank of the Brooksville Ridge. The hard rock phosphate deposits were formed by the dissolution of phosphate in the Hawthorn sediments and redeposition in karst features.

Ocala Limestone (Eocene) at the surface covers 14% of Hernando County. Lithology: limestone; dolostone (dolomite). The Ocala Limestone consists of nearly pure limestones and occasional dolostones. It can be subdivided into lower and upper facies on the basis of lithology. The lower member is composed of a white to cream-colored, fine to medium grained, poorly to moderately indurated, very fossiliferous limestone (grainstone and packstone). The lower facies may not be present throughout the areal extent of the Ocala Limestone and may be partially to completely dolomitized in some regions. The upper facies is a white, poorly to well indurated, poorly sorted, very fossiliferous limestone (grainstone, packstone and wackestone). Silicified limestone (chert) is common in the upper facies. Fossils present in the Ocala Limestone include abundant large and smaller foraminifers, echinoids, bryozoans and mollusks. The large foraminifera *Lepidocyclina* sp. is abundant in the upper facies and extremely limited in the lower facies. The presence of these large foraminifers in the upper facies is quite distinctive. The Ocala Limestone is at or near the surface within the Ocala Karst District in the west-central to northwestern peninsula and within the Dougherty Plain District in the north-central panhandle. In these areas, the Ocala Limestone exhibits extensive karstification. These karst features often have tens of feet of relief, dramatically influencing the topography of the Ocala Karst District and the Dougherty Plain District. Numerous disappearing streams and springs occur within these areas. The permeable, highly transmissive carbonates of the Ocala Limestone form an important part of the FAS.

Beach ridge and dune (Pleistocene/Holocene) at the surface covers 19% of Hernando County. Lithology: beach sand; clay or mud; silt. As described earlier, much of Florida's surface is covered by a varying thickness of undifferentiated sediments consisting of siliciclastics, organics and freshwater carbonates. Organics occur as plant debris, roots, disseminated organic matrix and beds of peat. Freshwater carbonates, often referred to as marls in the literature, are scattered over much of the State. These sediments are buff colored to tan, unconsolidated to poorly consolidated, fossiliferous carbonate muds. Sand,

silt and clay may be present in limited quantities. These carbonates often contain organics. The dominant fossils in the freshwater carbonates are mollusks.

Suwannee Limestone (Oligocene) at the surface covers 25% of Hernando County. Lithology: limestone; dolostone (dolomite). Peninsular Lower Oligocene carbonates crop out on the northwestern, northeastern and southwestern flanks of the Ocala Platform. The Suwannee Limestone consists of a white to cream, poorly to well indurated, fossiliferous, vuggy to moldic limestone (grainstone and packstone). The dolomitized parts of the Suwannee Limestone are moderately to well indurated, finely to coarsely crystalline, dolostone with limited occurrences of fossiliferous (molds and casts) beds. Silicified limestone is common in Suwannee Limestone. Fossils present in the Suwannee Limestone include mollusks, foraminifers, corals and echinoids.

2.1.4 Mineral Resources

A mineral resource survey has not been conducted on CWMA. However, the presence of a limestone resource is obvious from borrow pits presumably excavated during earlier construction of area roads prior to State acquisition.

2.1.5 Soils

Soil data provided by the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) indicates 23 map units (soil series) to be present on CWMA (Figure 4; map unit descriptions Appendix 13.5), with natural drainage classifications ranging from excessively drained to very poorly-drained. These data further indicate soil depth to the water table ranging from 0 to greater than 200 centimeters (Figure 5).

2.2 Vegetation

Geographic Information System (GIS) mapping data of vegetation for CWMA, and their associated natural community descriptions, were originally developed by the Florida Natural Areas Inventory (FNAI) from their assessments and field reviews performed in 2003. The FNAI revised these original GIS mapping data in 2012.

Twenty-five natural communities and areas undergoing active restoration efforts (Figure 6, Table 3) were identified, mapped and described, and lists of the known plant species for CWMA have been compiled (Table 4 - 6). Natural communities represent approximately 94.2% of the total vegetative cover of CWMA. The remainder of CWMA is comprised of altered areas (2.9%) and former natural communities undergoing restoration (2.9%). The majority of the altered area vegetation has a land cover of pine plantation.

Natural communities of CWMA include basin marsh, basin swamp, baygall, bottomland forest, depression marsh, dome swamp, hydric hammock, mesic flatwoods, mesic hammock, salt marsh, sandhill, scrub, scrubby flatwoods, sinkhole lake, spring-run stream, tidal

creek, wet flatwoods, wet prairie, and xeric hammock. In general, the natural communities have varying levels of alteration from fire suppression, logging, soil disturbance, and possibly from salt water intrusion associated with sea level rise.

The thirteen altered landcover types were also identified and mapped by FNAI, including artificial pond, borrow area, clearing/regeneration, developed, improved pasture, pine plantation, spoil area and utility corridor. Altered areas actively undergoing natural community restoration were mapped as well, including restoration - mesic flatwoods, restoration - sandhill, restoration - scrub, restoration - scrubby flatwoods, and restoration - wet flatwoods.

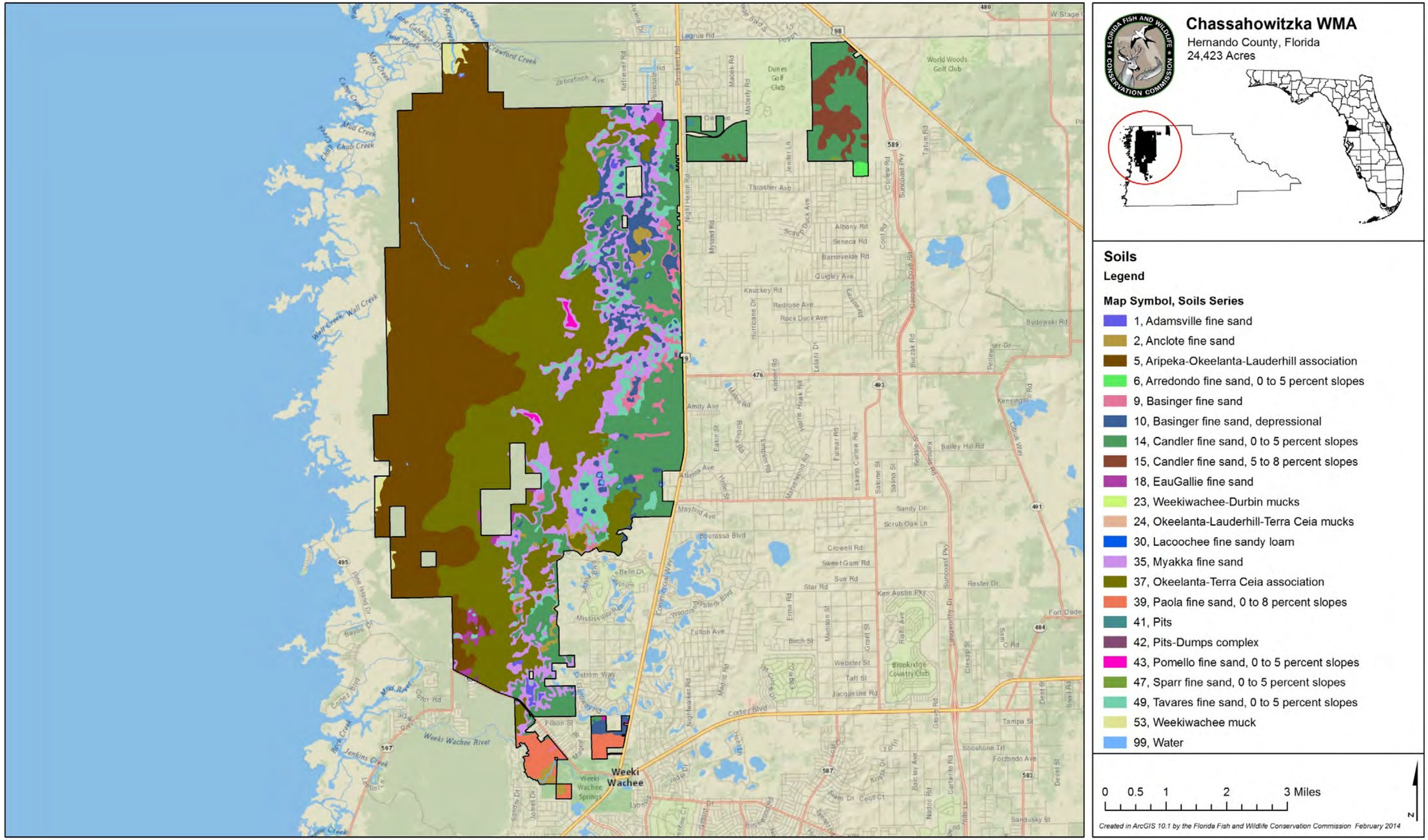


Figure 4. Soils

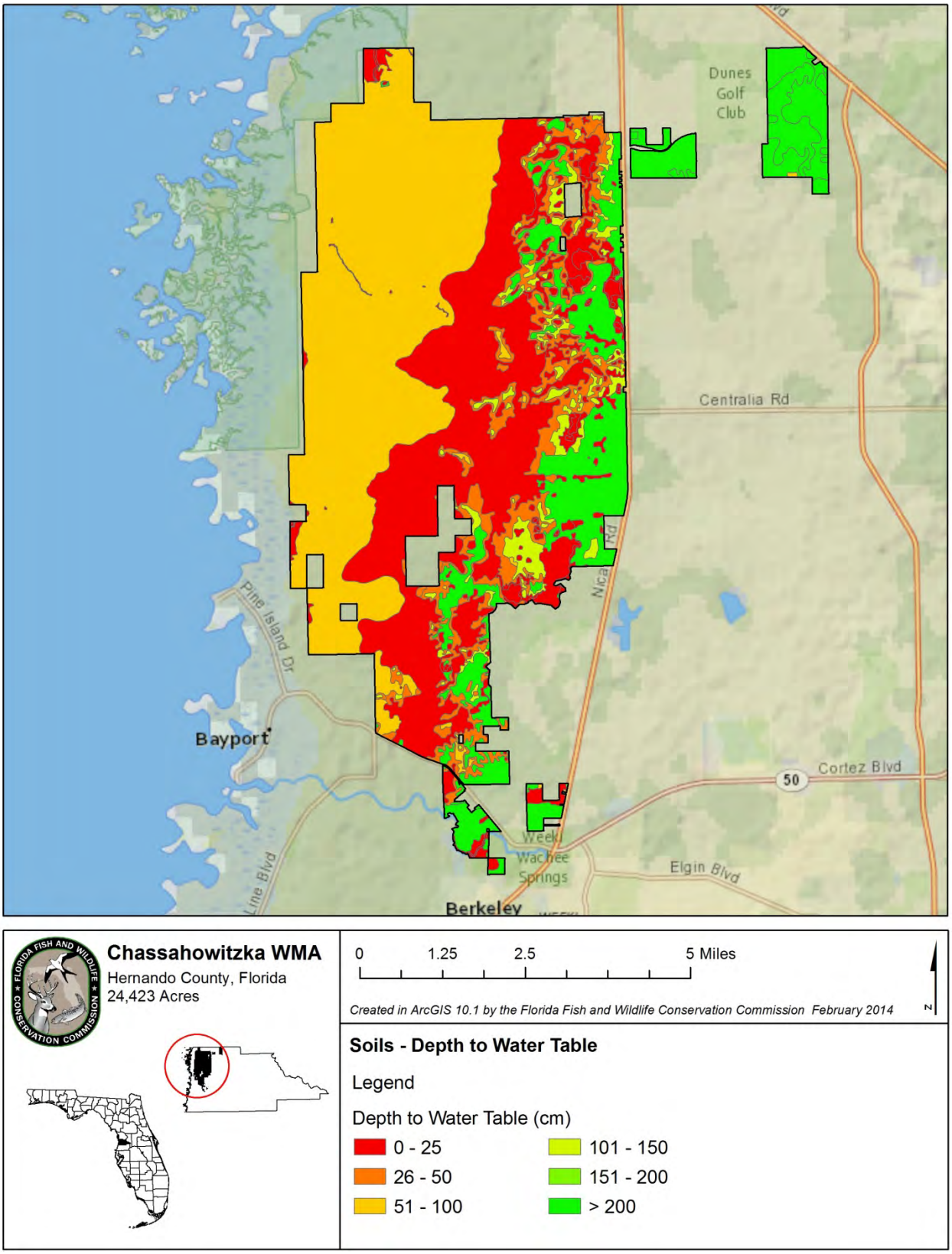


Figure 5. Soils - Depth to Water Table

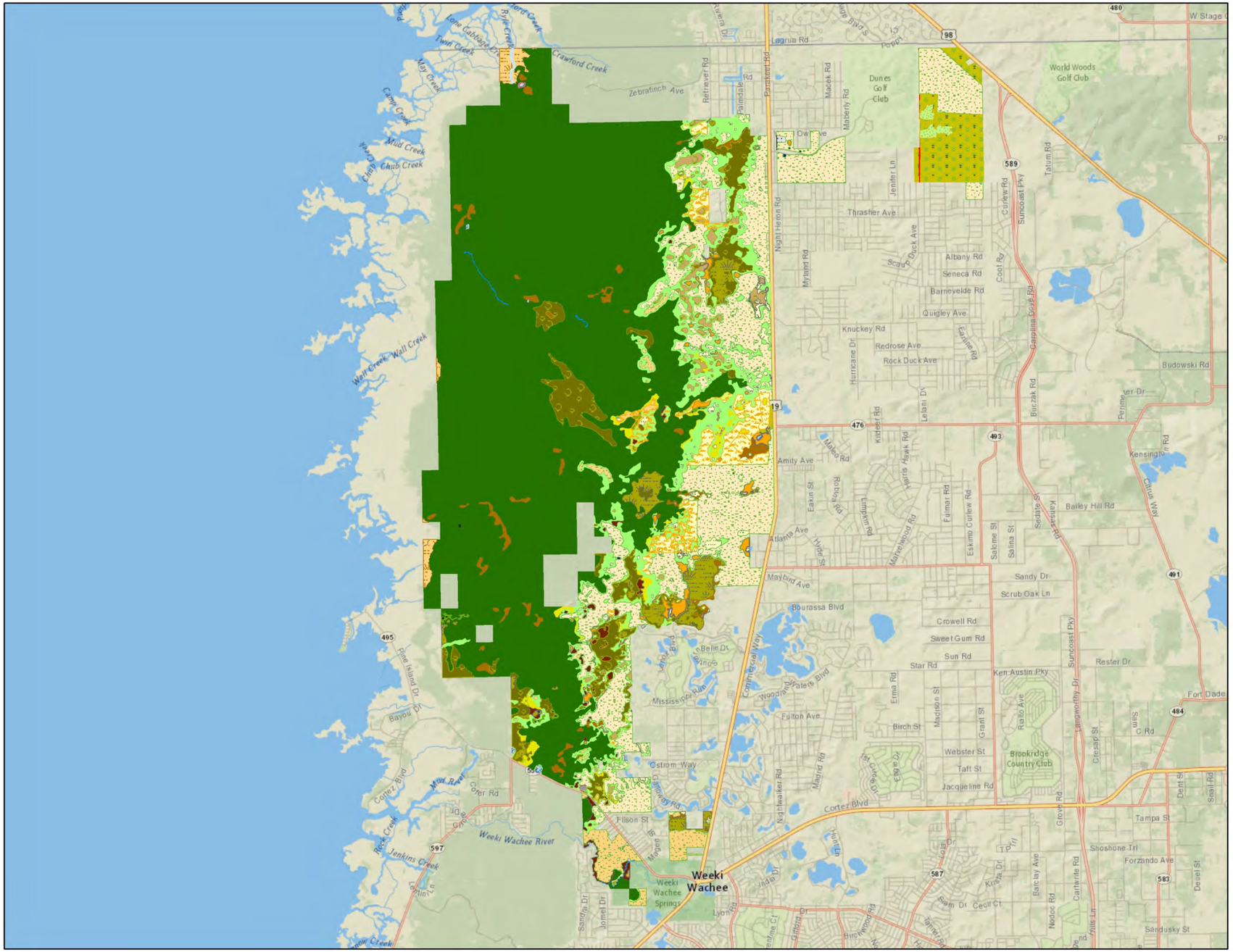


Figure 6. FNAI Natural and Altered Communities

Table 3. FNAI Natural and Altered Communities of CWMA

Natural or Altered Community	Acres	Percent of Area
Hydric hammock	15,577	57%
Sandhill	4,137	15%
Mesic flatwoods	1,934	7%
Basin swamp	1,384	5%
Pine plantation	681	2%
Basin marsh	556	2%
Restoration - sandhill	534	2%
Scrub	431	2%
Mesic hammock	355	1%
Dome swamp	337	1%
Depression marsh	305	1%
Xeric hammock	284	1%
Wet flatwoods	242	1%
Restoration - mesic flatwoods	211	1%
Salt marsh	156	1%
Baygall	143	1%
Pasture - improved	66	<1%
Scrubby flatwoods	36	<1%
Restoration - scrub	28	<1%
Restoration - wet flatwoods	21	<1%
Spring-run stream	17	<1%
Artificial pond	14	<1%
Restoration - scrubby flatwoods	13	<1%
Tidal creek	12	<1%
Utility corridor	10	<1%
Developed	10	<1%
Spoil area	8	<1%
Wet prairie	7	<1%
Clearing/regeneration	5	<1%
Bottomland forest	4	<1%
Borrow area	3	<1%
Sinkhole lake	2	<1%

Table 4. Native Plant Species Observed on CWMA

Common name	Scientific name
American beautyberry	*Callicarpa americana*
American elm	*Ulmus americana*
Arrow arum	*Peltandra virginica*
Bald cypress	*Taxodium distichum*
Bartram's air-plant	*Tillandsia bartramii*
Basswood	*Tilia americana*
Beaksedge	*Rhynchospora* sp.
Bigflower pawpaw	*Asimina obovata*
Black bogrush	*Schoenus nigricans*
Black cherry	*Prunus serotina*
Black needle rush	*Juncus roemerianus*
Blue huckleberry	*Gaylussacia frondosa* var. *tomentosa*
Blue maidencane	*Amphicarpum muhlenbergianum*
Bluejack oak	*Quercus incana*
Bluestem	*Andropogon* sp.
Bogbutton	*Lachnocaulon* sp.
Bottlebrush threeawn	*Aristida spiciformis*
Bracken fern	*Pteridium aquilinum*
Broomsedge bluestem	*Andropogon virginicus*
Bulltongue arrowhead	*Sagittaria lancifolia*
Bushy bluestem	*Andropogon glomeratus*
Cabbage palm	*Sabal palmetto*
Camphorweed	*Heterotheca subaxillaris*
Candyroot	*Polygala nana*
Carolina ash	*Fraxinus caroliniana*
Carolina laurelcherry	*Prunus caroliniana*
Carolina redroot	*Lachnanthes caroliana*
Carolina sealavender	*Limonium carolinianum*
Chapman's oak	*Quercus chapmanii*
Climbing hempvine	*Mikania scandens*
Coastalplain chaffhead	*Carphephorus corymbosus*
Coastalplain staggerbush	*Lyonia fruticosa*
Coastalplain willow	*Salix caroliniana*
Combleaf mermaidweed	*Proserpinaca pectinata*
Common arrowhead	*Sagittaria latifolia*
Common buttonbush	*Cephalanthus occidentalis*
Common pawpaw	*Asimina triloba*

Table 4. Native Plant Species Observed on CWMA

Common name	Scientific name
Common persimmon	*Diospyros virginiana*
Dahoon	*Ilex cassine*
Dogfennel	*Eupatorium capillifolium*
Dollar weed	*Hydrocotyle umbellata*
Dwarf huckleberry	*Gaylussacia dumosa*
Dwarf live oak	*Quercus minima*
Dwarf palmetto	*Sabal minor*
Earleaf greenbrier	*Smilax auriculata*
Early whitetop fleabane	*Erigeron vernus*
Eastern poison ivy	*Toxicodendron radicans*
Elderberry	*Sambucus nigra* ssp. *canadensis*
Elliott's bluestem	*Andropogon gyrans*
Elliott's yellow-eyed grass	*Xyris elliottii*
Fetterbush	*Lyonia lucida*
Fewflower milkweed	*Asclepias lanceolata*
Flattened pipewort	*Eriocaulon compressum*
Florida rosemary	*Ceratiola ericoides*
Four petal St. John's wort	*Hypericum tetrapetalum*
Fringed yellow-eyed grass	*Xyris fimbriata*
Gallberry	*Ilex coriacea*
Giant gallberry	*Ilex glabra*
Goldenrod	*Solidago* sp.
Gopher apple	*Licania michauxii*
Greenbrier	*Smilax* sp.
Green-eyes	*Berlandiera lyrata*
Green ash	*Fraxinus pennsylvanica*
Groundsel tree	*Baccharis halimifolia*
Hairawn muhly	*Muhlenbergia capillaris*
Hedge false bindweed	*Calystegia sepium* ssp. *limnophila*
Highbush blueberry	*Vaccinium corymbosum*
Ironwood	*Carpinus caroliniana*
Lanceleaf greenbrier	*Smilax smallii*
Large gallberry	*Ilex coriacea*
Laurel greenbrier	*Smilax laurifolia*
Laurel oak	*Quercus laurifolia*
Live oak	*Quercus virginiana*
Lizard's tail	*Saururus cernuus*

Table 4. Native Plant Species Observed on CWMA

Common name	Scientific name
Loblolly bay	*Gordonia lasianthus*
Longleaf pine	*Pinus palustris*
Lopsided Indiangrass	*Sorghastrum secundum*
Maiden fern	*Thelypteris* sp.
Maidencane	*Panicum hemitomon*
Marsh fern	*Thelypteris palustris*
Marsh mermaid-weed	*Proserpinaca palustris*
Marshpennywort	*Hydrocotyle* sp.
Muscadine	*Vitis rotundifolia*
Myrtle oak	*Quercus myrtifolia*
Narrow fruit horned beak sedge	*Rhynchospora inundata*
Narrowleaf silkgrass	*Pityopsis graminifolia*
Netted pawpaw	*Asimina reticulata*
Nutrush	*Scleria* sp.
Orange milkwort	*Polygala lutea*
Royal fern	*Osmunda regalis*
Partridgeberry	*Mitchella repens*
Panicgrass	*Panicum* spp.
Peelbark St. John's wort	*Hypericum fasciculatum*
Peppervine	*Ampelopsis arborea*
Perennial glasswort	*Sarcocornia ambigua*
Pickerelweed	*Pontederia cordata*
Pignut hickory	*Carya glabra*
Pineywoods dropseed	*Sporobolus junceus*
Pink sundew	*Drosera capillaris*
Pond cypress	*Taxodium ascendens*
Purple love-grass	*Eragrostis spectabilis*
Purple passion-flower	*Passiflora incarnata*
Rattan vine	*Berchemia scandens*
Red bay	*Persea borbonia*
Red cedar	*Juniperus virginiana*
Red maple	*Acer rubrum*
Rosy camphorweed	*Pluchea baccharis*
Rust-weed	*Polypremum procumbens*
Rusty staggerbush	*Lyonia ferruginea*
Salt-grass	*Distichlis spicata*
Sand cordgrass	*Spartina bakeri*

Table 4. Native Plant Species Observed on CWMA

Common name	Scientific name
Sand live oak	*Quercus geminata*
Sand pine	*Pinus clausa*
Sandyfield beaksedge	*Rhynchospora megalocarpa*
Sarsaparilla vine	*Smilax pumila*
Saw greenbrier	*Smilax bona-nox*
Saw palmetto	*Serenoa repens*
Sawgrass	*Cladium jamaicense*
Sawtooth blackberry	*Rubus argutus*
Sedge	*Carex* sp.
Shiny blueberry	*Vaccinium myrsinites*
Shortleaf gayfeather	*Liatris tenuifolia*
Skyblue lupine	*Lupinus diffusus*
Slash pine	*Pinus elliottii*
Slender wood oats	*Chasmanthium laxum*
Smooth cordgrass	*Spartina alterniflora*
Southern magnolia	*Magnolia grandiflora*
Spadeleaf	*Centella asiatica*
Spanish moss	*Tillandsia usneoides*
Sparkleberry	*Vaccinium arboreum*
Starrush white-top	*Rhynchospora colorata*
Stiff yellow flax	*Linum medium* var. *texanum*
Sugarcane plumegrass	*Saccharum giganteum*
Swamp bay	*Persea palustris*
Swamp dogwood	*Cornus foemina*
Swamp fern	*Blechnum serrulatum*
Swamp rose	*Rosa palustris*
Swamp tupelo	*Nyssa sylvatica* var. *biflora*
Sweetbay	*Magnolia virginiana*
Sweetgum	*Liquidambar styraciflua*
Tall elephantsfoot	*Elephantopus elatus*
Tarflower	*Bejaria racemosa*
Thoroughwort	*Eupatorium* sp.
Threeawn	*Aristida* sp.
Tick-trefoil	*Desmodium* sp.
Tuberous grass-pink	*Calopogon tuberosus*
Turkey oak	*Quercus laevis*
Virginia chain fern	*Woodwardia virginica*

Table 4. Native Plant Species Observed on CWMA

Common name	Scientific name
Virginia creeper	*Parthenocissus quinquefolia*
Virginia plantain	*Plantago virginica*
Water toothleaf	*Stillingia aquatica*
Wax myrtle	*Myrica cerifera*
Western tansy mustard	*Descurainia pinnata*
White sweet clover	*Melilotus albus*
White water lily	*Nymphaea odorata*
Wild bachelor button	*Centaurea cyanus*
Wild indigo	*Baptisia lecontei*
Wild olive	*Osmanthus americanus*
Wild pennyroyal	*Piloblephis rigida*
Winged sumac	*Rhus copallinum*
Wiregrass	*Aristida stricta* var. *beyrichiana*
Witch-grass	*Dichanthelium* sp.
Yankee weed	*Eupatorium compositifolium*
Yaupon holly	*Ilex vomitoria*
Yellow-eyed grass	*Xyris* sp.

Table 4. Rare, Imperiled, and Commercially Exploited Plants of CWMA

Common name	Scientific name	Status
Angle pod	*Matelea gonocarpos*	ST
Blue-flowered butterwort	*Pinguicula caerulea*	ST
Cardinal flower	*Lobelia cardinalis*	ST
Chapman's skeletongrass	*Gymnopogon chapmanianus*	N
Cinnamon fern	*Osmunda cinnamomea*	CE
Curtiss' milkweed	*Asclepias curtissii*	SE
Butterfly orchid	*Encyclia tampensis*	CE
Garberia	*Garberia heterophylla*	ST
Giant orchid	*Pteroglossaspis ecristata*	N
Green-fly orchid	*Epidendrum conopseum*	CE

Table 4. Rare, Imperiled, and Commercially Exploited Plants of CWMA

Common name	Scientific name	Status
Needle palm	*Rhapidophyllum hystrix*	CE
Scrub pinweed	*Lechea cernua*	ST
Gypsy-spikes	*Platanthera flava*	ST
Spreading pinweed	*Lechea divaricata*	SE
Plume polypody	*Polypodium plumula*	SE
Royal fern	*Osmunda regalis*	CE
Hidden stylisma	*Stylisma abdita*	SE
Giant wild-pine	*Tillandsia utriculata*	SE
Swamp plume polypody	*Polypodium ptilodon*	SE
Yellow-flowered butterwort	*Pinguicula lutea*	ST

Acronym Key

CE = Commercially Exploited

N = Not listed

SE = State Endangered

ST = State Threatened

Table 5. Invasive Exotic Plant Species of CWMA

Common name	Scientific name
Air potato	*Dioscorea bulbifera*
Brazilian pepper	*Schinus terebinthifolia*
Camphor tree	*Cinnamomum camphora*
Castor bean	*Ricinus communis*
Chinaberrytree	*Melia azedarach*
Chinese tallowtree	*Sapium sebiferum*
Cogongrass	*Imperata cylindrica*
Guineagrass	*Panicum maximum*
Japanese climbing fern	*Lygodium japonicum*
Loquat	*Eriobotrya japonica*
Mimosa	*Albizia julibrissin*

Table 5. Invasive Exotic Plant Species of CWMA

Common name	Scientific name
Natalgrass	*Melinis repens*
Paper mulberry	*Broussonetia papyrifera*
Skunkvine	*Paederia foetida*

2.2.1 FNAI Natural Community Descriptions

The following include generic natural community description excerpts from the FNAI Guide to the Natural Communities of Florida 2010 Edition, and have been modified by FWC for the purposes of this Management Plan. Natural community descriptions specific to CWMA were developed by FNAI in 2003 and updated in 2012. They too have been modified by FWC for the purposes of this Management Plan.

Basin marsh (556 acres)
Basin marsh is an herb-dominated community that occurs in large irregularly shaped depressions. Basin marshes are regularly inundated freshwater herbaceous wetlands that may occur in a variety of situations, but in contrast to depression marshes, are not small or shallow inclusions within a fire-maintained natural community. Plant species composition is heterogeneous, both within and between marshes, but can generally be divided into submersed, floating-leaved, emergent, and grassy zones from deepest to shallowest portions; shrub patches may be present within any of these zones.

At CWMA, basin marsh is an herb-dominated community that occurs in large irregularly shaped depressions. These depressions are generally associated with the large basin swamps in the sandhill-mesic flatwoods matrix. Sawgrass is the dominant plant in this community, often occurring in large homogenous stands. Outer edges of marshes may have sparse to moderately dense cover of wax myrtle, groundsel tree, red maple and button bush, over sand cordgrass, maiden-cane and various sedges and hydrophytic forbs. Deepest portions of basin marshes support white water lily, common arrowhead, and pickerelweed.

Basin swamp (1,384 acres)
Basin swamp is a forested wetland community that occurs in large irregularly shaped depressions, and is vegetated with hydrophytic trees and shrubs that can withstand an extended hydroperiod. Basin swamps are highly variable in size, shape, and species composition. Mixed species tree canopies are common, often including both evergreen and

deciduous tree species. This natural community typically occurs in any type of large landscape depression such as old lake beds, river basins, and ancient coastal swales and lagoons that existed during higher sea levels.

At CWMA, basin swamp occurs in irregularly shaped depressions embedded within mesic flatwoods, mesic hammock or hydric hammock communities. The open to moderately dense, canopy (25% to 75% coverage) generally is dominated by pond cypress, swamp tupelo, green ash, American elm, laurel oak, and red maple. Cabbage palm and slash pine are infrequent. Tall shrub cover is generally sparse to moderate (5 to 50%), and is usually dominated by wax myrtle, dahoon holly, Carolina ash, red maple, and buttonbush. The short shrub layer is generally sparse to moderate (5 to 50%), including fetterbush, coastal plain willow, and highbush blueberry. Herbaceous cover generally is sparse to moderate (5 to 25%), including common arrowhead, false nettle, water hoar hound, arrow arum, sawgrass, Virginia chain fern, royal fern, lizard's tail, and sedges.

Baygall (143 acres)
Baygall is characterized by dense stands of evergreen trees and shrubs that occur in depressions or seepage areas where groundwater is at or near the surface for long periods of time. Although most baygalls are small in acreage, some form large, mature forests. Soils are generally composed of peat, with seepage from uplands, rainfall, and capillary action from adjacent wetlands maintaining a saturated substrate. Baygall typically develops at the bases of slopes, edges of floodplains, in depressions, and in stagnant drainages. Generally influenced by flowing water, baygall is often drained by small blackwater streams.

At CWMA, baygall generally occurs in shallow depressions and drains embedded within flatwoods, or linear edges down-slope of scrub, sandhill or other well drained communities. Baygall at CWMA generally supports a moderately dense (40% to 60% coverage) canopy and mid-story of sweetbay, swamp bay, and loblolly bay. Slash pine also may be present in the canopy. Wax myrtle is a frequent tall shrub. There is a dense (50 to 100%) cover of fetterbush and saw palmetto. Herbaceous cover is generally sparse to absent, but may include cinnamon fern, royal fern and sedges. Smilax is common throughout the shrub layer.

Bottomland forest (4 acres)
Bottomland forests occur within floodplain forests and swamps on higher ground that is rarely inundated except during unusual flood events. Found in areas intermediate between swamps and uplands, the canopy may be quite diverse with both deciduous and evergreen hydrophytic to mesophytic trees. Bottomland forest is a closed-canopy forest found on terraces and levees within riverine floodplains and in shallow depressions. Bottomland forests along smaller streams are prone to periodic flooding attributable to localized rainfall

that increases seepage and runoff from surrounding uplands. In floodplains along larger rivers and tributaries, bottomland forests on higher terraces, ridges, and levees are subject to only short seasonal floods due to high relief or quickly drained sandy soils, or both conditions. The water table in these forests is high in blackwater or spring-fed floodplains, but relatively low during dry periods in alluvial floodplains. Inundation occurs only during higher floods, regardless of the stream type.

At CWMA, bottomland forest occurs with baygall and hydric hammock along the Weeki Wachee River. There is a canopy of laurel oak, and sweet-gum. Cabbage palm and ironwood comprise the mid-story. The short shrub layer is represented by cabbage palm seedlings, saw palmetto, and fetterbush. Herbaceous cover is sparse, including partridgeberry, swamp orchid, panicgrass and marsh fern.

Depression marshes (305 acres)
Depression marsh, an herbaceous wetland community found in low flatlands, forms the characteristic pockmarked landscape seen on aerial photographs of the flat landscapes of the Florida peninsula. Depression marsh is usually characterized as a shallow, rounded depression in sand substrate with herbaceous vegetation and shrubs, often in concentric bands. These marshes also frequently form an outer rim around swamp communities such as dome swamps. They form when the overlying sands slump into depressions dissolved in underlying limestone. Depression marshes often burn with the surrounding landscape, and are seasonally inundated. Depression marshes typically occur in landscapes occupied by fire-maintained natural communities such as mesic flatwoods, dry prairie, or sandhill.

At CWMA, depression marshes develop in shallow, generally rounded depressions. Characteristically, vegetation occurs in concentric bands along the hydrologic gradient. A canopy is generally absent, but may include an occasional slash pine, red maple or swamp tupelo. The shrub layer is typically sparse, but may reach coverage of 50% or more, depending on fire intervals. St. John's wort is the most common shrub. Others include dahoon holy, gallberry, red bay and fetterbush. Herbaceous cover is 75 to 100%, principally represented by blue maiden cane, panicgrasses, bluestem grasses, Virginia chain fern, yellow-eyed grasses, and sand cordgrass.

Dome swamp (337 acres)
Dome swamp is an isolated, forested, depression wetland occurring within a fire-maintained community such as mesic flatwoods. These swamps are generally small, but may also be large and shallow. The characteristic dome shape is created by smaller trees that grow in the shallower waters of the outer edge, while taller trees grow in the deeper water in the interior of the swamp. Dome swamps are most often found on flat terraces, where they develop when the overlying sand has slumped into a depression in the underlying limestone, creating a rounded depression connected to a shallow water table. In

uplands with clay soils, dome swamps may occupy depressions over a perched water table. Soils in dome swamps are variable, but are most often composed of a layer of peat, which may be thin or absent at the periphery, becoming thicker toward the center of the dome.

At CWMA, dome swamps are shallow, forested, and circular to elliptic depressions embedded within flatwoods. Pond cypress dominates the canopy; swamp tupelo and slash pine occasionally are present. The tall shrub layer is generally dominated by dahoon holly and wax myrtle; coverage ranges from 1 to 50%, depending on canopy coverage, fire frequency, and hydrology. Short shrub cover is 1 to 25%, represented by fetterbush, and highbush blueberry. Herbaceous coverage is variable, usually represented by Virginia chain fern, and bluestem grasses.

Hydric Hammock (15,577 acres)
Hydric hammock is an evergreen hardwood and/or palm forest with a variable understory typically dominated by palms and ferns occurring on moist soils, often with limestone very near the surface. While species composition varies, the community generally has a closed canopy of oaks and palms, an open understory, and a sparse to a moderate groundcover of grasses and ferns. Hydric hammock occurs on low, flat, wet sites where limestone may be near the surface, and soil moisture is kept high mainly by rainfall accumulation on poorly drained soils. Periodic flooding from rivers, seepage, and spring discharge may also contribute to hydric conditions.

Hydric hammock occupies extensive acreage in the western portion of CWMA where it exists in a mosaic with basin swamp. There is a nearly closed, diverse canopy of laurel oak, cabbage palm, green ash, American elm, sweetbay, bald cypress and red maple. Sweet-gum and slash pine are infrequent. There is a sub-canopy of cabbage palm. The tall shrub cover is sparse to moderate (5 to 25% cover), composed of wax myrtle, red cedar, and dahoon holly. The short shrub layer is sparse and may include Virginia willow, dwarf palmetto, needle palm, and highbush blueberry. Herb cover is sparse to moderate (1 to 25%), lizard's tail, arrow arum, swamp fern, and sedges. Leaf litter covers nearly 100 percent of the ground.

Mesic flatwoods (1,934 acres)
Mesic flatwoods is the most widespread natural community in Florida, covering the flat sandy terraces left behind by former high sea levels. Mesic flatwoods is characterized by an open canopy of tall pines and a dense, low ground layer of shrubs, grasses, and forbs. Longleaf pine is the principal canopy tree in northern and Central Florida. Soils are acidic, nutrient-poor, fine sands with upper layers darkened by organic matter. Drainage in this flat terrain can be impeded by a loosely cemented organic layer (spodic horizon) formed within several feet of the soil surface. The soils may be alternately xeric during dry periods, and saturated or even inundated after heavy rain events.

Mesic flatwoods are distributed throughout CWMA in narrow to broad transition areas between sandhill and basin swamp or hydric hammock. Typically there is a sparse canopy of longleaf pine, and slash pine. The tall shrub layer may be represented by a few scattered red bay, wax myrtle, or encroaching oaks. The short shrub layer is generally a dense cover of saw palmetto and gallberry. Other common shrubs include, fetterbush, shiny blueberry, huckleberry, wax myrtle, and dwarf live oak. Herbaceous cover within the mesic flatwoods is sparse to moderate (1 to 25%) and usually includes wiregrass, bottlebrush threeawn, bluestem grasses, goldenrod, yellow-eyed grass, bachelor's button, bantam-buttons, and panicgrasses.

Mesic hammock (355 acres)
Mesic hammock is a well-developed evergreen hardwood and/or palm forest. Mesic hammock may occur as "islands" on high ground within basin or floodplain wetlands, as patches of oak/palm forest in dry prairie or flatwoods communities, on river levees, or in ecotones between wetlands and upland communities. Historically, mesic hammocks were likely restricted to fire shadows, or other naturally fire-protected areas such as islands and peninsulas of lakes. Other landscape positions that can provide protection from the spread of fire are likely places for mesic hammock development, including edges of lakes, sinkholes, other depressional or basin wetlands, and river floodplains. Although mesic hammock is not generally considered a fire-adapted community, some small patches of hammock occurring as islands within marshes or prairies may experience occasional low-intensity ground fires. Mesic hammocks occupy soils that are sands mixed with organic matter, are rarely inundated, but though well-drained, maintain high moisture by heavy shading of the ground layer and accumulation of litter. Where limestone is near the surface, rock outcrops are common in mesic hammocks.

Mesic hammocks occur as islands within CWMA hydric hammock, and in a few mesic transition areas adjacent to basin wetlands. There is generally a canopy of live oak, laurel oak, and cabbage palm. Cabbage palm and eastern red cedar are common in the sub-canopy. Basswood is occasional. The tall shrub layer is composed of wax myrtle, cabbage palm, sparkleberry, yaupon holly, ironwood and red bay. Short shrub coverage is variable and may include saw palmetto, yaupon holly, and red bay. Herbaceous coverage is sparse to moderate (5 to 50%) dominated by slender woodoats, panicgrasses and various sedges.

Salt marsh (156 acres)
Salt marsh is a largely herbaceous community that occurs in the portion of the coastal zone affected by tides and seawater and protected from large waves, either by the broad, gently sloping topography of the shore, by a barrier island, or by location along a bay or estuary. The width of the intertidal zone depends on the slope of the shore and the tidal range. Salt marsh may have distinct zones of vegetation, each dominated by a single species of grass or

rush. Salt marsh soils range from deep mucks with high clay and organic content in the deeper portions to silts and fine sands in higher areas.

Salt marsh communities extend from the Gulf of Mexico to the tidal creeks on the CWMA. Black needle rush and smooth cordgrass dominate saline portions of this community, with salt-grass, Carolina sealavender, and perennial glassworts as common subordinate species. As the creeks change from brackish to fresh, sawgrass becomes common. High ground and islands along creeks support red cedar, cabbage palm and live oaks.

Sandhill (4,137 acres)
Sandhill is characterized by widely spaced pine trees with a sparse midstory of deciduous oaks and a moderate to dense groundcover of grasses, herbs, and low shrubs. Sandhill requires frequent fire to maintain its characteristic open structure. Sandhill occurs on the rolling topography and deep sands of the Southeastern U.S. Coastal Plain, including on crests and slopes of rolling hills and ridges with steep or gentle topography. Soils are deep, marine-deposited, often yellowish sands that are well-drained and relatively infertile. The deep, sandy soils and a lack of near surface hardpan or water table contribute to a xeric environment. Sandhill is important for aquifer recharge because the porous sands allow water to percolate rapidly with little runoff and minimal evaporation.

Sandhill at CWMA generally has a canopy of widely spaced longleaf pine. There is a moderately dense (40% to 60% coverage) sub-canopy and mid-story of turkey oak. Sand live oak is present in many of the sandhills, and is well established in the sub-canopy and tall shrub layer. The tall shrub layer is generally sparse, represented by young turkey oak. The short shrub layer is dominated by saw palmetto, gopher apple, shiny blueberry, and common pawpaw. High plant diversity can be found in the herbaceous layer of some sites. Common grasses include wiregrass, threeawn, various bluestem grasses, pineywoods dropseed, purple love-grass, lopsided Indiangrass and panicgrasses. Other common herbs include green-eyes, narrowleaf silkgrass, dollar weed, and wild indigo. Greenbrier occurs as an occasional vine. Weedy species in sandhills include dogfennel, sawtooth blackberry, camphorweed, bluestem grasses as well as a variety of other grasses.

Scrub (431 acres)
Scrub is a community composed of evergreen shrubs, with or without a canopy of pines, and is found on dry, infertile, sandy ridges. Scrub communities dominated by a canopy of sand pine are usually found on the highest sandy ridgelines. The pine canopy may range from widely scattered trees with a short, spreading growth form, to tall thin trees forming a dense canopy of uniform height. Scrub is located on dry, infertile, sandy ridges which often mark the location of former shorelines.

Scrub occurs as isolated patched on islands in the hydric hammock and in a few sandhills on CWMA. Sand pine is typically present in the canopy (sparse to dense), particularly on the islands and in the southern portion of CWMA. The shrub cover is generally dense (75 to 100%). Sand live oak is the dominant oak, generally covering 25 to 50 percent of the shrub strata. Chapman's oak myrtle oak, saw palmetto, and rusty lyonia are frequent, each generally covering 5 to 25 percent of the shrub strata. Wild olive, gallberry, huckleberry and shiny blueberry also may be present. Herbaceous cover is generally sparse, but may include goldenrod and bracken fern. Wiregrass is either absent or very sparse (<1% cover). Lichens are occasional to abundant.

Scrubby flatwoods (36 acres)
Scrubby flatwoods have an open canopy of widely spaced pine trees and a low, shrubby understory dominated by scrub oaks and saw palmetto, often interspersed with areas of barren white sand. Principal canopy species are longleaf pine and slash pine in northern and Central Florida. The shrub layer consists of oak species and shrubs typical of mesic flatwoods, as well as grasses and dwarf varieties of other shrubs. Scrubby flatwoods occur on slight rises within mesic flatwoods and in transitional areas between scrub and mesic flatwoods. Soils of scrubby flatwoods are moderately well-drained sands with or without an organic layer (spodic horizon).

At CWMA, scrubby flatwoods occur in the transitional areas between scrub and mesic flatwoods and in portions within a matrix of flatwoods that are in a fire shadow or have burned less frequently and therefore have developed an oak-dominated shrub layer. The vegetation is a combination of scrub and mesic flatwoods species. There typically is a sparse canopy of slash pine or longleaf pine. The tall shrub layer may be represented by sand live oak and Chapman's oak. The short shrub layer is generally a dense cover of sand live oak, Chapman's oak, myrtle oak, saw palmetto, gallberry, rusty lyonia, rusty staggerbush, and tarflower. Other common shrubs include fetterbush, shiny blueberry, huckleberry, and wax myrtle. Herbaceous cover within the scrubby flatwoods is sparse to moderate (1 to 25%) and usually includes wiregrass, bluestem grasses, and panicgrasses.

Sinkhole lake (2 acres)
Sinkhole lakes occur in three locations on CWMA in association with sandhill and xeric hammock. They have steep banks with exposed limestone. The edges of the sinks are dominated by fetterbush and wax myrtle. Vegetation within the sink is sparse to moderate including white water lily, maidencane, and other emergent herbs characteristic of depression marshes.

Spring-run stream (17 acres)
Spring-run streams are perennial water courses that derive most, if not all, of their water from artesian openings in the underground aquifer. Spring-run streams generally have

sand bottoms or exposed limestone along their central channel. Calcareous silts may form thick deposits in quiet shallow zones, while leaf drift and other debris collect around fallen trees and quiet basins. When undisturbed, submerged aquatic vegetation clothes most of a spring-run stream bottom. The water emanating from the aquifer is generally clear due to the filtering and absorbing actions of the soils and aquifer limestones through which the water percolates and flows. When the water is deep, it may appear bluish because of light-refraction. If the water sources for the aquifer are substantially influenced by nearby swamps or flatwoods, the spring-run stream may temporarily become stained with tannins and other dissolved organics during or following periods of heavy rain events. When extensive underground cavities connect the spring caverns with nearby sinks and swallow holes, the spring-run stream may become turbid with suspended particulates during and following heavy rains and floods. Conversely during periods of low rainfall, the aquifer can become supersaturated with calcium, carbonates, and other ions. These chemicals readily precipitate when the water reaches the surface, causing the spring head to appear milky.

Spring run streams flow from a couple of small springs within the swamps on CWMA, and also are represented by the Weeki Wachee River which flows through the southern portion of the area. Vegetation is generally sparse. In the swamps of CWMA, it is represented by lizards' tail, and arrow arum along the edges of the streams.

Wet flatwoods (242 acres)
Wet flatwoods occur in broad, low flatlands, often in a mosaic with these communities. They are found in the ecotones between mesic flatwoods, shrub bogs, wet prairies, dome swamps, or strand swamps. Wet flatwoods are pine forests with a sparse or absent midstory and a dense groundcover of hydrophytic grasses, herbs, and low shrubs. The relative density of shrubs and herbs varies greatly in wet flatwoods. Shrubs tend to dominate where fire has been absent for a long period or where cool season fires predominate; herbs are more abundant in locations that are frequently burned. Soils and hydrology also influence relative density of shrubs and herbs. Soils of shrubby wet flatwoods are generally poorly to very poorly drained sands. These soils generally have a mucky texture in the uppermost horizon. Loamy sands are typical of soils in grassy wet flatwoods.

At CWMA, wet flatwoods occur in association with mesic flatwoods. There typically is a sparse to moderately dense canopy of slash pine. The tall shrub layer is generally represented by wax myrtle, red bay, sweetbay, saw palmetto, and gallberry. The short shrub layer is generally a dense cover of fetterbush, gallberry, and saw palmetto. Herbaceous cover within the wet flatwoods is sparse (1 to 5%) and usually includes wiregrass, bottlebrush threeawn, bluestem grass, and yellow-eyed grass. Cinnamon fern and Virginia chain fern may be present.

Wet prairie (7 acres)
Wet prairie is an herbaceous community found on continuously wet, but not inundated, soils of gentle slopes between lower lying depression marshes, shrub bogs, or dome swamps, and slightly higher wet or mesic flatwoods, or dry prairie. Wet prairies are grass- and sedge-dominated wetlands maintained by a high or perched ground water table and frequent fires. They also occur in narrow seepage zones of saturated soil at the base of gentle slopes of stream drainages and in flat lowlands. Wet prairie usually occurs on acidic, nutrient-deficient, saturated soils.
The wet prairies at CWMA are assemblages of black bog rush and hairawn muhly, similar to prairies found in parts of South Florida where limestone is near the surface. In slightly lower areas, sawgrass becomes more common and quickly becomes dominant in ditches and marshy ecotones to the adjacent swamp. Other common herbs include spadeleaf, early white-top fleabane, combleaf mermaidweed, and sugarcane plumegrass. Slender shrubs of water toothleaf are occasional throughout the prairies, and small islands of saw palmetto are occasional on higher areas. Slash pine, red cedar, swamp bay, and dahoon occur sporadically, primarily around the edge of the community.

Xeric hammock (284 acres)
Xeric hammock is an evergreen forest found on well-drained sandy soils. The low canopy is typically closed and dominated by oak species. An emergent canopy of pine may be present. Xeric hammock typically develops where fire-exclusion allows for the establishment of the oak canopy. This may occur naturally when the area has significant barriers to fire, or more commonly, as the result of human intervention. In these areas, xeric hammock can form extensive stands or can occur as small patches within or near sandhill or scrub. Xeric hammock can also occur on high islands within flatwoods, or on a high, well-drained ridge within a floodplain. Xeric hammock also can occur on barrier islands and in other coastal situations, as an advanced successional stage of scrub.

Xeric hammock on CWMA is present where former sandhill has not recently burned, and in transition areas from sandhill to wetland communities where fire has not burned sufficiently hot enough to retard sand live oak growth. There is typically a nearly closed canopy of sand live oak, with Chapman's oak, and myrtle oak sometimes present in the tall shrub layer. The short shrub layer is generally represented by saw palmetto (5 to 50% cover). Herb cover is generally suppressed by abundant leaf litter, but may include sedges and panicgrass. Shiny blueberry and staggerbush are infrequent, and wiregrass is sparse to absent.

2.2.2 Forest Resources
A large portion of the CWMA consists of forested wetlands. The last major timber harvest of these wetlands occurred in the early 1900s, when cypress and cedar were harvested. The CWMA's upland forests are composed primarily of sandhill and flatwoods pine

communities, some of which were converted to pine plantations prior to State of Florida ownership. These plantations have a thick understory resulting from fire exclusion, and some consist of off-site pine species. Past pine harvests did not leave adequate seed trees for forest regeneration, and there are areas where on-site pines species (especially longleaf pine) may need to be planted to augment natural regeneration. The FWC will consult with the FFS regarding silvicultural operations for the purpose of natural community restoration within pine plantations, including thinning, harvest, site preparation and re-planting activities.

2.3 Fish and Wildlife Resources

The area's diverse vegetative communities provide the resources necessary to sustain large wildlife assemblages (Tables 7 - 13). The extensive nature of the hardwood swamp, and its association with uplands, creates good habitat conditions for far-ranging species, as well as allowing seasonal movement of wildlife species keyed to water level fluctuations. Carrying capacity of the swamp is highly influenced by the management practices of the uplands, including those on adjacent private lands.

Several wildlife species inhabiting CWMA are considered rare, endangered, threatened or species of special concern, including the Florida mouse, gopher tortoise, eastern indigo snake, gopher frog, American alligator, Florida pine snake, wood stork, Sherman's fox squirrel, and southeastern American kestrel. The CWMA is historically known to support nesting pairs of Southern bald eagles. Additionally, a small subpopulation of Florida black bear occurs on CWMA.

The diversity of fish species present on CWMA is high due to the variety of aquatic habitats, including blackwater streams, springs, tidal creeks, cypress ponds, sinkhole lakes, and aquatic caves. Waters range from fresh to brackish and salt water, with fish species occupying specific zones and habitats based on their various tolerances to salinity levels. This rich assemblage of freshwater fish species offers the potential for recreational fishing opportunities.

Table 6. Mammals Known or Expected to Occur on CWMA

Common name	Scientific name
Big brown bat	*Eptesicus fuscus*
Black rat	*Rattus rattus*
Bobcat	*Lynx rufus*
Brazilian free-tailed bat	*Tadarida brasiliensis*

Table 6. Mammals Known or Expected to Occur on CWMA

Common name	Scientific name
Cotton mouse	*Peromyscus gossypinus*
Eastern big-eared bat	*Plecotus rafinesquii*
Eastern cottontail	*Sylvilagus floridanus*
Eastern gray squirrel	*Sciurus carolinensis*
Eastern harvest mouse	*Reithrodontomys humulis*
Eastern pipistrelle	*Pipistrellus subflavus*
Eastern woodrat	*Neotoma floridana*
Evening bat	*Nycticeius humeralis*
Florida black bear	*Ursus americanus floridanus*
Florida mouse	*Podomys floridanus*
Florida muskrat	*Neofiber alleni*
Golden mouse	*Ochrotomys nuttalli*
Gray fox	*Urocyon cinereoargenteus*
Hispid cotton rat	*Sigmodon hispidus*
Homosassa shrew	*Sorex longirostris eionis*
Least shrew	*Cryptotis parva*
Long-tailed weasel	*Mustela frenata*
Marsh rabbit	*Sylvilagus palustris*
Marsh rice rat	*Oryzomys palustris*
Raccoon	*Procyon lotor*
Red bat	*Lasiurus intermedius*
Red fox	*Vulpes vulpes*
River otter	*Lutra canadensis*
Seminole bat	*Lasiurus seminolus*
Sherman's fox squirrel	*Sciurus niger shermani*
Short-tailed shrew	*Blarina carolinensis*
Southeastern bat	*Myotis austroriparius*
Southeastern pocket gopher	*Geomys pinetis*
Southern flying squirrel	*Glaucomys volans*
Spotted skunk	*Spilogale putorius*
Striped skunk	*Mephitis mephitis*
Virginia opossum	*Didelphis virginiana*
White-tailed deer	*Odocoileus virginianus*
Yellow bat	*Lasiurus intermedius*

Table 7. Birds Known or Expected to Occur on CWMA

Common name	Scientific name
American avocet	*Recurvirostra americana*
American bittern	*Botaurus lentiginosus*
American black duck	*Anas rubripes*
American coot	*Fulica americana*
American crow	*Corvus brachyrhynchos*
American goldfinch	*Carduelis tristis*
American oystercatcher	*Haematopus palliatus*
American pipit	*Anthus rubescens*
American redstart	*Setophaga ruticilla*
American robin	*Turdus migratorius*
American swallow-tailed kite	*Elanoides forficatus*
American white pelican	*Pelecanus erythrorhynchos*
American widgeon	*Anas americana*
Anhinga	*Anhinga anhinga*
Bachman's sparrow	*Aimophila aestivalis*
Baltimore oriole	*Icterus galbula*
Bank swallow	*Riparia riparia*
Barn owl	*Tyto alba*
Barn swallow	*Hirundo rustica*
Barred owl	*Strix varia*
Bay-breasted warbler	*Setophaga castanea*
Belted kingfisher	*Megaceryle alcyon*
Black skimmer	*Rynchops niger*
Black tern	*Chlidonias niger*
Black vulture	*Coragyps atratus*
Black-and-white warbler	*Mniotilta varia*
Blackburnian warbler	*Setophaga fusca*
Black-crowned night-heron	*Nycticorax nycticorax*
Black-necked stilt	*Himantopus mexicanus*
Blackpoll warbler	*Setophaga striata*
Black-throated blue warbler	*Setophaga caerulescens*
Black-throated green warbler	*Setophaga virens*
Black-whiskered vireo	*Vireo altiloquus*
Blue grosbeak	*Passerina caerulea*
Blue jay	*Cyanocitta cristata*
Blue-gray gnatcatcher	*Polioptila caerulea*

Table 7. Birds Known or Expected to Occur on CWMA

Common name	Scientific name
Blue-headed vireo	*Vireo solitarius*
Blue-winged teal	*Anas discors*
Boat-tailed grackle	*Quiscalus major*
Bobolink	*Dolichonyx oryzivorus*
Bonaparte's gull	*Chroicocephalus philadelphia*
Brewer's blackbird	*Euphagus cyanocephalus*
Broad-winged hawk	*Buteo platypterus*
Brown pelican	*Pelecanus occidentalis*
Brown thrasher	*Toxostoma rufum*
Brown-headed cowbird	*Molothrus ater*
Brown-headed nuthatch	*Sitta pusilla*
Burrowing owl	*Athene cunicularia*
Canada goose	*Branta canadensis*
Canvasback	*Aythya valisineria*
Cape May warbler	*Setophaga tigrina*
Carolina chickadee	*Poecile carolinensis*
Carolina wren	*Thryothorus ludovicianus*
Caspian tern	*Hydroprogne caspia*
Cattle egret	*Bubulcus ibis*
Cedar waxwing	*Bombycilla cedrorum*
Cerulean warbler	*Setophaga cerulea*
Chestnut-sided warbler	*Setophaga pensylvanica*
Chimney swift	*Chaetura pelagica*
Chipping sparrow	*Spizella passerina*
Chuck-will's-widow	*Caprimulgus carolinensis*
Clapper rail	*Rallus longirostris*
Cliff swallow	*Petrochelidon pyrrhonota*
Common grackle	*Quiscalus quiscula*
Common ground-dove	*Columbina passerina*
Common loon	*Gavia immer*
Common moorhen	*Gallinula chloropus*
Common nighthawk	*Chordeiles minor*
Common snipe	*Gallinago gallinago*
Common yellowthroat	*Geothlypis trichas*
Cooper's hawk	*Accipiter cooperii*
Dark-eyed junco	*Junco hyemalis*

Table 7. Birds Known or Expected to Occur on CWMA

Common name	Scientific name
Double-crested cormorant	*Phalacrocorax auritus*
Downy woodpecker	*Picoides pubescens*
Dunlin	*Calidris alpina*
Eared grebe	*Podiceps nigricollis*
Eastern bluebird	*Sialia sialis*
Eastern kingbird	*Tyrannus tyrannus*
Eastern meadowlark	*Sturnella magna*
Eastern phoebe	*Sayornis phoebe*
Eastern screech-owl	*Megascops asio*
Eastern towhee	*Pipilo erythrophthalmus*
Eastern whip-poor-will	*Antrostomus vociferus*
Eastern wood-pewee	*Contopus virens*
Field sparrow	*Spizella pusilla*
Fish crow	*Corvus ossifragus*
Florida mottled duck	*Anas fulvigula*
Florida sandhill crane	*Grus canadensis pratensis*
Florida scrub-jay	*Aphelocoma coerulescens*
Forster's tern	*Sterna forsteri*
Gadwall	*Anas strepera*
Glossy ibis	*Plegadis falcinellus*
Gray catbird	*Dumetella carolinensis*
Gray kingbird	*Tyrannus dominicensis*
Gray-cheeked thrush	*Catharus minimus*
Great blue heron	*Ardea herodias*
Great crested flycatcher	*Myiarchus crinitus*
Great egret	*Ardea alba*
Great horned owl	*Bubo virginianus*
Greater yellowlegs	*Tringa melanoleuca*
Green heron	*Butorides virescens*
Green-winged teal	*Anas crecca*
Gull-billed tern	*Gelochelidon nilotica*
Hairy woodpecker	*Picoides villosus*
Herring gull	*Larus argentatus*
Hooded merganser	*Lophodytes cucullatus*
Hooded warbler	*Setophaga citrina*
Horned grebe	*Podiceps auritus*

Table 7. Birds Known or Expected to Occur on CWMA

Common name	Scientific name
House sparrow	*Passer domesticus*
House wren	*Troglodytes aedon*
Indigo bunting	*Passerina cyanea*
Kentucky warbler	*Oporornis formosus*
Killdeer	*Charadrius vociferus*
King rail	*Rallus elegans*
Laughing gull	*Larus atricilla*
Least bittern	*Ixobrychus exilis*
Least sandpiper	*Calidris minutilla*
Least tern	*Sternula antillarum*
Lesser scaup	*Aythya affinis*
Lesser yellowlegs	*Tringa flavipes*
Limpkin	*Aramus guarauna*
Little blue heron	*Egretta caerulea*
Loggerhead shrike	*Lanius ludovicianus*
Long-billed dowitcher	*Limnodromus scolopaceus*
Louisiana waterthrush	*Seiurus motacilla*
Magnificent frigatebird	*Fregata magnificens*
Magnolia warbler	*Setophaga magnolia*
Mallard	*Anas platyrhynchos*
Marbled godwit	*Limosa fedoa*
Marsh wren	*Cistothorus palustris*
Merlin	*Falco columbarius*
Mourning dove	*Zenaida macroura*
Muscovy duck	*Cairina moschata*
Northern bobwhite	*Colinus virginianus*
Northern cardinal	*Cardinalis cardinalis*
Northern flicker	*Colaptes auratus*
Northern harrier	*Circus cyaneus*
Northern mockingbird	*Mimus polyglottos*
Northern parula	*Setophaga americana*
Northern pintail	*Anas acuta*
Northern rough-winged swallow	*Stelgidopteryx serripennis*
Northern shoveler	*Anas clypeata*
Northern waterthrush	*Parkesia noveboracensis*
Orange-crowned warbler	*Oreothlypis celata*

Table 7. Birds Known or Expected to Occur on CWMA

Common name	Scientific name
Orchard oriole	*Icterus spurius*
Osprey	*Pandion haliaetus*
Ovenbird	*Seiurus aurocapilla*
Painted bunting	*Passerina ciris*
Palm warbler	*Setophaga palmarum*
Pectoral sandpiper	*Calidris melanotos*
Peregrine falcon	*Falco peregrinus*
Pied-billed grebe	*Podilymbus podiceps*
Pileated woodpecker	*Dryocopus pileatus*
Pine siskin	*Spinus pinus*
Pine warbler	*Setophaga pinus*
Piping plover	*Charadrius melodus*
Prairie warbler	*Setophaga discolor*
Prothonotary warbler	*Protonotaria citrea*
Purple finch	*Carpodacus purpureus*
Purple gallinule	*Porphyrio martinicus*
Purple martin	*Progne subis*
Red knot	*Calidris canutus*
Red-bellied woodpecker	*Melanerpes carolinus*
Red-breasted merganser	*Mergus serrator*
Red-cockaded woodpecker	*Picoides borealis*
Reddish egret	*Egretta rufescens*
Red-eyed vireo	*Vireo olivaceus*
Redhead	*Aythya americana*
Red-headed woodpecker	*Melanerpes erythrocephalus*
Red-shouldered hawk	*Buteo lineatus*
Red-tailed hawk	*Buteo jamaicensis*
Red-winged blackbird	*Agelaius phoeniceus*
Ring-billed gull	*Larus delawarensis*
Ring-necked duck	*Aythya collaris*
Rock dove	*Columba livia*
Roseate spoonbill	*Platalea ajaja*
Rose-breasted grosbeak	*Pheucticus ludovicianus*
Royal tern	*Thalasseus maximus*
Ruby-crowned kinglet	*Regulus calendula*
Ruby-throated hummingbird	*Archilochus colubris*

Table 7. Birds Known or Expected to Occur on CWMA

Common name	Scientific name
Ruddy duck	*Oxyura jamaicensis*
Ruddy turnstone	*Arenaria interpres*
Rusty blackbird	*Euphagus carolinus*
Sanderling	*Calidris alba*
Sandhill crane	*Grus canadensis*
Sandwich tern	*Thalasseus sandvicensis*
Savannah sparrow	*Passerculus sandwichensis*
Scarlet tanager	*Piranga olivacea*
Scott's seaside sparrow	*Ammodramus maritimus peninsulae*
Semipalmated plover	*Charadrius semipalmatus*
Semipalmated sandpiper	*Calidris pusilla*
Sharp-shinned hawk	*Accipiter striatus*
Sharp-tailed sparrow	*Ammodramus caudacutus*
Short-billed dowitcher	*Limnodromus griseus*
Short-tailed hawk	*Buteo brachyurus*
Smooth-billed ani	*Crotophaga ani*
Snowy egret	*Egretta thula*
Snowy plover	*Charadrius nivosus*
Solitary sandpiper	*Tringa solitaria*
Song sparrow	*Melospiza melodia*
Sora	*Porzana carolina*
Southeastern American kestrel	*Falco sparverius paulus*
Southern bald eagle	*Haliaeetus leucocephalus*
Spotted sandpiper	*Actitis macularia*
Summer tanager	*Piranga rubra*
Swainson's thrush	*Catharus ustulatus*
Swamp sparrow	*Melospiza georgiana*
Tennessee warbler	*Vermivora peregrina*
Tree swallow	*Tachycineta bicolor*
Tricolored heron	*Egretta tricolor*
Tufted titmouse	*Baeolophus bicolor*
Turkey vulture	*Cathartes aura*
Upland sandpiper	*Bartramia longicauda*
Veery	*Catharus fuscescens*
Vesper sparrow	*Pooecetes gramineus*
Western kingbird	*Tyrannus verticalis*

Table 7. Birds Known or Expected to Occur on CWMA

Common name	Scientific name
Western sandpiper	*Calidris mauri*
Whimbrel	*Numenius phaeopus*
White ibis	*Eudocimus albus*
White-eyed vireo	*Vireo griseus*
White-throated sparrow	*Zonotrichia albicollis*
Whooping crane	*Grus americana*
Wild turkey	*Meleagris gallopavo*
Willet	*Tringa semipalmata*
Wilson's phalarope	*Phalaropus tricolor*
Wilson's plover	*Charadrius wilsonia*
Wood duck	*Aix sponsa*
Wood stork	*Mycteria americana*
Wood thrush	*Hylocichla mustelina*
Worm-eating warbler	*Helmitheros vermivorum*
Yellow warbler	*Setophaga petechia*
Yellow-bellied sapsucker	*Sphyrapicus varius*
Yellow-billed cuckoo	*Coccyzus americanus*
Yellow-breasted chat	*Icteria virens*
Yellow-crowned night-heron	*Nyctanassa violacea*
Yellow-rumped warbler	*Setophaga coronata*
Yellow-throated vireo	*Vireo flavifrons*
Yellow-throated warbler	*Setophaga dominica*

Table 8. Amphibians Known or Expected to Occur on CWMA

Common name	Scientific name
Barking treefrog *	*Hyla gratiosa*
Bullfrog *	*Lithobates catesbeianus*
Cope's gray treefrog *	*Hyla chrysoscelis*
Dwarf salamander *	*Eurycea quadridigitata*

Table 8. Amphibians Known or Expected to Occur on CWMA

Common name	Scientific name
Dwarf siren *	*Pseudobranchus striatus*
Eastern lesser siren *	*Siren intermedia intermedia*
Eastern narrowmouth toad *	*Gastrophryne carolinensis*
Eastern spadefoot toad *	*Scaphiopus holbrookii*
Florida cricket frog *	*Acris gryllus dorsalis*
Gopher frog *	*Lithobates capito*
Greater siren *	*Siren lacertina*
Green treefrog *	*Hyla cinerea*
Little grass frog *	*Pseudacris ocularis*
Narrow-striped dwarf siren	*Pseudobranchus axanthus axanthus*
Oak toad *	*Anaxyrus quercicus*
One-toed amphiuma *	*Amphiuma pholeter*
Ornate chorus frog	*Pseudacris ornata*
Peninsula newt *	*Notopthalmus viridescens piaropicola*
Pig frog *	*Lithobates grylio*
Pine woods treefrog *	*Hyla femoralis*
Slimy salamander	*Plethodon grobmani*
Southern chorus frog	*Pseudacris nigrita*
Southern dusky salamander	*Desmognathus auriculatus*
Southern leopard frog *	*Lithobates sphenocephalus*
Southern toad *	*Anaxyrus terrestris*
Squirrel treefrog *	*Hyla squirella*
Striped newt	*Notophthalmus perstriatus*
Two-toed amphiuma *	*Amphiuma means*

* Species captured during the drift fence survey on the CWMA conducted from July 1995 - June 1996.

Table 9. Reptiles Known or Expected to Occur on CWMA

Common name	Scientific name
American alligator	*Alligator mississippiensis*
Broadhead skink	*Eumeces laticeps*
Brown anole	*Anolis sagrei*
Brown water snake	*Nerodia taxispilota*
Central Florida crowned snake	*Tantilla relicta neilli*
Dusky pygmy rattlesnake	*Sistrurus miliarius barbouri*
Eastern coachwhip	*Masticophis flagellum flagellum*
Eastern coral snake	*Micrurus fulvius*
Eastern corn snake	*Pantherophis guttatus*
Eastern diamondback rattlesnake	*Crotalus adamanteus*
Eastern garter snake	*Thamnophis sirtalis sirtalis*
Eastern glass lizard	*Ophisaurus ventralis*
Eastern hognose snake	*Heterodon platyrhinos*
Eastern indigo snake	*Drymarchon corais couperi*
Eastern kingsnake	*Lampropeltis getula getula*
Eastern mud snake	*Farancia abacura abacura*
Eastern rat snake	*Pantherophis alleghaniensis*
Eastern slender glass lizard	*Ophisaurus attenuatus longicaudus*
Florida box turtle	*Terrapene carolina bauri*
Florida brown snake	*Storeria victa*
Florida chicken turtle	*Deirochelys reticularia chrysea*
Florida cottonmouth	*Agkistrodon piscivorus conanti*
Florida gopher tortoise	*Gopherus polyphemus*
Florida green water snake	*Nerodia floridana*
Florida kingsnake	*Lampropeltis getula floridana*
Florida mud turtle	*Kinosternon subrubrum steindachneri*
Florida pine snake	*Pituophis melanoleucus mugitus*
Florida redbelly turtle	*Pseudemys nelsoni*
Florida scarlet snake	*Cemophora coccinea coccinea*
Florida scrub lizard	*Sceloporus woodi*
Florida snapping turtle	*Chelydra serpentina osceola*
Florida softshell	*Apalone ferox*
Florida water snake	*Nerodia fasciata pictiventris*
Green anole	*Anolis carolinensis*
Ground skink	*Scincella lateralis*
Gulf Coast box turtle	*Terrapene carolina major*

Table 9. Reptiles Known or Expected to Occur on CWMA

Common name	Scientific name
Island glass lizard	*Ophisaurus compressus*
Loggerhead musk turtle	*Sternotherus minor minor*
Mangrove salt marsh snake	*Nerodia clarkii compressicauda*
North Florida swamp snake	*Seminatrix pygaea pygaea*
Northern rough green snake	*Opheodrys aestivus aestivus*
Ornate diamondback terrapin	*Malaclemys terrapin macrospilota*
Peninsula cooter	*Pseudemys peninsularis*
Peninsula crowned snake	*Tantilla relicta relicta*
Peninsula mole skink	*Eumeces egregius onocrepis*
Peninsula ribbon snake	*Thamnophis sauritus sackenii*
Pine woods snake	*Rhadinaea flavilata*
Rainbow snake	*Farancia erytrogramma erytrogramma*
River cooter	*Pseudemys concinna*
Scarlet kingsnake	*Lampropeltis elapsoides*
Short-tailed snake	*Stilosoma extenuatum*
Six-lined racerunner	*Cnemidophorus sexlineatus sexlineatus*
South Florida swamp snake	*Seminatrix pygaea cyclas*
Southeastern five-lined skink	*Eumeces inexpectatus*
Southern black racer	*Coluber constrictor priapus*
Southern fence lizard	*Sceloporus undulatus undulatus*
Southern hognose snake	*Heterodon simus*
Southern ringneck snake	*Diadophis punctatus punctatus*
Stinkpot	*Sternotherus odoratus*
Striped mud turtle	*Kinosternon baurii*
Striped swamp snake	*Regina alleni*
Worm lizard	*Rhineura floridana*

Table 10. Fish Known or Expected to Occur on CWMA

Common name	Scientific name
American eel	*Anguilla rostrata*
Atlantic needlefish	*Strongylura marina*
Bayou killifish	*Fundulus pulvereus*
Black crappie	*Pomoxis nigromaculatus*
Blackbanded sunfish	*Enneacanthus chaetodon*
Blue tilapia	*Oreochromis aureus*
Bluefin killifish	*Lucania goodei*
Bluegill	*Lepomis macrochirus*
Bluespotted sunfish	*Enneacanthus gloriosus*
Bowfin	*Amia calva*
Brook silverside	*Labidesthes sicculus*
Brown bullhead	*Ameiurus nebulosus*
Chain pickerel	*Esox niger*
Channel catfish	*Ictalurus punctatus*
Coastal shiner	*Notropis petersoni*
Dollar sunfish	*Lepomis marginatus*
Everglades pygmy sunfish	*Elassoma evergladei*
Flagfish	*Jordanella floridae*
Florida gar	*Lepisosteus platyrhincus*
Gizzard shad	*Dorosoma cepedianum*
Golden shiner	*Notemigonus crysoleucas*
Golden topminnow	*Fundulus chrysotus*
Goldfish	*Carassius auratus*
Hardhead catfish	*Ariopsis felis*
Hog choker	*Trinectes maculatus*
Ironcolor shiner	*Notropis chalybaeus*
Lake chubsucker	*Erimyzon sucetta*
Largemouth bass	*Micropterus salmoides*
Least killifish	*Heterandria formosa*
Lined topminnow	*Fundulus lineolatus*
Longnose gar	*Lepisosteus osseus*
Marsh killifish	*Fundulus confluentus*
Mosquitofish	*Gambusia affinis*
Okefenokee pygmy sunfish	*Elassoma okefenokee*
Pirate perch	*Aphredoderus sayanus*
Pugnose minnow	*Opsopoeodus emiliae*

Table 10. Fish Known or Expected to Occur on CWMA

Common name	Scientific name
Pygmy killifish	*Leptolucania ommata*
Redbreast sunfish	*Lepomis auritus*
Redear sunfish	*Lepomis microlophus*
Redeye chub	*Notropis harperi*
Redfin pickerel	*Esox americanus*
Sailfin molly	*Poecilia latipinna*
Sailfin shiner	*Pteronotropis hypselopterus*
Seminole killifish	*Fundulus seminolis*
Sheephead minnow	*Cyprinodon variegatus*
Spotted sunfish	*Lepomis punctatus*
Striped mullet	*Mugil cephalus*
Swamp darter	*Etheostoma fusiforme*
Tadpole madtom	*Noturus gyrinus*
Taillight shiner	*Notropis maculatus*
Threadfin shad	*Dorosoma petenense*
Tidewater silverside	*Menidia beryllina*
Warmouth	*Lepomis gulosus*
Yellow bullhead	*Ameiurus natalis*

Table 11. Imperiled Wildlife Species of CWMA

Common name	Scientific name	Status
American alligator	*Alligator mississippiensis*	FT(S/A)
Eastern indigo snake	*Drymarchon corais*	FT
Florida mouse	*Podomys floridanus*	SSC
Florida pine snake	*Pituophis melanoleucus*	SSC
Florida sandhill crane	*Grus canadensis pratensis*	ST
Florida scrub-jay	*Aphelocoma coerulescens*	FT
Gopher frog	*Rana capito*	SSC
Gopher tortoise	*Gopherus polyphemus*	ST

Table 11. Imperiled Wildlife Species of CWMA

Common name	Scientific name	Status
Little blue heron	*Egretta caerulea*	SSC
Roseate spoonbill	*Platalea ajaja*	SSC
Sherman's fox squirrel	*Sciurus niger shermani*	SSC
Snowy egret	*Egretta thula*	SSC
Southeastern American kestrel	*Falco sparverius paulus*	ST
Tricolored heron	*Egretta tricolor*	SSC
White ibis	*Eudocimus albus*	SSC
Wood stork	*Mycteria americana*	FE

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).

Table 12. Non-native Wildlife Species of CWMA

Coyote*	*Canis latrans*
European starling	*Sturnus vulgaris*
Giant toad	*Rhinella marina*
Greenhouse frog	*Eleutherodactylus planirostris*
House mouse	*Mus musculus*
Mediterranean gecko	*Hemidactylus turcicus*
Nine-banded armadillo*	*Dasypus novemcinctus*
Nutria	*Myocaster coypus*
Rio Grande cichlid*	*Herichthys cyanoguttatum*
Wild hog	*Sus scrofa*

* Native to North America

2.3.1 Integrated Wildlife Habitat Ranking System

The FWC has developed the Integrated Wildlife Habitat Ranking System (IWHRS) as a GIS-based assessment tool that incorporates a wide variety of land cover and wildlife species data. The IWHRS evaluates the Florida landscape based upon the habitat needs of wildlife as a way to identify ecologically significant lands in the state, and to assess the potential impacts of management and land-use changes. The IWHRS was developed to provide technical assistance to various local, regional, state, and federal agencies, and entities interested in wildlife needs and conservation in order to: (1) determine ways to avoid or minimize project impacts by evaluating alternative placements, alignments, and transportation corridors during early planning stages, (2) assess direct, secondary, and cumulative impacts to habitat and wildlife resources, and (3) identify appropriate parcels for public land acquisition for wetland and upland habitat mitigation purposes. The 2009 IWHRS indicates that CWMA has a high mean wildlife value of 7.7 (Figure 7).

2.3.2 FWC Wildlife Observations and FNAI Element Occurrences

Geographic information system data maintained by FWC (Wildlife Observations) and FNAI (Element Occurrences; data usage agreement Appendix 13.6) indicate that CWMA has numerous documented occurrences of wildlife and a diverse assemblage of animal species (Figure 8).

2.3.3 Imperiled Species

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

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

2.3.4 Florida black bear

Due to the improving condition of the statewide population, the Florida black bear was removed from Florida's Endangered and Threatened Species List on August 23, 2012 after

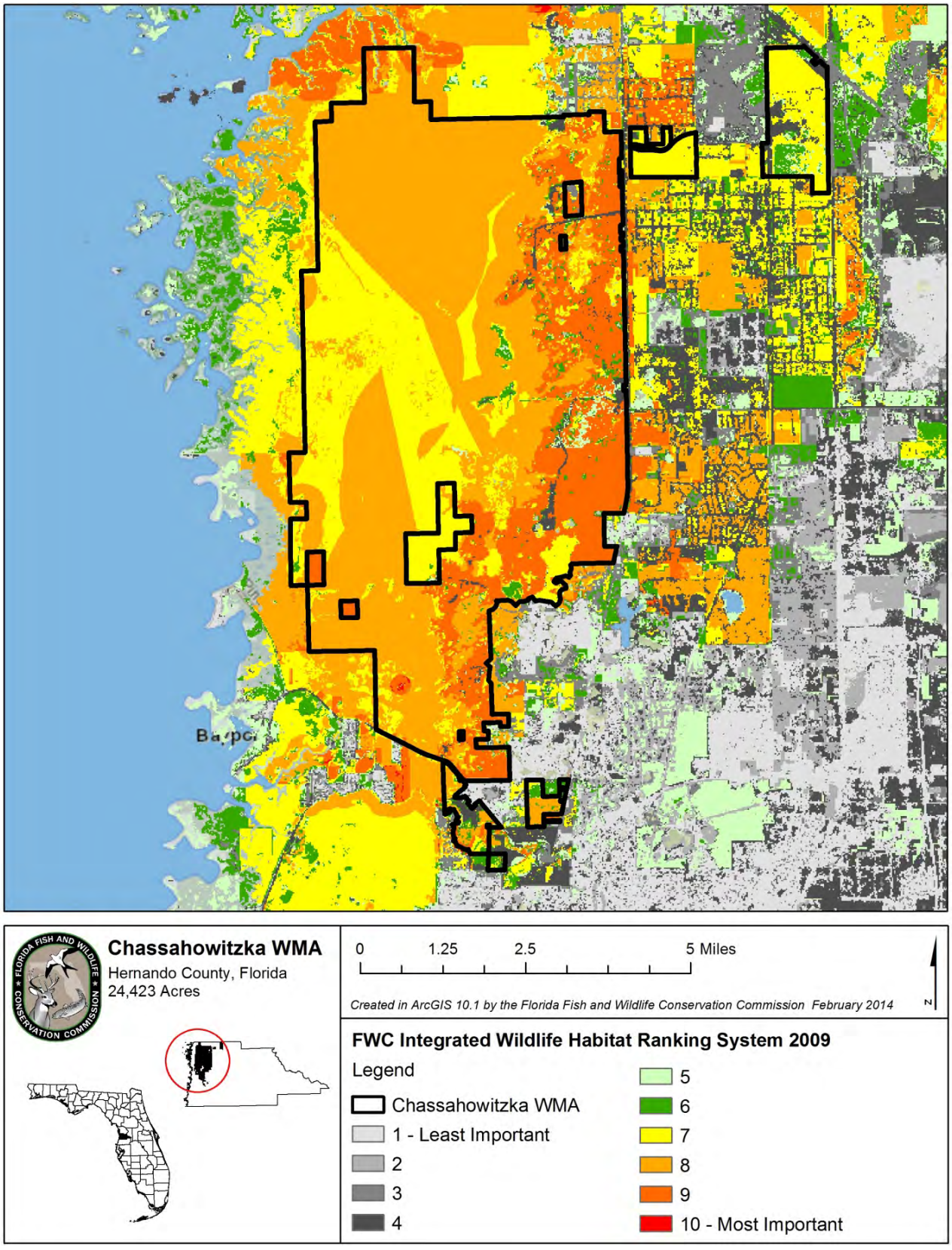


Figure 7. FWC Integrated Wildlife Habitat Ranking System 2009

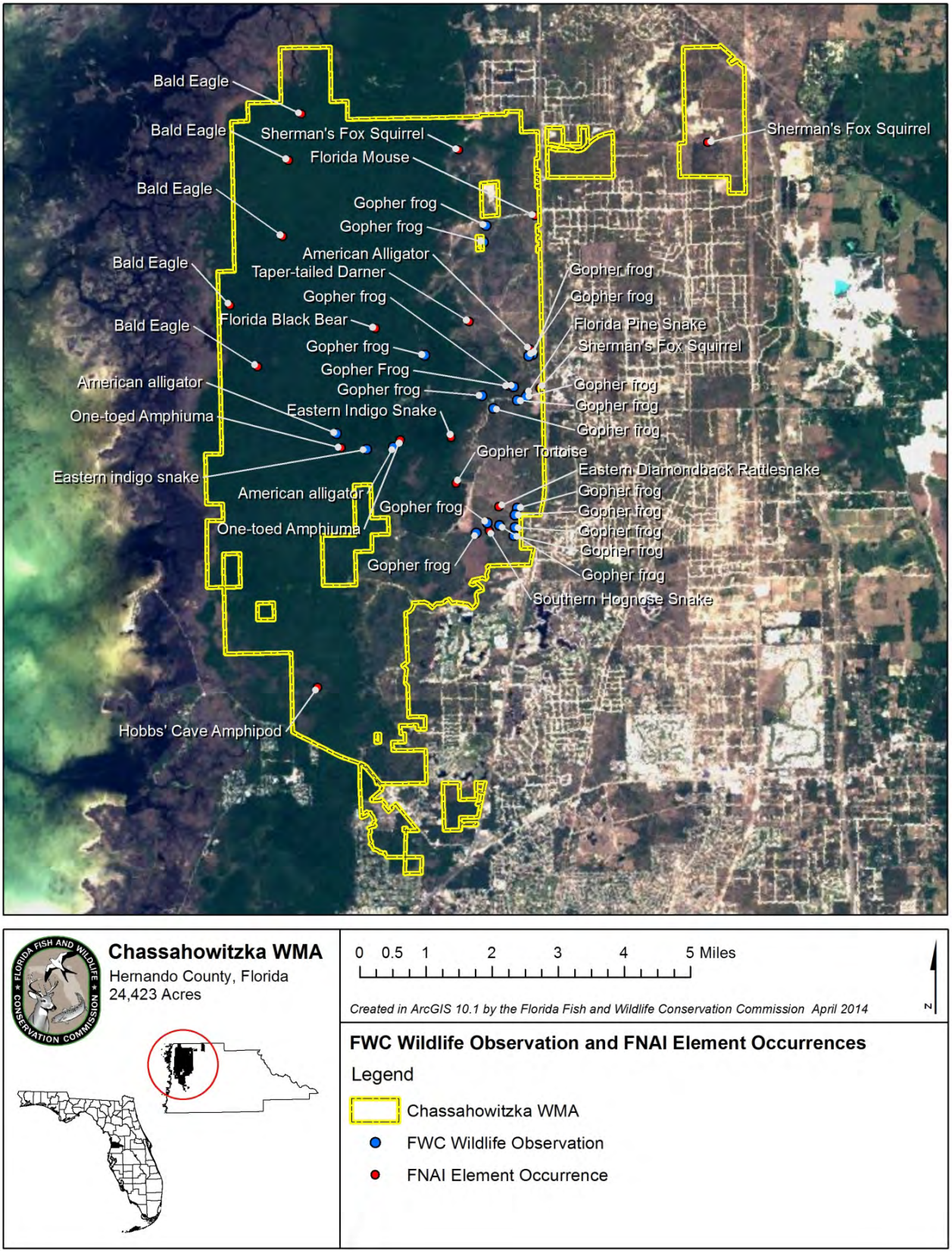


Figure 8. FWC Wildlife Observations and FNAI Element Occurrences

approval by FWC's Commissioners at the June 2012, Commission meeting. A Florida Black Bear Management Plan[5] was also approved at this meeting.

Florida black bears found on CWMA are part of the Chassahowitzka subpopulation of the species. As a result of the development pattern in west-central Florida, this subpopulation is functionally restricted to lands west of U.S. 19 from Aripeka Sandhills Preserve to Homosassa Tract of the Withlacoochee State Forest. The subpopulation is located in the southern portion of FWC's Big Bend Bear Management Unit (BMU).

Although no statistically rigorous estimate of abundance exists, it is considered the smallest subpopulation in Florida, likely consisting of about 20 individuals. An FWC hair sampling study of the Chassahowitzka subpopulation conducted in 2012 identified 11 individuals. Due to the subpopulation's small number of individuals, statistically meaningful estimates of abundance using standard mark-recapture models are not possible. The FWC's 2012 hair sampling study also found the estimated the occupied range of this subpopulation to be approximately 157.7 square miles (408.5 km^2) and includes CWMA and portions of CNWR.

2.4 Native Landscapes and Scenic Resources

The most predominant native landscapes and scenic resources within the CWMA are the area's vast expanse of coastal hardwood swamp forest, springs, sinks, streams and sandhill longleaf pine forests. Other native landscapes include mesic flatwoods, basin swamp, basin marsh, scrub, mesic hammock, dome swamp, depression marsh, xeric hammock, wet flatwoods, salt marsh, scrubby flatwoods, spring-run stream, tidal creek, wet prairie, and bottomland forest. In addition, geological karst formations, including several areas classified by FNAI as sinkhole lakes, occur on CWMA. The most-popular of these is the Eagle Nest Sink, which receives high levels of visitation for wildlife viewing and aquatic cave diving. Complete descriptions of the natural communities found on CWMA may be found in **Section 2.2.1** of this Management Plan.

2.5 Water Resources

The CWMA lies within four drainage basins (Figure 9). The primary drainage basin is a Direct Runoff to Gulf (Class 3M waters, estuary). Other basins include the Chassahowitzka River (Class 2 waters, estuary), Mud River – Salt Creek (Class 3M waters, estuary), Weeki Wachee Spring Run (Class 3F waters, stream). Perhaps the most interesting hydrological features of CWMA are the large number of springs found within the swamp. The CWMA is not within or adjacent to an aquatic preserve.

The CWMA overlies both the Floridan aquifer and a small surficial aquifer. The Floridan aquifer is the primary source of water for domestic, agricultural, and industrial use in

Figure 9. Water Resources

Hernando County. The aquifer is comprised of the middle and upper Avon Park and the Ocala and Suwannee Limestones. The lower part of the Avon Park contains anhydrite and gypsum, which renders the water non-potable and the rock less permeable, and marks the base of the aquifer. The aquifer is less than 700 feet thick near the coast, where the top of the aquifer is at land surface, and more than 800 feet thick in the Brooksville Ridge area, where the top of the aquifer may be as deep as 100 feet below sea level. The Floridan aquifer is unconfined in most parts of the county, but in some areas of rather limited extent the aquifer is confined by overlying clay beds.

The Floridan aquifer ranges from an elevation of approximately 80 feet above mean sea level near the eastern edge of Hernando County to less than 10 feet above mean sea level along the coast. Groundwater flow in the Floridan aquifer is generally to the west-northwest across most of the county. At a few locations in the county, there is a surficial or perched aquifer in the sands above the Floridan aquifer (especially the Brooksville Ridge area), where the sands are separated from the underlying limestone by beds of low permeability clay. In most places, the surficial aquifer only contains water during the rainy seasons, and water levels fluctuate rapidly.

There is a series of shallow wells in the southwest part of the county that are used to monitor the surficial aquifer; they generally contain water year round and yield significant quantities of water, but in this area there is no clay separating the sands from the limestones, and the surficial aquifer is thought to be hydraulically connected with the underlying Floridan aquifer. Water flow in the surficial aquifer, at least where it is not directly connected hydraulically to the Floridan aquifer, generally follows the slope of the land; movement is from topographically high to topographically low areas. Site-specific features such as ponds and ditches may exert an influence on flow during periods of recharge and discharge. During extreme rainfall events the aquifer may be recharged by the surface water bodies, and during dry seasons the water table may discharge to the surface water bodies.

Field observations indicate that small springs are numerous on CWMA. The locations of all springs have not yet been determined. In cooperation with the Florida Springs Initiative, springs on CWMA will be located, mapped and managed to protect the water resources. The first magnitude spring at Weeki Wachee is located just off CWMA to the south. Blind Creek, located in the middle of the area, is spring-fed and traverses the swamp for several miles before receding through a sinkhole. Ryle Creek, located at the north end of CWMA, also receives spring waters. The spring that heads the Chassahowitzka River, off the property to the north, is also a first magnitude spring. Most or all of the springs on CWMA, according to the Springs Initiative, are part of the Chassahowitzka Springs Group.

As established by Rule 62-302.400 (Classification of Surface Waters, Usage, Reclassification, Classified Waters) and Rule 62-302.700 (Special Protection, Outstanding Florida Waters, Outstanding National Resource Waters) of the Florida Administrative Code (FAC) (FDEP), the waters of the state-owned portion of CWMA along with the waters of the adjoining CNWR are classified as Outstanding Florida Waters (OFW). Waters and the attendant aquatic and upland resources are managed consistent with the provisions of the DEP OFW program.

As defined in Rule 62-302.700, Outstanding Florida Waters shall mean waters designated by the Environmental Regulation Commission as worthy of special protection because of their natural attributes. These attributes often include estuary water quality protection. Hernando County is known to contain estuaries that by regulatory definition are pristine in nature. Estuaries play an essential role in the life cycles of many fish and invertebrates. These fish and invertebrates also represent important commercial and recreational resources. Efforts are made to protect the water quality and habitat values of these systems. Such efforts include protection of the estuary and those areas contributing freshwater to the system.

The CWMA is important to the adjacent coastal estuary. It supplies a source of fresh water, and serves as a reservoir for release of fresh water into the estuary. Additionally, it filters and cleans outgoing water, resulting in high water quality within the estuary. In essence, the swamp collects, stores, filters and slowly releases the water resource into the estuary and aquifer.

2.6 Beaches and Dunes

There are no beaches or dunes located on CWMA.

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. The DHR lists 27 cultural and historic sites in their Florida Master Site File for CWMA (Appendix 13.7). For more information on the previous uses of CWMA please see **Section 3.1** below.

One significant cultural site that may have a potential for visitor interpretation is the abandoned town of Centralia. From 1910 - 1922, the Tidewater Cypress lumber company operated a mill at Centralia, a town of 1,500 laborers and their families. The laborers were a conglomerate of ethnic groups, and included Greeks, Irish, and Germans. The town had a well-stocked commissary, school, restaurant and even a theater, doctor, and dentist. The mill, at the time one of the largest in the state, could produce 100,000 board feet of lumber each day during peak periods. By 1938 the railroad had ceased operation, and the town of Centralia was deserted.

3 Uses of the Property

3.1 Previous Use and Development

Thousands of years before Europeans arrived, Native Americans hunted, fished, and gathered wild plants along Florida's Gulf coast. Evidence of several Native American campsites has been found within CWMA on the same high and dry ground used as camps by 20th century hunters. The swamp itself was doubtless as inhospitable a habitation site for Native Americans as it is for modern Floridians. Within CWMA is Indian Bend, a Weeden Island (A.D. 300- A.D. 1300) burial mound excavated at the turn of the century by C.B. Moore. Indian Bend yielded primary and secondary burials as well as check-stamped pottery.

Consequently, 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.

In 1528, the Panfilo de Narvarez expedition travelled north from Tampa Bay several miles inland from the coast, perhaps along the sand ridge bordering the eastern edge of the Chassahowitzka swamp. Although no encampments or other sites have been found, the Seminole Indians were known to have been in the area during the Second Seminole War (1835-1842). They gave the region the name Chassahowitzka, meaning "pumpkin hanging place." The pumpkin referred to was a small climbing variety that is now rare and perhaps even extinct.

Along with more advanced agricultural practices, the Spanish and other settlers brought livestock, primarily cattle and hogs, as well as horses to Florida. This began an era of broad use of the landscape for agriculture. Rangeland cattle grazing and other agricultural practices began to be utilized in a more systematic way and occurred throughout much of the central Florida peninsula through most of the European settlement era from the 16th through the 20th centuries. Use of these agricultural practices began an era of increased alteration of the natural landscape. However, it wasn't until the 19th and 20th centuries that major settlement and more extensive alteration of the landscape in the area began with the widespread use of agriculture and associated development.

In the early 1900's virgin bald cypress was harvested in the swamp. Southern red cedar was logged after the marketable cypress was removed to make pencils and cigar boxes. A vast tram system was constructed for mules to haul timber from the swamp to a railroad in

Homosassa. Many of the trams still remain and today are used by hunters, bikers, hikers, birders, and nature photographers.

3.2 Current Use of the Property

The CWMA is managed by FWC as a Wildlife Management Area in conformance with the original purposes for acquisition noted above in order to ensure the preservation of fish and wildlife resources and for fish and wildlife based public outdoor recreation. The FWC, as lead manager of the area, will manage the CWMA in accordance with the FWC's statutory and administrative authority to conserve fish and wildlife. Management goals for CWMA will also emphasize conservation of fish and wildlife resources in accordance with the original purposes of acquisition under the CARL program and under the general guidance of the Florida Constitution, Florida Statutes including Chapters 253, 259 and 372 (among others) and associated FAC Rules, the Conceptual State Lands Management Plan, and the FWC Strategic Plan. Strategies on CWMA are designed to perpetuate the natural communities of the swamp and uplands, and its associated wildlife. It is the intent of FWC to continue to work cooperatively with USFWS, SWFWMD, DEP and others to provide adequate protection for the springs, spring traces and other resources comprising this unique and valuable hydrological resource complex.

Management activities are designed to facilitate the conservation and restoration of imperiled species, protection and perpetuation of common native flora and fauna, and protection of water quality and natural hydrology. To accomplish this, a wide range of operational and resource management actions are conducted on CWMA each year. These include prescribed burning, wildlife habitat restoration and improvement, invasive exotic species maintenance and control, imperiled species management, monitoring and protection, facilities and infrastructure repair and maintenance, road maintenance, conservation acquisition and stewardship partnership activities, archeological and historic resources monitoring and protection, as well as research, visitor interpretation and environmental education.

Resource management strategies developed by FWC to manage the multiple-uses allowed on CWMA address concerns related to wildlife, fisheries and forest management. Provisions for select recreational opportunities are compatible with the original purposes for acquiring CWMA. Current and anticipated uses of the property are diverse. Hunting continues to be a popular recreational activity on CWMA. Due to the diversity of vegetation, CWMA also offers excellent opportunities for wildlife viewing, especially for wading birds and Sherman's fox squirrel, with the added possibility of viewing the secretive Florida black bear. Other fish and wildlife based public outdoor recreational uses include fishing, hiking, picnicking, photography, bicycling, driving-tour sightseeing, aquatic cave diving, and horseback riding.

Due to the proximity of population centers in Hernando County, public use can be expected to increase as public awareness of opportunities increases. The FWC administers public hunting in the fall, winter and spring seasons for various game species including small game, deer, turkey, and feral hogs. These activities account for slightly more than half of the user-days.

3.2.1 Visitation and Economic Benefits

Visitation and public use of the area for fish and wildlife based public outdoor recreational opportunities is the primary source of economic benefits from CWMA, and contribute to the overall economy for the southwest region of Florida. In Fiscal Year 2012 -2013, an estimated 25,986 people visited CWMA. Primarily, as a result of this visitation and use of the area, FWC economic analysis estimates indicate that the CWMA generated an estimated annual economic impact of $5,077,405 for the State and the southwest Florida region. This estimated annual economic impact has aided in the support or creation of an estimated 52 jobs*

Further revenue generating potential of the CWMA will depend upon future uses described in this Management Plan. Additional revenue from environmental lands such as the CWMA 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 value of ecosystem services, including the protection of air and water quality functions, are considered to be significant to local and regional land and water resources, as well as human health.

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

3.3 Single- or Multiple-use Management

The CWMA will be managed under the multiple-use concept as a Wildlife Management Area. This concept 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 CWMA 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 CWMA. 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 13.8). 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:

	Approved	**Conditional**	**Rejected**
Apiaries		✓	
Amateur astronomy		✓	
Bicycling		✓	
Cattle grazing			✓
Citrus or other agriculture			✓
Ecosystem services and maintenance	✓		
Ecotourism		✓	
Environmental Education	✓		
First-responder training		✓	
Fishing		✓	
Geocaching		✓	
Hiking		✓	
Horseback riding		✓	
Hunting		✓	
Linear facilities			✓
Military training		✓	
Preservation of cultural sites	✓		
Primitive camping		✓	
Protection of imperiled species	✓		
Off-road vehicle use			✓
Shooting sports park		✓	
Soil and water conservation	✓		
Timber harvest	✓		
Wildlife viewing	✓		

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 and with associated objectives, identified challenges, and solution strategies have been developed for CWMA (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 CWMA by FWC, as well as an analysis performed in 2013 by DEP-DSL as part of a comprehensive evaluation of all state-owned conservation lands, has determined that all portions of the area are being managed and operated for the original purposes of acquisition, and remain integral to the continued conservation of important fish and wildlife resources, and continue to provide good fish and wildlife resource based public outdoor recreational opportunities. Therefore, no portion of the CWMA should be considered or declared surplus.

4 Accomplished Objectives from the 2002 - 2012 CWMA Management Plan

This section is exclusively dedicated to reporting the extent to which the Objectives described in the CWMA Management Plan 2002 - 2012 (pages 23 - 26) were successfully completed. Accomplishments for CWMA during the previous planning timeframe are further discussed in more comprehensive detail throughout **Section 5** of this Management Plan.

The following **Resource Management Goals and Objectives** from the 2002 – 2012 CWMA Management Plan describe the planned activities for CWMA during this period. The degree to which FWC was able to accomplish the planned activities during this period is reflected as **Percent Accomplished** for each associated Objective.

Table 13. Objectives Accomplished from the CWMA Management Plan 2002 - 2012

	Percent Accomplished
Goal 1: Manage and restore plant and animal communities to optimize the abundance, diversity and distribution of native species.	
Objective 1: By 2001, implement the removal or thinning of off-site slash pine in accordance with the forest management plan developed in cooperation with DOF.	100%
Objective 2: Develop quantifiable vegetative management objectives by 2003.	100%
Objective 3: Complete the current contracted vegetative inventory by 2004.	100%
Objective 4: By 2006, complete an evaluation of plant community conditions relative to the vegetative management objectives.	100%
Objective 5: Complete a small mammal survey by 2006.	100%
Objective 6: Continue to implement the existing fire management plan (ongoing).	100%
Objective 7: In cooperation with DOF, implement Best Management Practices for southern pine beetle infestations (ongoing).	100%
Objective 8: Annually, treat all acres (currently approximately ten) containing exotic plant species, (e.g., skunkvine, cogongrass, and air potato) (ongoing).	100%
Objective 9: Annually plant food plots on at least 10 acres of firelines, and maintain 30 acres of other wildlife openings previously established on disturbed sites (ongoing).	100%
Goal 2: Ensure that management practices provide habitat protection for listed species.	
Objective 1: To improve habitats for listed species occurring on the CWMA, evaluate habitat usage of these species by 2006.	100%

Table 13. Objectives Accomplished from the CWMA Management Plan 2002 - 2012

	Percent Accomplished
Objective 2: Complete a red-cockaded woodpecker survey by 2006.	100%
Objective 3: Implement management activities, to include specific burning, mechanical and chemical treatments, to achieve vegetative management objectives for wildlife by 2006.	100%
Objective 4: Continue to protect the integrity of the hardwood swamp to ensure the long-term welfare of the black bear population and associated plant and animal species (ongoing).	100%
Goal 3: Establish compatible uses consistent with perpetuation of natural communities.	
Objective 1: By 2001, propose regulations necessary to eliminate nighttime public use south of County Road 550.	100%
Objective 2: By 2001, propose regulations necessary to prohibit alcohol consumption south of County Road 550.	100%
Objective 3: By 2003, submit a proposal to modify regulations to reduce conflict between small and big game hunters.	100%
Objective 4: By 2005, establish a Citizen Support Organization to assist with activities being developed by the Nature-based Recreation Program. *Comment: the Brooksville Ridge Volunteer Program was created and continues to assist in management support of CWMA.*	100%
Objective 5: In cooperation with the Department of State, Division of Historical Resources, contract with the local Boy Scouts to survey cultural sites by 2002 (This responds to the Management Review Team's first recommendation). *Comment: It was determined in cooperation with DHR that a survey was not necessary. FWC will continue to coordinate with DHR to determine and future survey needs.*	0%
Objective 6: In cooperation with DEP, develop or adopt spring management guidelines by 2003.	100%

Table 13. Objectives Accomplished from the CWMA Management Plan 2002 - 2012

	Percent Accomplished
Objective 7: By 2006, provide wildlife viewing opportunities and multi-use trails as specified in the Nature-based Recreation Plan.	100%
Objective 8: Continue to offer an appropriate mix of hunting opportunities including archery, muzzleloading gun, general gun and small game hunting seasons (ongoing).	100%
Goal 4: Physically delineate selected boundaries to facilitate natural resource management and public use administration.	
Objective 1: In cooperation with DSL, SWFWMD, or other state agencies, contract for selected line surveys by 2001	100%
Objective 2: Complete and maintain boundary firebreaks throughout uplands by 2002.	100%
Objective 3: Complete fencing of appropriate boundaries by 2005.	100%
Objective 4: Post and maintain boundaries for enforcement considerations (ongoing).	100%
Goal 5: Facilitate and conduct scientific research and monitoring to optimally manage and protect native plant and animal communities of the area.	
Objective 1: Continue to monitor photo-plots in scrub, sandhill, flatwoods, and wetland communities (ongoing).	100%
Objective 2: Annually sample vegetative treatment plots within scrub habitat (ongoing).	100%
Objective 3: Continue to monitor mammalian and avian populations by conducting annual surveys (ongoing).	100%
Goal 6: Manage and protect cultural resources of the CWMA.	

Table 13. Objectives Accomplished from the CWMA Management Plan 2002 - 2012

	Percent Accomplished
Objective 1: In cooperation with the Department of State, Division of Historical Resources, contract with the local Boy Scouts to survey cultural sites by 2002 (This responds to the Management Review Team's first recommendation). *Comment:* i*t was determined in cooperation with DHR that a survey was not necessary. FWC will continue to coordinate with DHR to determine any future survey needs.*	0%
Objective2: Continue to identify, monitor and protect cultural resources (ongoing) (This responds to the Management Review Team's first recommendation.	100%
Goal 7: Assure an optimum boundary by continuing to identify and pursue acquisition needs, and establish lands into the WMA.	
Objective 1: By 2001, nominate nine parcels for addition to the FWC Inholdings and Additions Program.	100%
Goal 8: Manage and protect hydrological resources	
Objective 1: By 2001, contact the Florida Springs Initiative to document WMA spring trace locations and necessary protection measures. *FWC has completed a comprehensive hydrological assessment that included spring trace analysis.*	100%
Objective 2: By 2003, install erosion control structures as recommended by engineering survey.	100%
Goal 9: Obtain adequate staffing and funding to promote environmental education and wildlife appreciation through interpretive facilities and materials.	
Objective 1: By 2001, request a position for a recreation specialist (OPS, leading to FTE) to coordinate nature based recreation in the northwest portion of the region, to include CWMA. *Comment: reorganization of FWC established an Office of Public Access and Wildlife Viewing Services, recreation specialists are assigned on a statewide basis to address this need.*	100%

Table 13. Objectives Accomplished from the CWMA Management Plan 2002 - 2012

	Percent Accomplished
Objective 2: By 2002, complete Phase I of the FWC Nature-based Recreation Plan.	100%
Objective 3: By 2006, complete Phase II of the Nature-based Recreational Plan.	100%
Goal 10: Provide adequate infrastructure on the CWMA to manage resources and provide public use programs.	
Objective 1: By 2002, complete construction of an office and shop located on the Seville tract.	100%
Objective 2: By 2003, complete the movement of all equipment and facilities to the new shop and office from current off-site location.	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 CWMA is to restore and maintain natural communities in a condition that sustains ecological processes and conserves biological diversity, especially fish and wildlife resources. In conjunction with this primary emphasis, it is FWC's intent to provide quality fish and wildlife resource based public outdoor recreational opportunities on CWMA. The FWC will utilize the best available data, guidelines, natural resource management practices, and recreational management practices to achieve these outcomes in accordance with the original purposes for acquisition. Furthermore, as noted earlier, the management activities described in this section are in compliance with those of the Conceptual State Lands Management Plan.

5.1 Land Management Review

The 2010 Land Management Review of CWMA (Appendix 13.4) 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, 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, adaptive management can involve applying a conservation action at a site, observing the results and adjusting the action in the future if warranted.[2, 3]

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

5.2.1 Monitoring

A well-developed monitoring protocol is also one of the principal, required criteria for the management of CWMA. Monitoring and performance measures are important, but often overlooked elements of conservation planning. Monitoring provides the critical link between implementing conservation actions and revising management goals.
Monitoring is the systematic, repeated measurement of environmental characteristics to detect changes, and particularly trends, in those characteristics. Monitoring provides essential feedback, the data needed to understand the costs, benefits, and effectiveness of planned conservation actions and the management projects undertaken to address them.[2]

For natural communities, monitoring protocols are established through FWC's Objective-Based Vegetation Management (OBVM, Section 5.3.1) program, which monitors how specific vegetative attributes are responding to FWC management. For imperiled and focal fish and wildlife species, monitoring protocols are established through FWC's Wildlife Conservation Prioritization and Recovery (WCPR, Section 5.4.2) program. FWC staff may monitor additional fish and wildlife species when deemed appropriate. Exotic and invasive plant and animal species (Section 5.8) 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 5.11) are monitored with guidance from the DHR.

5.2.2 Performance Measures

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

5.2.3 Implementation

The CWMA 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 CWMA, 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

Prior to 2014, FWC initiated extensive habitat restoration efforts on CWMA. These include altered sites of former mesic flatwoods, sandhill, scrub, scrubby flatwoods, and wet flatwoods communities (Figure 6). To date, restoration activities have consisted of removal of invasive hardwoods, removal of offsite pine species, timber thinning, ground cover restoration, longleaf pine reforestation plantings, and the reintroduction of prescribed fire. Upon successful restoration of these altered areas, they will be monitored and maintained.

Restoration activities have primarily focused on off-site slash pine plantations, off-site sand pine plantations, and fire-suppressed overgrown sandhill. Thinning of slash pine and clear-cutting sand pine was conducted on approximately 1,735 acres between 2006 and 2013. Approximately 900 of these acres were off site pine plantations. Planting longleaf seedlings began in these areas in 2011. Approximately 242 acres were machine planted with bare-root longleaf seedlings; of these, 158 acres were thinned slash pine plantations and 84 acres were planted as a replacement for trees lost to wildfire. Another 80 acres of longleaf

restoration is being conducted in 2014. These containerized trees are being planted on former sand pine plantation.

Various mechanical and chemical treatments have been used to control encroaching oak trees in fire-suppressed sandhills. Shredding, chainsaw hand crews, and oak harvests have all been implemented between 2006 and 2014. In some cases stumps are herbicided to prevent re-sprouting. Careful attention is paid to leave enough multi-aged oaks of different species to provide food and cover for wildlife. To date, most areas of overgrown sandhill have been identified and treated.

Prescribed fire continues to be a valuable tool for restoring and maintaining various natural communities on CWMA. In some areas, fire alone can be used to restore overgrown sandhill if succession has not been allowed to progress for too long. Much of the area was severely fire suppressed upon acquisition. Fire suppression and urban interface present many challenges to the reintroduction and continuation of a prescribed burn program. Despite these challenges, fire has been reintroduced into much of the area since acquisition. Once fire is reintroduced, management units are scheduled on an appropriate rotation.

On CWMA, FWC will continue to 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 habitat management techniques as appropriate. Retention of the native old growth component of forests, while also providing for natural regeneration, remains an important consideration.

As detailed above, the CWMA has high-quality natural communities including hydric hammock (57%), sandhill (15%), mesic flatwoods (7%), basin swamp (5%) and basin marsh (2%). Less represented natural communities include baygall, bottomland forest, depression marsh, dome swamp, mesic hammock, salt marsh, scrubby flatwoods, sinkhole, spring run stream, tidal creek, wet flatwoods, wet prairie and xeric hammock. The FWC will continue to manage and protect these natural communities.

Described earlier, the FNAI has conducted surveys and mapped the current vegetative communities and portions of the historic vegetation communities of CWMA. This information will be used to guide and prioritize management and restoration efforts on the area. On disturbed upland sites, FWC intends to initiate ground cover and natural community restoration as appropriate and feasible.

5.3.1 Objective-Based Vegetation Management

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

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

After natural communities have been mapped, management units are delineated. Delineating management units takes into account the distribution and extent of the current and/or historic mapped natural communities, existing and proposed infrastructure, and other management considerations. FWC land managers then identify the predominant current or historic natural community within each management unit that guides the type and frequency of management activities that should be applied.

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

Vegetation monitoring samples the selected attributes, and the results are compared to the established desired future conditions. All monitoring performed under OBVM is completed using the program's Standard Operating Procedures. Initial mapping and vegetation sampling provides FWC staff with baseline data indicating natural community structure, distribution, and condition on the area. Comparing the subsequent monitoring results to desired future conditions, provides key operational information on a natural community's vegetation structural status at a given point in time and trend over time. Using this information, managers can evaluate, adjust and modify their management practices to meet the stated objectives. By comparing natural community mapping products through

the years, managers can track progress in moving altered communities to functioning natural communities.

5.3.2 Prescribed Fire and Fire Management

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

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

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

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

Single drum (with standard, not offset blades), one-pass roller chopping and shredding can be valuable management tools, enabling the use of prescribed fires in areas heavily invaded by dense woody vegetation. However, roller chopping may damage the herbaceous ground cover, especially wiregrass. Therefore, its application will be limited to situations where burning can only be accomplished by first reducing woody vegetation by mechanical means.

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, such as denning Florida black bears. 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 rotating fire return interval that averages 2 - 5 years in sandhill communities. An emphasis will be placed on burning during the spring and early summer months.

To promote suitable Florida black bear habitat, a fire return interval of 5 - 10 years will be maintained on approximately 50% (967 acres) of the mesic flatwoods, the remaining approximately 50% being maintained on a 2 - 5 year target fire return interval. To the extent possible, these two diverse fire return intervals within the mesic flatwoods will be periodically rotated throughout the overall mesic flatwoods natural community of CWMA. This strategy will promote forage, escape cover, and suitable den sites for Florida black bears. However, these fire return intervals may be adjusted as guided by OBVM and the completion of the CWMA Black Bear Habitat Management Plan being developed and implemented as part of the overall WCPR Strategy for the area.

In addition to the general prescribed fire management guidelines described above, an area-specific Prescribed Fire Plan (Appendix 13.9) has been developed and implemented for CWMA. This plan includes, but not be limited to, delineation of burn management units, detailed descriptions of prescribed fire methodology, safety and smoke management guidelines.

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

5.4.1 Fish and Wildlife

Prior to 2014, wildlife management on CWMA has been initiated for various wildlife species, including southeastern American kestrel, bats, bluebirds, and gopher frog. Nest boxes for kestrels were installed in 2008 and again 2011. Four of the seven boxes have been documented as being used by nesting kestrels since installation. Four bat houses were installed in 2006 as part of a cooperative Boy Scouts of America project. Brazilian free-tailed were detected at all four houses during 2014 emergence counts. Thirteen bluebird boxes are maintained on the area. These boxes are not monitored for nesting activity, but are checked annually for any needed maintenance. Efforts have been made during prescribed burns to improve habitat for gopher frogs by ensuring that fire burns through wetlands. In 2012, brush and invading slash pines were removed by hand from eight wetlands on CWMA. These efforts have facilitated the reintroduction of fire into wetlands that could potentially be used by gopher frogs.

Due to the variety of natural communities, a diversity of associated wildlife including rare and imperiled species, as well as common game and non-game species, can be found on CWMA. In managing for wildlife species, an emphasis will be placed on conservation, protection and management of natural communities.

The size and natural community diversity of CWMA creates a habitat mosaic for a wide variety of wildlife species. Resident wildlife will be managed for optimum richness, diversity and abundance. In addition to resident wildlife, CWMA 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. The FWC intends to manage game populations on a sustained-yield basis to assure healthy game populations and a high-quality recreational experience. In general, game wildlife populations will be managed to provide continued recreational sport hunting and wildlife viewing opportunities. Some of the hunting opportunities may be regulated through a limited entry hunt program to ensure the persistence of viable game species populations, as well as hunter safety and satisfaction. The potential for conflicts among recreational activities and user groups will also be considered and continually monitored.

Wildlife management emphasis is placed on documenting the occurrence and abundance of rare and imperiled species on the property. The FWC will continue to update inventories for certain species, with emphasis on rare and imperiled fish and wildlife species. Monitoring of wildlife species will continue as an ongoing effort for the area.

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

5.4.2 Imperiled and Focal Species Management: Wildlife Conservation Prioritization and Recovery

The FWC has identified the need to: 1) demonstrate optimal wildlife habitat conservation on FWC-managed lands; 2) develop science-based performance measures to evaluate management; 3) recover imperiled species; and 4) prevent future imperilment of declining wildlife species. To help meet these needs, the FWC uses a comprehensive resource management approach to managing FWC-managed areas. Restoring the form and function of Florida's natural communities is the foundation of this management philosophy. The FWC uses OBVM to monitor how specific vegetative parameters are responding to FWC management, and uses the WCPR program to ensure management is having the desire effect on wildlife.

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

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

and wildlife species (Florida's Threatened and Endangered Species), as well as select focal species found on the area.

The FWC hosted the CWMA WCPR workshop in March 2009. Staff used input received at the workshop to draft the CWMA WCPR Strategy, and species experts reviewed the draft document. After incorporating input from the experts, the CWMA WCPR Strategy was approved in October 2009. Due to the importance of the CWMA to the local black bear subpopulation, staff revised the Strategy in 2010 to include a bear Strategic Management Area (SMA) and to insert a measurable objective. The measurable objective calls for the completion of a CWMA Bear Habitat Management Plan by the end of 2015.

Since 2010, CWMA staff has implemented the CWMA WCPR Strategy, and initiated many of the management actions described therein. The information developed for the CWMA WCPR Strategy has been utilized throughout the development of this Management Plan.

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

5.4.3 Focal Species Selection and Management

The following are excerpts from FWC's WCPR Strategy for CWMA (Appendix 13.10):

The 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 communities' management on select wildlife. In an effort to ensure a focused, science based approached to species management, the FWC is using the focal species approach, incorporating a variety of concepts and considerations that, if applied correctly, allow FWC to identify 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.

For FWC's Public Lands Conservation Planning (PLCP) project, 60 focal species were selected for the Florida statewide assessment. Potential habitat models were used to create statewide potential habitat maps for each species. Models were created using relevant

available data. The base layer for all models was the FWC 2003 landcover data. Additional data layers such as the species range, soils, land use maps, etc were selected based on the natural history of the species. As such, each model is species specific. Once statewide potential habitat maps were available, a Population Viability Analysis (PVA) was conducted for each species.

Using the statewide landcover based habitat maps, 21 of the 60 focal species were modeled to have potential habitat on CWMA (Table 15). Additionally, one focal species not modeled to have potential habitat on the area was identified as occurring on the property, and one additional species was added due to its conservation importance. To create more accurate area-specific potential habitat maps, FWC used the same statewide model for each focal species on the area, but replaced the 2003 landcover data with area-specific natural community data (Figure 6, Table 3). The resulting potential habitat map was then refined based on the input of local managers and species experts.

Other imperiled species are likely to occur on CWMA in addition to the select focal species listed below. All of these imperiled species will continue to benefit from FWC's ongoing management actions that aim to restore natural communities' structure and function. These species, and other imperiled species on CWMA, are adapted to the natural communities found in Florida and have a higher probability of persistence under FWC management actions than in the absence of management.

For comprehensive information regarding monitoring and specific management actions for the focal species of CWMA, please refer to the WCPR Strategy for CWMA (Appendix 13.10). Where applicable, measurable objectives contained within the CWMA WCPR Strategy are included in **Section 6** of this Management Plan.

Table 15. Focal Species Identified as Having Potential Habitat on CWMA

American swallow-tailed kite
Bachman's sparrow [B]
Brown-headed nuthatch [B]
Cooper's hawk
Eastern indigo snake
Florida black bear [A, C]
Florida gopher tortoise [A]
Florida mottled duck [D]
Florida mouse
Florida pine snake
Florida scrub-jay [A, C]

Table 15. Focal Species Identified as Having Potential Habitat on CWMA

Gopher frog [A]
Limpkin
Northern bobwhite [B]
Red-cockaded woodpecker
Scott's seaside sparrow [D]
Sherman's fox squirrel [C]
Short-tailed hawk
Southeastern American kestrel [A]
Southeastern bat
Southern bald eagle
Striped newt [D]
Wading birds (multiple species)

[A] Indicates a species for which WCPR identified a measurable objective was.

[B] Indicates a species for which WCPR identified a monitoring program.

[C] Indicates a species for which WCPR identified a Strategic Management Area.

[D] Indicates a species which was modeled to have potential habitat on the area when using statewide data; however there is little opportunity to manage for these species on the area and they are not a focus of management on the area.

5.4.4 Florida black bear

Maintaining a sustainable statewide bear population is an established objective of FWC and is acknowledged in FWC's Florida Black Bear Management Plan; several strategies have been identified to accomplish this objective. These include ensuring that smaller subpopulations, such as the Big Bend BMU subpopulation, of which the bears of CWMA are a component, are increased to a minimum of 200 individuals. In addition, statewide strategies include facilitating an increase to the genetic exchange among subpopulations.

Implementing these strategies requires the current occupied range within the Big Bend BMU be expanded. Doing so will facilitate connectivity with other occupied bear habitat, and thereby promote genetic exchange among subpopulations. Actions may include moving locally-captured bears into the public lands within the Big Bend BMU occupied range. As opportunity arises, cubs and adult female bears may be released into CWMA, CNWR, and the Lower Suwannee NWR. In addition, surveys for suitable bear habitat may be conducted in Green Swamp Conservation Area and other conservation lands between the Ocala/St. Johns and Chassahowitzka subpopulations to determine where improvements to bear habitat are needed, to promote connectivity, and to determine the feasibility of augmenting bear subpopulations in these areas. Other challenges addressed by the FWC

Florida Black Bear Management Plan include maintaining wildlife habitats and corridors on public and private lands, reducing human-bear conflicts through use of bear-proof cans for garbage and proper storage of birdseed and pet food, and educating Floridians and visitors about black bear behavior and conservation.

To provide suitable habitat of the bear subpopulation, as well as other associated plant and animal species, FWC will continue to protect the integrity of the mesic flatwoods and hardwood swamp (for more Florida black bear habitat management information related to prescribed fire return intervals please see Section 5.3.2 above). The FWC will manage the CWMA subpopulation of Florida black bears as guided by FWC's Florida Black Bear Management Plan. Furthermore, as described in the CWMA WCPR Strategy, FWC will develop an area-specific Black Bear Habitat Management Plan for CWMA.

5.5 Public Access and Recreational Opportunities

5.5.1 Americans with Disabilities Act

When public facilities are developed on areas managed by FWC, every effort is made to comply with the Americans with Disabilities Act (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 ADA[4] 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.

5.5.2 Recreation Master Plan

The FWC has adopted a comprehensive approach to the planning and administration of fish and wildlife resource based public outdoor recreational opportunities for CWMA. To accomplish this, FWC has worked with recreational stakeholders and the general public to develop a Recreation Master Plan for CWMA (Appendix 13.10) that will be used to further guide design and development of appropriate infrastructure that will support the recreational use of the area by the general public. This Recreation Master Plan includes planning for parking, trail design, and area resource interpretation.

5.5.3 Public Access Carrying Capacity

Baseline carrying capacities for users on FWC-managed lands are established by conducting a site specific sensitivity analysis using available data for the site. The intent of the carrying capacity analysis is to minimize wildlife and habitat disturbance and provide the experience of being "immersed in nature" that visitors to FWC-managed areas desire. Carrying capacities are just a first step; management of recreational use requires a means of monitoring visitor impacts. Responding to these impacts may require adjusting the carrying capacities as necessary. The carrying capacities generated through this process are used as a tool to help plan and develop public access, wildlife viewing, and fish and wildlife resource based public outdoor recreation opportunities. Based on an analysis of the overall approved uses and supported public access user opportunities, and the anticipated proportional visitation levels of the various user groups, FWC has determined that CWMA can currently support 550 visitors per day.

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

5.5.4 Wildlife Viewing

The CWMA supports a wide variety of native wildlife species, both resident and seasonally migratory, that are available for visitors' enjoyment for observation and photography. The quality of habitat found on CWMA attracts a suite of species including various birds, mammals, reptiles and amphibians throughout CWMA.

5.5.4.1 Interpretation

Interpretive kiosks, describing CWMA's natural communities, restoration efforts, wildlife, and ongoing management actions such as prescribed fire, are located at the main entrance and the Indigo Road trailhead. These kiosks also provide area regulations, interpretive and recreational brochures. Additional interpretive panels are located at Eagle Nest Sink and along the driving tour.

5.5.5 Hunting

Currently, hunting opportunities include archery, muzzleloading gun, general gun, wild hog-dog, raccoon, spring turkey, youth spring turkey and migratory bird seasons. A re-evaluation of the potential for hunting opportunities, including the need to control wild hogs, will be periodically performed by FWC.

5.5.6 Fishing and Frogging
Fishing and frogging are allowed year round.

5.5.7 Boating
The only practical boating access is via Ryle Creek on the northern boundary of CWMA.

5.5.8 Trails and Hiking
Hiking is allowed throughout CWMA. Currently, 9.4 miles of trails are available for public recreation on CWMA. The FWC will continue to periodically reevaluate the potential for additional trails, as well as trail connectivity opportunities to other conservation areas, and will monitor new trails biannually for user impacts to natural communities.

5.5.9 Bicycling
During periods open for hunting, and during a seven-day scouting period prior to each hunt, bicycles are allowed throughout the area. During non-hunting periods, bicycles are allowed on designated (named) roads only.

5.5.10 Equestrian
Horseback riding is allowed on designated (named) roads only.

5.5.11 Camping
Currently, camping is prohibited on CWMA, with the exception of primitive overnight camping allowed at a designated site on Ryle Creek by persons paddling the Nature Coast Segment (Segment 7) of the Florida Circumnavigational Saltwater Paddling Trail. Paddlers utilizing this camp site must obtain a permit from FWC, and have the permit in their possession while camping.

Due to the proximity to several State Parks and privately operated RV/campgrounds that provide camping opportunities, FWC has not identified a need to provide camping facilities on CWMA. The FWC will periodically reassess the need and feasibility of providing camping facilities on CWMA.

5.5.12 Aquatic Cave Diving
Aquatic caves are cavities below the surface of the ground that contain permanent standing water and range from shallow pools to completely inundated caverns. Aquatic caves develop in areas of karst topography, as water moves through underlying limestone, dissolving it and creating fissures and caverns. Due to the rise and fall of water levels, many aquatic caves have alternately been terrestrial caves. Some aquatic caves occur in conjunction with springs. Caves have stable internal environments with temperature, humidity and water conditions remaining fairly constant. Cave waters are usually clear and deep water often appears blue. The water may take on a brown stain if decaying plant

matter is carried in with rainwater; in some areas the water may have a milky appearance because fine limestone silt is present. The chemical makeup of the water in caves is dependent on the source; most waters in aquatic caves have a high mineral content. Many aquatic cave systems have species that are specifically adapted to and endemic in that system and are therefore at greater risk from even minute changes in the habitat.

Caves support unique and irreplaceable species, and those with very unique adaptations that may be sensitive to small increases in levels of contaminants, shifts in dissolved oxygen, temperature or food webs. Threats specific to aquatic caves include incompatible recreational activities and mining activities, causing destruction of critical, irreplaceable habitat. Due to this sensitivity, management actions for aquatic caves may include gating cave entrances or filling in cave openings to prevent trespass from unauthorized recreation.

Several of the actions developed to mitigate statewide threats to unique habitats are only applicable to aquatic caves and a few other habitats (i.e., calcareous stream, cypress swamp, freshwater marsh and wet prairie, natural lake, reservoir/managed lake, seepage/steep head stream, soft-water stream, spring and spring run, terrestrial cave, and coastal tidal river or stream). Specific actions are intended to prevent harm to cave and other ecosystems influenced by ground water by developing numeric nutrient criteria specific to cave systems and to prevent physical destruction or degradation of cave habitat from recreational activities. The FWC will work to develop specific action strategies to reduce the impacts from incompatible recreational activities. As necessary, FWC will monitor conditions, and consult with DEP and the SWFWMD concerning potential impacts from nearby mining operations.

Eagle Nest Sink and Buford Spring are two popular aquatic cave dive sites at CWMA. Eagle Nest is a deep sink with both upstream and downstream tunnels. There is a large debris cone in the center that slopes downward. This site is deep (310 feet) and is considered an advanced dive. The National Association for Cave Diving and National Speleological Society Cave Diving Section recommends that divers have Full Cave Certification, Trimix breathing gas certification and appropriate experience with deep cave dives.

After Wakulla Spring, Buford Spring on CWMA is the second largest cavern in Florida. The maximum depth is 165 feet at the siphoning downstream end of the main cavern. The inflow at this depth comes from some out flowing areas at 140 feet. On the right side of the cavern, all this area seems to be a collapse zone that has eroded its way open to a small degree over a long time. Although access is available for the general public, it is highly recommended that first time divers go with someone familiar and experienced with the site.

5.5.13 Geocaching

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

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

5.5.14 Amateur Astronomy

Although in proximity to developed portions of Florida, CWMA does afford a relatively low level of nighttime light pollution, and thus is conducive to the viewing of constellations, stars and planets. Some of the open upland areas provide amateur astronomers a broad view of the nighttime sky.

5.6 Environmental Education, Outreach and Partnerships

The FWC will assess the need for and pursue research and environmental education partnership opportunities as appropriate. The FWC will develop and conduct periodic environmental education and outreach programs. The FWC will continue to coordinate with the Brooksville Ridge Volunteer Program for continued management support and assistance. The FWC will continue to identify partnerships that could provide for environmental educational programs and outreach.

5.7 Exotic and Invasive Species Maintenance and Control

Prior to 2014, FWC initiated invasive exotic plant species control and eradication efforts for approximately 226 acres of CWMA. The FWC will continue efforts to control the establishment and spread of Florida Exotic Pest Plant Council (FLEPPC) Category I or II plants on CWMA. Invasive exotic plants known to occur on CWMA include cogongrass, air potato, Japanese climbing fern, loquat, skunkvine, natalgrass, camphor tree, Chinaberrytree, Chinese tallowtree, mimosa, paper mulberry, castor bean, Brazilian pepper, and guineagrass.

Control techniques may include mechanical, chemical, biological, and other appropriate treatments. Treatments utilizing herbicides will comply with instructions found on the herbicide labels and employ the Best Management Practices for their application.

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

5.8 Hydrological Preservation and Restoration

5.8.1 Hydrological Assessment, Restoration and Management

A Hydrology Assessment and a Conceptual Restoration Plan for CWMA have been completed. Pursuant to the recommendations of the hydrological assessment, FWC will implement hydrological restoration as feasible and appropriate. FWC will also utilize the results of the hydrological assessment to implement management activities and regimens to better maintain appropriate seasonal water levels.

5.8.2 Water Resource Monitoring

The FWC will cooperate with the SWFWMD and DEP to develop and implement any necessary surface water quality and quantity monitoring protocols for CWMA. The FWC will continue to cooperate with the SWFWMD and DEP to protect and monitor area springs. In this capacity, FWC will primarily rely on the expertise of the SWFWMD and DEP to facilitate these monitoring activities. Additionally, FWC may also initiate and facilitate water resources monitoring, in cooperation with DEP and the SWFWMD, as deemed necessary.

5.9 Forest Resource Management

An update to the current assessment of the timber resources of CWMA will be conducted by the FFS or a contracted professional forester. The management of timber resources will be considered in the context of the updated Timber Assessment and the overall land management goals and activities.

The FWC will also consult with the FFS or a professional forestry consultant to prepare and implement a Forest Management Plan including reforestation, harvesting and prescribed burning activities based on restoration and maintenance needs of the natural communities and other goals established for management of CWMA.

Timber resources include some pine plantations in need of thinning for habitat improvement. Thinning of the forest over-story, hydrological restoration and reintroduction of prescribed burning are the most important factors in re-establishment of natural

communities and the enhancement of wildlife habitats in these areas. Upland pine forest planted with off-site pines will be reforested with longleaf pine or other on-site species as appropriate. Degraded or disturbed bottomland hardwood sites will be encouraged to reforest naturally with native wetland oaks, hardwoods and other appropriate native plant species.

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

5.10 Cultural and Historical Resources

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

To date, the DHR Master Site File indicates 27 known cultural sites on CWMA. FWC will submit subsequently located cultural sites on CWMA 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 management of these resources, and prior to any facility development or other ground disturbing activities.

5.11 Capital Facilities and Infrastructure

The FWC's land management philosophy is designed to conserve the maximum amount of wildlife habitat while providing the minimal number of capital facilities and infrastructure (Figure 10) 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.

Currently, the infrastructure of CWMA includes 36.5 miles of maintained roads, and 9.4 miles of multi-use trails. Current facilities on CWMA include:

- Administrative structures 2
- Boardwalks 1
- Kiosks 3
- Parking areas 9
- Picnic areas 4
- Wildlife viewing structures 1

As described in **Section 5.6.1** of this Management Plan, for any public facilities that are developed on areas managed by FWC, every effort is made to comply with the Americans with Disabilities Act (Public Law 101-336).

5.12 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.

5.12.1 Optimal Resource Boundary

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

5.12.2 Optimal Conservation Planning Boundary

The second tier is known as the OCPB (Figure 11). 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.

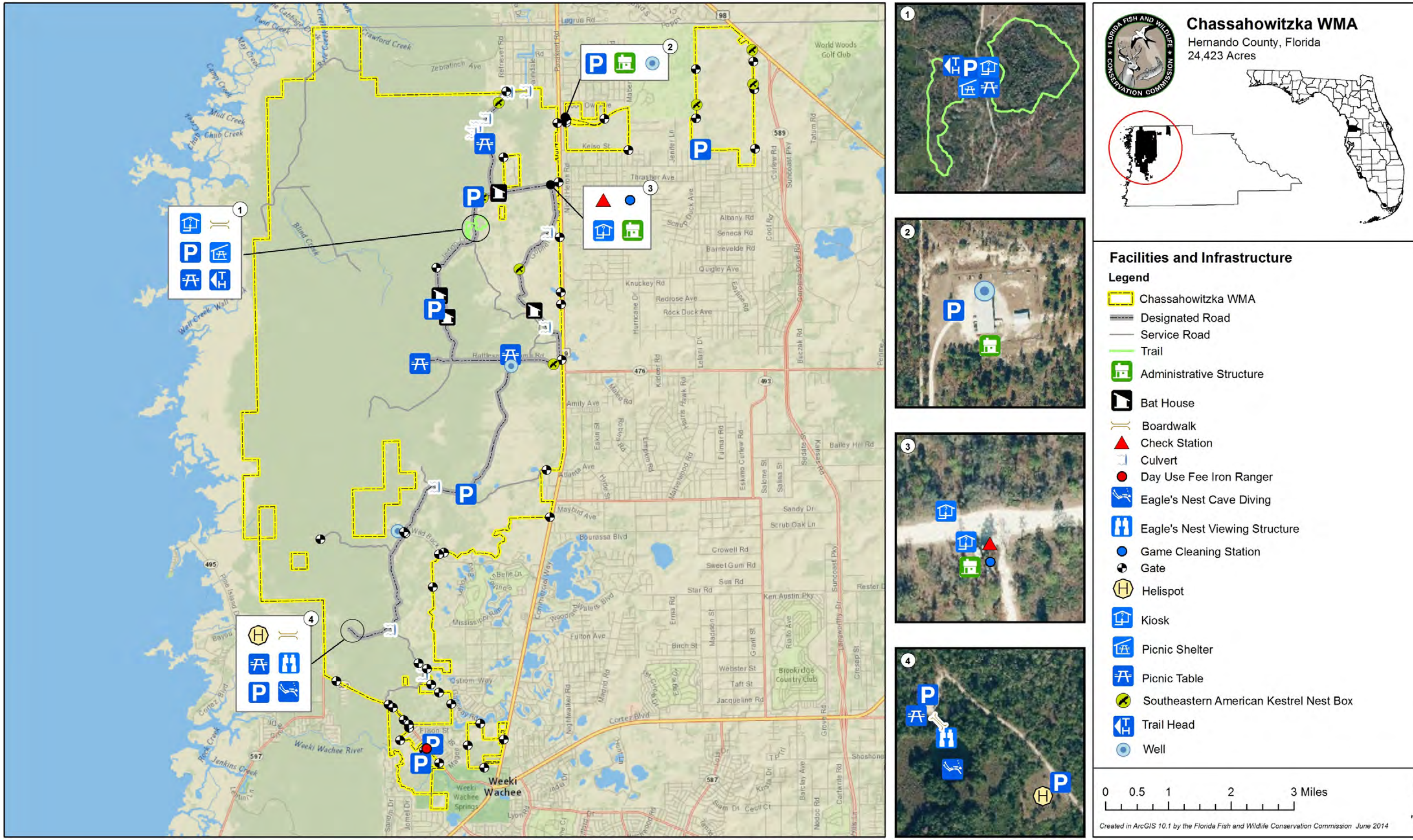


Figure 10. Facilities and Infrastructure

The OCPB provides the basis for development of a broader CAS for CWMA. 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.

5.12.3 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 project proposals and boundary modifications
- Conservation easements
- Federal or State grant conservation proposals
- Regional or local conservation proposals
- Local, state, and federal planning proposals
- Non-governmental organization conservation proposals

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

Private landowners seeking assistance with habitat management will likely find it offered within FWC's 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/ .

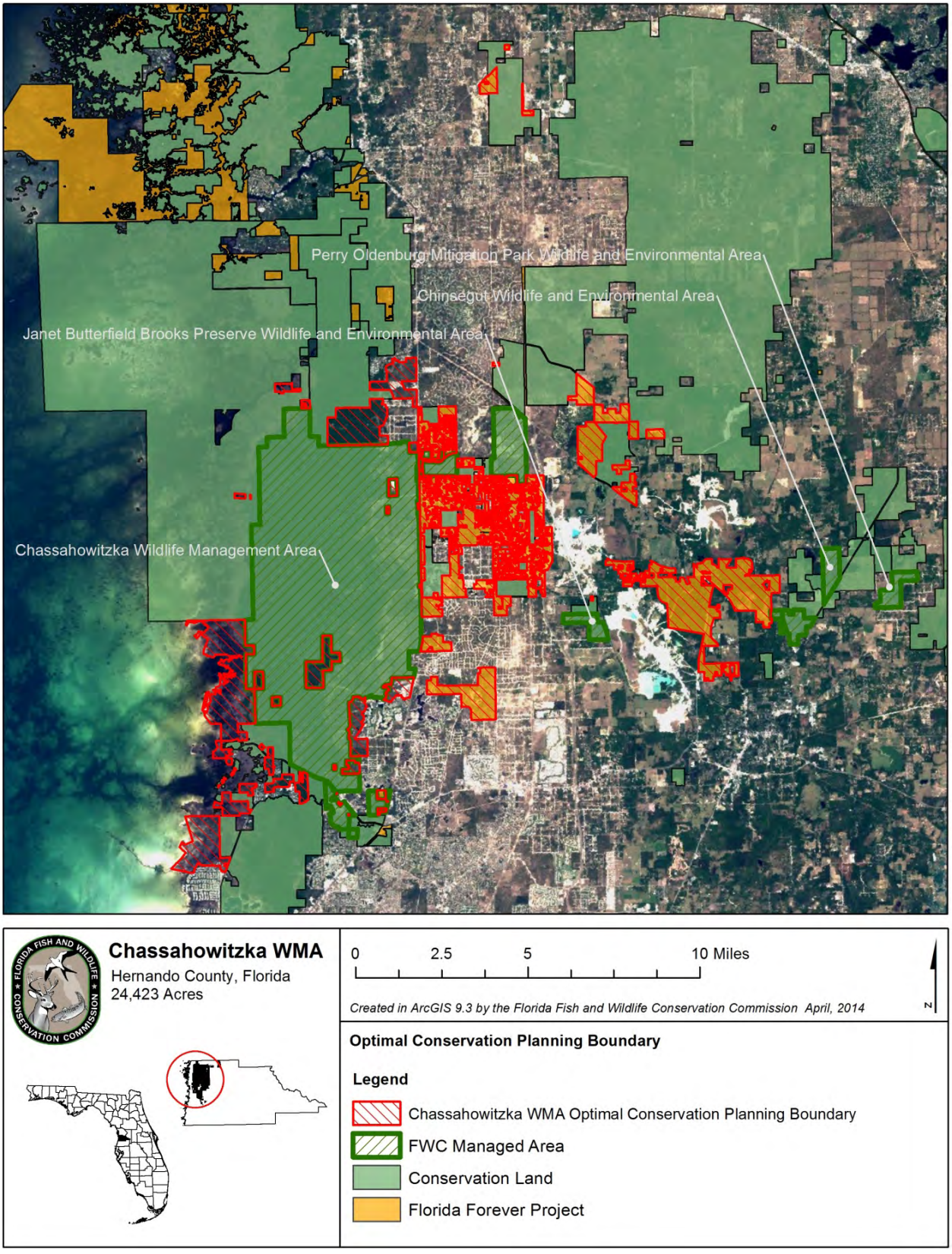


Figure 11. Optimal Conservation Planning Boundary

5.12.4 FWC Florida Forever Additions and Inholdings Acquisition List

Currently, FWC has identified 4,334 acres (43 parcels) of potential additions or privately held inholdings for CWMA. In addition, 12,540 acres of the Annutteliga Hammock Florida Forever project remain to be acquired. Upon completion of the CAS, additions to the FWC Florida Forever Additions and Inholdings acquisition list may be recommended.

5.13 Research Opportunities

The FWC intends to cooperate with researchers, universities, and others as feasible and appropriate. For CWMA, 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 CWMA must have prior approval by FWC.

5.14 Cooperative Management and Special Uses

5.14.1 Cooperative Management

The FWC is responsible for the overall management and operation of CWMA as set forth in the lease agreements with the Board of Trustees. In keeping with the lease agreements, and in order to conduct its management operations in the most effective and efficient manner, the FWC cooperates with other agencies to achieve management goals and objectives described in this management plan. These include cooperating with DHR to ensure the requirements of the Management Procedures Guidelines - Management of Archaeological and Historical Resources document (Appendix 13.7) are followed with regard to any ground-disturbing activities. In addition, the FFS is a designated cooperating agency, and assists FWC by providing technical assistance on forest resource management. Also, FWC cooperates and consults with the SWFWMD and DEP for the monitoring and management of both ground and surface water resources and the overall management of CWMA.

5.14.2 First Responder and Military Training

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

5.14.3 Apiaries

Currently, there are no apiaries operating on CWMA. However, use of apiaries is conditionally approved for CWMA, 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 Strategic Plan (Appendix 13.8). Location, management, and administration of apiaries on CWMA will be guided by the FWC Apiary Policy (Appendix 13.12).

5.15 Climate Change

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

The Intergovernmental Panel on Climate Change (IPCC), a multi-national scientific body, reports that climate change is likely proceeding at a rate where there will be unavoidable impacts to humans, wildlife, and habitat. Given current levels of heat-trapping greenhouse gas emissions, shifts in local, regional, and national climate patterns including changes in precipitation, temperature, increased frequency and intensity of extreme weather events, rising sea levels, tidal fluctuations, and ocean acidification are projected . The current trend of global temperature increase has appeared to accelerate in recent decades, and continued greenhouse gas emissions may result in projected global average increases of 2 – 11.5° F by the end of the century.[6]

This 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, 9] more frequent invasions and outbreaks of exotic invasive species;[10] and loss of habitat in coastal areas due to sea level rise.[11] Some species are projected to adjust to these conditions through ecological or evolutionary adaptation, whereas others are projected to exhibit range shifts as their distributions track changing climatic conditions. Those species that are unable to respond to changing climatic conditions are projected to go extinct. Some

estimates suggest that as many as 20% - 30% of the species currently assessed by the IPCC are at risk of extinction within this century if global mean temperatures exceed increases of 2.7 – 4.5° F.[12] A number of ecosystems are projected to be affected at temperature increases well below these levels.

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

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

Elements of climate change that may potentially affect CWMA include inundation and saltwater intrusion from sea level rise (Figure 12), more frequent and more potent storm events, alteration of vegetation reproductive cycles, and changes in the fire regime. The results of a Sea Level Affecting Marsh Model for the CWMA show habitats that may potentially be impacted. The low-lying coastal habitats, such as salt marsh and hardwood swamp natural communities are projected to face the most direct and dramatic impacts of climate change, particularly from a projected rising sea level and from the projected increased frequency and intensity of coastal storms.[13, 14, 15, 16] The effects of sea level rise in the recent past have been observed on the adjacent CNWR; cabbage palms have been dying on coastal islands due to salinity increases. The potential loss of habitat may result in the loss of species using that habitat, including migrating and nesting birds. Storm events also

cause considerable physical damage to native vegetation along vulnerable shorelines, impacting nesting habitat for sea life and shorebirds. The projected rise in sea levels may decrease the availability and abundance of prey for wading birds that forage in shallow waters on the expansive tidal flats of the Gulf Coast. Climate change may amplify and hasten these effects, potentially at rates that exceed the normal resiliency of plant communities to recover, shift or adapt accordingly.[17, 18] Projected salt water intrusion into the subsurface freshwater lens from potential sea level rise and saltwater inundation of surface freshwaters from storm surges may alter coastal ecosystems and freshwater marshes, possibly resulting in more salt-tolerant aquatic plant communities.

To address the potential impacts of climate change on the CWMA, Goals and Objectives have been developed as a component of this Management Plan (Section 6.13). 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 CWMA Management Plan in the future.

5.16 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. Water conservation is accomplished through hydrological restoration, management and monitoring as described in **Section 5.8** and **Section 6.7**.

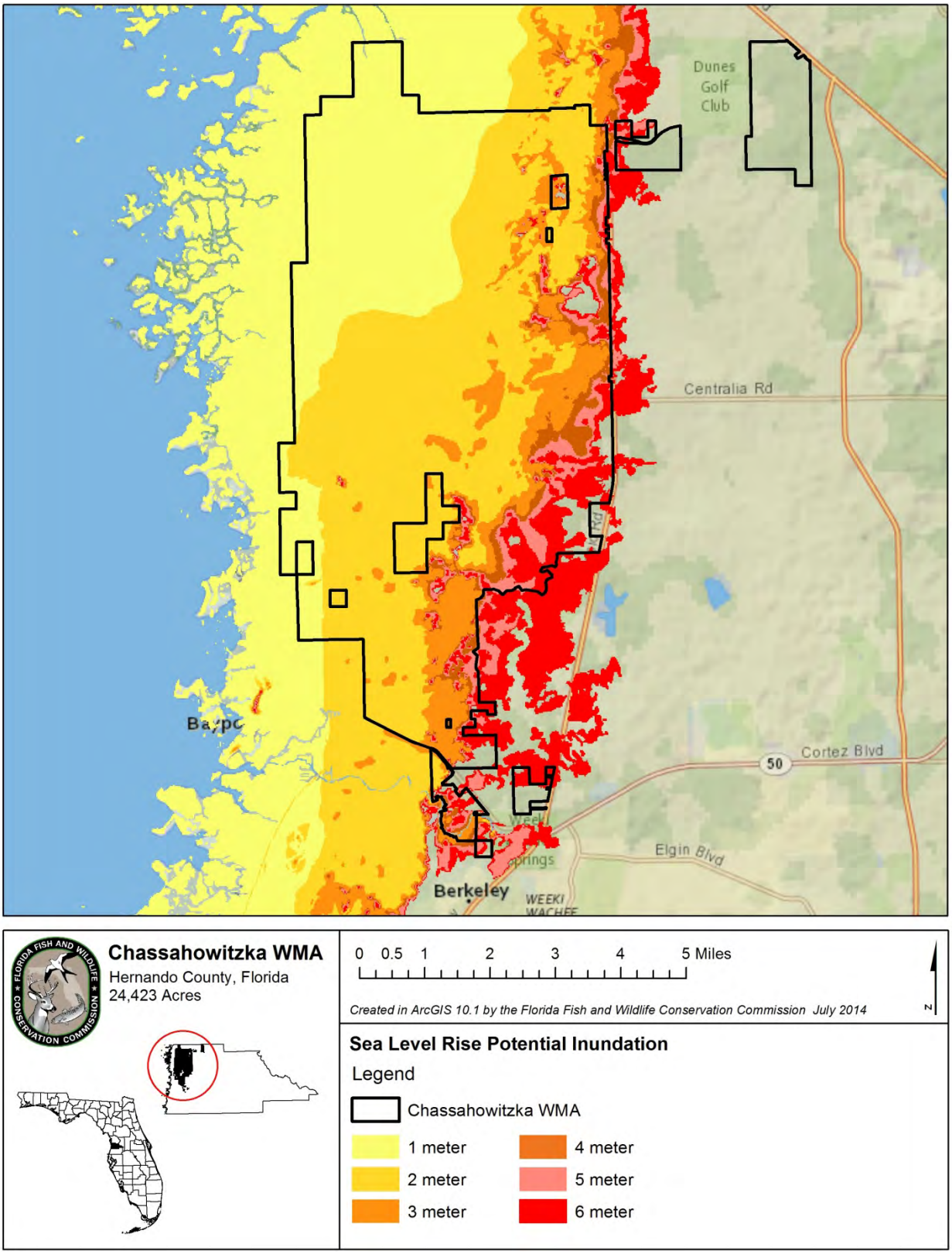


Figure 12. Sea Level Rise Potential Inundation

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 CWMA. The objectives listed within each management goal offer more specific management guidance and measures, and are considered the necessary steps to be completed to accomplish the management goals. Many of the objectives listed have specific end-of-the-calendar-year target dates for completion and all of them are classified as having either short-term (less than two years) or long-term (up to ten years) timelines for completion.

6.1 Habitat Restoration and Improvement

Goal: Improve extant habitat and restore disturbed areas.

Short-term

6.1.1 Continue to implement OBVM on the area.

6.1.2 Continue to follow the recommendations of the CWMA WCPR Strategy when conducting habitat restoration and improvement activities on the area.

6.1.3 Update and implement a Prescribed Burn Plan for the area.

6.1.4 Prescribe burn 2,500 acres of fire adapted communities on the area per year.

6.1.5 Maintain 2,069 acres (50%) of sandhill within a 2 - 5 year target fire return interval.

6.1.6 To promote suitable Florida black bear habitat, on a rotational basis, maintain 50% (967 acres) of mesic flatwoods within a 5 - 10 year fire return interval, and 50% on a 2 - 5 year fire return interval, or as subsequently modified by the CWMA Black Bear Habitat Management Plan (see Section 6.3.6).

6.1.7 Conduct habitat/natural community improvement on 75 acres including replanting of longleaf pine on former off-site sand pine plantation (Figure 13).

Long-term

6.1.8 Continue to implement OBVM on the area.

6.1.9 Continue to follow the recommendations of the CWMA WCPR Strategy when conducting habitat restoration and improvement activities on the area.

6.1.10 Continue to prescribe burn 2,500 acres of fire adapted communities on the area per year.

6.1.11 Maintain 4,137 acres (100%) of sandhill within a 2 - 5 year target fire return interval.

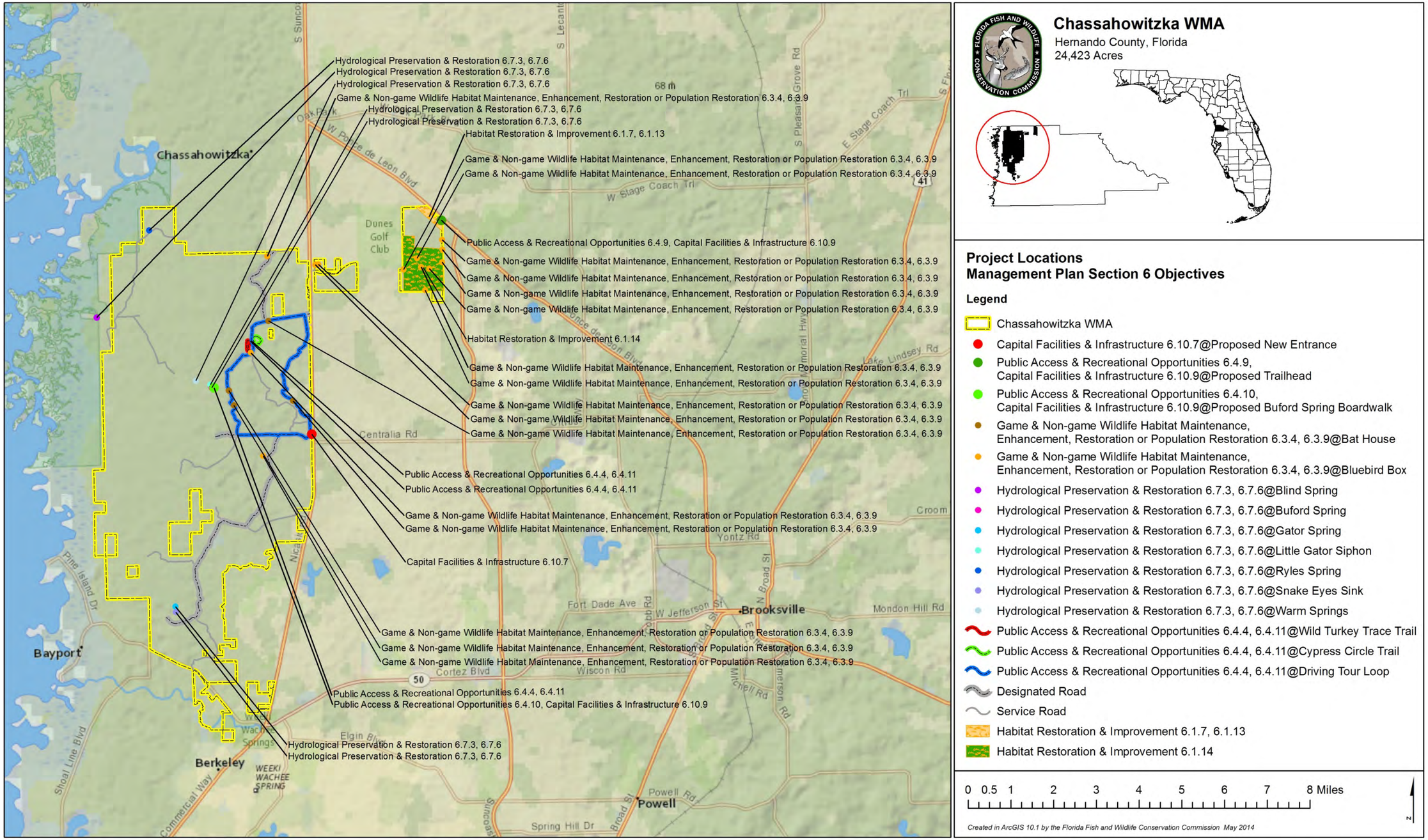


Figure 13. Project Locations - Management Plan Section 6 Objectives

6.1.12 To promote suitable Florida black bear habitat, on a rotational basis, continue to maintain 967 acres (50%) of mesic flatwoods within a 5 - 10 year fire return interval and 50% on a 2 - 5 year fire return interval, or as subsequently modified by the CWMA Black Bear Habitat Management Plan (see 6.3.6).

6.1.13 Continue to conduct habitat/natural community improvement on 75 acres including replanting of longleaf pine on former off-site sand pine plantation (Figure 13).

6.1.14 Conduct habitat/natural community improvement on 664 acres including replanting of longleaf pine within the Sherman's fox squirrel SMA (Figure 13).

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

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

Short-term

6.2.1 Continue to implement the CWMA WCPR Strategy.

6.2.2 As described in the CWMA WCPR Strategy, conduct a baseline gopher frog survey to determine the extent of their distribution, and the number of breeding ponds by 2015.

6.2.3 As described in the CWMA WCPR Strategy, monitor Bachman's sparrow, brown-headed nuthatch, Florida scrub-jay, gopher frog, gopher tortoise, Northern bobwhite, Sherman's fox squirrel, and southeastern American kestrel.

6.2.4 As described in the CWMA WCPR Strategy, maintain at least 6 functional southeastern America kestrel nest boxes within suitable habitat on CWMA.

6.2.5 Continue to conduct an annual Breeding Bird Survey

6.2.6 Continue to collect opportunistic wildlife species occurrence data.

6.2.7 Continue periodic aerial surveys for bald eagle nesting activity.

6.2.8 Continue to monitor for imperiled plant species utilizing CWMA staff, FWC Fish and Wildlife Research Institute (FWRI), OBVM, and FNAI.

Long-term

6.2.9 Continue to implement CWMA WCPR Strategy by managing identified natural communities for focal wildlife species.

6.2.10 As described in the CWMA WCPR Strategy, monitor Bachman's sparrow, brown-headed nuthatch, Florida scrub-jay, gopher frog (if detected within first 5 years), gopher tortoise, Northern bobwhite, Sherman's fox squirrel, and southeastern American kestrel.

6.2.11 As described in the CWMA WCPR Strategy, restore all potential Florida scrub-jay habitat within the SMA to suitable conditions by 2019.

6.2.12 As described in the CWMA WCPR Strategy, continue to maintain at least 6 functional southeastern America kestrel nest boxes within suitable habitat on CWMA.

6.2.13 Evaluate the use of the available southeastern America kestrel nest boxes and the suitability of recently restored habitat to determine the need for additional nest boxes by 2019.

6.2.14 Continue to conduct an annual Breeding Bird Survey

6.2.15 Continue to collect opportunistic wildlife species occurrence data.

6.2.16 Repeat periodic gopher tortoise burrow surveys at least every 10 years.

6.2.17 Continue periodic aerial surveys for bald eagle nesting activity.

6.2.18 By 2021, revise and update the CWMA WCPR Strategy.

6.2.19 Continue to monitor for imperiled plant species utilizing CRWMA staff, FWC-FWRI, OBVM, and FNAI.

6.3 Game and Non-game Wildlife Habitat Maintenance, Enhancement, Restoration or Population Restoration.

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

Short-term

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

6.3.2 Continue to conduct periodic spotlight monitoring surveys for white-tailed deer every three years.

6.3.3 Continue to conduct annual Chuck-wills-widow and common night-hawk point count survey.

6.3.4 Continue to maintain thirteen eastern bluebird boxes and four bat houses (Figure 13).

6.3.5 Continue to collect opportunistic wildlife occurrence data.

6.3.6 As guided by the CWMA WCPR Strategy, develop and implement a CWMA Florida Black Bear Habitat Management Plan by 2015.

Long-term

6.3.7 Continue to collect biological harvest data at check station.

6.3.8 Continue to conduct periodic spotlight monitoring surveys for white-tailed deer every three years.

6.3.9 Continue to conduct annual Chuck-wills-widow and common night-hawk point count survey.

6.3.10 Continue to maintain thirteen eastern bluebird boxes and four bat houses (Figure 13).

6.3.11 As guided by the CWMA WCPR Strategy, continue to implement a CWMA Florida Black Bear Habitat Management Plan on the area.

6.3.12 Continue to collect opportunistic wildlife occurrence data.

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 550 visitors per day.

6.4.2 Continue to provide hunting opportunities for archery, muzzleloading gun, general gun, wild hog-dog season, raccoon season, spring turkey season, youth spring turkey season, migratory bird season, fishing and frogging.

6.4.3 Continue to provide two kiosks, bird list, recreation guide, Eagle Nest Sink interpretive sign, website, two driving tour interpretive signs and a driving tour guide for interpretation and education.

6.4.4 Continue to maintain 9.4 miles of trails (Figure 13).

6.4.5 Continue to monitor trails annually for visitor impacts.

Long-term

6.4.6 Continue to maintain public access and recreational opportunities to allow for a recreational carrying capacity of 550 visitors per day.

6.4.7 Continue to provide hunting opportunities for archery, muzzleloading gun, general gun, wild hog-dog season, raccoon season, spring turkey season, youth spring turkey season, migratory bird season, fishing and frogging.

6.4.8 As necessary, review and revise the CWMA Recreation Master Plan.

6.4.9 Develop one new information sign and trailhead at the Annuteliga Hammock north entrance (Figure 13).

6.4.10 Design and develop an elevated walkway to Buford Spring (Figure 13).

6.4.11 Continue to maintain 9.4 miles of trails (Figure 13).

6.4.12 Continue to monitor trails annually for visitor impacts.

6.4.13 Reassess recreational opportunities every three years.

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

6.4.15 Continue to identify partnerships that could provide for environmental educational programs and outreach.

6.5 Environmental Education, Outreach and Partnerships

Goal: Develop and provide environmental education programs, and encourage volunteer participation in management support.

Short-term

6.5.1 Continue to develop and conduct periodic environmental education and outreach programs.

6.5.2 Continue to coordinate with the Brooksville Ridge Volunteer Program for continued management support and assistance.

6.5.3 Continue to identify partnerships that could provide for environmental educational programs and outreach.

Long-term

6.5.4 Continue to conduct periodic environmental education and outreach programs.

6.5.5 Continue to assess the need for and pursue research and environmental education partnership opportunities as appropriate.

6.5.6 Continue to coordinate with the Brooksville Ridge Volunteer Program for continued management support and assistance.

6.5.7 Continue to identify partnerships that could provide for environmental educational programs and outreach.

6.6 Exotic and Invasive Species Maintenance and Control

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

Short-term

6.6.1 Annually treat at least 20 acres of EPPC Category I and Category II invasive exotic plant species including cogongrass, air potato, Japanese climbing fern, skunkvine, natalgrass, camphor tree, Chinaberrytree, Chinese tallowtree, mimosa, paper mulberry, castorbean, Brazilian pepper, and guineagrass.

6.6.2 Continue control measures (hunting) on one exotic animal species (wild hog).

Long-term

6.6.3 Continue to annually treat at least 50 acres of EPPC Category I and Category II invasive exotic plant species including cogongrass, air potato, Japanese climbing fern, skunkvine, natalgrass, camphor tree, Chinaberrytree, Chinese tallowtree, mimosa, paper mulberry, castorbean, Brazilian pepper, and guineagrass.

6.6.4 Continue control measures (hunting) on one exotic animal species (wild hog).

6.7 Hydrological Preservation and Restoration

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

Short-term

6.7.1 As recommended by the Hydrology Assessment and Conceptual Restoration Plan, install and maintain low-water crossings and culverts as appropriate to maintain and enhance natural hydrological functions.

6.7.2 Continue to cooperate with the SWFWMD for the monitoring of surface and ground water quality and quantity.

6.7.3 Protect and monitor the springs located on the area (Figure 13).

Long-term

6.7.4 As recommended by the Hydrology Assessment and Conceptual Restoration Plan, continue to install and maintain low-water crossings and culverts as appropriate to maintain and enhance natural hydrological functions.

6.7.5 Continue to cooperate with the SWFWMD for the monitoring of surface and ground water quality and quantity.

6.7.6 Continue to protect and monitor the springs located on the area (Figure 13).

6.8 Forest Resource Management

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

Short-term

6.8.1 Cooperate with the FFS to update the Timber Assessment.

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

Long-term

6.8.3 Prepare and implement a Forest Management Plan including reforestation, harvesting and prescribed burning activities based on restoration and maintenance needs of the natural communities and other goals established for management of CWMA.

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

6.9 Cultural and Historical Resources

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

Short-term

6.9.1 Ensure all known sites are recorded in the DHR Master Site file.

6.9.2 As directed by DHR, continue to monitor, protect and preserve as necessary 26 identified cultural and historic sites located on the area.

6.9.3 Coordinate with DHR to assess the need for conducting a cultural resource survey.

6.9.4 Follow DHR's Management Procedures for Archaeological and Historical Sites and Properties on State-Owned or Controlled Properties for the management of cultural and historic resources.

Long-term

6.9.5 Investigate the feasibility of providing interpretation for the Centralia site.

6.9.6 Cooperate with DHR or trained FWC Staff in designing site plans for development of infrastructure.

6.9.7 As directed by DHR, continue to monitor, protect and preserve as necessary 26 identified cultural and historic sites located on the area.

6.9.8 Continue to submit updates of additional sites to DHR for inclusion in their Master Site file.

6.9.9 As necessary, continue to coordinate with DHR for Archaeological Resource Management training of FWC staff.

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

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

6.10 Capital Facilities and Infrastructure

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

Short-term

6.10.1 Continue to maintain 13 facilities on the area.

6.10.2 Maintain 36.5 miles of roads on the area.

6.10.3 Maintain 9.4 miles of trails currently existing on the area.

Long-term

6.10.4 Continue to maintain 13 facilities on the area.

6.10.5 Continue to maintain 36.5 miles of roads on the area.

6.10.6 Continue to maintain 9.4 miles of trails currently existing on the area.

6.10.7 If feasible, relocate main entrance facilities to Rattlesnake Road including development of a parking area, kiosks, check station, vault toilet and picnic shelter (Figure 13).

6.10.8 In conjunction with the relocation of the main entrance, investigate alternatives to maintain the loop driving tour, including development of additional road segments.

6.10.9 Construct two additional facilities at Buford Springs and Annuteliga Hammock north entrance trailhead, including an elevated walkway at Buford Spring, appropriate kiosks, interpretive and regulatory signage (Figure 13).

6.11 Land Conservation and Stewardship Partnerships

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

Short-term

6.11.1 Identify potential important wildlife resources, habitat, landscape-scale linkages, and wildlife corridors for operational/resource management that may be important to the continued viability of fish and wildlife populations in the region.

6.11.2 Develop a CAS.

6.11.3 Contact and inform adjoining landowners about the FWC LAP to pursue non-acquisition conservation stewardship, partnerships and potential conservation easements.

6.11.4 Develop and maintain a GIS shapefile and other necessary data to facilitate nominations from the FWC OCPB and for FWC's LAP and Land Acquisition Programs.

6.11.5 Continue to identify and pursue conservation acquisition needs.

6.11.6 Identify and develop conservation stewardship partnerships, including potential non-governmental organization partnerships and grant program opportunities.

6.11.7 Determine efficacy of conducting an adjacent landowner's assistance/conservation stewardship partnership workshop.

6.11.8 Identify potential conservation easements donations.

6.11.9 Evaluate and determine if any portions of CWMA are no longer needed for conservation purposes, and therefore may be designated as surplus lands.

Long-term

6.11.10 To minimize fragmentation of the area, continue to identify strategic parcels to revise the completed OCPB for CWMA as deemed necessary.

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

6.11.12 Continue to pursue acquisition of parcels added to the FWC acquisition list as acquisition work plan priorities and funding allow.

6.11.13 Continue to maintain a GIS shapefile and other necessary data to facilitate nominations from the FWC OCPB and for the FWC LAP and Land Acquisition Program.

6.11.14 Continue to identify and pursue conservation acquisition needs.

6.11.15 Continue to identify and develop conservation stewardship partnerships, including potential non-governmental organization partnerships and grant program opportunities.

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

6.11.17 Conduct a landowner assistance/conservation stewardship partnership workshop if deemed appropriate.

6.12 Research Opportunities

Goal: Explore and pursue cooperative research opportunities.

Short-term

6.12.1 Assess the need for and pursue research partnership opportunities as appropriate.

6.12.2 Work with FWC's Black Bear Management Program to perform a literature search to determine if there are any known impacts to Florida black bear ecology due to the hunting of white-tailed deer, wild hogs and birds utilizing hunting dogs.

6.12.3 Facilitate cooperative research opportunities through universities and the FWC FWRI.

6.12.4 Cooperate with researchers, universities and others as appropriate.

Long-term

6.12.5 Continue to assess the need for and pursue research partnership opportunities as appropriate.

6.12.6 Continue to facilitate cooperative research opportunities through universities and the FWC FWRI.

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

6.13 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 CWMA.

Long-term

6.13.1 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 CWMA.

6.13.2 Incorporate appropriate climate change monitoring protocols and management strategies into the OBVM program for the CWMA.

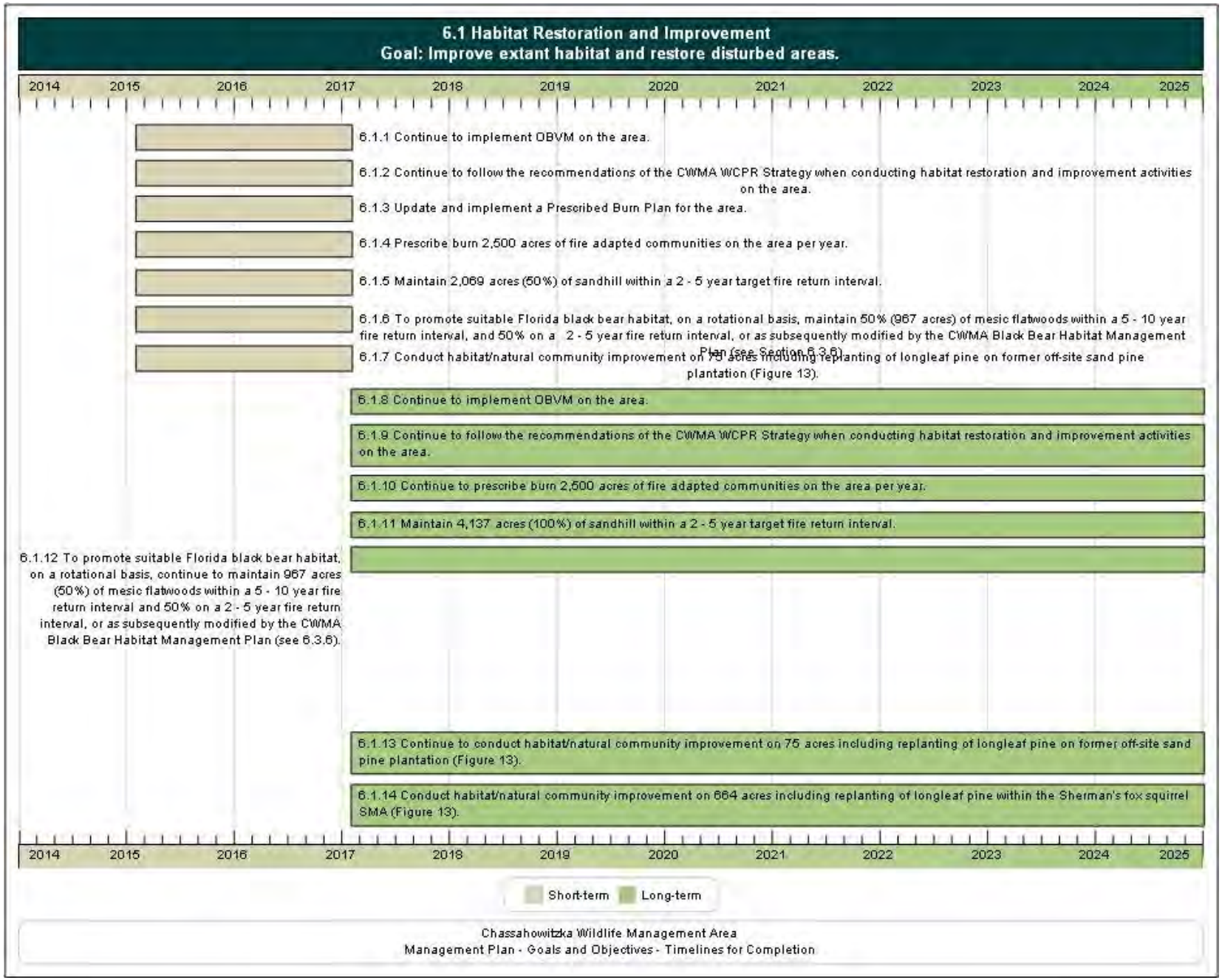
6.13.3 Incorporate appropriate climate change adaptation strategies into the WCPR for CWMA.

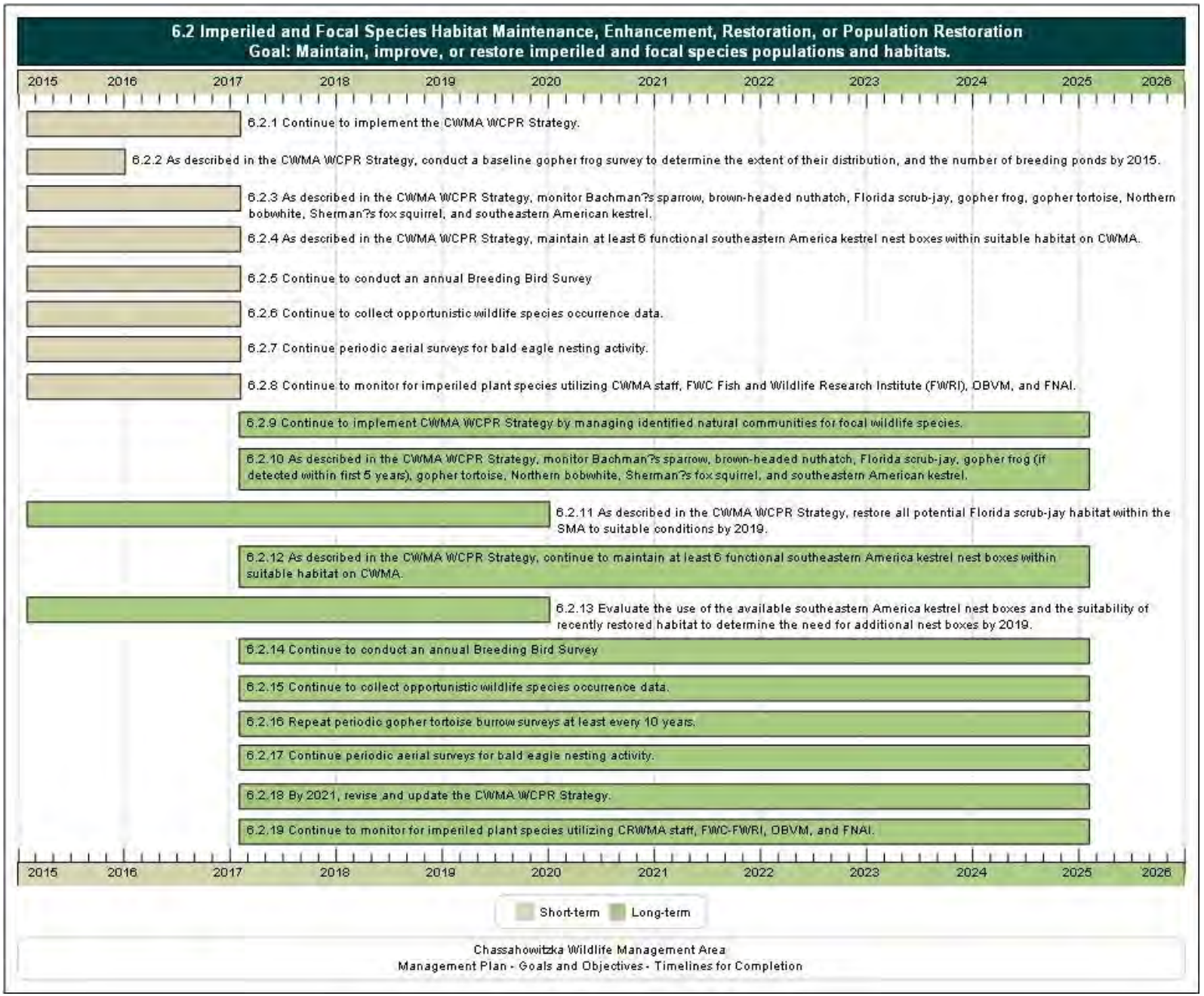
6.13.4 As appropriate, update the CWMA Prescribed Fire Plan to incorporate new scientific information regarding projected climate change, such as increased frequency of drought, on the fire regime of CWMA's fire-adapted habitats.

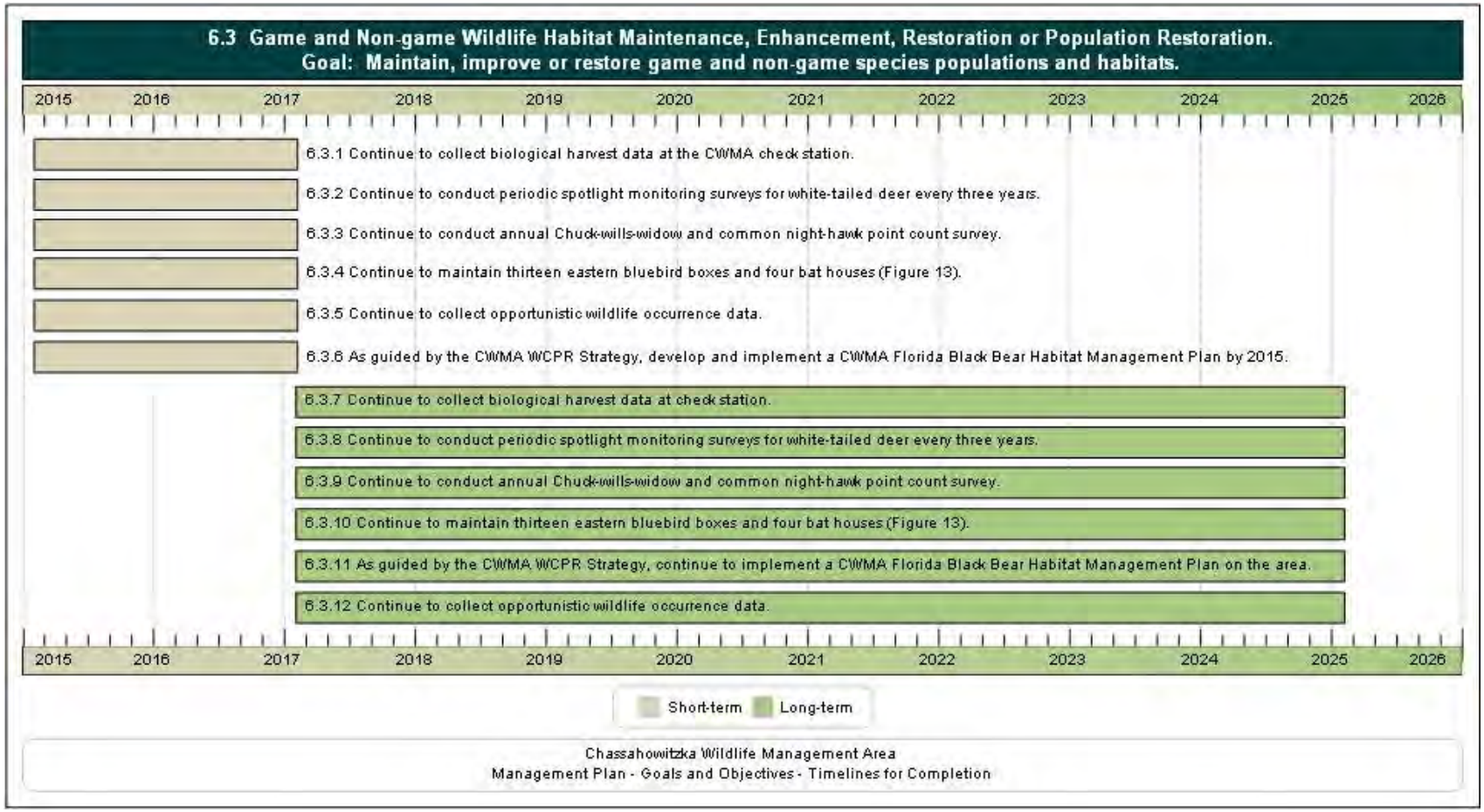
6.13.5 As science, technology, and climate policy evolve, educate natural resource management partners and the public about the agency's policies, programs and efforts to study, document and address potential climate change; assess the need to incorporate public education about climate change into the update of the CWMA Recreation Master Plan.

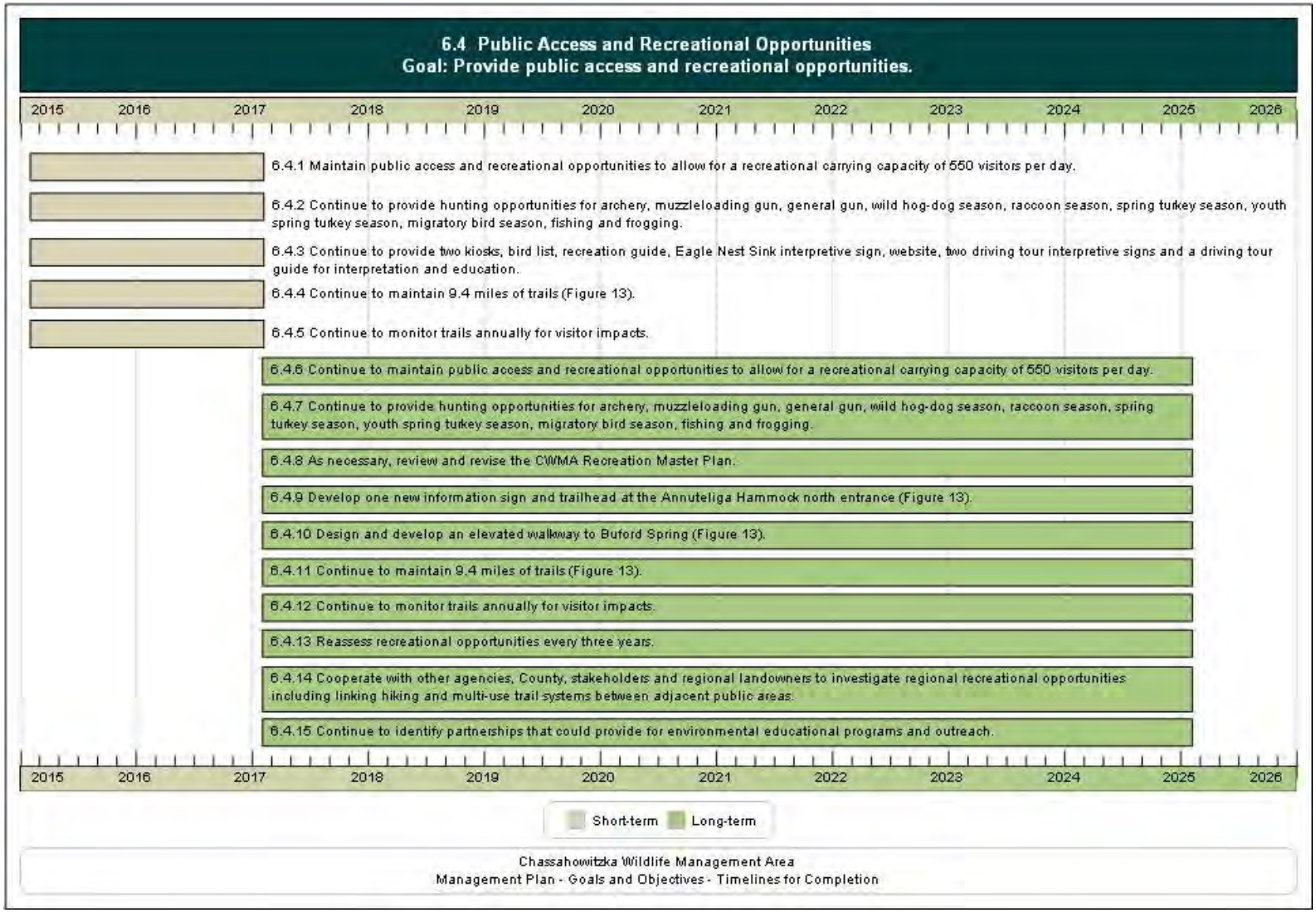
7 Schedule: Timelines for Completion of Resource Management Goals and Objectives

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


6.1 Habitat Restoration and Improvement
Goal: Improve extant habitat and restore disturbed areas.
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
6.1.1 Continue to implement OBVM on the area.
6.1.2 Continue to follow the recommendations of the CWMA WCPR Strategy when conducting habitat restoration and improvement activities on the area.
6.1.3 Update and implement a Prescribed Burn Plan for the area.
6.1.4 Prescribe burn 2,500 acres of fire adapted communities on the area per year.
6.1.5 Maintain 2,069 acres (50%) of sandhill within a 2 - 5 year target fire return interval.
6.1.6 To promote suitable Florida black bear habitat, on a rotational basis, maintain 50% (967 acres) of mesic flatwoods within a 5 - 10 year fire return interval, and 50% on a 2 - 5 year fire return interval, or as subsequently modified by the CWMA Black Bear Habitat Management Plan (see Section 6.3.6).
6.1.7 Conduct habitat/natural community improvement on 75 acres including replanting of longleaf pine on former off-site sand pine plantation (Figure 13).
6.1.8 Continue to implement OBVM on the area.
6.1.9 Continue to follow the recommendations of the CWMA WCPR Strategy when conducting habitat restoration and improvement activities on the area.
6.1.10 Continue to prescribe burn 2,500 acres of fire adapted communities on the area per year.
6.1.11 Maintain 4,137 acres (100%) of sandhill within a 2 - 5 year target fire return interval.
6.1.12 To promote suitable Florida black bear habitat, on a rotational basis, continue to maintain 967 acres (50%) of mesic flatwoods within a 5 - 10 year fire return interval and 50% on a 2 - 5 year fire return interval, or as subsequently modified by the CWMA Black Bear Habitat Management Plan (see 6.3.6).
6.1.13 Continue to conduct habitat/natural community improvement on 75 acres including replanting of longleaf pine on former off-site sand pine plantation (Figure 13).
6.1.14 Conduct habitat/natural community improvement on 664 acres including replanting of longleaf pine within the Sherman's fox squirrel SMA (Figure 13).
Short-term
Long-term
Chassahowitzka Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion

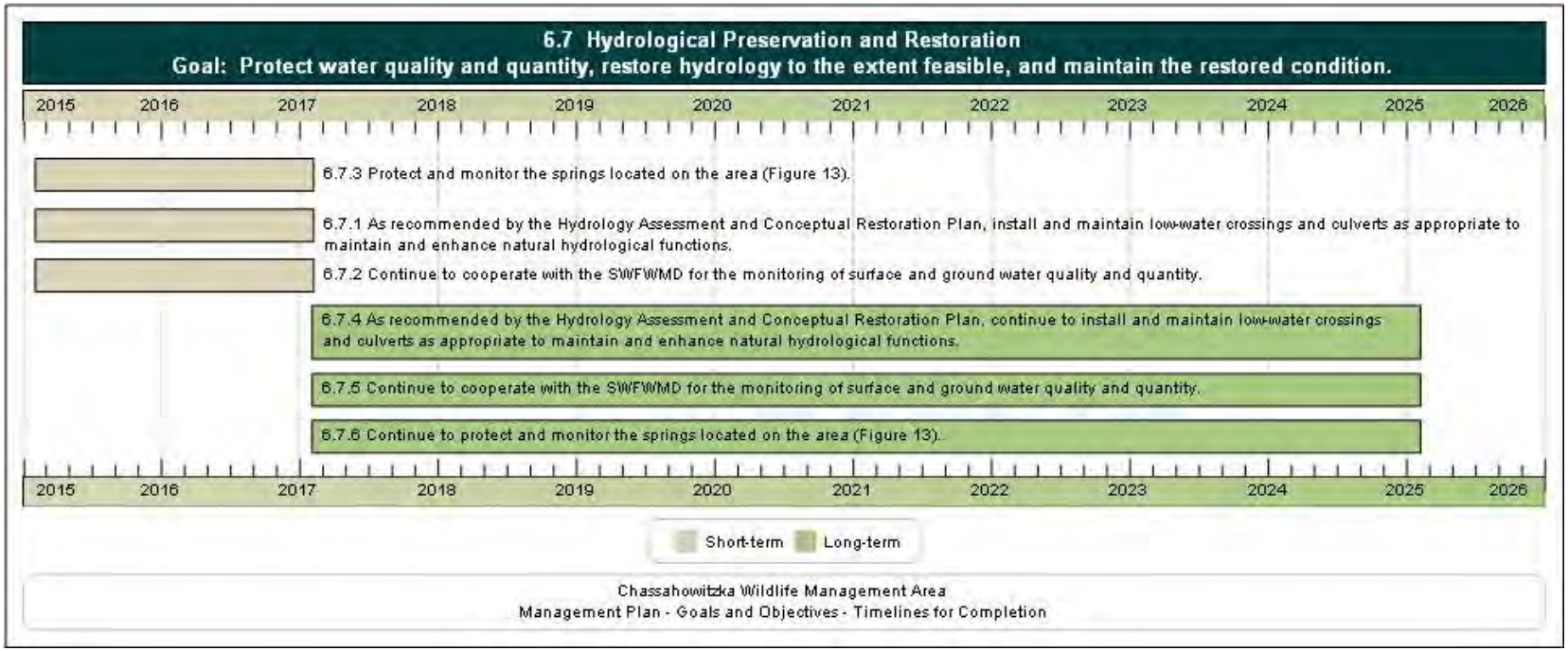

6.2 Imperiled and Focal Species Habitat Maintenance, Enhancement, Restoration, or Population Restoration
Goal: Maintain, improve, or restore imperiled and focal species populations and habitats.
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
6.2.1 Continue to implement the CWMA WCPR Strategy.
6.2.2 As described in the CWMA WCPR Strategy, conduct a baseline gopher frog survey to determine the extent of their distribution, and the number of breeding ponds by 2015.
6.2.3 As described in the CWMA WCPR Strategy, monitor Bachman?s sparrow, brown-headed nuthatch, Florida scrub-jay, gopher frog, gopher tortoise, Northern bobwhite, Sherman?s fox squirrel, and southeastern American kestrel.
6.2.4 As described in the CWMA WCPR Strategy, maintain at least 6 functional southeastern America kestrel nest boxes within suitable habitat on CWMA.
6.2.5 Continue to conduct an annual Breeding Bird Survey
6.2.6 Continue to collect opportunistic wildlife species occurrence data.
6.2.7 Continue periodic aerial surveys for bald eagle nesting activity.
6.2.8 Continue to monitor for imperiled plant species utilizing CWMA staff, FWC Fish and Wildlife Research Institute (FWRI), OBVM, and FNAI.
6.2.9 Continue to implement CWMA WCPR Strategy by managing identified natural communities for focal wildlife species.
6.2.10 As described in the CWMA WCPR Strategy, monitor Bachman?s sparrow, brown-headed nuthatch, Florida scrub-jay, gopher frog (if detected within first 5 years), gopher tortoise, Northern bobwhite, Sherman?s fox squirrel, and southeastern American kestrel.
6.2.11 As described in the CWMA WCPR Strategy, restore all potential Florida scrub-jay habitat within the SMA to suitable conditions by 2019.
6.2.12 As described in the CWMA WCPR Strategy, continue to maintain at least 6 functional southeastern America kestrel nest boxes within suitable habitat on CWMA.
6.2.13 Evaluate the use of the available southeastern America kestrel nest boxes and the suitability of recently restored habitat to determine the need for additional nest boxes by 2019.
6.2.14 Continue to conduct an annual Breeding Bird Survey
6.2.15 Continue to collect opportunistic wildlife species occurrence data.
6.2.16 Repeat periodic gopher tortoise burrow surveys at least every 10 years.
6.2.17 Continue periodic aerial surveys for bald eagle nesting activity.
6.2.18 By 2021, revise and update the CWMA WCPR Strategy.
6.2.19 Continue to monitor for imperiled plant species utilizing CRWMA staff, FWC-FWRI, OBVM, and FNAI.
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
Short-term
Long-term
Chassahowitzka Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion


6.3 Game and Non-game Wildlife Habitat Maintenance, Enhancement, Restoration or Population Restoration.
Goal: Maintain, improve or restore game and non-game species populations and habitats.
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
6.3.1 Continue to collect biological harvest data at the CWMA check station.
6.3.2 Continue to conduct periodic spotlight monitoring surveys for white-tailed deer every three years.
6.3.3 Continue to conduct annual Chuck-wills-widow and common night-hawk point count survey.
6.3.4 Continue to maintain thirteen eastern bluebird boxes and four bat houses (Figure 13).
6.3.5 Continue to collect opportunistic wildlife occurrence data.
6.3.6 As guided by the CWMA WCPR Strategy, develop and implement a CWMA Florida Black Bear Habitat Management Plan by 2015.
6.3.7 Continue to collect biological harvest data at check station.
6.3.8 Continue to conduct periodic spotlight monitoring surveys for white-tailed deer every three years.
6.3.9 Continue to conduct annual Chuck-wills-widow and common night-hawk point count survey.
6.3.10 Continue to maintain thirteen eastern bluebird boxes and four bat houses (Figure 13).
6.3.11 As guided by the CWMA WCPR Strategy, continue to implement a CWMA Florida Black Bear Habitat Management Plan on the area.
6.3.12 Continue to collect opportunistic wildlife occurrence data.
Short-term
Long-term
Chassahowitzka Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion


6.4 Public Access and Recreational Opportunities
Goal: Provide public access and recreational opportunities.
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
6.4.1 Maintain public access and recreational opportunities to allow for a recreational carrying capacity of 550 visitors per day.
6.4.2 Continue to provide hunting opportunities for archery, muzzleloading gun, general gun, wild hog-dog season, raccoon season, spring turkey season, youth spring turkey season, migratory bird season, fishing and frogging.
6.4.3 Continue to provide two kiosks, bird list, recreation guide, Eagle Nest Sink interpretive sign, website, two driving tour interpretive signs and a driving tour guide for interpretation and education.
6.4.4 Continue to maintain 9.4 miles of trails (Figure 13).
6.4.5 Continue to monitor trails annually for visitor impacts.
6.4.6 Continue to maintain public access and recreational opportunities to allow for a recreational carrying capacity of 550 visitors per day.
6.4.7 Continue to provide hunting opportunities for archery, muzzleloading gun, general gun, wild hog-dog season, raccoon season, spring turkey season, youth spring turkey season, migratory bird season, fishing and frogging.
6.4.8 As necessary, review and revise the CWMA Recreation Master Plan.
6.4.9 Develop one new information sign and trailhead at the Annuteliga Hammock north entrance (Figure 13).
6.4.10 Design and develop an elevated walkway to Buford Spring (Figure 13).
6.4.11 Continue to maintain 9.4 miles of trails (Figure 13).
6.4.12 Continue to monitor trails annually for visitor impacts.
6.4.13 Reassess recreational opportunities every three years.
6.4.14 Cooperate with other agencies, County, stakeholders and regional landowners to investigate regional recreational opportunities including linking hiking and multi-use trail systems between adjacent public areas.
6.4.15 Continue to identify partnerships that could provide for environmental educational programs and outreach.
Short-term
Long-term
Chassahowitzka Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion

6.5 Environmental Education, Outreach and Partnerships
Goal: Develop and provide environmental education programs, and encourage volunteer participation in management support.
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
6.5.1 Continue to develop and conduct periodic environmental education and outreach programs.
6.5.2 Continue to coordinate with the Brooksville Ridge Volunteer Program for continued management support and assistance.
6.5.3 Continue to identify partnerships that could provide for environmental educational programs and outreach.
6.5.4 Continue to conduct periodic environmental education and outreach programs.
6.5.5 Continue to assess the need for and pursue research and environmental education partnership opportunities as appropriate.
6.5.6 Continue to coordinate with the Brooksville Ridge Volunteer Program for continued management support and assistance.
6.5.7 Continue to identify partnerships that could provide for environmental educational programs and outreach.
Short-term
Long-term
Chassahowitzka Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion

6.6 Exotic and Invasive Species Maintenance and Control
Goal: Remove exotic and invasive plants and animals and conduct needed maintenance- control.
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
6.6.1 Annually treat at least 20 acres of EPPC Category I and Category II invasive exotic plant species including cogongrass, air potato, Japanese climbing fern, skunkvine, natalgrass, camphor tree, Chinaberrytree, Chinese tallowtree, mimosa, paper mulberry, castorbean, Brazilian pepper, and guineagrass.
6.6.2 Continue control measures (hunting) on one exotic animal species (wild hog).
6.6.3 Continue to annually treat at least 50 acres of EPPC Category I and Category II invasive exotic plant species including cogongrass, air potato, Japanese climbing fern, skunkvine, natalgrass, camphor tree, Chinaberrytree, Chinese tallowtree, mimosa, paper mulberry, castorbean, Brazilian pepper, and guineagrass.
6.6.4 Continue control measures (hunting) on one exotic animal species (wild hog).
Short-term
Long-term
Chassahowitzka Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion


6.7 Hydrological Preservation and Restoration
Goal: Protect water quality and quantity, restore hydrology to the extent feasible, and maintain the restored condition.
2015
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2019
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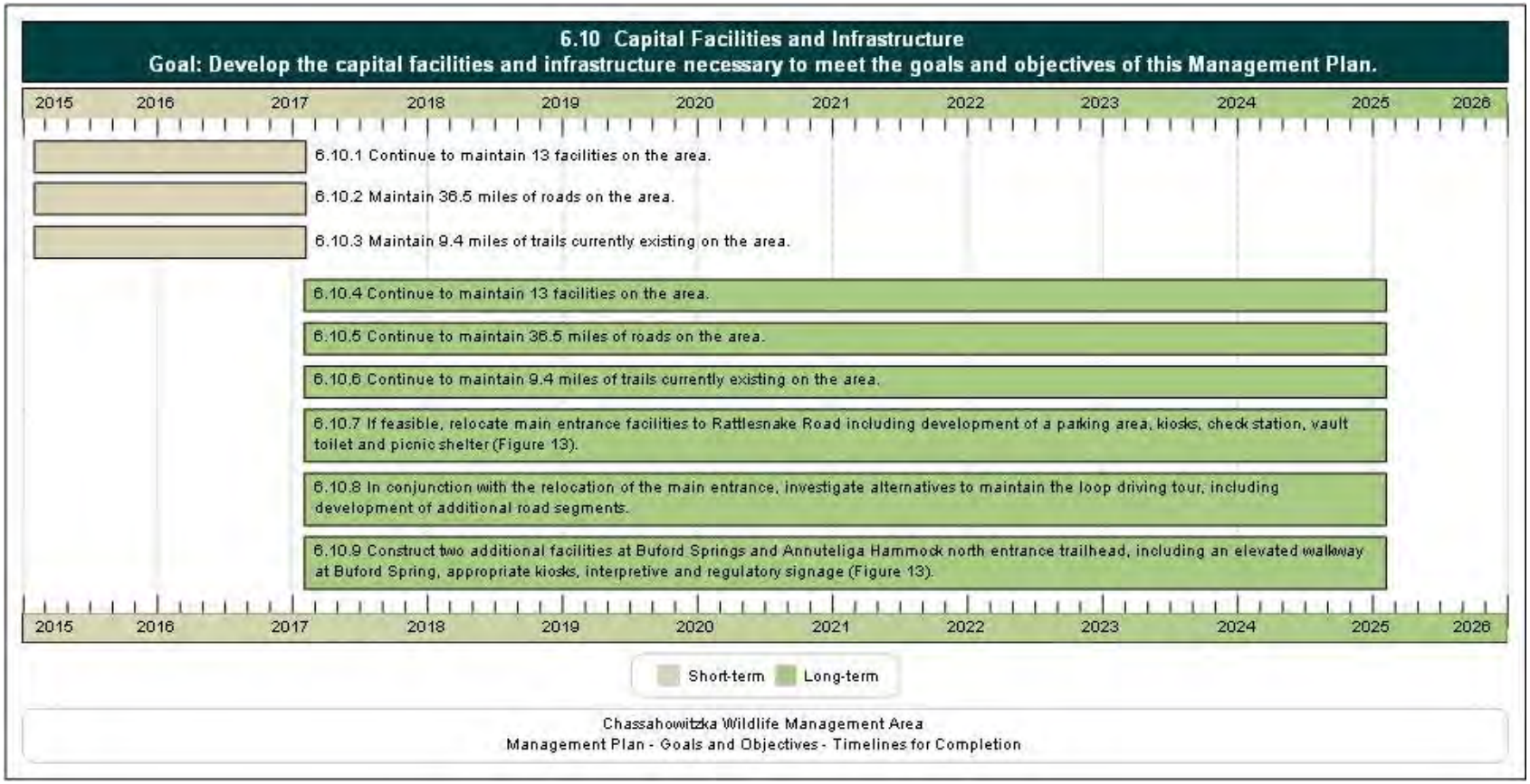
2021
2022
2023
2024
2025
2026
6.7.3 Protect and monitor the springs located on the area (Figure 13).
6.7.1 As recommended by the Hydrology Assessment and Conceptual Restoration Plan, install and maintain low-water crossings and culverts as appropriate to maintain and enhance natural hydrological functions.
6.7.2 Continue to cooperate with the SWFWMD for the monitoring of surface and ground water quality and quantity.
6.7.4 As recommended by the Hydrology Assessment and Conceptual Restoration Plan, continue to install and maintain low-water crossings and culverts as appropriate to maintain and enhance natural hydrological functions.
6.7.5 Continue to cooperate with the SWFWMD for the monitoring of surface and ground water quality and quantity.
6.7.6 Continue to protect and monitor the springs located on the area (Figure 13).
Short-term
Long-term
Chassahowitzka Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion

6.8 Forest Resource Management
Goal: Manage timber resources to improve or restore natural communities for the benefit of wildlife.
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
6.8.1 Cooperate with the FFS to update the Timber Assessment.
6.8.2 Consult with the FFS or a professional forestry consultant regarding forest management activities as appropriate.
6.8.3 Prepare and implement a Forest Management Plan including reforestation, harvesting and prescribed burning activities based on restoration and maintenance needs of the natural communities and other goals established for management of CWMA.
6.8.4 Continue to consult with the FFS or a professional forestry consultant regarding forest management activities as appropriate.
Short-term
Long-term
Chassahowitzka Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion

6.9 Cultural and Historical Resources
Goal: Protect, preserve and maintain cultural and historic resources.
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
6.9.1 Ensure all known sites are recorded in the DHR Master Site file.
6.9.2 As directed by DHR, continue to monitor, protect and preserve as necessary 26 identified cultural and historic sites located on the area.
6.9.3 Coordinate with DHR to assess the need for conducting a cultural resource survey.
6.9.4 Follow DHR's Management Procedures for Archaeological and Historical Sites and Properties on State-Owned or Controlled Properties for the management of cultural and historic resources.
6.9.5 Investigate the feasibility of providing interpretation for the Centralia site.
6.9.6 Cooperate with DHR or trained FWC Staff in designing site plans for development of infrastructure.
6.9.7 As directed by DHR, continue to monitor, protect and preserve as necessary 26 identified cultural and historic sites located on the area.
6.9.8 Continue to submit updates of additional sites to DHR for inclusion in their Master Site file.
6.9.9 As necessary, continue to coordinate with DHR for Archaeological Resource Management training of FWC staff.
6.9.10 If determined to be necessary by the DHR, contract for a cultural and archaeological resources survey.
6.9.11 Continue to follow DHR's Management Procedures for Archaeological and Historical Sites and Properties on State-Owned or Controlled Properties for the management of cultural and historic resources.
Short-term
Long-term
Chassahowitzka Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion


6.10 Capital Facilities and Infrastructure
Goal: Develop the capital facilities and infrastructure necessary to meet the goals and objectives of this Management Plan.
2015
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2020
2021
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2023
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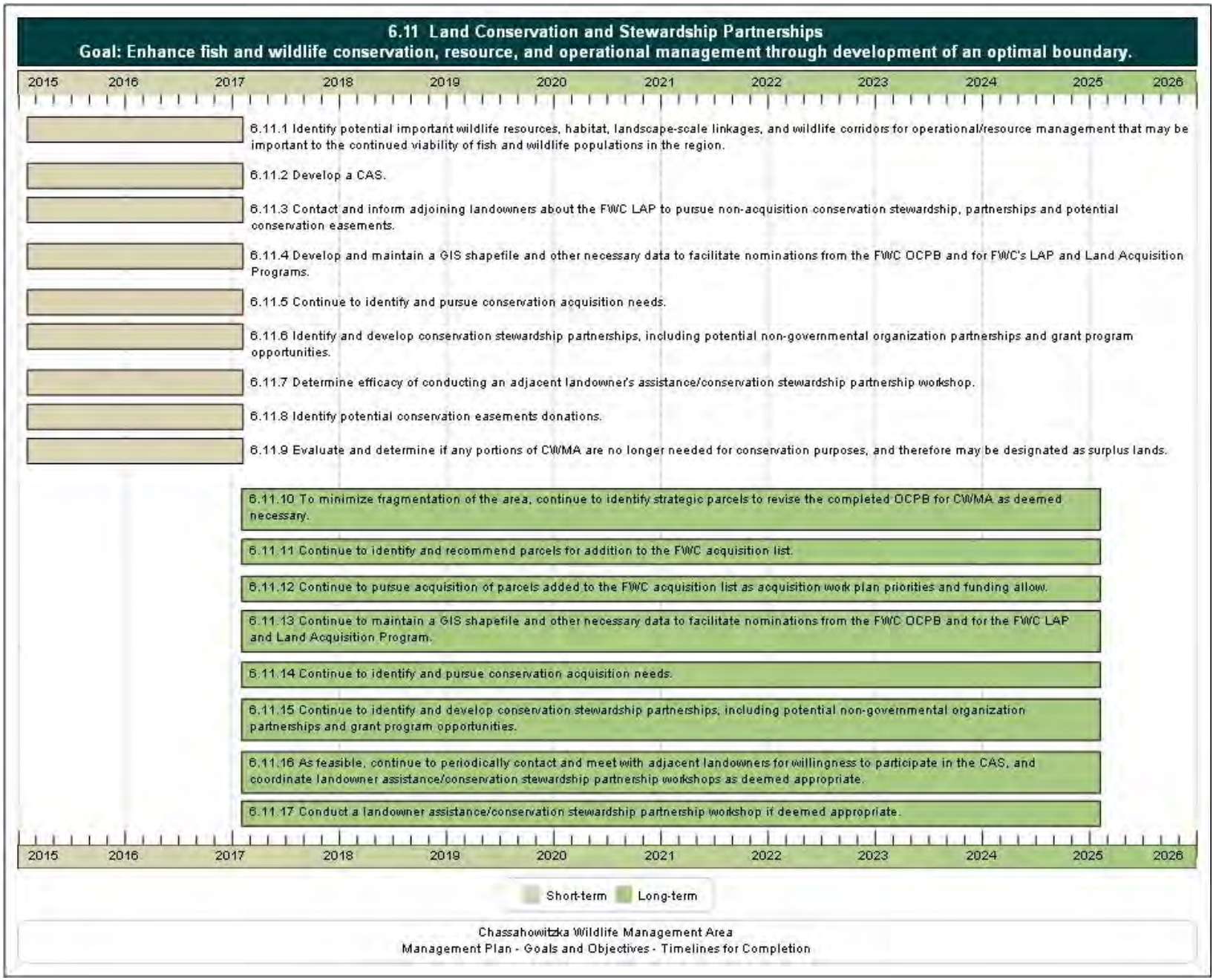
2026
6.10.1 Continue to maintain 13 facilities on the area.
6.10.2 Maintain 36.5 miles of roads on the area.
6.10.3 Maintain 9.4 miles of trails currently existing on the area.
6.10.4 Continue to maintain 13 facilities on the area.
6.10.5 Continue to maintain 36.5 miles of roads on the area.
6.10.6 Continue to maintain 9.4 miles of trails currently existing on the area.
6.10.7 If feasible, relocate main entrance facilities to Rattlesnake Road including development of a parking area, kiosks, check station, vault toilet and picnic shelter (Figure 13).
6.10.8 In conjunction with the relocation of the main entrance, investigate alternatives to maintain the loop driving tour, including development of additional road segments.
6.10.9 Construct two additional facilities at Buford Springs and Annuteliga Hammock north entrance trailhead, including an elevated walkway at Buford Spring, appropriate kiosks, interpretive and regulatory signage (Figure 13).
Short-term
Long-term
Chassahowitzka Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion


6.11 Land Conservation and Stewardship Partnerships
Goal: Enhance fish and wildlife conservation, resource, and operational management through development of an optimal boundary.
2015
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2023
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2025
2026
6.11.1 Identify potential important wildlife resources, habitat, landscape-scale linkages, and wildlife corridors for operational/resource management that may be important to the continued viability of fish and wildlife populations in the region.
6.11.2 Develop a CAS.
6.11.3 Contact and inform adjoining landowners about the FWC LAP to pursue non-acquisition conservation stewardship, partnerships and potential conservation easements.
6.11.4 Develop and maintain a GIS shapefile and other necessary data to facilitate nominations from the FWC OCPB and for FWC's LAP and Land Acquisition Programs.
6.11.5 Continue to identify and pursue conservation acquisition needs.
6.11.6 Identify and develop conservation stewardship partnerships, including potential non-governmental organization partnerships and grant program opportunities.
6.11.7 Determine efficacy of conducting an adjacent landowner's assistance/conservation stewardship partnership workshop.
6.11.8 Identify potential conservation easements donations.
6.11.9 Evaluate and determine if any portions of CWMA are no longer needed for conservation purposes, and therefore may be designated as surplus lands.
6.11.10 To minimize fragmentation of the area, continue to identify strategic parcels to revise the completed OCPB for CWMA as deemed necessary.
6.11.11 Continue to identify and recommend parcels for addition to the FWC acquisition list.
6.11.12 Continue to pursue acquisition of parcels added to the FWC acquisition list as acquisition work plan priorities and funding allow.
6.11.13 Continue to maintain a GIS shapefile and other necessary data to facilitate nominations from the FWC OCPB and for the FWC LAP and Land Acquisition Program.
6.11.14 Continue to identify and pursue conservation acquisition needs.
6.11.15 Continue to identify and develop conservation stewardship partnerships, including potential non-governmental organization partnerships and grant program opportunities.
6.11.16 As feasible, continue to periodically contact and meet with adjacent landowners for willingness to participate in the CAS, and coordinate landowner assistance/conservation stewardship partnership workshops as deemed appropriate.
6.11.17 Conduct a landowner assistance/conservation stewardship partnership workshop if deemed appropriate.
2015
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2023
2024
2025
2026
Short-term
Long-term
Chassahowitzka Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion

6.12 Research Opportunities
Goal: Explore and pursue cooperative research opportunities.
2015
2016
2017
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2019
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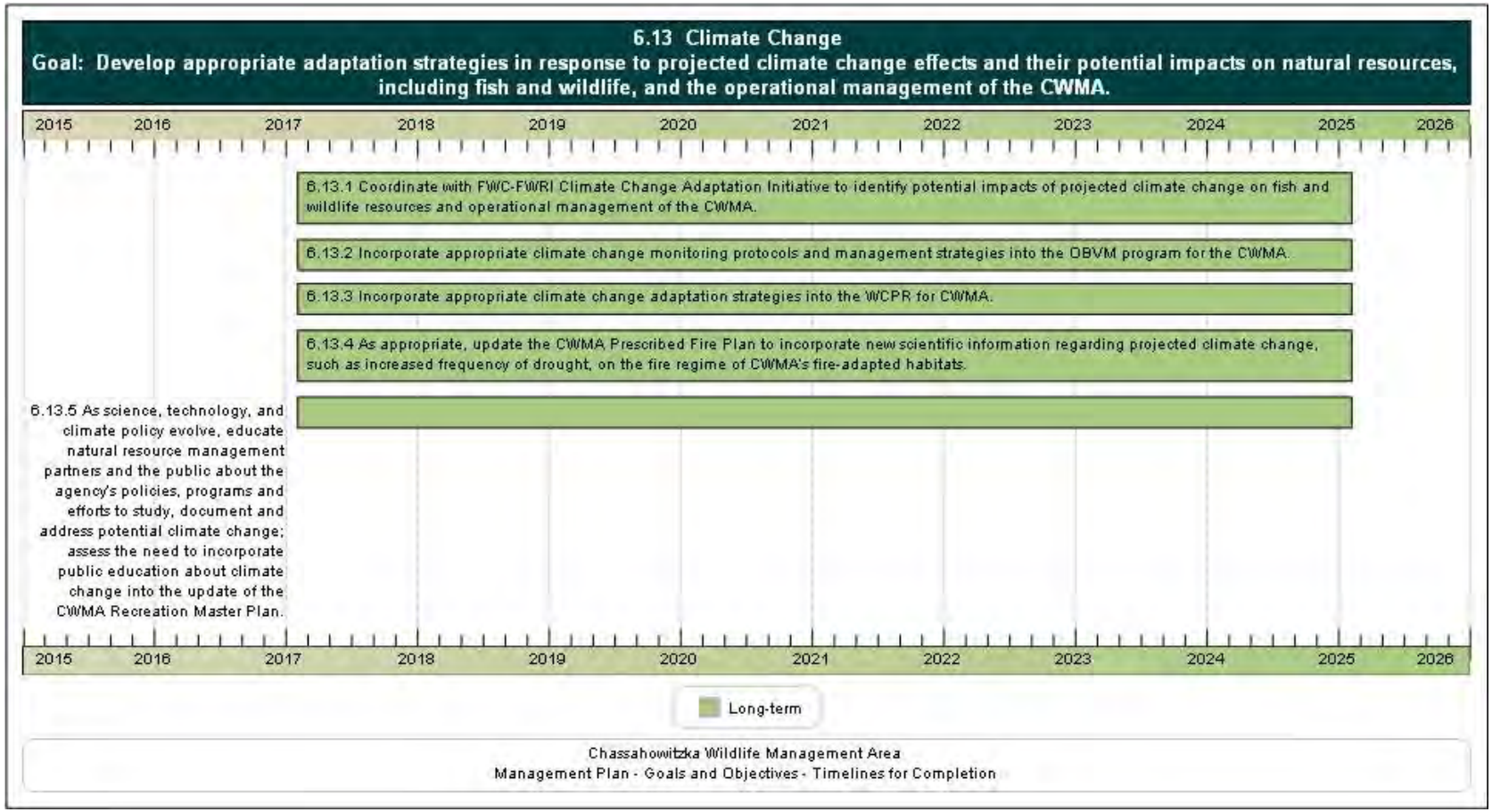
2021
2022
2023
2024
2025
2026
6.12.1 Assess the need for and pursue research partnership opportunities as appropriate.
6.12.2 Work with FWC's Black Bear Management Program to perform a literature search to determine if there are any known impacts to Florida black bear ecology due to the hunting of white-tailed deer, wild hogs and birds utilizing hunting dogs.
6.12.3 Facilitate cooperative research opportunities through universities and the FWC FWRI.
6.12.4 Cooperate with researchers, universities and others as appropriate.
6.12.5 Continue to assess the need for and pursue research partnership opportunities as appropriate.
6.12.6 Continue to facilitate cooperative research opportunities through universities and the FWC FWRI.
6.12.7 Continue to cooperate with researchers, universities and others as appropriate.
Short-term
Long-term
Chassahowitzka Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion


6.13 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 CWMA.
2015
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2019
2020
2021
2022
2023
2024
2025
2026
6.13.1 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 CWMA.
6.13.2 Incorporate appropriate climate change monitoring protocols and management strategies into the OBVM program for the CWMA.
6.13.3 Incorporate appropriate climate change adaptation strategies into the WCPR for CWMA.
6.13.4 As appropriate, update the CWMA Prescribed Fire Plan to incorporate new scientific information regarding projected climate change, such as increased frequency of drought, on the fire regime of CWMA's fire-adapted habitats.
6.13.5 As science, technology, and climate policy evolve, educate natural resource management partners and the public about the agency's policies, programs and efforts to study, document and address potential climate change; assess the need to incorporate public education about climate change into the update of the CWMA Recreation Master Plan.
Long-term
Chassahowitzka Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion

8 Resource Management Challenges and Strategies

The following section identifies and describes further management needs and challenges associated with CWMA, and provide solution strategies that will address these challenges. These specific challenges may not be fully being addressed in the broader goals and objectives (Section 6) above, and are therefore provided here.

8.1 Challenge 1: River bank erosion from unauthorized public use continues to be an issue at the Weeki Wachee tract.

8.1.1 Strategy: Improve regulatory and informational signage regarding erosion control efforts at the affected areas and enforce closed zones.

8.2 Challenge 2: The natural resource and recreational connection between Annutteliga Hammock and Seville via SWFWMD property should be improved.

8.2.1 Strategy 1: Work with the SWFWMD to develop and improve natural resource and recreational connectivity among the FWC and SWFWMD-managed tracts.

8.3 Challenge 3: Delineation of CWMA boundary requires improvement.

8.3.1 Strategy 1: Maintain adequate sign posting of the CWMA boundary; remove potentially confusing interior posting.

8.4 Challenge 4: The management agreement with the USFWS National Wildlife Refuge is dated.

8.4.1 Strategy 1: Cooperate with the USFWS to update the management agreement.

8.5 Challenge 5: Access easement issues exist for various privately owned inholdings.

8.5.1 Strategy 1: Work to resolve potential conflicts regarding access to privately owned inholdings along official and historic access easements.

8.6 Challenge: A complete boundary survey of CWMA is lacking.

8.6.1 Strategy: Explore the feasibility of contracting for boundary survey of the area.

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

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

The cost estimate below, although exceeding what FWC typically receives through the appropriations process, is estimated to be what is necessary for optimal management, and is consistent with the current and planned resource management and operation and of CWMA. Cost estimate categories are those currently recognized by FWC and the Land Management Uniform Accounting Council. More information on these categories, as well as the Fiscal Year 2013 - 2014 Operational Plan showing detailed cost estimates by activity and categories of expenditures, may be found in Appendix 13.13.

Chassahowitzka WMA Management Plan Cost Estimate

Maximum expected one year expenditure

Resource Management	
Exotic Species Control	$15,153
Prescribed Burning	$117,097
Cultural Resource Management	$1,438
Timber Management	$9,421
Hydrological Management	$4,048
Other (Restoration, Enhancement, Surveys, Monitoring,	$131,696
Subtotal	**$278,852**
Administration	
General administration	**$45,458**
Support	
Land Management Planning	$30,201
Land Management Reviews	$4,607
Training/Staff Development	$1,438
Vehicle Purchase	$103,645
Vehicle Operation and Maintenance	$52,929
Other (Technical Reports, Data Management, etc.)	$5,044
Subtotal	**$197,864**
Capital Improvements	
New Facility Construction	$148,156
Facility Maintenance	$139,592
Subtotal	**$287,748**
Visitor Services/Recreation	
Info./Education/Operations	**$60,889**
Law Enforcement	
Resource protection	**$24,827**
Total	**$895,639 ***

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

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

Chassahowitzka WMA Management Plan Cost Estimate

Ten-year projection

Resource Management	
Exotic Species Control	$133,132
Prescribed Burning	$1,028,828
Cultural Resource Management	$12,635
Timber Management	$82,774
Hydrological Management	$35,563
Other (Restoration, Enhancement, Surveys, Monitoring, etc.)	$1,157,094
Subtotal	**$2,450,028**
Administration	
General administration	**$399,397**
Support	
Land Management Planning	$265,345
Land Management Reviews	$9,947
Training/Staff Development	$12,635
Vehicle Purchase	$364,732
Vehicle Operation and Maintenance	$465,044
Other (Technical Reports, Data Management, etc.)	$44,316
Subtotal	**$1,162,020**
Capital Improvements	
New Facility Construction	$314,907
Facility Maintenance	$1,226,472
Subtotal	**$1,541,380**
Visitor Services/Recreation	
Info./Education/Operations	**$534,981**
Law Enforcement	
Resource protection	**$218,136**
Total	**$6,305,941** *

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

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

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 CWMA 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 13.8). 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 CWMA in compliance with Chapter 388.4111 F.S. (Appendix 13.14). This plan was developed in cooperation with the local Hernando County arthropod control agency. This plan is also in conformance with the Local Government Comprehensive Plan as approved and adopted for Hernando County, Florida, (Appendix 13.15).

12 Endnotes

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