A Management Plan for the Caravelle Ranch Wildlife Management Area

2014 - 2024

Putnam and Marion Counties, Florida

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

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FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

MARJORY STONEMAN DOUGLAS BUILDING
3900 COMMONWEALTH BOULEVARD
TALLAHASSEE, FLORIDA 32399-3000

RICK SCOTT
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LT. GOVERNOR

HERSCHEL T. VINYARD JR.
SECRETARY

August 19, 2014

Mr. David Alden
Florida Fish and Wildlife Conservation Commission
Division of Habitat and Species Conservation
Terrestrial Habitat Conservation and Restoration Section
620 South Meridian Street
Tallahassee, Florida, 32399-1600

Re: Caravelle Ranch Wildlife Management Area – Lease # 4100

Dear ~~Mr. Alden~~: David

The Division of State Lands, Office of Environmental Services, acting as agent for the Board of Trustees of the Internal Improvement Trust Fund, hereby approves the Caravelle Ranch Wildlife Management Area management plan. The next management plan update is due August 19, 2024.

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

Sincerely,

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

St. Johns River
Water Management District
Hans G. Tanzler III, Executive Director

4049 Reid Street • P.O. Box 1429 • Palatka, FL 32178-1429 • (386) 329-4500
On the Internet at floridaswater.com.

December 10, 2014

Jennifer Tucker
Florida Fish and Wildlife Conservation Commission
Division of Habitat and Species Conservation
Land Conservation and Planning
620 South Meridian Street
Tallahassee FL, 32399

Dear Jennifer,

On December 9, 2014, the Governing Board of St. Johns River Water Management District approved the 10-year management plan for Caravelle Ranch Wildlife Management Area.

We appreciate FWC staff taking the time to provide a presentation to the Governing Board members.

Sincerely,

J.B. Miller

J.B. Miller
Land Resource Specialist
Bureau of Real Estate Services

GOVERNING BOARD

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A Management Plan
for
Caravelle Ranch Wildlife Management Area

Putnam and Marion Counties, Florida

Owned by the Board of Trustees of the Internal Improvement Trust Fund and the
St. Johns River Water Management District
Managed by the Florida Fish and Wildlife Conservation Commission

April 2014

Approved

Thomas Eason Director,
Division of Habitat and Species Conservation

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LAND MANAGEMENT PLAN EXECUTIVE SUMMARY

Lead Agency: Florida Fish and Wildlife Conservation Commission (FWC)
Common CRWMA of Property: Caravelle Ranch Wildlife Management Area (CRWMA)
Location: Putnam and Marion Counties, Florida
Acreage Total: 10,450 acres
Acreage Breakdown:

Land Cover Classification	Acres	Percent of Total Area
Abandoned field	619.1	5.1%
Basin swamp	77.3	0.6%
Canal/ditch	11.6	0.1%
Clearing	206.3	1.7%
Depression marsh	103.2	0.8%
Developed	7.9	0.1%
Dome swamp	108.5	0.9%
Floodplain swamp	5,000.9	41.1%
Hydric hammock	822.2	6.8%
Impoundment/artificial pond	4.0	<0.1%
Mesic flatwoods	1,601.4	13.2%
Mesic hammock	796.7	6.5%
Pasture - improved	1,472.0	12.1%
Scrubby flatwoods	23.8	0.2%
Wet flatwoods	1,297.2	10.7%
Wet prairie	21.6	0.2%
Xeric hammock	2.1	<0.1%

*GIS-calculated acreage for land cover classification varies slightly from actual total acreage.
Lease/Management Agreement No.: 4100 (Appendix 13.1)
Use: Single _____ Management Responsibilities:
Multiple X Agency FWC Responsibilities
Wildlife Management Area, resource protection, law enforcement
Designated Land Use: Wildlife Management Area.
Sublease (s): None
Encumbrances: Apiary Agreement, Cattle Grazing Contract, Three Housing Agreements.
Type Acquisition: Conservation and Recreation Lands, Save Our Rivers, Preservation 2000.
Unique Features: Natural communities including basin swamp, depression marsh, dome swamp, floodplain swamp, hydric hammock, mesic flatwoods, mesic hammock, pine plantation, scrubby flatwoods, wet flatwoods, wet prairie, xeric hammock, and some ruderal areas (abandoned field, improved pasture, clearing, developed, canal/ditch, impoundment/artificial pond).
Archaeological/Historical: Seven sites documented within CRWMA.
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: 214.5 acres FWC Additions and Inholdings list; 66,302 acres remaining in the Etoniah/Cross Florida Greenway Florida Forever Project (Figure 3), and potential additional acreage within the Optimal Conservation Planning boundary (Figure 10).
Surplus Lands/Acreage: None.
Public Involvement: Management Advisory Group consensus building meeting and Public Hearing (Appendix 13.2).

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

ARC Approval Date _____ BTIITF Approval Date: _____

Comments: _____

_____

_____

_____

_____

Land Management Plan Compliance Checklist

Required for State-owned conservation lands over 160 acres

Section A: Acquisition Information Items

Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
1	The common name of the property.	18-2.018 & 18-2.021	1
2	The land acquisition program, if any, under which the property was acquired.	18-2.018 & 18-2.021	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, 133-134
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	2, 5, 72
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	48
7	Identification of other parcels of land within or immediately adjacent to the property that should be purchased because they are essential to management of the property. *Please clearly indicate parcels on a map.*	18-2.021	73 - 75
8	Identification of adjacent land uses that conflict with the planned use of the property, if any.	18-2.021	9
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)	6
10	Proximity of property to other significant State, local or federal land or water resources.	18-2.021	7 - 11

Section B: Use Items

Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
11	The designated single use or multiple use management for the property, including use by other managing entities.	18-2.018 & 18-2.021	47
12	A description of past and existing uses, including any unauthorized uses of the property.	18-2.018 & 18-2.021	45 - 48
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	46 - 48
14	A description of the management responsibilities of each entity involved in the property's management and how such responsibilities will be coordinated.	18-2.018	76
15	Include a provision that requires that the managing agency consult with the Division of Historical Resources, Department of State before taking actions that may adversely affect archeological or historical resources.	18-2.021	71, 76, 378
16	Analysis/description of other managing agencies and private land managers, if any, which could facilitate the restoration or management of the land.	18-2.021	76, 113

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)	46 - 48
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	114
19	Letter of compliance from the local government stating that the LMP is in compliance with the Local Government Comprehensive Plan.	BOT requirement	PENDING
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	48, 53 - 109
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	47 - 48
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	193
23	A statement regarding incompatible use in reference to Ch. 253.034(10).	253.034(10)	6 - 7

*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	9 - 10, 154
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)	154

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)	9 -10, 154
27	Summary of comments and concerns expressed by the advisory group for parcels over 160 acres	18-2.021	154 - 158
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)	9 - 10, 154
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	53 - 54, 171
30	Summary of comments and concerns expressed by the management review team, if required by Section 259.036, F.S.	18-2.021	171
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	171

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	12 - 44, 184
33	Insert FNAI based natural community maps when available.	ARC consensus	18
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	44, 12 - 44
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	12 - 44
36	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding beaches and dunes.	18-2.021	43
37	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding mineral resources, such as oil, gas and phosphate, etc.	18-2.018 & 18-2.021	43

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	12 - 44
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	33 -34
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	12 - 44, 263
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)	53 - 109
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.	↓	53 - 109
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.		53 - 112
42-C.	The associated measurable objectives to achieve the goals.		78 - 90
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.*		194, 202, 265, 319, 378, 392
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.		109 - 112, 382
43	***Quantitative data description of the land regarding an inventory of forest and other natural resources and associated acreage. *See footnote.*	253.034(5)	12 - 44
44	Sustainable Forest Management, including implementation of prescribed fire management	18-2.021, 253.034(5) & 259.032(10) ↓	
44-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).		53 - 109
44-B.	Detailed description of Both short and long-term management goals (see requirement for # 42-B).		70
44-C.	Measurable objectives (see requirement for #42-C).		86
44-D.	Related activities (see requirement for #42-D).		194, 202, 265, 319, 378, 392
44-E.	Budgets (see requirement for #42-E).		109 - 112, 382
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).	↓	53 - 109

45-B.	Detailed description of Both short and long-term management goals (see requirement for # 42-B).		53 - 109
45-C.	Measurable objectives (see requirement for #42-C).		78 - 90
45-D.	Related activities (see requirement for #42-D).		194, 202, 265, 319, 378, 392
45-E.	Budgets (see requirement for #42-E).		109 - 112, 382
46	***Quantitative data description of the land regarding an inventory of exotic and invasive plants and associated acreage. *See footnote.*	253.034(5)	23, 64
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.	BOARD OF TRUSTEES requirement via lease language	114, 399
48	Exotic and invasive species maintenance and control	259.032(10) & 253.034(5)	
48-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	64
48-B.	Detailed description of Both short and long-term management goals (see requirement for # 42-B).		83 - 84
48-C.	Measurable objectives (see requirement for #42-C).		83 - 84
48-D.	Related activities (see requirement for #42-D).		194, 202, 265, 319, 378, 392
48-E.	Budgets (see requirement for #42-E).		109 - 112, 382

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	4
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	43
51	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding swamps, marshes and other wetlands.	18-2.021	16 - 30
52	***Quantitative description of the land regarding an inventory of hydrological features and associated acreage. *See footnote.*	253.034(5)	43, 68 - 70
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).	↓	68 - 70, 85 - 86
53-B.	Detailed description of Both short and long-term management goals (see requirement for # 42-B).		85 - 86

53-C.	Measurable objectives (see requirement for #42-C).		85 - 86
53-D.	Related activities (see requirement for #42-D).		194, 202, 265, 319, 378, 392
53-E.	Budgets (see requirement for #42-E).		109 - 112, 382

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	44, 378
55	***Quantitative data description of the land regarding an inventory of significant land, cultural or historical features and associated acreage.	253.034(5)	44, 378
56	A description of actions the agency plans to take to locate and identify unknown resources such as surveys of unknown archeological and historical resources.	18-2.021	71, 378
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).	↓	71
57-B.	Detailed description of Both short and long-term management goals (see requirement for # 42-B).		86 - 87
57-C.	Measurable objectives (see requirement for #42-C).		86 - 87
57-D.	Related activities (see requirement for #42-D).		194, 202, 265, 319, 378, 392
57-E.	Budgets (see requirement for #42-E).		109 - 112, 382

**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)	71
59	Capital Facilities and Infrastructure	259.032(10) & 253.034(5)	
59-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	65 - 68, 71
59-B.	Detailed description of Both short and long-term management goals (see requirement for # 42-B).		87 - 88
59-C.	Measurable objectives (see requirement for #42-C).		87 - 88
59-D.	Related activities (see requirement for #42-D).		194, 202, 265,

			319, 378, 392
59-E.	Budgets (see requirement for #42-E).		109 - 112, 382
60	*** Quantitative data description of the land regarding an inventory of recreational facilities and associated acreage.	253.034(5)	71
61	Public Access and Recreational Opportunities	259.032(10) & 253.034(5)	
61-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	65 - 68
61-B.	Detailed description of Both short and long-term management goals (see requirement for # 42-B).		84 - 85
61-C.	Measurable objectives (see requirement for #42-C).		84 - 85
61-D.	Related activities (see requirement for #42-D).		194, 202, 265, 319, 378, 392
61-E.	Budgets (see requirement for #42-E).		109 - 112, 382

Section H: Other/ Managing Agency Tools

Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
62	Place this LMP Compliance Checklist at the front of the plan.	ARC and managing agency consensus	iii
63	Place the Executive Summary at the front of the LMP. Include a physical description of the land.	ARC and 253.034(5)	i
64	If this LMP is a 10-year update, note the accomplishments since the drafting of the last LMP set forth in an organized (categories or bullets) format.	ARC consensus	49 - 52
65	Key management activities necessary to achieve the desired outcomes regarding other appropriate resource management.	259.032(10)	53 - 109
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)	109 - 112, 382
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)	109 - 112, 382
68	A statement of gross income generated, net income and expenses.	18-2.018	47, 109 - 112, 382

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

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1 Introduction and General Information

Nestled between the Ocklawaha and St. Johns Rivers, the Caravelle Ranch Wildlife Management Area (CRWMA) is set within a much larger mosaic of public conservation lands that are interspersed with hardwood river swamps, pine flatwoods, punctuated with small depression ponds, hardwood hammocks, and scattered pasture lands. Providing floodplain, watershed, and water quality protection for these rivers and the Cross-Florida Barge Canal, CRWMA provides habitat for a variety of imperiled and more common native wildlife species along with a diverse array of fish and wildlife-based public outdoor recreational opportunities including hunting, fishing, wildlife viewing, hiking, horseback riding, and bicycling. CRWMA is managed by the Florida Fish and Wildlife Conservation Commission (FWC) to conserve habitat for an array of imperiled and other native wildlife including the Florida black bear, gopher tortoise, Florida sandhill crane, along with other important natural and cultural resources.

The FWC is currently assigned lead management authority for approximately 10,450 acres of CRWMA. This lead managed area is composed of public property owned by the State of Florida (approximately 5,180 acres) and approximately 5,270 acres, titled to the St. Johns River Water Management District (SJRWMD). The FWC lead managed portion of CRWMA is situated in Putnam County west of the St. Johns River and north of the Ocklawaha River, approximately ten miles south of Palatka, with a small portion in northeast Marion County. The CRWMA is roughly bisected by State Road (SR) 19. The property begins 0.6 miles south of where SR19 crosses the Barge Canal within parts of Sections 25, 26, 27, and 37, Township 11 South and Range 25 East, as well as within the entire Sections 19, 20, 28, 29, and 30 in Township 11 South and Range 26 East.

Additionally, the FWC subleases approximately 16,027 acres from the Department of Environmental Protection (DEP), Division of Recreation and Parks' Office of Greenways and Trails (OGT) for cooperative management. Both the SJRWMD and DEP-OGT leased lands are included within the overall Establishment Order for CRWMA to provide outdoor recreational opportunities including hunting and fishing. Combined with the lands for which the FWC is the lead managing agency, there are a total of approximately 27,251 acres within the overall Establishment Order for CRWMA (Figure 1).

However, the DEP-OGT is the lead managing agency for those portions of CRWMA that have been sub-leased for recreational opportunities to the FWC by the DEP-OGT. Therefore, this management plan will address only the approximately 10,450 acres of CRWMA on which the FWC is the lead managing agency; the OGT lands are not addressed in this FWC management plan, but are covered in a management plan developed by the DEP.

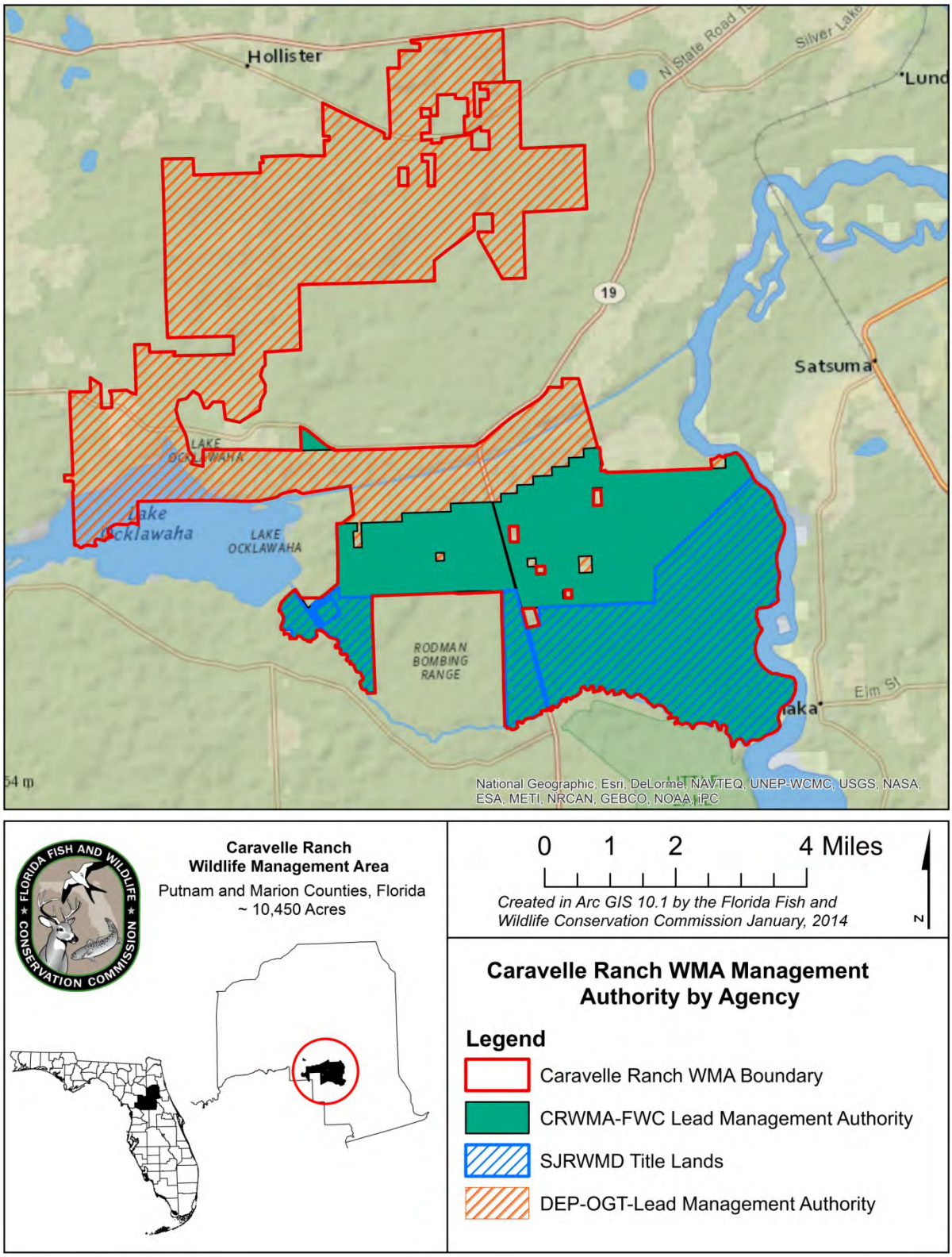


Figure 1. CRWMA Management Authority by Agency

1.1 Management Plan Purpose

This Management Plan serves as the basic statement of policy and direction for the management of CRWMA. It provides information including the past usage, conservation acquisition history, and descriptions of the natural and cultural resources found on CRWMA. Furthermore, it identifies the 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 CRWMA'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 DEP's Division of State Lands (DSL), in compliance with paragraph seven of Lease No. 4100 (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 the DSL. Terms (Appendix 13.15) used in this Management Plan describing management activities and associated measurable goals and objectives conform to those developed for the Land Management Uniform Accounting Council Biennial Land Management Operational Report.

1.1.1 FWC Planning Philosophy

The FWC's planning philosophy includes emphasizing management recommendation consensus-building among stakeholders and input from user groups and the general public at the beginning of the planning process. The FWC engages stakeholders by convening a Management Advisory Group (MAG) and solicits additional input from user groups and the general public at a public hearing (Appendix 13.2). The FWC also engages area, district, and regional agency staff, as well as other FWC staff expertise, in developing this Management Plan, thereby facilitating area biologist and manager "ownership" of the Management Plan. Collectively, this diverse array of input and expertise provides the framework for 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 CRWMA Management Plan (Sections 5 – 8).

Additional management planning input is received through Land Management Reviews (LMR) conducted every five years, which includes a review of the previous Management Plan, as well as a field review of CRWMA. The LMR report (Section 5.1, Appendix 13.3) provides FWC staff with important information and guidance provided by a diverse team of land management auditors, and communicates the recommendations of the LMR team to the FWC so they may be adequately addressed in this Management Plan, and thus guide the implementation of the LMR team recommendations on CRWMA.

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

1.2 Location

The FWC lead managed portion of CRWMA is situated in Putnam County west of the St. Johns River and north of the Ocklawaha River, approximately ten miles south of Palatka, with a small portion of SJRWMD-owned land located in northeast Marion County. As shown in Figure 2, the CRWMA lies within Putnam County, roughly bisected by State Road (SR) 19. The property begins 0.6 miles south of where SR19 crosses the Barge Canal within parts of Sections 25, 26, 27, and 37, Township 11 South and Range 25 East, as well as within the entire Sections 19, 20, 28, 29, and 30 in Township 11 South and Range 26 East. The portion of CRWMA located in northeast Marion County is within Section 3, Township 11, and Range 25. The CRWMA is not located within any Area of Critical State Concern [Chapter 380.05, FS)] or within or adjacent to an aquatic preserve (Chapter 18-2.018 and 18-2.021 FAC).

The main entrance to CRWMA is on the east side of SR 19 approximately 1.1 miles south of the Cross Florida Barge Canal and 2.7 miles north of the Ocklawaha River. Another entrance is located on the west side of SR19 directly opposite the main entrance. There is also a walk-in entrance on the east side of SR19 approximately 1.5 miles south of the main entrance. This entrance is for accessing the hiking trails and includes a parking area.

CRWMA entrance sign, *FWC*

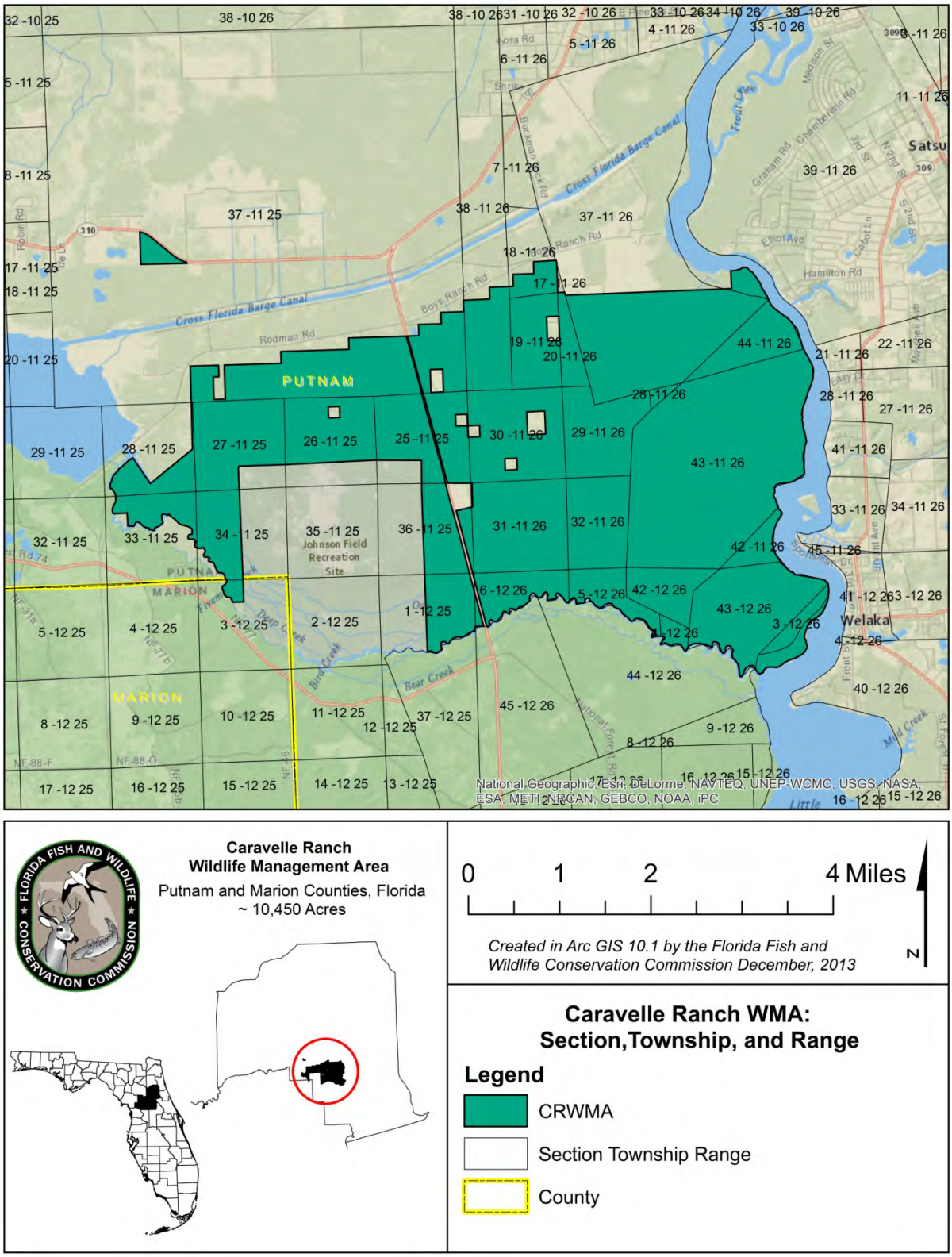


Figure 2. CRWMA Section, Township, and Range

1.3 Acquisition

The State of Florida purchased the original 5,103 acre portion of CRWMA on which the FWC has lead management authority in 1994 through the Conservation and Recreation Lands (CARL) program for conservation and public outdoor resource based recreation purposes. A donation and subsequent purchases by the State under the Preservation 2000 Program increased the acres on which the FWC is lead managing agency to 5,180.

The CARL Trust Fund was approved in 1979 and relies on funds generated principally from the documentary stamp tax and severance taxes on phosphate rock. The CARL program was established for the purpose of purchasing environmentally endangered lands and other lands such as those which have potential for public recreation.

1.4 Purpose for Acquisition of the Property

The primary purposes for acquiring lands within the CRWMA under the CARL Program were to expedite restoration and protection of the St. Johns and Ocklawaha River systems, protect endangered and threatened species, and provide resource-based public outdoor recreational opportunities.

The SJRWMD lands that are leased to the FWC within the CRWMA were acquired by the SJRWMD in 1992 under the Save Our Rivers Program (SOR). The primary purposes for acquiring these lands were for floodplain, watershed, and water quality protection of the St. Johns and Ocklawaha River systems while also providing natural resource-based public recreational opportunities.

1.5 Management Authority

The FWC is the designated lead managing agency for CRWMA under the authority granted by Lease Number 4100 from the Board of Trustees agent, the 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, 597, and 870 of the Florida Statutes. These constitutional provisions and laws provide the FWC the authority to protect, conserve, and manage the State's fish and wildlife resources.

As stated previously, the FWC is currently assigned lead management authority for approximately 10,450 acres of CRWMA. This lead managed area is composed of public property owned by the State of Florida and the SJRWMD, 5,180 acres and 5,270 acres respectively. Additionally, the FWC subleases approximately 16,027 acres from the DEP-OGT, DRP for cooperative management.

1.6 Management Directives

The Board of Trustees' Lease Agreement with the FWC, directs the 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 259.032(11), FS..." The lease agreement further directs the 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."

Additionally, the FWC's lease agreement from the SJRWMD requires that the lands "be managed and maintained in an environmentally acceptable manner so as to restore and protect their natural state and condition" and to provide public recreational opportunities to the extent possible considering the environmental sensitivity and suitability of these lands and as compatible with the SJRWMD primary water management functions as provided in Chapter 373.59 FS.

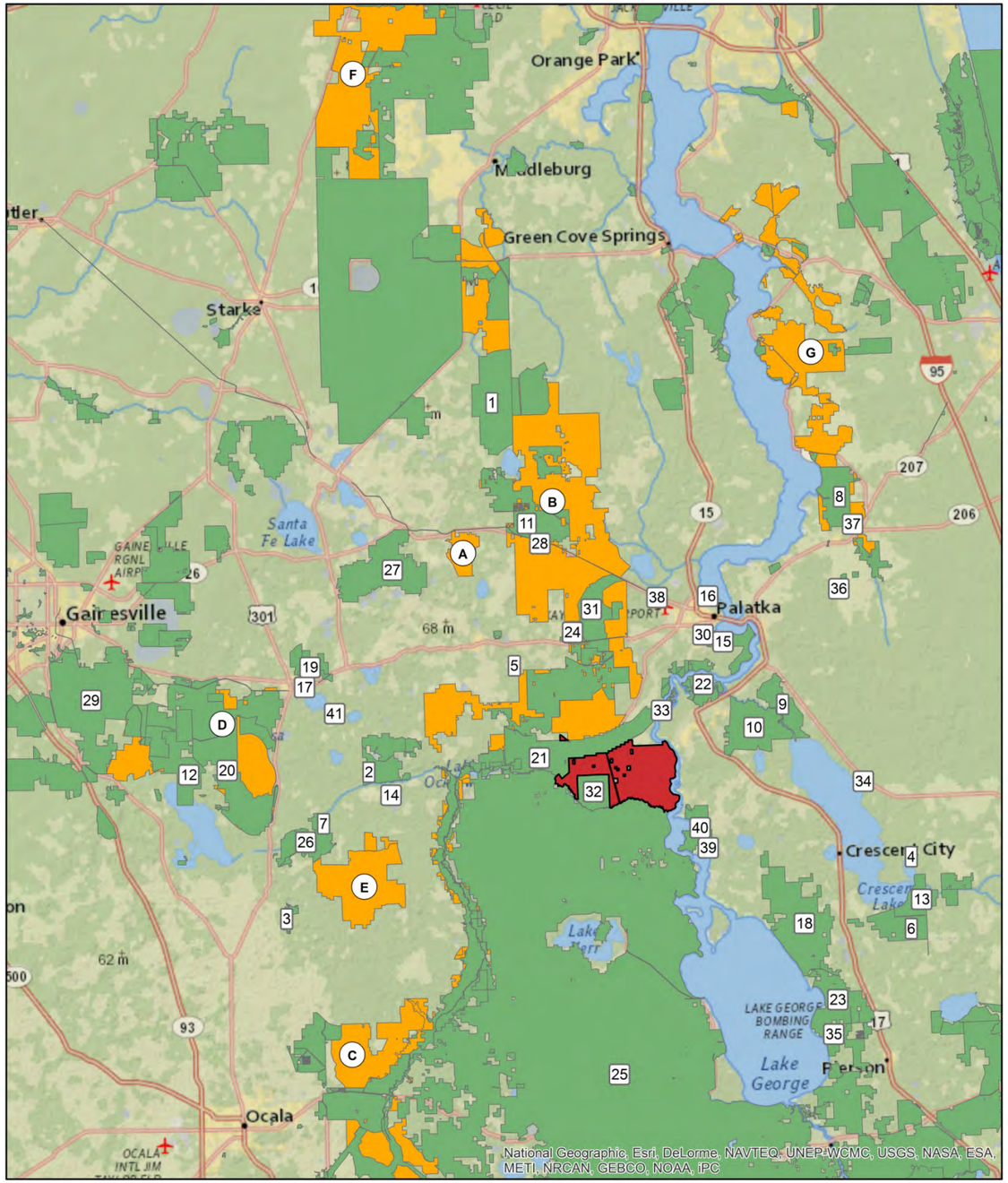
1.7 Title Interest and Encumbrances

CRWMA is owned by the State of Florida, with title held by the Board of Trustees (Governor and Cabinet) and the SJRWMD. The following agreements/contracts are in place: Apiary Agreement (#12169), Cattle Grazing Contract (#08191), three housing agreements (#10023, 10026, and 10031), Timber Contract (#11335), and Trail Agreement (#96022). There are no outstanding title interests on CRWMA. Agreements and contracts currently in place will not impede the FWC's ability to manage the property in conformance with the lease requirements and management directives outlined above.

1.8 Proximity to Other Public Properties

As shown in Figure 3, CRWMA is located in the vicinity of a large number of publicly owned conservation areas and Florida Forever projects. Tables 1 and 2 list the conservation lands and Florida Forever projects within a 20-mile radius of CRWMA, including lands managed by public and private entities, that conserve cultural and natural resources within this region of Florida.

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



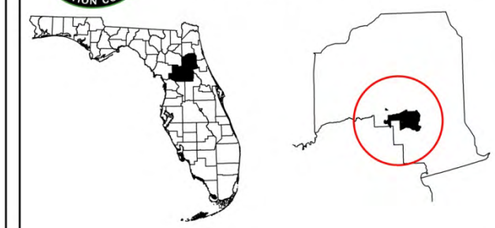
Conservation Lands and Florida Forever Projects

Conservation Land	Map Label
Belmore State Forest	1
BJ Bar Ranch Conservation Easement	2
Black Sink Prairie	3
Bull Creek Campground	4
Carl Duval Moore State Forest and Park	5
Crescent Lake Conservation Area	6
Crones Cradle Conservation Easement	7
Deep Creek Conservation Area (SJRWMD)	8
Dunns Creek Conservation Area	9
Dunns Creek State Park	10
Etoniah Creek State Forest	11
Georgia Pacific-Lochloosa Conservation Easement	12
Haw Creek Preserve State Park	13
Horseshoe Lake	14
Horseshoe Point Conservation Area	15
J. A. Ginn Jr. Parcel	16
Janes Conservation Easement	17
Lake George Conservation Area	18
Little Orange Creek Nature Park	19
Lochloosa Wildlife Conservation Area	20
Marjorie Harris Carr Cross Florida Greenway State Recreation and Conservation Area	21
Murphy Creek Conservation Area	22
Nine Mile Point	23
Nine Mile Swamp Park	24
Ocala National Forest	25
Orange Creek Restoration Area	26
Ordway-Swisher Biological Station	27
Palatka-to-Lake Butler State Trail	28
Paynes Prairie Preserve State Park	29
Ravine Gardens State Park	30
Rice Creek Conservation Area	31
Rodman Bomb Target	32
Seven Sisters Conservation Area	33
Shell Bluff	34
Smith Conservation Easement (Volusia County)	35
Smith Family Farms Conservation Easements	36
Tatum Tract	37
Walton Parcel	38
Welaka National Fish Hatchery	39
Welaka State Forest	40
Wiles Culbertson Conservation Easement	41

Florida Forever Project	Map Label
Clay Ranch	A
Etoniah/Cross Florida Greenway	B
Heather Island/Ocklawaha River	C
Lochloosa Wildlife	D
Mill Creek	E
Northeast Florida Timberlands and Watershed Reserve	F
St. Johns River Blueway	G

Caravelle Ranch Wildlife Management Area

Putnam and Marion Counties, Florida
~ 10,450 Acres



Legend

- CRWMA
- Conservation Land
- Florida Forever Project

0 5 10 20 Miles

Created in ArcGIS 10.1 by the Florida Fish and Wildlife Conservation Commission December, 2013

Figure 3. Conservation Lands and Florida Forever Projects

1.9 Adjacent Land Uses

CRWMA is primarily located in south central Putnam County, with a small portion of the area located in northeast Marion County. The U.S. Census 2012 population estimate for Putnam County Florida was 73,263 individuals. The 2012 population estimate for Palatka, located approximately 10 miles from CRWMA, was 10,472 people. The 2012 population estimate for Marion County was 335,125 individuals. The Bureau of Economic and Business Research's (BEBR) mid-range population projection projects Putnam County's population to increase to 74,900 individuals and Marion County's population to increase to 417,200 individuals by 2025.

The lands within the CRWMA on which the FWC is the lead managing agency are bordered on the north by the DEP-OGT's Marjorie Harris Carr Cross Florida Greenway. The Rodeheaver Boys Ranch borders the northeast portion of CRWMA. The area's southern boundary is adjacent to the Rodman Bombing Range, a U. S. Navy bombing facility, and the Ocala National Forest. The majority of the area to the east of the CRWMA is characterized by privately owned agricultural/silvicultural land, and is currently zoned for Agriculture. The eastern perimeter of CRWMA is bordered by the St. Johns River. The western border of CRWMA is adjacent to the Marjorie Harris Carr Cross Florida Greenway and the Ocala National Forest. The nearest municipality is Welaka, located to the east, across the St Johns River.

The land within and surrounding the CRWMA in Putnam County is currently zoned for Agriculture. This designation allows for agricultural operations and low density residential dwellings. Nearby land across the St. Johns River is primarily zoned for Agriculture, as well as Residential, Mixed (R-2); Residential, Single Family (R-1); Residential, Single Family Estate (RE); and Residential 1A, Single Family (R-1A).

The 2010 Putnam County Comprehensive Plan Future Land Use Element designates CRWMA and its surrounding public lands as Conservation land. Land to the north and west of CRWMA that is not in public ownership is generally designated as Agriculture II, which allows for a residential density of one unit/20 acres to one unit/10 acres. Across the St. Johns River and adjacent to CRWMA, future land uses are generally designated for Agriculture II and for Rural Residential development. The density for Rural Residential development ranges from one unit/five acres to one unit/acre. The future land use designation for the small portion of CRWMA located in Marion County is Preservation. Surrounding lands in Marion County are designated as Preservation or Rural Land. The Rural Land designation represents privately held lands suited for very low density (one unit/acre) and agricultural purposes.

1.10 Public Involvement

The FWC conducted a MAG meeting in Palatka, Florida on June 20, 2012 to obtain input from both public and private stakeholders regarding management of CRWMA. Results of this meeting were used by the FWC to develop management goals and objectives and to

identify opportunities and strategies for inclusion in this Management Plan. A summary of issues and opportunities raised by the MAG, as well as a listing of participants, is included as Appendix 13.2. In addition, a public hearing, as required by Chapter 259.032(10), FS, was held in Palatka, Florida on July 31, 2012. The report of that public hearing is also contained in Appendix 13.2. A website is also maintained for receipt of public input at http://myfwc.com/conservation/terrestrial/management-plans/develop-mps/ . Further testimony and input is received at a public hearing held by the ARC. Input received from all public involvement efforts has been considered in the development of this Management Plan.

Table 1. Conservation Lands Within 20-miles of CRWMA

Federal Government	**Managing Agency**
Ocala National Forest	USDA-USFS
Rodman Bomb Target	US DOD
Welaka National Fish Hatchery	USDI-FWS

State of Florida	**Managing Agency**
Bellmore State Forest	DACS-FFS
Carl Duval Moore State Forest and Park	DACS-FFS
Dunns Creek State Park	DEP-DRP
Etoniah Creek State Forest	DACS-FFS
Haw Creek Preserve State Park	DEP-DRP
Marjorie Harris Carr Cross FL Greenway	DEP-DRP
Palatka-to-Lake Butler State Trail	DEP-DRP
Paynes Prairie Preserve State Park	DEP-DRP
Ravine Gardens State Park	DEP-DRP
Smith Family Farms Conservation Easements	DACS-FFS
Welaka State Forest	DACS-FFS

Water Management District	**Managing Agency**
BJ Bar Ranch Conservation Easement	SJRWMD
Black Sink Prairie	SJRWMD
Crescent Lake Conservation Area	SJRWMD
Crones Cradle Conservation Easement	SJRWMD
Deep Creek Conservation Area	SJRWMD
Dunns Creek Conservation Area	SJRWMD
Georgia Pacific-Lochloosa Easement	SJRWMD
Horseshoe Point Conservation Area	SJRWMD
J. A. Ginn Jr. Parcel	SJRWMD
Lake George Conservation Area	SJRWMD
Lochloosa Wildlife Conservation Area	SJRWMD
Murphy Creek Conservation Area	SJRWMD

Table 1. Conservation Lands Within 20-miles of CRWMA

Orange Creek Restoration Area	SJRWMD
Rice Creek Conservation Area	SJRWMD
Seven Sisters Conservation Area	SJRWMD
Walton Parcel	SJRWMD

City/County	Managing Agency
Bull Creek Campground	Flagler County
Horseshoe Lake	Flagler County
Janes Conservation Easement	City of Hawthorne
Little Orange Creek Nature Park	City of Hawthorne
Nine Mile Point	Volusia County
Nine Mile Swamp Park	Putnam County
Shell Bluff	Flagler County
Smith Conservation Easement	Volusia County
Tatum Tract	St. Johns County

Private/Public Conservation Organization	Managing Agency
Ordway-Swisher Biological Station	University of Florida
Wiles Culbertson Conservation Easement	Putnam Land Conservancy

Acronym Key	Agency Name
DACS-FFS	Florida Department of Agriculture and Consumer Services, Florida Forest Service
DEP-DRP	Florida Department of Environmental Protection, Division of Recreation and Parks
SJRWMD	St. Johns River Water Management District
US DOD	United States Department of Defense
USDA-USFS	United States Department of Agriculture, United States Forest Service
USDI-FWS	United States Department of Interior, Fish and Wildlife Service

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

Project Name	Acres
Clay Ranch	2,460
Etoniah/Cross Florida Greenway	87,419
Heather Island/Ocklawaha River	19,952
Lochloosa Wildlife	37,773
Mill Creek	12,293
Northeast Florida Timberlands and Watershed Reserve	147,059
St. Johns River Blueway	28,037

2 Natural and Cultural Resources

2.1 Physiography

2.1.1 Climate

The climate of northeast Florida is humid-subtropical. Between October and May, cold fronts regularly sweep through the state which keeps conditions dry, particularly over the peninsula. In winters where an El Niño climate cycle exists, rainfall increases while temperatures are cooler statewide. Beginning in the spring, towards the end of the dry season, lightning originated wild fires become more common. There is a defined rainy season from June through September, which are also the months most at risk of tropical cyclones making landfall in the region. Easterly winds off the warm waters of the Atlantic Ocean's Gulf Stream running through the Florida Straits keep temperatures moderate across Florida's peninsula year round.

Putnam County's January temperatures range between 81˚ Fahrenheit (F) for the average high and 59˚ F for the average low. July temperatures range between 92˚ F for the average high and 73˚ F for the average low. Annually, Putnam County experiences an average total rainfall of approximately 51 inches.

2.1.2 Topography

Putnam County lies within several physiographic provinces including the Northern Highlands, the Duval Upland, the Crescent City Ridge, the Teasdale Hill, the Palatka Hill, the San Mateo Hill, the Florahome Valley and the Welaka Hill. The Marion Uplands and the Mount Dora Ridge occur in a small section of southwestern Putnam County. The lower lying regions of the county are in the Central Valley, the St. Johns River Offset, and the Eastern Valley.

The CRMWA is located within the St. John's River Offset. Elevations range from 5 to 30 feet above mean sea level. Slopes are less than 5% except along a small section of Camp Branch Creek and along the barge canal where ditching created steep spoil banks.

2.1.3 Soils

There are 27 different soil series distributed across CRWMA as shown in Figure 4. The U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) defines a soil map unit as: "a collection of soil areas or non-soil areas (miscellaneous areas) delineated in a soil survey." Soil map units may contain multiple soil components, which are given names that are unique identifiers. Analyses of depth to water table for map units occurring within CRWMA are also provided in Figure 5. Appendix 13.4 provides aggregation data for CRWMA map units, including a more complete listing of attributes and soil components.

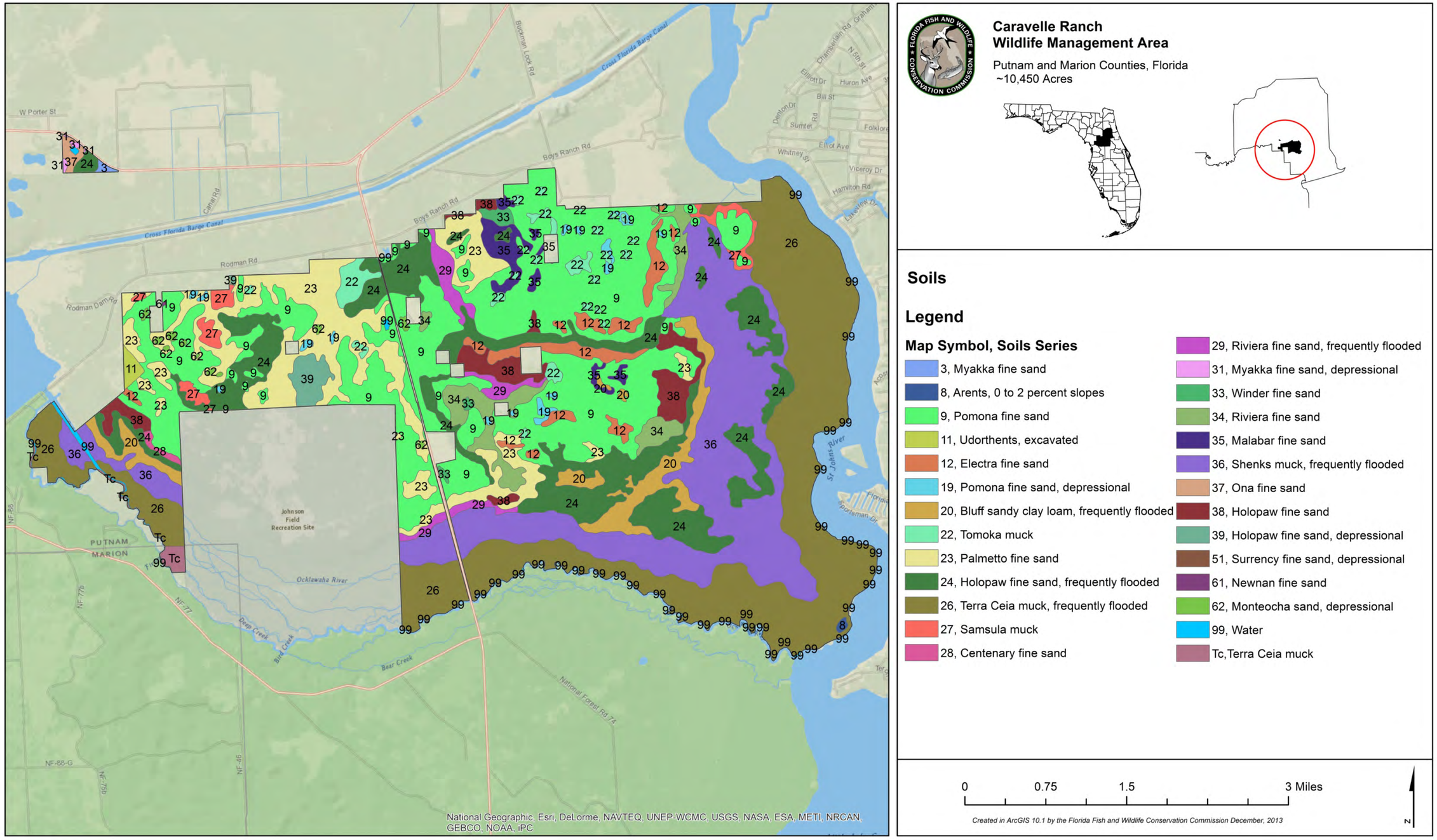


Figure 4. Soils of CRWMA

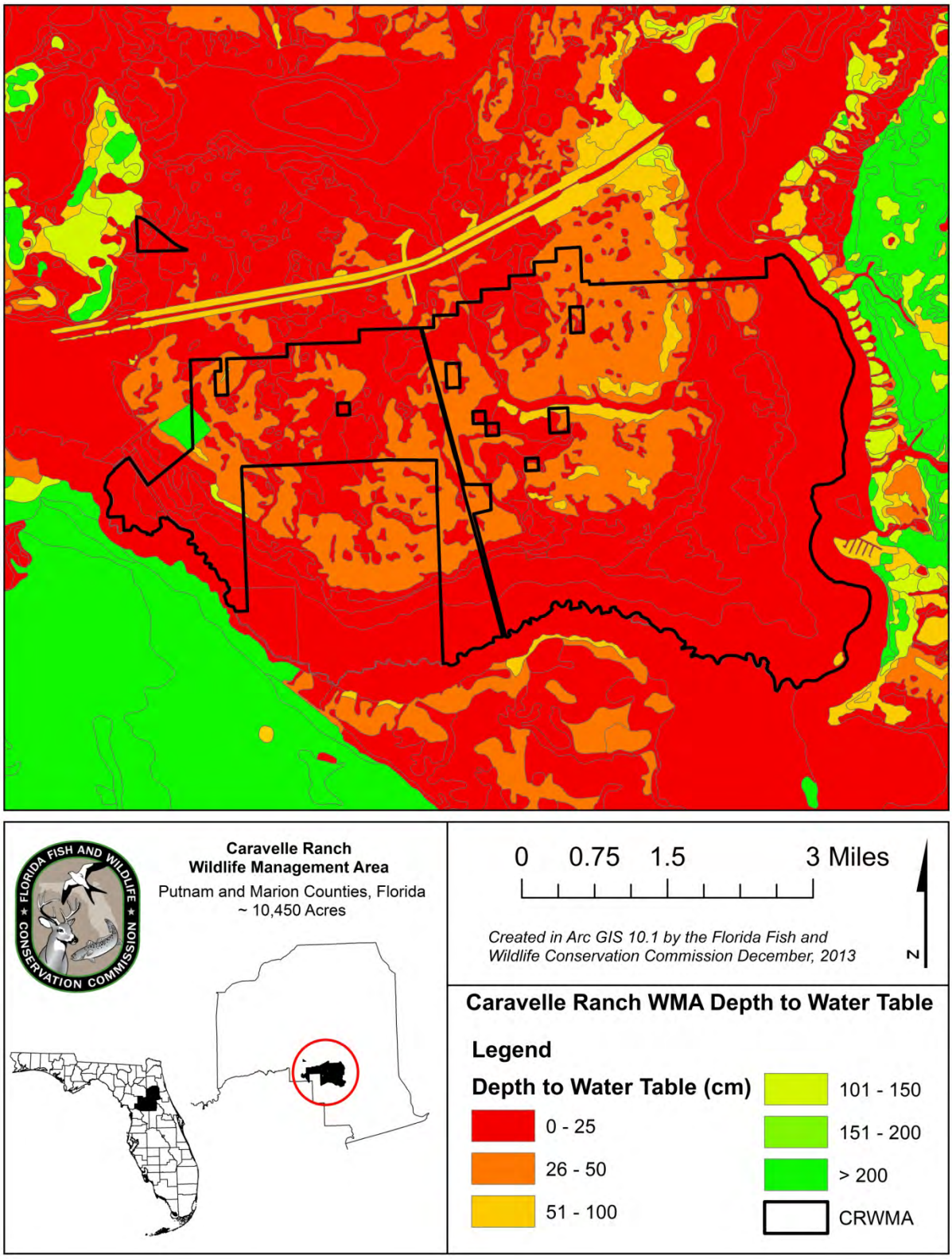


Figure 5. Soils of CRWMA - Depth to Water Table

2.1.4 Geologic Conditions

The surface sediments at CRWMA are primarily Undifferentiated sediments and Holocene sediments, described below. The geology of Putnam County, as reflected on the U.S. Department of Interior, United States Geological Survey's website (http://tin.er.usgs.gov/geology/state/fips-unit.php?code=f12097), is as follows:

2.1.4.1 Undifferentiated sediments (Pleistocene/Holocene) at surface, covers 10 % of Putnam County

Much of Florida's surface is covered by a varying thickness of undifferentiated sediments consisting of siliciclastics, organics, and freshwater carbonates. The siliciclastics are light gray, tan, brown to black, unconsolidated to poorly consolidated, clean to clayey, silty, unfossiliferous, variably organic-bearing sands to blue green to olive green, poorly to moderately consolidated, sandy, silty clays. Organics occur as plant debris, roots, disseminated organic matrix, and beds of peat. Freshwater carbonates 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. Lithology: clay or mud; beach sand; silt; gravel; peat; sand.

2.1.4.2 Trail Ridge sands (Pleistocene) at surface, covers 4 % Putnam County

Sediments showing surficial expression of beach ridges and dunes were mapped separately as were the sediments composing Trail Ridge. The subdivisions of the Undifferentiated Quaternary Sediments are not lithostratigraphic units but are utilized in order to facilitate a better understanding of the State's geology. The siliciclastics are light gray, tan, brown to black, unconsolidated to poorly consolidated, clean to clayey, silty, unfossiliferous, variably organic-bearing sands to blue green to olive green, poorly to moderately consolidated, sandy, silty clays. Gravel is occasionally present in the panhandle. Organics occur as plant debris, roots, disseminated organic matrix and beds of peat. Freshwater carbonates 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. Lithology: sand; clay or mud; silt; gravel; peat.

2.1.4.3 Ocala Limestone (Eocene) at surface, covers 0.2 % of Putnam County

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 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 westcentral 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. Lithology: limestone; dolostone (dolomite).

2.1.4.4 Holocene sediments (Holocene) at surface, covers 44 % of Putnam County

The Holocene sediments in Florida occur near the present coastline at elevations generally less than 5 feet. The sediments include quartz sands, carbonate sands and muds, and organics. Lithology: beach sand; clay or mud; biogenic sediment.

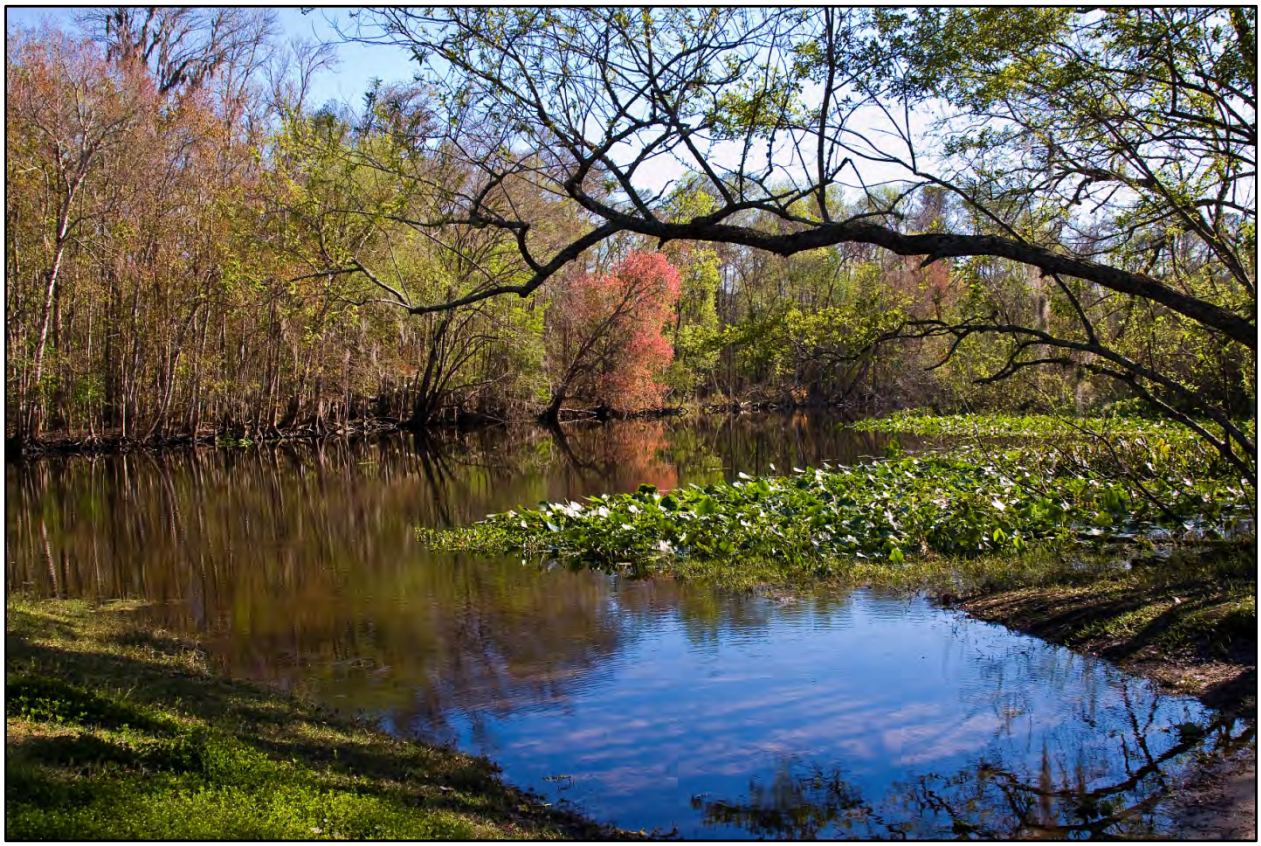
2.1.4.5 Cypresshead Formation (Pliocene) at surface, covers 41 % of Putnam County

The Cypresshead Formation named by Huddlestun (1988), is composed of siliciclastics and occurs only in the peninsula and eastern Georgia. It is at or near the surface from northern Nassau County southward to Highlands County forming the peninsular highlands. It appears that the Cypresshead Formation occurs in the subsurface southward from the outcrop region and similar sediments, the Long Key Formation, underlie the Florida Keys. The Cypresshead Formation is a shallow marine, near shore deposit equivalent to the Citronelle Formation deltaic sediments and the Miccosukee Formation prodeltaic sediments. The Cypresshead Formation consists of reddish brown to reddish orange, unconsolidated to poorly consolidated, fine to very coarse grained, clean to clayey sands. Cross bedded sands are common within the formation. Discoid quartzite pebbles and mica are often present. Clay beds are scattered and not really extensive. In general, the Cypresshead Formation in exposure occurs above 100 feet above mean sea level. Original fossil material is not present in the sediments although poorly preserved molds and casts of mollusks and burrow structures are occasionally present. The presence of these fossil "ghosts" and trace fossils documents marine influence on deposition of the Cypresshead sediments. The permeable sands of the Cypresshead Formation form part of the surficial aquifer system. Lithology: sand; clay or mud.

2.2 Vegetation

The FWC, through the services of the Florida Natural Areas Inventory (FNAI), has completed mapping of the historic and natural communities of CRWMA. The current natural communities, as displayed in Figure 6 and Table 3, include basin swamp,

depression marsh, dome swamp, floodplain swamp, hydric hammock, mesic flatwoods, mesic hammock, scrubby flatwoods, wet flatwoods, wet prairie, xeric hammock, and some ruderal areas including abandoned field, canal/ditch, developed, and clearing. Plant species that have been observed on CRWMA are listed below in Tables 4, 5, and 6.



CRWMA, *David Moynahan*

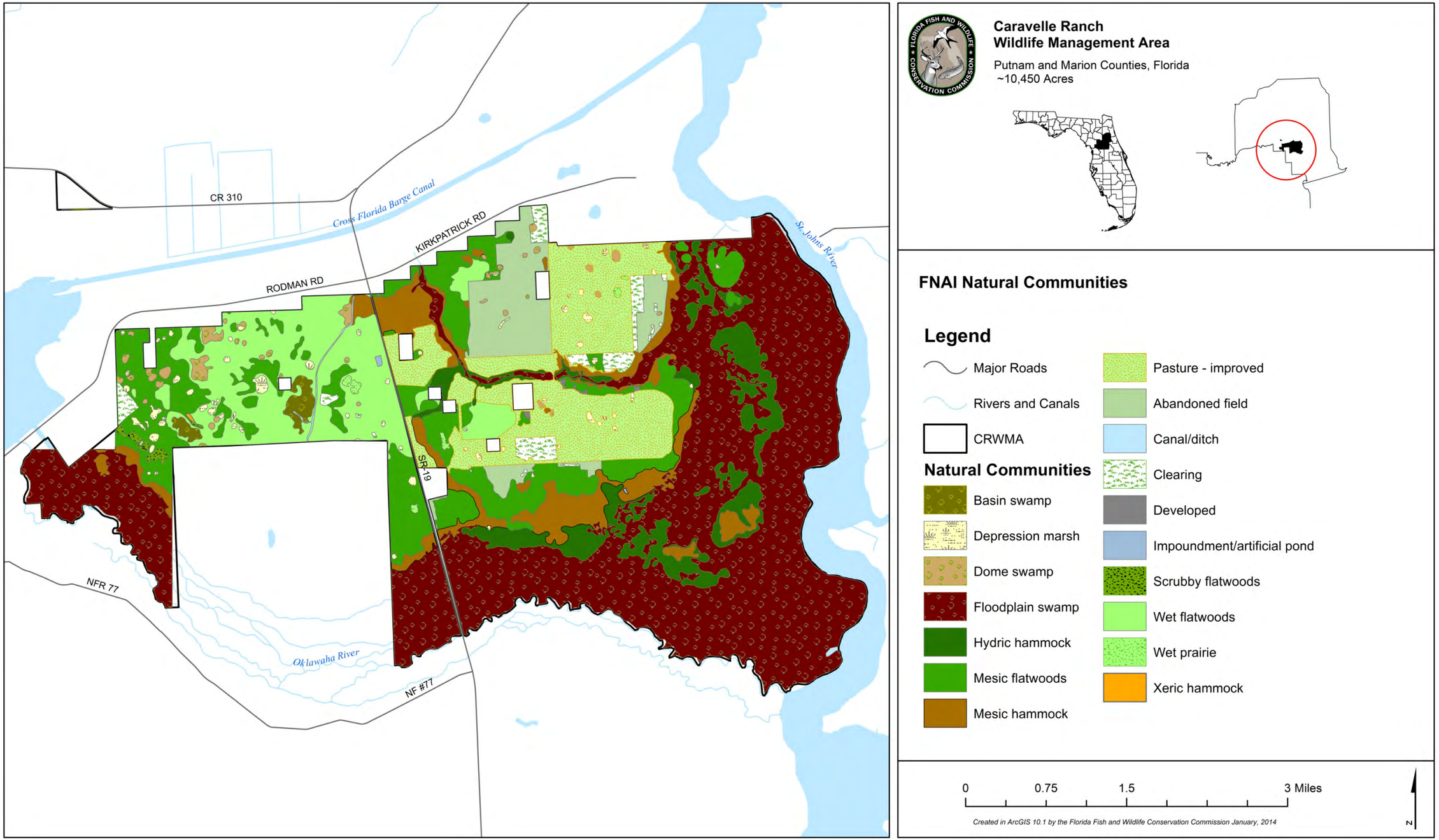


Figure 6. FNAI Natural and Anthropogenic Communities of CRWMA

Table 3. FNAI Natural and Anthropogenic Communities of CRWMA

FNAI Community	Acres	Percent of Area
Abandoned field	619.1	5.1%
Basin swamp	77.3	0.6%
Canal/ditch	11.6	0.1%
Clearing	206.3	1.7%
Depression marsh	103.2	0.8%
Developed	7.9	0.1%
Dome swamp	108.5	0.9%
Floodplain swamp	5,000.9	41.1%
Hydric hammock	822.2	6.8%
Impoundment/artificial pond	4.0	<0.1%
Mesic flatwoods	1,601.4	13.2%
Mesic hammock	796.7	6.5%
Pasture - improved	1,472.0	12.1%
Scrubby flatwoods	23.8	0.2%
Wet flatwoods	1,297.2	10.7%
Wet prairie	21.6	0.2%
Xeric hammock	2.1	<0.1%

*Total GIS calculated acreage for natural community classifications varies from the Establishment Order acreage for CRWMA.

Table 4. Plant Species Observed on CRWMA

Common Name	Scientific Name
Air potato	*Dioscorea bulbifera*
Alder	*Alnus serrulata*
American beautyberry	*Callicarpa americana*
American elm	*Ulmus americana*
American holly	*Ilex opaca*
Arrowhead	*Sagittaria* spp.
Bahiagrass	*Paspalum notatum*
Bald cypress	*Taxodium distichum*
Baldwin's nutrush	*Scleria baldwinii*
Beaksedge	*Rhynchospora* spp.
Bermudagrass	*Cynodon dactylon*
Blackberry	*Rubus* spp.
Blackgum	*Nyssa sylvatica*
Blue flag iris	*Iris versicolor* var. *virginica*
Blue maidencane	*Amphicarpum muhlenbergianum*
Blueflower butterwort*	*Pinguicula caerulea*
Bluejack oak	*Quercus incana*
Bluestem grass	*Andropogon glomeratus*
Bog buttons	*Lachnocaulon* spp.

Table 4. Plant Species Observed on CRWMA

Common Name	Scientific Name
Bog white violet	*Viola lanceolata*
Bottlebrush threeawn	*Aristida spiciformis*
Bracken fern	*Pteridium aquilinum*
Bulrush	*Scirpus* sp.
Bunched beaksedge	*Rhynchospora cephalantha*
Buttonbush	*Cephalanthus occidentalis*
Cabbage palm	*Sabal palmetto*
Camphor tree	*Cinnamomum camphora*
Carolina ash	*Fraxinus caroliniana*
Carolina laurel cherry	*Prunus caroliniana*
Carolina redroot	*Lachnanthes caroliana*
Carpetgrass	*Axonopus* spp.
Chalky bluestem	*Andropogon capillipes*
Chapman's oak	*Quercus chapmanii*
Chapman's goldenrod	*Solidago odora* var. *chapmanii*
Chinaberry tree	*Melia azedarach*
Chinese tallowtree	*Sapium sebiferum*
Cinnamon fern	*Osmunda cinnamomea*
Clubmoss	*Lycopodium* spp.
Coastal sweet pepperbush	*Clethra alnifolia*
Cogongrass	*Imperata cylindrica*
Combleaf mermaid weed	*Proserpinaca pectinata*
Dahoon holly	*Ilex cassine*
Darrow's blueberry	*Vaccinium darrowii*
Deerberry	*Vaccinium stamineum*
Dog fennel	*Eupatorium capillifolium*
Dog hobble	*Leucothoe racemosa*
Dwarf palmetto	*Sabal minor*
Earleaf greenbrier	*Smilax auriculata*
Early paspalum	*Paspalum praecox*
Elliott's lovegrass	*Eragrostis elliottii*
Elliott's milkpea	*Galactia elliottii*
Elliot's yellow-eyed grass	*Xyris elliottii*
Erect centella	*Centella erecta*
Erect witchgrass	*Panicum erectifolium*
Floating bladderworts	*Utricularia radiata*
Florida tickseed	*Coreopsis floridana*
Fringed nutrush	*Scleria ciliata*
Gallberry	*Ilex glabra*
Garberia*	*Garberia heterophylla*
Giant gallberry	*Ilex coriacea*
Greater bladder sedge	*Carex intumescens*

Table 4. Plant Species Observed on CRWMA

Common Name	Scientific Name
Green ash	*Fraxinus pennsylvanica*
Hemock witchgrass	*Dichanthelium portoricense*
Highbush blueberry	*Vaccinium corymbosum*
Hog plum	*Ximenia americana*
Hooded pitcherplant*	*Sarracenia minor*
Jamaica swamp sawgrass	*Cladium jamaicense*
Japanese climbing fern	*Lygodium japonicum*
Justiceweed	*Eupatorium leucolepis*
Laurel greenbrier	*Smilax laurifolia*
Laurel oak	*Quercus laurifolia*
Live oak	*Quercus virginiana*
Lizard's tail	*Saururus cernuus*
Loblolly bay	*Gordonia lasianthus*
Loblolly pine	*Pinus taeda*
Longleaf pine	*Pinus palustris*
Longleaf threeawn	*Aristida palustris*
Lopsided indiangrass	*Sorghastrum secundum*
Maidencane	*Panicum hemitomon*
Marsh pennywort	*Hydrocotyle* sp.
Meadow-beauties	*Rhexia* spp.
Milkworts	*Polygala* spp.
Millet beaksedge	*Rhynchospora miliacea*
Muscadine	*Vitis rotundifolia*
Myrtle oak	*Quercus myrtifolia*
Myrtleleaf St. John's-wort	*Hypericum myrtifolium*
Narrowfruit horned beaksedge	*Rhynchospora inundata*
Narrowleaf silkgrass	*Pityopsis graminifolia*
Natalgrass	*Melinis repens*
Netted chain fern	*Woodwardia areolata*
Partridge berry	*Mitchella repens*
Pawpaw	*Asimina* sp.
Peppervine	*Ampelopsis arborea*
Persimmon	*Diospyros virginiana*
Pickerel weed	*Pontederia cordata*
Pipeworts	*Eriocaulon* spp.
Plumed beaksedge	*Rhynchospora plumosa*
Poison ivy	*Toxicodendron radicans*
Pond cypress	*Taxodium ascendens*
Primrosewillow	*Ludwigia* spp.
Purple bluestem	*Andropogon glomeratus* var. *glaucopsis*
Queensdelight	*Stillingia sylvatica*
Red bay	*Persea borbonia*

Table 4. Plant Species Observed on CRWMA

Common Name	Scientific Name
Red maple	*Acer rubrum*
Redtop panicgrass	*Panicum rigidulum*
Rosy camphorweed	*Pluchea rosea*
Royal fern	*Osmunda regalis* var. *spectabilis*
Runner oak	*Quercus minima*
Rusty lyonia	*Lyonia ferruginea*
Sand cordgrass	*Spartina bakeri*
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*
Sedges	*Carex* spp.
Shaggy hedgehyssop	*Gratiola pilosa*
Shield fern	*Thelypteris* sp.
Shiny blueberry	*Vaccinium myrsinites*
Shiny lyonia	*Lyonia lucida*
Shortbristle horned beaksedge	*Rhynchospora corniculata*
Slash pine	*Pinus elliottii*
Slender woodoats	*Chasmanthium laxum*
Smallflower blueberry	*Vaccinium virgatum*
Smallspike false nettle	*Boehmeria cylindrica*
Smartweeds	*Polygonum* spp.
Southern bladderwort	*Utricularia juncea*
Southern umbrella-sedge	*Fuirena scirpoidea*
Southern waxy sedge	*Carex glaucescens*
Sparkleberry	*Vaccinium arboreum*
Sprawling hoarypea	*Tephrosia hispidula*
St. Andrew's-cross	*Hypericum hypericoides*
St. John's wort	*Hypericum fasciculatum*
Staggerbush	*Lyonia fruticosa*
Sugarcane plumegrass	*Saccharum coarctatum*
Sundews	*Drosera* spp.
Swamp bay	*Persea palustris*
Swamp dogwood	*Cornus foemina*
Swamp milkweed	*Asclepias perennis*
Swamp tupelo	*Nyssa sylvatica* var. *biflora*
Sweet bay	*Magnolia virginiana*
Sweetgum	*Liquidambar styraciflua*
Tall elephantsfoot	*Elephantopus elatus*
Tenangle pipewort	*Eriocaulon decangulare*

Table 4. Plant Species Observed on CRWMA

Common Name	Scientific Name
Torpedo grass	*Panicum repens*
Tropical soda apple	*Solanum viarum*
Turkey oak	*Quercus laevis*
Vanillaleaf	*Carphephorus odoratissimus*
Virginia buttonweed	*Diodia virginiana*
Virginia chain fern	*Woodwardia virginica*
Virginia creeper	*Parthenocissus quinquefolia*
Virginia water horehound	*Lycopus virginicus*
Virginia willow	*Itea virginica*
Water cowbane	*Tiedemannia filiformis*
Water oak	*Quercus nigra*
Waterhyssop	*Bacopa* sp.
Wax myrtle	*Myrica cerifera*
Whip nutrush	*Scleria triglomerata*
Winged sumac	*Rhus copallinum*
Wild olive	*Cartrema americana*
Wiregrass	*Aristida stricta* var. *beyrichiana*
Witchgrass	*Dichanthelium ensifolium*
Woolly witchgrass	*Dichanthelium scabriusculum*
Yaupon	*Ilex vomitoria*
Yellow butterwort*	*Pinguicula lutea*
Yellow hatpins	*Syngonanthus flavidulus*
Yellow-eyed grasses	*Xyris* spp.

*Indicates an imperiled species

Table 5. Imperiled Plant Species of CRWMA

Common Name	Scientific Name	Status
Blueflower butterwort	*Pinguicula caerulea*	ST
Garberia	*Garberia heterophylla*	ST
Hooded pitcherplant	*Sarracenia minor*	ST
Yellow butterwort	*Pinguicula lutea*	ST

ST = State-designated Threatened

Table 6. Exotic Plant Species Observed at CRWMA

Common Name	Scientific Name
Air potato	*Dioscorea bulbifera*
Bahiagrass	*Paspalum notatum*
Bermudagrass	*Cynodon dactylon*
Camphor tree	*Cinnamomum camphora*

Table 6. Exotic Plant Species Observed at CRWMA

Common Name	Scientific Name
Chinaberry tree	*Melia azedarach*
Chinese tallowtree	*Sapium sebiferum*
Cogongrass	*Imperata cylindrica*
Japanese climbing fern	*Lygodium japonicum*
Natalgrass	*Melinis repens*
Torpedo grass	*Panicum repens*
Tropical soda apple	*Solanum viarum*

2.2.1 FNAI Natural Community Descriptions

The following natural community descriptions were prepared by FNAI and updated by the FWC, with concurrence by FNAI, to reflect management actions and current community conditions.

2.2.1.1 Basin swamp *(77.3 acres)*

Basin swamps are forested wetlands that occupy irregularly shaped depressions. This community occurs in the western part of the CRWMA, embedded within mesic/wet flatwoods. The mixed pine and hardwood canopy is typically dense (>75% cover). Canopy and sub-canopy tree species include blackgum, slash pine, pond cypress, loblolly bay, red maple. Shrub layers can be sparse to dense. Basin swamps observed at the CRWMA usually have hummocks of dense shiny lyonia and buttonbush, which cover 25 to 50 percent of the shrub layer. Highbush blueberry occurs occasionally here. Herbaceous vegetation is generally sparse, occurring in drier patches, or in areas under canopy gaps. Grasses, sedges and ferns dominate the herbaceous cover, including Jamaica swamp sawgrass, sedges, millet beaksedge, Virginia chain fern, and lizard's tail.

Basin swamps typically contain standing water much of the year, and historically may have burned during only during extreme dry periods. On CRWMA, basin swamps near the Rodman Reservoir and Canal have disrupted hydrology, causing drier than normal conditions.

2.2.1.2 Depression marsh *(103.2 acres)*

Depression marshes are small, ovoid wetlands embedded within flatwoods or sandhill landscapes. A canopy is generally absent, but may include slash pine, pond cypress or black gum. Shrub cover is generally sparse and may include wax myrtle, giant gallberry, red maple, buttonbush, and shiny lyonia. Maidencane dominates the wetter portions of the marsh, usually with cover exceeding 75%. Other herbaceous species typical of the wetter, interior part of depression marshes include Virginia chain fern, pickeral weed, arrowhead, lizard tail, narrowfruit horned beaksedge, southern waxy sedge, and floating bladderworts. The drier edges of depression marshes are floristically variable, and typically harbor small-statured forbs such as yellow-eyed grasses, bog buttons, pipewort, southern bladderwort

and yellow hatpins. Grasses found along depression edges include blue maidencane, purple bluestem, chalky bluestem, and sand cordgrass.

Infrequent winter burning, or fire suppression, encourages large accumulations of dead vegetation, as well as invasion of woody shrubs. Such accumulations crowd out the smaller forbs and grasses, and allow succession of the community to a woody-dominated type, such baygall or dome swamp.

A "variant" of depression marsh occurs on CRWMA, in areas in or near the Ocklawaha River floodplain. These small herbaceous depressions are dominated by dense Jamaica swamp sawgrass rather than maidencane. Otherwise, they are similar in aspect and floristic composition to the maidencane type.

2.2.1.3 Dome swamp *(108.5 acres)*

Dome swamps occur in relatively small, shallow depressions within flatwood landscapes. These round depressions are usually forested with pond cypress, which can form a dense, closed canopy. Swamp tupelo, loblolly bay, red maples are infrequent. In smaller, dryer dome swamps, slash pine may co-occur with cypress as a canopy dominant. Midstory and understory strata may be variable in aspect, depending on past fire history and hydrologic changes. Domes swamps at CRWMA range from those with little midstory and grass dominated understory vegetation, to those with dense shrubs and sparse understory. Typical midstory shrub species include shiny lyonia, wax myrtle, highbush blueberry, red maple, coastal sweet pepperbush, Virginia willow, and button bush. In dome swamps with open canopies and periodic standing water, maidencane typically dominates the herbaceous understory, along with purple bluestem, Virginia chain fern, pickeral weed, arrowhead, and southern waxy sedge. Other occasional herbaceous species include Virginia water horehound, pipeworts, primrose willow, yellow-eyed grasses, beaksedges, blue maidencane, and floating bladderworts. The "open" grassy dome swamps typically have shrub layers with < 25% cover. Conversely, dome swamps that are drier and/or have been long fire suppressed, may have shrub layers exceeding 75% cover. Shiny lyonia is typically the major shrub species, forming dense "tussocks". Invading slash pine saplings may be present in the shrub strata. Vines are more abundant in shrubby dome swamps, including poison ivy, muscadine and greenbriers.

Some CRWMA dome swamps in areas of highly altered hydrology appear to be drying out. Because the normal hydroperiod is no longer observed, pines and other upland species are encroaching into the swamps. In some cases, dense shrubs and vines can create impenetrable thickets, crowding out the cypress and other wetland plants. When possible, dome swamps are allowed to burn along with the surrounding area.

2.2.1.4 Floodplain swamp *(5,000.9 acres)*

Floodplain swamps occur on frequently flooded terraces of river floodplains. These multi-layered forests harbor many hardwood trees and shrub species, and are variable in respect

to canopy and shrub dominants. Very subtle changes in micro-topography affect flooding duration, and subsequent seedling germination and survival.

On CRWMA, floodplain swamps are part of the Ocklawaha River, St. Johns River, and Camp Branch Creek floodplains and comprise much of the southern part of the WMA. Bald cypress is the most abundant canopy species of CRWMA floodplain swamps. Green ash is also abundant, particularly along the Ocklawaha riverfront. Other species common in the canopy and subcanopy strata are cabbage palm, American elm, red maple, and sweetgum. Species common in the shrub strata include wax myrtle, alder, dahoon holly, swamp dogwood, Virginia willow. Herbaceous vegetation varies from patchy (in drier areas) to non-existent (in flooded areas). Some common herb species include pickerel weed, blueflag, greater bladder sedge, lizard's tail, bulrush, shortbristle horned beaksedge, redtop panicgrass, smartweeds, smallspike false nettle, marsh pennywort, waterhyssop, and Swamp milkweed.

2.2.1.5 Hydric hammock *(822.3 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 in association with floodplain swamp at CRWMA on portions of the Ocklawaha River, St. Johns River, and Camp Branch Creek floodplains. There is a nearly closed, diverse canopy of laurel oak, cabbage palm, green ash, American elm, sweet bay, bald cypress and red maple. Sweetgum 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, dahoon holly, red bay, and swamp dogwood. The short shrub layer is sparse and may include dog hobble, dwarf palmetto, and highbush blueberry. Herbaceous cover is sparse to moderate (1 to 25%), and includes lizard's tail, smartweeds, smallspike false nettle, marshpennywort, partridge berry, waterhyssop, and sedges. Leaf litter covers nearly 100 percent of the ground. Woody vines are frequent and include poison ivy and Virginia creeper.

2.2.1.6 Mesic flatwoods *(1,601.4 acres)*

Mesic flatwoods typically have pine canopies ranging from 25 to 75 percent cover. The most common pine is slash pine, although a few older longleaf pines remain in some areas. Mesic flatwoods are characterized by their sparse subcanopy and dense cover of saw palmetto in the short shrub layer. Shrub abundance and cover is generally relative to past fire history. Areas that are within the recommended burn rotation tend to have more developed herbaceous ground cover and a lower shrub cover. Shrub layers include saw palmetto, giant gallberry, shiny lyonia, shiny blueberry, deerberry, and wax myrtle. Runner oaks, and sparkleberry are often present in drier-phase mesic flatwoods, while

loblolly bay, highbush blueberry, smallflower blueberry, swamp bay and abundant gallberry occur in slightly wetter areas.

Mesic flatwoods is the most widespread natural community on CRWMA, covering large areas of flat terraces and low, broad ridges. Most of the mesic flatwoods on CRWMA have recovering herbaceous layers that are being promoted by the mechanical reduction of midstory and shrub structure, timber harvests to achieve proper basal area and increase sunlight penetration, and proper fire return intervals. In addition to wiregrass, these areas contain bluestem grasses, bottlebrush threeawn, narrowleaf silkgrass, witchgrass, hemlock witchgrass, Elliott's milkpea, milkworts, sprawling hoarypea, queen's-delight, and meadow-beauties.

In the central and western portions of CRWMA, mesic flatwoods are interspersed with wet flatwoods. Mesic flatwoods may be distinguished by a substantially greater coverage of saw palmetto, shiny blueberry, and oak species (other than water oak). Wet flatwoods on CRWMA are generally characterized by their lack of palmetto and abundance of gallberry.

The mesic flatwoods community on CRWMA contains acreage that was previously typed as pine plantation on the FNAI surveys. The FWC and FNAI changed the designation to reflect the fact that these areas have the appropriate vegetative characteristics to meet the mesic flatwoods definition. There is no bedding visible, the overstory (typically slash pine) has been thinned to a basal area well below the maximum recommended range, the groundcover and shrub layers are of the correct composition, and an appropriate fire regime is in place.

2.2.1.7 Mesic hammock *(796.7 acres)*

Mesic hammock is a well-developed evergreen hardwood and/or palm forest on soils that are rarely inundated. The canopy is typically closed and dominated by live oak with cabbage palm generally common in the canopy and subcanopy. The shrubby understory may be dense or open, tall or short, and is typically composed of a mix of saw palmetto, American beautyberry, American holly, gallberry, sparkleberry, hog plum, persimmon, highbush blueberry, Carolina laurelcherry, yaupon, wild olive, and/or wax myrtle. 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 naturally fire-protected areas such as islands and peninsulas of lakes (Harper 1911). Other landscape positions that can provide protection from the spread of fire from one or more directions are thus likely places for mesic hammock development. These include edges of lakes, sinkholes, other depressional or basin wetlands, and river floodplains.

Mesic hammocks occur on CRWMA in transitional areas between mesic flatwoods and hydric hammock or in low areas within the flatwoods matrix. Live oaks form closed

canopies over sparse shrub layers. Other trees present in the subcanopy and tall shrub strata include water oak, cabbage palm, sweetgum, red maple, wax myrtle, and American elm. Short shrub species include saw palmetto, smallflower blueberry, persimmon, and American beauty berry. Herbaceous ground cover is dominated by grass species with a few other herbaceous species present. These include partridgeberry, tall elephants foot, variable witchgrass, whip nutrush, millet beaksedge, and braken fern. Common vine species include poison ivy, saw greenbrier, Virginia creeper, muscadine.

2.2.1.8 Pasture – improved *(1,472.0 acres)*

Improved pasture is an unnatural community dominated by grasses that are suitable for cattle grazing. This landcover designation includes all current and former improved pasture. These lands primarily occur in areas of former mesic and wet flatwoods. Young pines are usually present, mixed with sparse to dense patches of shrubs, including wax myrtle, live oaks, water oaks, and blackberry. Vines are abundant, particularly peppervine and greenbrier. The dominant grass is bahia, an exotic grass introduced for cattle forage. Other common species include carpetgrasses, Virginia buttonweed, and dogfennel.

2.2.1.9 Scrubby flatwoods *(23.8 acres)*

Scrubby flatwoods occur in the western portion of CRWMA, on broad ridges of coarse, well-drained sand. The canopy in this area is unevenly distributed slash pine with large open areas due to wildfire mortality. Scrubby flatwoods are typically situated on ridgetops, upslope of mesic flatwoods, baygalls or depression marshes. The CRWMA scrubby flatwoods are located in an area of mesic flatwoods immediately upslope of the Ocklawaha River floodplain. Shrub strata are moderately dense and contain oak species such as Chapman's oak, myrtle oak, turkey oak, and runner oak. Also present at moderate densities are shiny lyonia, staggerbush, rusty lyonia, saw palmetto, sparkleberry, and shiny blueberry. Herbaceous plants are common throughout the site and include wiregrass, bottlebrush threeawn, narrowleaf silkgrass, vanillaleaf, Elliott's milkpea, sandyfield beaksedge, and Chapman's goldenrod. Scrubby flatwoods on lower slopes were being encroached by hardwoods from the mesic hammock adjacent to the floodplain, but several rotations of growing season fire have begun to reverse the process.

2.2.1.10 Wet flatwoods *(1,297.2 acres)*

Similar to mesic flatwoods, wet flatwoods usually have slash pine canopies ranging from 25 to 75 percent cover. The shrub layers are typified by dense growths of gallberry and the absence of palmetto and oaks. Other characteristic shrub species include myrtleleaf St. Johnswort, swamp bay, highbush blueberry, loblolly bay, shiny lyonia, and wax myrtle.

Wet flatwoods occur in the central and western portions of CRWMA, usually inter-digitated with mesic flatwoods. Wet flatwoods occur in slightly lower positions on the landscape, subject to higher water tables and more frequent periods of inundation. Herbaceous cover in CRWMA wet flatwoods can be patchy due to the frequency of inundation and gallberry competition. Where the herbaceous ground cover exists, dominant species are wiregrass,

blue maidencane, purple bluestem, Elliot's yellow-eyed grass, erect witchgrass, chalky bluestem, tenangle pipewort and erect centella. Other herbaceous species include sundews, southern umbrella-sedge, beaksedges, plumed beaksedge, whip nutrush, hooded pitcherplant, yellow-eyed grasses, primrose-willow, combleaf mermaidweed, rosy camphorweed, carpetgrass, and shaggy hedgehyssop.

2.2.1.11 Wet prairie *(21.6 acres)*

Wet prairies are generally characterized as having no pine canopy, and little or no shrub cover. The understory herbaceous layer remains relatively intact and floristically distinct. Normally, a combination of seasonal inundation and frequent fire prevents germination of woody species and encourages a diverse assemblage of grass, sedge, and forb species.

Wet prairie occurs in patches in the central portion of CRWMA, usually surrounded by wet and mesic flatwoods. The larger wet prairie areas have inclusional depression marshes and/or dome swamps CRWMA wet prairies generally have very sparse, short canopies of slash pines (< 5% cover). Shrub cover ranges from sparse (< 5% cover), to dense (> 50% cover), including wax myrtle, shiny lyonia, gallberry, highbush blueberry, sweetbay, slash pine, pond cypress, buttonbush, and swamp bay. Often, a continuous layer of St. John's wort is present. Dominant herbs are primarily grass species, including longleaf threeawn, erect witchgrass, the wetland variety of chalky bluestem, redtop panicgrass, purple bluestem, woolly witchgrass, sugarcane plumegrass, Elliott's lovegrass, early paspalum, and blue maidencane. In addition, many common, grass-like species are present, including Baldwin's nutrush, southern umbrella-sedge, bunched beaksedge , other beaksedge species, southern waxy sedge, yellow-eyed grasses. Forb species include rosy camphorweed, erect centella, Carolina redroot, Florida tickseed, pipeworts, bladderworts, justiceweed, water cowbane, bog white violet, and arrowhead. Dense patches of vines may be present, predominantly laurel greenbrier. Common fern and fern-like species include Virginia chainfern, royal fern, and clubmoss.

2.2.1.12 Xeric hammock *(2.1 acres)*

Xeric hammock normally describes a low canopy oak forest with sparse midstory and understory vegetation. This community is represented on CRWMA on only 2.1 acres that is also a state-registered archeological site. Due to the past history of Native American and European use, the area today consists of large, open growth live oaks. The groundcover is maintained by frequent mowing to facilitate public use of the provided picnic area.

2.2.1.13 Anthropogenic communities

This landcover designation includes all current and former improved pastures, old agricultural lands, borrow pits and other substantially modified lands on CRWMA. These lands primarily occur in areas of former mesic and wet flatwoods. Anthropogenic communities are characterized by introduced, non-native pasture grasses, and native "weedy" species. Young pines are usually present, mixed with sparse to dense patches of shrubs, including wax myrtle, live oaks, water oaks and blackberry. Vines are abundant,

particularly peppervine and greenbrier. The dominant grass is bahia, an exotic grass introduced for cattle forage. Other common species include carpetgrasses, Virginia buttonweed, and dog fennel.

Abandoned field
Abandoned fields/abandoned pastures are old fields, fallow pastures, early successional areas formerly grazed or in agriculture without recent activity to maintain the area as pasture or planted field. These areas are often dominated by weedy native and non-native species. Old pastures are generally designated when weedy cover from woody species is greater than 20 percent. There are currently approximately 619 acres classified as abandoned field. However, this includes +/- 85 acres that are planted in 15 year old longleaf, +/- 460 acres fenced out of current cattle lease for restoration purposes, and an additional +/- 45 acres undergoing additional low-intensity restoration activities.

Canal/ditch
Canal/ditch ruderal areas are areas where the historic natural community has been altered by an artificial drainage way. Approximately 12 acres of the CRWMA fall into this category due to the presence of canals and ditches.

Clearing
FNAI defines clearing/regeneration areas as including dove fields, wildlife food plots, recent or historic clearings that have significantly altered the groundcover and/or overstory of the original natural community. CRWMA contains approximately 206 acres that are classified as clearing. This includes 125 acres of dove fields, approximately 50 acres of food plots, and 30+ acres of groundcover restoration areas.

Developed
FNAI classifies land as developed if it contains check stations, ORV use areas, parking lots, buildings, maintained lawns (as part of recreational, business, or residential areas), botanical or ornamental gardens, campgrounds, recreational, industrial, and residential areas. There are approximately eight acres of developed land on CRWMA

Impoundment/artificial pond
Impoundments/artificial ponds at CRWMA are borrow pits that were excavated for fill during the construction of SR 19. There are approximately four acres of impoundment/artificial pond at CRWWMA.

2.2.2 Forest Resources

Section 253.036, Florida Statutes requires that plans for natural areas 1,000 acres or greater in size include a professional forester's assessment of the resource conservation and revenue-producing potentials of the tract's forests. The FWC utilizes forest management regimes consistent with the purposes for acquisition of this property. When silvicultural practices are necessary for restoration of wildlife habitat or ecosystem management objectives are deemed appropriate, personnel from the Florida Department of Agriculture

and Consumer Services' Florida Forest Service (FFS) or a professional forestry consultant will be consulted.

A Timber Assessment was completed by the FFS for CRWMA in 2000 and will be updated by 2015. The 2000 Timber Assessment developed by the FFS is included in Appendix 13.5. Additionally, a Forest Management Plan is being developed to reflect current resource and management needs as part of a timber thinning contract with The Forestry Company through June 2015. The 20-year Timber Management Plan will further inform and assist the FWC staff in managing timber resources in an economically efficient and responsible manner.

2.3 Fish and Wildlife Resources

The CRWMA has a diverse assortment of fish and wildlife species (Tables 7 – 12). There are eight known imperiled or protected animal species, also known as listed species, occurring within CRWMA.

The FWC has developed a Geographic Information Systems (GIS)-based assessment tool that incorporates a wide variety of land cover and wildlife species data. This tool, the Integrated Wildlife Habitat Ranking System (IWHRS), ranks the Florida landscape based upon the habitat needs of wildlife as a way to identify ecologically significant lands in the state, and to assess the potential impacts of management and land-use changes. The IWHRS was developed to provide technical assistance to various local, regional, state, and federal agencies, and entities interested in wildlife needs and conservation in order to: (1) determine ways to avoid or minimize project impacts by evaluating alternative placements, alignments, and transportation corridors during early planning stages, (2) assess direct, secondary, and cumulative impacts to habitat and wildlife resources, and (3) identify appropriate parcels for public land acquisition for wetland and upland habitat mitigation purposes. The IWHRS (2009) indicates that CRWMA has a moderately high mean wildlife value of 6.1 (Figure 7).

American swallow-tailed kite at CRWMA, *FWC*

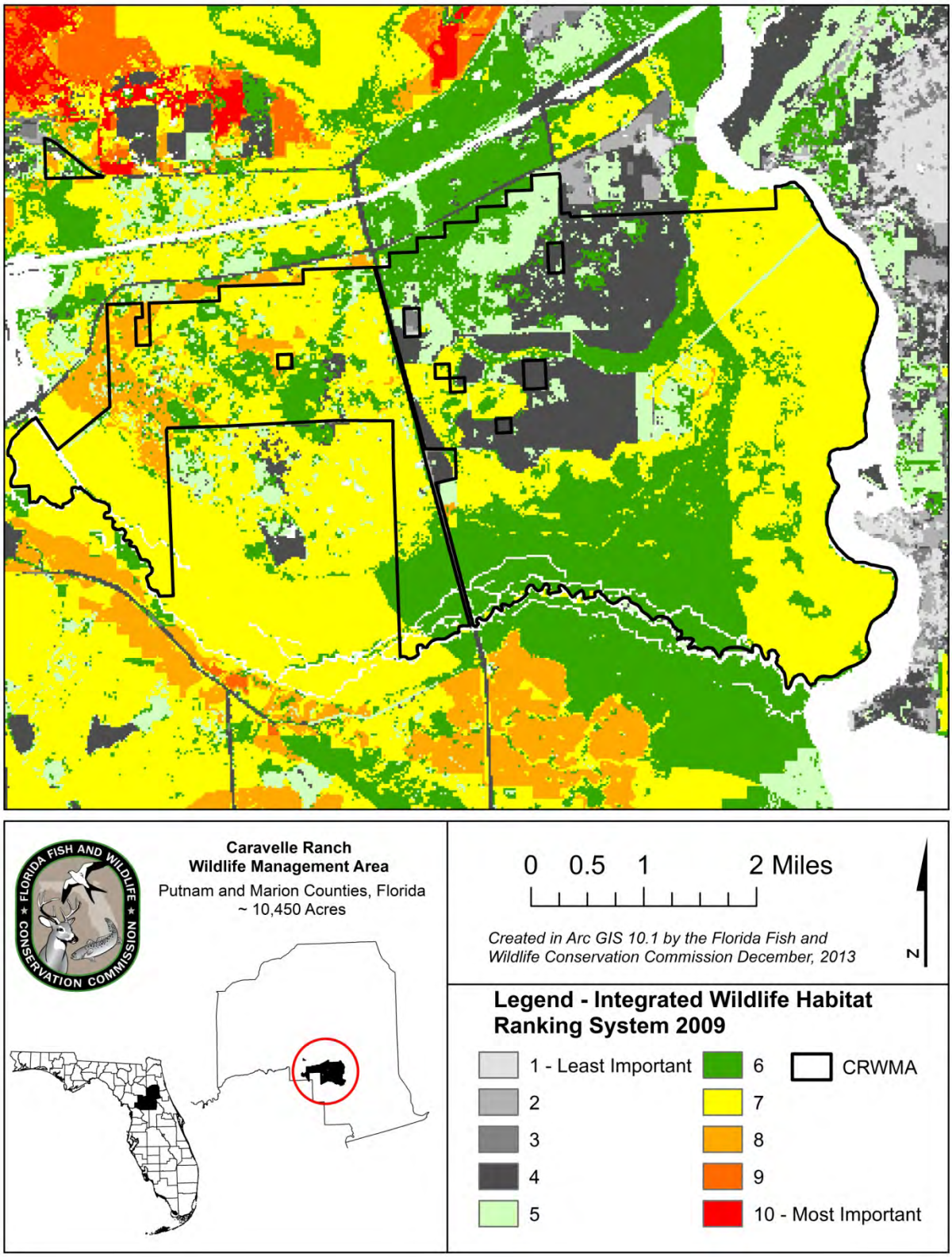


Figure 7. FWC Integrated Wildlife Habitat Ranking System 2009

2.3.1 Imperiled Species

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

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

Little blue heron, *FWC*

The CRWMA's diverse vegetative communities provide the resources necessary to sustain large wildlife assemblages and create good habitat conditions for far-ranging species, as well as allowing seasonal movement of wildlife species. Several species of wildlife that are endangered, threatened, or species of special concern inhabit the area, including the gopher tortoise, limpkin, wood stork, and Florida sandhill crane.

Table 7 lists the imperiled species known to occur on CRWMA. The avian species known to occur on CRWMA are listed in Table 8. Tables 9-12 list the amphibian species, reptilian species, mammal species, and exotic species observed on CRWMA respectively. There is currently not a comprehensive list of fish or invertebrate species for CRWMA.

Table 7. Rare and Imperiled Species Observed on CRWMA

Common name	Scientific name	Status
Mammals		
Sherman's fox squirrel	*Sciurus niger shermani*	SSC
Birds		
Florida sandhill crane	*Grus canadensis pratensis*	ST
Limpkin	*Aramus guarauna*	SSC
Little blue heron	*Egretta caerulea*	SSC
Snowy egret	*Egretta thula*	SSC
Tricolored heron	*Egretta tricolor*	SSC

Table 7. Rare and Imperiled Species Observed on CRWMA

Common name	Scientific name	Status
White ibis	*Eudocimus albus*	SSC
Wood stork	*Mycteria americana*	FE
Reptiles		
American alligator	*Alligator mississippiensis*	FT(S/A)
Gopher tortoise	*Gopherus polyphemus*	ST
Plants		
Blueflower butterwort	*Pinguicula caerulea*	ST
Garberia	*Garberia heterophylla*	ST
Hooded pitcherplant	*Sarracenia minor*	ST
Yellow butterwort	*Pinguicula lutea*	ST

Abbreviation	Status
FE	Federally-designated Endangered
FT(S/A)	Federally-designated Threatened because of similarity of appearance
ST	State-designated Threatened
SSC	State Species of Special Concern

Table 8. Avian Species Observed on CRWMA

Common	Scientific Name
Acadian flycatcher	*Empidonax virescens*
American coot	*Fulica americana*
American crow	*Corvus brachyrhynchos*
American goldfinch	*Spinus tristis*
American kestrel	*Falco sparverius*
American redstart	*Setophaga ruticilla*
American robin	*Turdus migratorius*
American swallow-tailed kite	*Elanoides forficatus*
American woodcock	*Scolopax minor*
Anhinga	*Anhinga anhinga*
Bachman's sparrow	*Peucaea aestivalis*
Bald eagle	*Haliaeetus leucocephalus*
Barn owl	*Tyto alba*
Barn swallow	*Hirundo rustica*
Barred owl	*Strix varia*
Belted kingfisher	*Ceryle alcyon*
Black vulture	*Coragyps atratus*

Table 8. Avian Species Observed on CRWMA

Common	Scientific Name
Black-and-white warbler	*Mniotilta varia*
Black-crowned night heron	*Nycticorax nycticorax*
Blue grosbeak	*Passerinca caerulea*
Blue jay	*Cyanocitta cristata*
Blue-grey gnatcatcher	*Polioptila caerulea*
Blue-headed vireo	*Vireo solitarius*
Blue-winged teal	*Anas discors*
Boat-tailed grackle	*Quiscalus major*
Brown thrasher	*Toxostoma rufum*
Brown-headed cowbird	*Molothrus ater*
Brown-headed nuthatch	*Sitta pusilla*
Carolina chickadee	*Poecile carolinensis*
Carolina wren	*Thryothorus ludovicianus*
Cattle egret	*Bubulcus ibis*
Cedar waxwing	*Bombycilla cedrorum*
Chestnut-sided warbler	*Setophaga pensylvanica*
Chimney swift	*Chaetura pelagica*
Chipping sparrow	*Spizella passerina*
Chuck-wills-widow	*Caprimulgus carolinensis*
Common grackle	*Quiscalus quiscula*
Common ground-dove	*Columbina passerina*
Common loon	*Gavia immer*
Common moorhen	*Gallinula chloropus*
Common nighthawk	*Chordeiles minor*
Common snipe	*Capella gallinago*
Common yellowthroat	*Geothlypis trichas*
Cooper's hawk	*Accipiter cooperii*
Double-crested cormorant	*Phalacrocorax auritus*
Downy woodpecker	*Picoides pubescens*
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 wood-pewee	*Contopus virens*
Eurasian collared-dove	*Streptopelia decaocto*
European starling	*Sturnus vulgaris*
Field sparrow	*Spizella pusilla*
Fish crow	*Corvus ossifragus*

Table 8. Avian Species Observed on CRWMA

Common	Scientific Name
Golden-crowned kinglet	*Regulus satrapa*
Grasshopper sparrow	*Ammodramus savannarum*
Gray catbird	*Dumetella carolinensis*
Great blue heron	*Ardea herodias*
Great egret	*Casmerodius albus*
Great horned owl	*Bubo virginianus*
Great-crested flycatcher	*Myiarchus crinitus*
Green heron	*Butorides virescens*
Hairy woodpecker	*Picoides villosus*
Henslow's sparrow	*Ammodramus henslowii*
Hermit thrush	*Catharus guttatus*
Hooded merganser	*Lophodytes cucullatus*
Hooded warbler	*Setophaga citrina*
House wren	*Troglodytes aedon*
Indigo bunting	*Passerina cyanea*
Kentucky warbler	*Geothlypis formosa*
Killdeer	*Charadrius vociferus*
Least bittern	*Ixobrychus exilis*
Limpkin	*Aramus guarauna*
Little blue heron	*Egretta caerulea*
Loggerhead shrike	*Lanius ludovicianus*
Louisiana waterthrush	*Parkesia motacilla*
Mottled duck	*Anas fulvigula*
Mourning dove	*Zenaida macroura*
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 rough-winged swallow	*Stelgidopteryx serripennis*
Northern waterthrush	*Parkesia noveboracensis*
Orange-crowned warbler	*Vermivora celata*
Orchard oriole	*Icterus spurius*
Osprey	*Pandion haliaetus*
Ovenbird	*Seiurus aurocapilla*
Palm warbler	*Setophaga palmarum*
Pied-billed grebe	*Podilymbus podiceps*
Pileated woodpecker	*Dryocopus pileatus*
Pine warbler	*Setophaga pinus*

Table 8. Avian Species Observed on CRWMA

Common	Scientific Name
Prairie warbler	*Setophaga discolor*
Prothonotary warbler	*Prothonotaria citrea*
Purple martin	*Progne subis*
Red-bellied woodpecker	*Melanerpes carolinus*
Red-eyed vireo	*Vireo olivaceus*
Red-headed woodpecker	*Melanerpes erythrocephalus*
Red-shouldered hawk	*Buteo lineatus*
Red-tailed hawk	*Buteo jamaicensis*
Red-winged blackbird	*Agelaius phoeniceus*
Ring-necked duck	*Aythya collaris*
Rock dove	*Columba livia*
Ruby-crowned kinglet	*Regulus calendula*
Ruby-throated hummingbird	*Archilochus colubris*
Rufous-sided towhee	*Pipilo erythrophthalmus*
Sandhill crane	*Grus canadensis*
Savannah sparrow	*Passerculus sandwichensis*
Sedge wren	*Cistothorus platensis*
Sharp-shinned hawk	*Accipiter striatus*
Snow goose	*Chen caerulescens*
Snowy egret	*Egretta thula*
Song sparrow	*Melospiza melodia*
Spotted sandpiper	*Actitis macularia*
Summer tanager	*Piranga rubra*
Swamp sparrow	*Melospiza georgiana*
Tree swallow	*Tachycineta bicolor*
Tricolored heron	*Egretta tricolor*
Tufted titmouse	*Parus bicolor*
Turkey vulture	*Cathartes aura*
Vesper sparrow	*Pooecetes gramineus*
White ibis	*Eudocimus albus*
White-eyed vireo	*Vireo griseus*
Wild turkey	*Meleagris gallopavo*
Willet	*Tring semipalmata*
Wilson's snipe	*Gallinago delicata*
Wood duck	*Aix sponsa*
Wood stork	*Mycteria americana*
Worm-eating warbler	*Helmitheros vermivorum*
Yellow-bellied sapsucker	*Sphyrapicus varius*
Yellow-billed cuckoo	*Coccyzus americanus*
Yellow-rumped warbler	*Setophaga coronata*

Table 8. Avian Species Observed on CRWMA

Common	Scientific Name
Yellow-throated vireo	*Vireo flavifrons*
Yellow-throated warbler	*Setophaga dominica*

Table 9. Amphibian Species Observed at CRWMA

Common Name	Scientific Name
Bronze frog	*Rana clamitans clamitans*
Eastern narrowmouth toad	*Gastrophryne carolinensis*
Eastern spadefoot	*Scaphiopus holbrookii*
Florida cricket frog	*Acris gryllus dorsalis*
Greater siren	*Siren lacertina*
Green treefrog	*Hyla cinerea*
Greenhouse frog	*Elethrodactylus planirostrus*
Little grass frog	*Pseudacris ocularis*
Narrow-striped dwarf siren	*Pseudobranchus axanthus*
Oak toad	*Bufo quercicus*
Peninsula newt	*Notophthalmus viridescens piaropicola*
Pig frog	*Rana grylio*
Pinewoods treefrog	*Hyla femoralis*
River frog	*Rana heckscheri*
Southern chorus frog	*Pseudacris nigrita*
Southern leopard frog	*Rana utricularia*
Southern toad	*Bufo terrestris*
Spring peeper	*Hyla crucifer*
Squirrel treefrog	*Hyla squirrella*
Two-toed amphiuma	*Amphiuma means*

Table 10. Reptilian Species Observed at CRWMA

Common Name	Scientific Name
Black racer	*Coluber constrictor*
Broadhead skink	*Eumeces laticeps*
Coral snake	*Micrurus fulvius*
Dusky pygmy rattlesnake	*Sistrurus miliarius barbouri*
Eastern diamondback rattlesnake	*Crotalus adamanteus*
Eastern garter snake	*Thamnophis sirtalis sirtalis*
Eastern glass lizard	*Ophisaurus ventralis*
Eastern hognose	*Heterodon platirhinos*
Florida box turtle	*Terrapene carolina bauri*

Table 10. Reptilian Species Observed at CRWMA

Common Name	Scientific Name
Florida chicken turtle	*Deirochelys reticularia*
Florida cottonmouth	*Agkistrodon piscivorus conanti*
Florida green watersnake	*Nerodia floridana*
Florida redbelly turtle	*Pseudemys nelsoni*
Florida scarlett snake	*Cemophora coccinea coccinea*
Florida softshell	*Apalone ferox*
Florida watersnake	*Nerodia fasciata pictiventris*
Glossy crayfish snake	*Regina rigida rigida*
Gopher tortoise	*Gopherus polyphemus*
Green anole	*Anolis carolinensis*
Ground skink	*Scincella lateralis*
North Florida swamp snake	*Seminatrix pygaea pygaea*
Peninsula ribbon snake	*Thamnophis sauritus sackenii*
Rough green snake	*Opheodrys aestivus*
Scarlet kingsnake	*Lampropeltis triangulum elapsoides*
Six-lined racerunner	*Cnemidophorus sexlineatus*
Southeastern five-lined skink	*Eumeces inexpectatus*
Striped mud turtle	*Kinosternon bauri*
Yellow rat snake	*Elaphe obsoleta quadrivittata*

Table 11. Mammal Species Observed on CRWMA

Common Name	Scientific Name
Bobcat	*Lynx rufus*
Cotton mouse	*Peromyscus gossypinus*
Cotton rat	*Sigmodon hispidus*
Coyote	*Canis latrans*
Eastern cottontail	*Sylvilagus floridanus*
Eastern pipistrelle	*Perimyotis subflavus*
Florida black bear	*Ursus americanus floridanus*
Gray fox	*Urocyon cinereoargenteus*
Gray squirrel	*Sciurus carolinensis*
Marsh rabbit	*Sylvilagus palustris*
Nine-banded armadillo	*Dasypus novemcinctus*
Opossum	*Didelphis virginiana*
Raccoon	*Procyon lotor*
Rafinesque's big eared bat	*Corynorhinus rafinesquii*
River otter	*Lutra canadensis*
Sherman's fox squirrel	*Sciurus niger shermani*

Table 11. Mammal Species Observed on CRWMA

Common Name	Scientific Name
Southern short-tailed shrew	*Blarina carolinensis*
White-tailed deer	*Odocoileus virginianus*
Wild hog	*Sus scrofa*
Striped skunk	*Mephitis mephitis*

Table 12. Exotic Animal Species Observed on CRWMA

Common Name	Scientific Name
Mammals	
Nine-banded armadillo	*Dasypus novemcinctus*
Wild hog	*Sus scrofa*
Birds	
Eurasian collared-dove	*Streptopelia decaocto*
European starling	*Sturnus vulgaris*
Rock dove	*Columba livia*
Amphibians	
Greenhouse treefrog	*Eleutherodactylus planirostris planirostris*

2.3.2 FWC Wildlife Observations and FNAI Element Occurrences

FNAI assigns ranks to "element" occurrences, which are an exemplary or rare component of the natural environment. As defined by FNAI, an "element" is any exemplary or rare component of the natural environment such as a species, natural community, bird rookery, spring, sinkhole, cave, or other ecological feature. An element occurrence is a single extant habitat which sustains or otherwise contributes to the survival of a population or a distinct, self-sustaining example of a particular element. This ranking system was developed by The Nature Conservancy and the Natural Heritage Program Network based on the element's global rank (element's worldwide status) or state

Eastern diamondback at CRWMA, *FWC*

rank (status of element in Florida). The FNAI ranking system and definitions are located on the following website: www.fnai.org/ranks.cfm.

Known locations of the FWC wildlife occurrences and FNAI element occurrences from the most recent GIS databases of the respective agencies are displayed in Figure 8. Appendix 13.7 contains a letter from FNAI authorizing the FWC to utilize their database for purpose of displaying known plant and animal resources.

Gopher tortoise at CRWMA, *FWC*

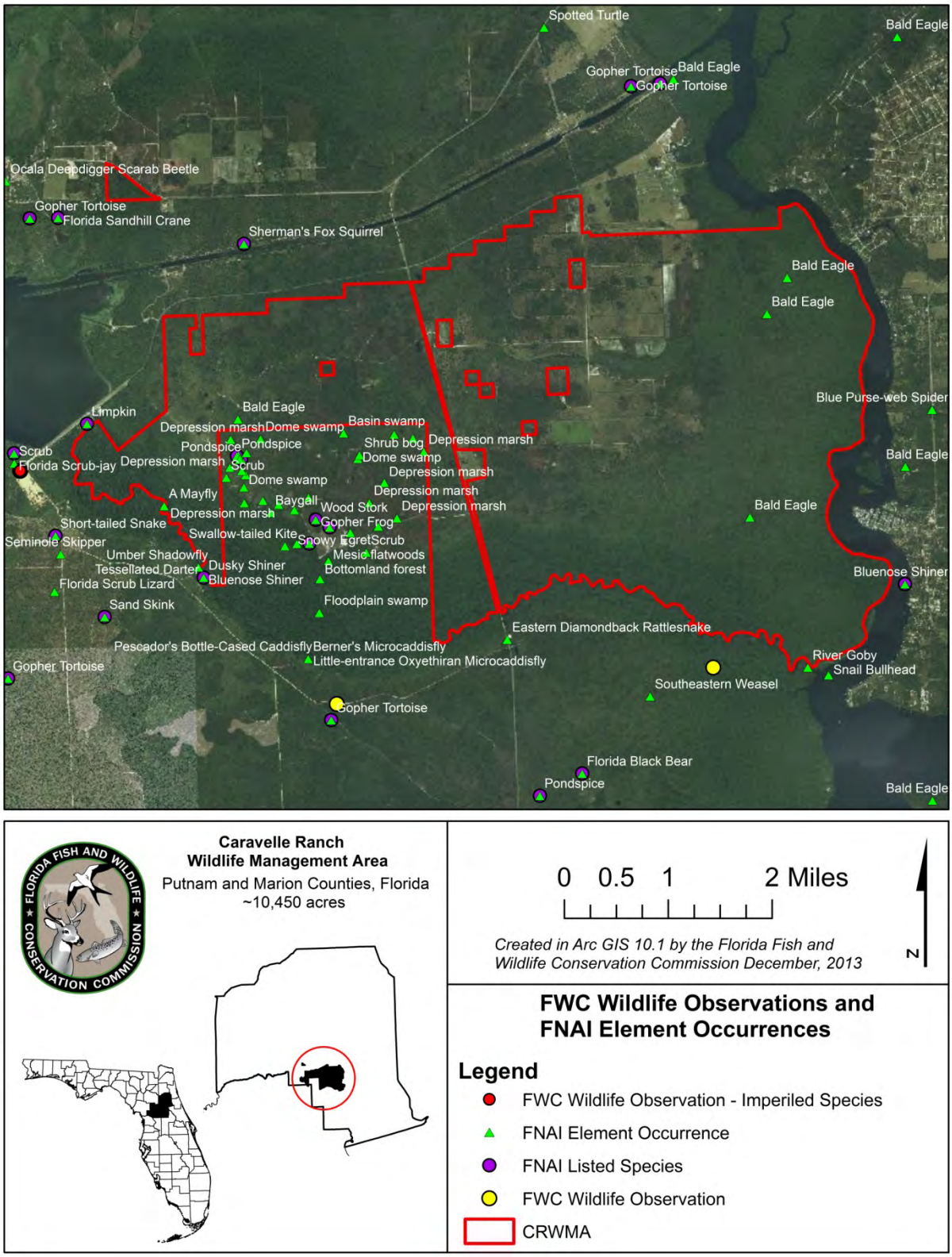


Figure 8. FNAI Element Occurrences and FWC Wildlife Observations

2.4 Native Landscapes

The CRWMA has a diverse assemblage of native landscapes exemplified by a broad swath of intact floodplain marshes, swamps and forests, along the St. Johns and Ocklawaha Rivers to its upland pine forest. These are but some of the native landscapes found in the CRWMA's natural communities that are fully described in the vegetation Section 2.2.1.

2.5 Water Resources

CRMWA lies within the drainage basins of Camp Branch Creek, the Ocklawaha River, and the St. Johns River. CRWMA is bordered by the St. Johns River to the east and its largest tributary, the Ocklawaha River, to the south. CRWMA provides floodplain, watershed, and water quality protection for these rivers and the Cross-Florida Barge Canal, located north of the FWC-managed portion of CRWMA. The Cross Florida Barge Canal bisects OGT lands and connects the St. Johns River to the Rodman reservoir. Currently, a structure with a flap gate located on the south bank of the Barge Canal regulates the flow of Camp Branch Creek into CRWMA. This creek flows south and east through the CRWMA before draining into the St. Johns River. Restoration work at Camp Branch Creek to return water to the creek channel was completed in February 2011.

Surface waters on CRWMA are classified as Class III (fresh waters), which meet water quality criteria established to protect fish consumption, recreation and the propagation and maintenance of a healthy, well-balanced population of fish and wildlife (62-302.400, FAC). Surface waters at CRWMA are designated as Outstanding Florida Waters that are to be protected from degradation from their current water quality classification (62-302.700, FAC). The St. Johns River adjacent to CRWMA is classified as impaired by DEP for exceeding the Total Maximum Daily Load for mercury.

Three primary aquifer systems underlay Putnam County: the surficial aquifer, the secondary artesian aquifer, and the Floridian aquifer. Parts of CRWMA provide recharge to the Floridian Aquifer at a rate of 0-4 inches per year (Putnam County Comprehensive Plan Infrastructure Element, 2006).

2.6 Beaches and Dunes

There are no beaches or dunes within CRWMA.

2.7 Mineral Resources

Commercially valuable mineral resources within Putnam County include heavy minerals, sand, and kaolin clay. The only known mineral resource for the portion of CRWMA that is located in Marion County is sand. There are no active mineral mines located within CRWMA. Oil and gas deposits are not known to exist in formations that appear to have any potential economic feasibility for extraction.

2.8 Cultural Resources

The Florida Master Site File lists seven prehistoric sites to occur within CRWMA (Appendix 13.14). Four are Native American middens. The age of these middens is currently unknown. Two middens are located in the river swamp on the lands owned by SJRWMD and leased to the FWC that are included within the overall Establishment Order for CRWMA. The FWC biologists have located an additional midden in the river swamp on the portion owned by the SJRWMD. This specific midden was partially excavated by an archeological group from Buffalo, New York. Tailings from the excavation are still visible. The hole left from the excavation was filled in with cabbage palm logs and the tailings left in a pile next to the midden. Additional archaeological sites probably occur, however, the area has not been completely surveyed. Future surveys may identify additional cultural resources. All Master Site recordings, assessments, and preservation strategies will be coordinated with Florida Department of State, Division of Historical Resources.

2.9 Scenic Resources

The most extensive natural communities on CRWMA are floodplain swamp, mesic flatwoods, wet flatwoods, and improved pasture. Wildlife viewing opportunities include the chance to see Florida black bears near the river swamps and sandhill cranes along marshes where they nest. The CRWMA is part of a network of sites along the Great Florida Birding Trail, which includes areas across the state selected for their excellent bird watching, wildlife viewing, or educational opportunities.

Sandhill crane, *FWC*

The abundance of rabbits in the pastures favors red-shouldered hawks, kestrels, and bobcats. Rodman Reservoir is a good spot for seeing bald eagles, waterfowl, and wading birds. Horseback riding, hiking, and biking are best in the fall and spring on non-hunting days. Spring is an excellent time for birders who may see as many as 15 swallow-tailed kites circling the area.

A network of well-maintained and marked roads provides ample opportunities for hiking, wildlife viewing, biking, and horseback riding to view these resources. Complete descriptions of the natural communities found on CRWMA are fully described in the vegetation Section 2.2.1.

3 Uses of the Property

3.1 Previous Use and Development

Prior to European settlement, the landscape of Florida, including this area of the peninsula, was settled and used by a variety of aboriginal peoples whose culture relied mainly on hunting, fishing and subsistence agriculture. Though some land alteration occurred, only minor alteration of the landscape is thought to have taken place until the advent of European settlement beginning with the Spanish occupation of Florida in the sixteenth century. Along with more advanced agricultural practices, the Spanish and other settlers brought live stock, primarily cattle and hogs, to Florida. This began an era of broad use of the landscape for agriculture.

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

Historical development associated with the early settlement of the CRWMA is similar to other early settlements in west-central Florida. Exploitation of timber resources and agricultural development were the main factors that opened the area to settlers. Early in the 20th century, lumbering and naval stores industries followed the railroad south. At first, large stands of pine were milled for turpentine, then the larger saw timber was cut, and finally the pulpwood was removed.

Prior to 1965, CRWMA was used for commercial timber operations, cattle grazing, and hunting. In the late 1960s and early 1970s, trees were removed from portions of the property east of State Highway 19 to create pastures for cattle. The Caravelle Ranch Cattle Company of Palatka managed a cattle company at the time. Acreage east of SR19 was ditched to remove standing water from pastures to improve forage and crop production. Additional water control structures were installed to retain water for cattle. At this time, the land was used as a hunting preserve. Managers reported high populations of turkey, quail, deer, and dove. At some point, land managers released feral hogs to supplement the existing population. Over time, the density of feral hogs on the ranch became a problem due to competition with cattle for grain.

Previous landowners managed the pine flatwoods west of SR19 and south of Rodman Road for timber production, hunting, and some cattle grazing during the 1960s. Most of the timber on the area was harvested during the 1970s and 1980s, and replanted as a slash pine plantation. Most timber on the FWC lead is from this reforestation. A subsequent lack of prescribed fire created conditions with extensive shrub cover and little herbaceous

groundcover in the years before State ownership. A private hunting club maintained a lease on the western portion of CRWMA and created the extensive network of roads and wildlife openings currently used by area managers.

During the 1930s, the State of Florida Canal Authority managed the lands within the CRWMA that are part of the Marjorie Harris Carr Cross Florida Greenway acres that later became on which the DEP-OGT is lead managing agency. The Canal Authority was authorized to create and maintain the Cross Florida Barge Canal in 1933. Ground was broke for the canal in 1935 and again in 1963. This canal currently bisects the OGT portion of CRWMA and connects the St. Johns River to the Rodman Reservoir to the west. A structure with a flap gate located on the south bank of the barge canal regulates the flow of water into the Camp Branch Creek. This creek flows south and east through the FWC lead before draining into the St. Johns River. Water levels in the creek are heavily affected by water levels in the canal.

Cypress rafts, *Florida Photo Archives*

Bald cypress was harvested from hardwood river swamps during the 1930s and 1940s. During the late 1980s, the property was held by the Federal Deposit Insurance Corporation (FDIC), and several other timber harvests occurred. The roads that lead into the hardwood river swamp (areas now owned by the SJRWMD) were built during this time to permit access for logging. The portion of CRWMA under management by SJRWMD has been open to public hunting and other passive recreational activities since being established as a WMA in 1992.

3.2 Current Use of the Property

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

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

Due to the proximity of population centers in Putnam County, public use can be expected to increase as public awareness of opportunities increases. The FWC administers hunts in the fall and spring for various game species including small game, deer, turkey, and feral hogs, which account for approximately 90% 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 impacts from CRWMA for this region of Florida. In Fiscal Year 2012-2013, an estimated 11,379 people visited the CRWMA, up from an estimated 8,511 visitors in 2011-2012. Primarily, as a result of this visitation and use of the area, the FWC economic analysis estimates indicate that the CRWMA generated an estimated annual economic impact of $2,223,343 for the State and the Northeast Florida region. This estimated annual economic impact has aided in the creation of an estimated 23 jobs.

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

3.3 Single or Multiple-use Management

CRWMA will be managed under the multiple-use concept as a Wildlife Management Area. CRWMA will provide fish and wildlife-based public outdoor recreation and educational opportunities, while protecting the natural and cultural resources found on the area. Any natural and cultural resources of CRWMA 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 CRWMA. 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 13.16). 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	✓		
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	✓		
Preservation of historical sites	✓		
Primitive camping	✓		
Protection of imperiled species	✓		
Off-road vehicle use			✓
Shooting sports park	✓		
Soil and water conservation	✓		
Timber harvest	✓		
Wildlife observation	✓		

3.3.2 Assessment of Impact of Planned Uses of the Property

To communicate the 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 CRWMA (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 the FWC is the lead manager, the FWC evaluates and identifies recommended areas for a potential surplus designation by the DSL, ARC, and the Board of Trustees. This evaluation consists of GIS modeling and analysis, aerial photography interpretation, analysis of fish and wildlife resources, a review of resource and operational management needs, and a review of public access and recreational use of the area. Also, the FWC considers recommendations for surplus lands as they relate to

Florida's "No Net Loss of Hunting Lands" legislation (Ch. 379.3001 F.S.), as well as surplus restrictions for lands acquired through the Federal Aid in Wildlife Restoration Act (Pittman-Robertson) or through other federal grant programs.

The evaluation of CRWMA by the FWC has determined that all portions of the area are being managed and operated for the original purposes of acquisition, and remain integral to the continued conservation of important fish and wildlife resources, protection of the water quality of the St. Johns River and Ocklawaha River, and continue to provide good fish and wildlife resource based public outdoor recreational opportunities. For these reasons, none of the lands currently located within CRWMA meet the FWC criteria for a potential surplus designation.

4 Accomplished Objectives from the CRWMA Management Plan 2002-2012

The following Resource Management Goals and Objectives are from the CRWMA Management Plan 2002 – 2012. Planned activities for CRWMA during this period were detailed in the Objectives listed below. The degree to which the FWC was able to accomplish the planned activities during this period is reflected as **Percent Accomplished** with each associated Objective.

Resource Management Goals and Objectives	**Percent Accomplished**
Goal 1: Facilitate and conduct scientific research to optimally manage and protect native upland and wetland communities of CRWMA.	
Objective 1: Cooperate with SJRWMD on projects that may impact water resources (ongoing).	100%
Objective 2: Continue an assessment of the effects of roller chopping, long-term prescribed fire, and mowing on mesic flatwoods (ongoing).	100%
Objective 3: Continue an assessment of cattle grazing impacts on native plant communities (ongoing).	100%
Objective 4: To provide baseline management information, establish photo-plots in Mesic Flatwoods, Bottomland Forests, Floodplain Swamp, Xeric Hammock, and Ruderal Communities of the Caravelle Ranch WMA managed community types by 2002. *Comment: Xeric Hammock (1.5 acres) was not monitored due to a sensitive cultural site.*	100%
Objective 5: Contract with FNAI to conduct a comprehensive floral and faunal inventory by 2003.	100%
Goal 2: Manage and restore pastures to provide high quality wildlife habitat.	
Objective 1: Maintain a portion of pasture acreage after bahiagrass removal using prescribed fire, mowing, and discing to provide habitat for wildlife that depend on early successional vegetation (ongoing).	100%

Objective 2: Utilize portions of the disturbed pasture sites as dove fields, food plots and wildlife openings (ongoing).	100%
Objective 3: Contingent upon development of accepted restoration methods, proceed with restoration of ten percent of improved pasture area to native vegetative communities by 2005. *Comment: FWC has initiated restoration on 21% of the improved pasture areas.*	100%
Goal 3: Maintain the integrity of CRWMA's native communities.	
Objective 1: Continue to locate and eradicate exotic plant species using most appropriate means (ongoing).	100%
Objective 2: Continue to utilize prescribed fire, mechanical and chemical treatments to provide quality wildlife habitat (ongoing).	100%
Objective 3: Complete development of a forest management plan to benefit wildlife by 2002. *FWC is cooperating with SJRWMD to develop a forest management plan for the SJRWMD lands.*	50%
Objective 4: Complete thinning of 124 acres of mesic flatwoods community by 2002.	100%
Objective 5: Work with the Florida Department of Agriculture's Division of Forestry to identify additional acreage for thinning consistent with the forest management plan by 2005.	100%
Objective 6: Delineate management units and develop quantifiable vegetation management objectives for these management units by 2006.	100%
Goal 4: To optimize hunter satisfaction, maintain or increase game populations through management activities.	
Objective 1. Conduct annual game wildlife inventories to monitor changes in population trends (ongoing).	100%
Objective 2: Continue to collect biological data from harvested game to evaluate general physiological condition (ongoing).	100%
Objective 3: Utilize portions of the disturbed sites as dove fields, food plots and wildlife openings (ongoing).	100%
Objective 4: Continue to maintain four 50-acre dove fields (ongoing). Comment: *FWC now maintains three dove fields (~125 acres).*	62.5%
Objective 5: Establish 10 miles of annual wildlife food plantings along firelines by 2004.	100%
Objective 6: Create an additional 10 acres of wildlife food plots on previously disturbed sites by 2004. *Comment: FWC now maintains ~50 acres of wildlife food plots.*	100%
Goal 5: Provide nature-based recreation and educational opportunities.	
Objective 1: Provide visitor sign-in boxes to monitor man-days and types of recreational use by 2002.	100%

Objective 2: Develop a vehicular access strategy to accommodate nature-based recreational opportunities outside the hunting season by 2003. *FWC has determined that vehicular access outside of hunting season is not appropriate. FWC provides walk in access, including horse walk-through gates.*	0%
Objective 3: By 2003, enhance an existing primitive campsite for equestrian use by providing pickets and watering troughs. *Comment: FWC provides water for horses at the entrance campsite. However, troughs were considered inappropriate due to water quality concerns and pathogens.*	100%
Objective 4: To enhance wildlife viewing opportunities, establish ten miles of annual wildlife food plantings along firelines and create ten acres of wildlife food plots on previously disturbed sites by 2004.	100%
Objective 5: By 2004, develop a recreational guide identifying natural-based recreational opportunities and other points of interest.	100%
Objective 6: Complete development of self-guided interpretive trails and multi-use trails by 2004.	100%
Objective 7: Provide infrastructure that offers the public wildlife viewing opportunities by 2005.	100%
Objective 8: In cooperation with the SJRWMD, assess the need for development of a self-guided interpretive canoe trail by 2005. *Comment: FWC and SJRWMD assessed the need for a canoe trail and determined access to paddling could not be provided within the CRWMA.*	100%
Goal 6: Protect listed wildlife species and manage their habitats.	
Objective 1: Continue to maintain snags, stumps and other ecosystem components to provide important wildlife habitats (ongoing).	100%
Objective 2: Develop and distribute informational materials on listed species, including the Florida black bear and swallow-tailed kite by 2002.	100%
Objective 3: Contract with FNAI to conduct a comprehensive floral and faunal inventory by 2003.	100%
Goal 7: Provide high quality recreational fishing opportunities.	
Objective 1: Investigate the feasibility of providing vehicular access to the north side of the Barge Canal for fishermen and other recreational users by 2002. *Comment: DEP-OGT has lead-management responsibility on this portion of CRWMA.*	100%
Objective 2: Coordinate with the FWC Division of Fisheries to develop fishing opportunities on Camp Branch Pond and borrow pits by 2002.	100%
Objective 3: Construct a fishing dock at Camp Branch Pond by 2004. *Comment: FWC determined that a dock was not appropriate at this location. Other improvements were developed to enhance fishing access.*	0%
Goal 8: Manage and Protect Cultural Resources of the CRWMA.	
Objective 1: Post signage advising the public of protection provided to cultural resources by Chapter 267, F. S. by 2002.	100%

Objective 2: Continue to cooperate with the Division of Historical Resources to identify additional cultural resources on the area by 2003.	100%
Goal 9: Assure an optimum boundary by continuing to identify and pursue acquisition needs, and establish adjacent public lands into the WMA.	
Objective 1: Continue to maintain a GIS shapefile, acreage, and other necessary data to facilitate nominations for the Inholdings and Additions Program (ongoing).	100%
Objective 2: By 2003, propose that the Miller property and the Naval Bombing Range be acquired. *Comment: FWC has determined that acquisition of the Naval Bombing Range is not necessary or appropriate. FWC continues to identify strategic lands for inclusion in a OCPB.*	50%
Goal 10: Develop manpower, equipment, and infrastructure necessary to adequately support management, resource protection, and recreational uses on the area.	
Objective 1: Following acquisition of new properties, submit a request for a new position to achieve the FWC staffing standard by 2003.	100%

In addition to the accomplished objectives from the 2002-2012 management plan (Section 4), others have been made. To address the management goal of habitat restoration and improvement, the FWC contracted with FNAI to identify and map historic and current natural community types. The FWC has also contracted with The Forestry Company to thin timber in the mesic flatwoods communities of CRWMA to improve wildlife habitat and to further this management goal. Thinning began in December 2012 and approximately 1,100 acres have been thinned thus far. With the assistance of The Forestry Company, a pre- and post-timber harvest report is being developed and implemented. A Prescribed Burn Plan has been developed and implemented to address habitat maintenance needs and to help achieve desired future conditions in native plant communities (Appendix 13.8). To improve wildlife habitat, 12 bluebird, 10 wood duck, and three kestrel boxes were installed. A bat house for Rafinesque's big-eared bats was installed. The FWC continues to maintain three special opportunity dove fields totaling 125 acres and approximately 50 acres of wildlife food plots.

Rafinesque's big-eared bat, *FWC*

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 CRWMA is to restore and maintain natural communities in a condition that sustains ecological processes and conserves biological diversity, especially fish and wildlife resources. In conjunction with this primary emphasis, it is the FWC's intent to provide quality fish and wildlife-based recreational opportunities on CRWMA. The FWC will utilize the best available data, guidelines, natural resource management practices, and recreational management practices to achieve these outcomes in accordance with the original purposes for acquisition. Furthermore, the management activities described in this section are in compliance with those of the Conceptual State Lands Management Plan. Private inholdings on CRWMA and the proximity of adjacent private lands require consideration when performing management activities such as hydrology manipulations and prescribed burns, which may cause flooding issues or property damage concerns from fire/smoke, respectively.

Prescribed burn at CRWMA, *FWC*

5.1 Land Management Review

A land management review was conducted in January 2010 and the results of that review and FWC responses to recommendations are included as Appendix 13.3. It was determined that CRWMA is being managed in accordance with the purposes for acquisition and that management practices, including public access, are in compliance with the management plan. The recommendations the Land Management Review were considered and addressed in the development of this Management Plan, including development of management intent language, goals and objectives, and identification of management challenges and development of solution strategies (Sections 5 - 8).

5.2 Adaptive Management

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

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

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

5.2.1 Monitoring

A well-developed monitoring protocol is also one of the principal, required criteria for the management of CRWMA. 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 the FWC's OBVM (Section 5.3.1) program, which monitors how specific vegetative parameters are responding to FWC management. For imperiled and focal fish and wildlife species, monitoring protocols are established through the FWC's WCPR program (Section 5.4.2). Additional select common and game fish and wildlife species may be monitored by FWC staff as appropriate. Exotic and invasive plant and animal species (Section 5.5) are also monitored as needed and appropriate. Recreational uses are monitored through the 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 5.8) are monitored with guidance from the Florida Department of State's Division of Historical Resources (DHR).

5.2.2 Performance Measures

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

5.2.3 Implementation

The CRWMA 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 CRWMA, and resolve conservation threats to fish and wildlife and the habitats they occupy. Based on evaluations of project results, the conservation actions are revised as necessary, and the adaptive management process is repeated.

5.3 Habitat Restoration and Improvement

On CRWMA, the FWC will focus on managing for native habitat, emphasizing maintenance of high-quality natural communities, and restoration of disturbed areas. CRWMA currently has high-quality natural communities that the FWC will continue to manage and protect. An important consideration of this management approach is the retention of the native old growth component of forests, while also providing for natural regeneration.
The FWC, through the work of the FNAI has conducted surveys and mapped the current and historic vegetative communities of CRWMA. CRWMA has high-quality native communities including floodplain swamp, mesic flatwoods, wet flatwoods, hydric hammock, and mesic hammock that the FWC will continue to manage and protect. On disturbed upland sites, including clearings, improved pastures, and abandoned fields, the FWC intends to initiate ground cover and natural community restoration. Restoration actions in mesic flatwoods and wet flatwoods focus on the use of prescribed fire. To meet desired future conditions for vegetative parameters, the FWC uses a 2-3 year fire return interval in flatwoods utilizing a mixture of dormant and growing season fire.

5.3.1 Objective-Based Vegetation Management

The FWC uses a comprehensive resource management approach to managing FWC-managed areas. Restoring the form and function of Florida's natural communities is the

foundation of this management philosophy. The FWC uses OBVM to monitor how specific vegetative attributes are responding to FWC management.

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

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

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 with the results being compared to the established desired future conditions. All monitoring performed under OBVM is completed using the program's Standard Operating Procedures.

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

desired future conditions, provides key operational information on a management unit's vegetation structural status at a given point in time and trend over time. Using this information, managers can evaluate, adjust and modify their management practices to meet the stated objectives.

5.3.2 Prescribed Fire and Fire Management

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

Timber removal, site preparation, drainage, and lack of fire have all combined to alter the plant species composition on portions 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 these areas 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 CRWMA in accordance with vegetative management objectives. As fire moves across a landscape, some areas carry fire better than others. Areas with higher vegetative fuel loads typically burn more evenly and with greater intensity. Areas with lower vegetative fuel loads or wetland areas inundated with water typically will not carry fire as evenly, and usually burn at a lower intensity. Employing a burning program with different burning frequencies, intensities, and seasonality (dormant season vs. growing season) of prescribed burns create habitat diversity and a mosaic of vegetation patterns. This mosaic is designed to have both frequently burned and infrequently burned aspects.

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

Single drum (with standard, not offset blades), one-pass roller chopping can be a valuable management tool, 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 safely 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.

Prescribed fire at CRWMA, *FWC*

The transitional areas between two adjacent but different vegetative cover types, such as forests and wetlands, are known as ecotones. With the possible exception of wildfire suppression, mechanical soil disturbance in ecotones will be avoided in order to protect habitats for important rare species that often occur between flatwoods and riparian drainages. Silvicultural site preparation and creation of firebreaks are avoided when possible in these zones. Additionally, fires are allowed to burn into the edges of marshes, swamps and other wetlands in order to maintain these habitats. Once fuel loads have been reduced and a more open appearance has returned, vegetative management objectives will likely dictate a fire return interval that averages 1-4 years, preferably during the spring and early summer months.

In addition to the general prescribed fire management guidelines described above, an area-specific Prescribed Burn Plan has been developed and implemented for CRWMA (Appendix 13.8). This plan includes delineation of burn management units, detailed descriptions of prescribed fire methodology, safety, and smoke management guidelines.

5.3.3 Habitat Restoration

Habitat restoration activities on CRWMA are currently taking two paths. The first is very intensive and involves the removal of off-site species, planting of native groundcover species, reforestation, and planting of native mid-story and shrub species. CRWMA was one the original pilot areas for a new FWC program aimed at attempting this type of ground-up restoration. The area currently has 30+ acres involved in active groundcover restoration activity. This area has received multiple herbicide treatments, ground preparation, and been mechanically seeded with native seed mixes collected from other FWC properties by staff. They have been replanted with containerized longleaf pine, although that effort resulted in a very low success rate and will likely require additional plantings.

The second restoration track being undertaken is less intensive from both a budgetary and a manpower standpoint. Approximately 460 acres of the cattle lease area was fenced out for restoration purposes. This area had only remnant bahia grass coverage due to the shading created by a heavy canopy of wax myrtle and oak. The acreage is currently managed under a regime of mechanical fuel manipulations, prescribed burning, and longleaf plantings. The habitat treatments are designed to encourage and supplement the native communities that are still present on the site and in the seedbank.

Groundcover restoration site at CRWMA, *FWC*

These restoration efforts together represent approximately 21 percent of acreage that was converted to improved pastures on the area. New planned restoration activities will take place on at least 80 acres in two sections, one east of Dove Field Two and one east of the Tyler Pasture. When successfully restored, these areas will be monitored and maintained as necessary.

Cattle grazing on CRWMA, *FWC*

5.3.4 Cattle Grazing

A five-year cattle grazing agreement (Appendix 13.9) with Jim Farley Cattle Company, is in effect until December 8, 2018. Cattle grazing on CRWMA is used as a management tool to supplement and enhance vegetation management using prescribed fire, mechanical, and chemical treatments. Cattle grazing is primarily conducted on improved and semi-improved pasture areas; areas classified as ruderal. Cattle are stocked at no more than one-half the rate recommended by NRCS or the University of Florida Extension Service. The current lease allows up to 142 Animal Units on approximately 1,690 acres.

5.3.5 Apiaries

A three-year apiary agreement (Appendix 13.10) with Brinson Honey Company is in effect until November 26, 2015. The use of apiaries is conditionally approved for CRWMA and is deemed to be consistent with purposes for acquisition, is in compliance with the Conceptual State Lands Management Plan, and is consistent with the FWC agency mission, goals, and objectives as expressed in the agency strategic plan and priorities document. The FWC Apiary Policy (Appendix 13.11) will be followed with regards to site location, management, and administration of apiaries.

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

5.4.1 Fish and Wildlife

The variety of natural communities at CRWMA provide habitat for a diversity of associated wildlife, including rare and imperiled species, game, and non-game species. In managing for wildlife species, an emphasis will be placed on conservation, protection, and management of natural communities. Natural communities important to wildlife include floodplain swamp, mesic flatwoods, wet flatwoods, mesic hammock, hydric hammock, as well as field and pasture areas. Resident wildlife will be managed for optimum diversity and abundance. In addition to resident wildlife, CRWMA provides resources critical to many migratory birds including waterfowl, passerines, raptors, and shorebirds. Habitats important to migratory species will be protected, maintained, or enhanced.

Kestrel in flight, *FWC*

Additional wildlife management emphasis is placed on documenting the occurrence and abundance of rare and imperiled species on the property. Management activities are designed to restore, enhance, or maintain imperiled species and their habitats. These habitats will be protected and restored by following approved Federal and the FWC recovery plans, guidelines, and other scientific recommendations. Land management activities including prescribed burning, mechanical vegetation management, and timber stand improvements will take into account imperiled species requirements and habitat

needs. Potential for negative impacts from recreational activities will also be considered and monitored.

The FWC will continue to maintain and monitor use of American kestrel nest boxes, bluebird boxes, wood duck boxes, and the bat house built for Rafinesque's big-eared bat. The FWC will periodically monitor and survey known gopher tortoise burrows.

Gopher tortoise burrow at CRWMA, *FWC*

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. However, 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.

5.4.2 Imperiled Species - Wildlife Conservation Prioritization and Recovery

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

The goal of the 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. The FWC's WCPR program objectives include prioritizing what the FWC does for imperiled and focal species on the FWC-managed areas; ensuring the actions taken on

these areas are part of statewide conservation programs and priorities; and informing others about the work accomplished on lands the FWC manages.

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

In summary, for FWC-managed areas, the WCPR program helps assess imperiled and focal wildlife species needs and opportunities, prioritize what the 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, the FWC will facilitate fulfilling the needs of focal and imperiled wildlife species on CRWMA. In the long-term, by implementing these strategies on FWC-managed lands and continuing to assess wildlife species' needs, the FWC will continue to play an integral role in aiding the recovery of imperiled species and preventing the future imperilment of declining wildlife species.

In May 2011, a WCPR Strategy was approved for the CRWMA (see Appendix 13.6 for more detailed information). The FWC has designated a suite of 62 imperiled and rare species statewide as focal species in order to focus statewide wildlife habitat conservation and management efforts on the State's most important wildlife conservation priorities. Using the statewide landcover based habitat maps, models identified 21 of the FWC's designated focal species as having potential habitat on CRWMA. Staff added one additional species, the short-tailed hawk, to the list due to its known use of the area. However, not all of the identified species have the same level of management opportunity or need and not all have been documented on CRWMA. Therefore, seven focal species are surveyed or monitored (i.e., gopher frog, striped newt, gopher tortoise, Bachman's sparrow, brown-headed nuthatch, Northern bobwhite, and Southeastern American kestrel). The focal species for CRWMA are listed in Table 13.

Table 13. Focal Species Having Potential Habitat on CRWMA

Common Name	Scientific Name	Status
American swallow-tailed kite	*Elanoides forficatus*	NL
Bachman's sparrow	*Aimophila aestivalis*	NL
Brown-headed nuthatch	*Sitta pusilla*	NL
Cooper's hawk	*Accipiter cooperii*	NL
Florida black bear	*Ursus americanus floridanus*	NL
Florida mottled duck	*Anas fulvigula*	NL
Florida mouse	*Podomys floridanus*	SSC
Florida pinesnake	*Pituophis melanoleucus mugitus*	SSC
Florida sandhill crane	*Grus canadensis pratensis*	ST
Florida scrub-jay	*Aphelocoma coerulescens*	FT
Frosted flatwoods salamander	*Ambystoma cingulatum*	FT
Gopher frog	*Lithobates capito*	SSC
Gopher tortoise	*Gopherus polyphemus*	ST
Limpkin	*Aramus guarauna*	SSC
Northern bobwhite	*Colinus virginianus*	NL
Red-cockaded woodpecker	*Picoides borealis*	FE
Sherman's fox squirrel	*Sciurus niger shermani*	SSC
Short-tailed hawk	*Buteo brachyurus*	NL
Southeastern American kestrel	*Falco sparverius*	ST
Southern bald eagle	*Haliaeetus leucocephalus*	NL
Striped newt	*Notophthalmus perstriatus*	NL
Wading birds		
Great egret	*Ardea alba*	NL
Little blue heron	*Egretta caerulea*	SSC
Reddish egret	*Egretta rufescens*	SSC
Roseate spoonbill	*Platalea ajaja*	SSC
Snowy egret	*Egretta thula*	SSC
Tricolored heron	*Egretta tricolor*	SSC
White ibis	*Eudocimus alba*	SSC
Wood stork	*Mycteria americana*	FE

Abbreviation	Status
FE	Federally-designated Endangered
FS	Federally-designated Threatened
NL	Not Listed
SSC	State Species of Special Concern
ST	State-designated Threatened

5.5 Exotic and Invasive Species Maintenance and Control

The FWC will continue efforts to control the establishment and spread of Florida Exotic Pest Plant Council (FLEPPC) Category I or II plants on CRWMA. Exotic plant species known to occur on CRWMA include tropical soda apple, camphortree, cogongrass, Chinese tallowtree, chinaberry tree, Japanese climbing fern, air potato, natalgrass and torpedograss. Control techniques are ongoing and include mechanical, chemical, biological, and other appropriate treatments. Treatments utilizing herbicides will comply with instructions found on the herbicide label and employ the Best Management Practices for their application.

Wild hog, *FWC*

An exotic animal species of concern found on CRWMA is the wild hog. Having an inherently high reproductive rate, when populations of wild hogs are left unchecked, these voracious omnivores are known to significantly degrade natural communities through foraging activity (rooting). As a predator of their eggs, wild hogs also are known to impact the success of ground nesting birds such as Northern bobwhite and wild turkey. The FWC will consult with other regional natural resource managing agencies and private land owners to coordinate wild hog control measures as necessary. To responsibly control the hog population of CRWMA, the FWC will evaluate the efficacy of implementing additional control measures, such as limited entry public hunting opportunities or trapping. Hogs are currently legal to hunt during the archery, muzzleloading gun, general gun, supervised small game, and small game seasons with no size or bag limit.

The nine-banded armadillo is another animal classified by the FWC as being an invasive exotic species. This species is believed to potentially impact ground nesting bird populations due to their predation of the birds' eggs. Similar to wild hogs, the FWC will control armadillos by allowing hunting of the species during appropriate hunting seasons. Other control measures for armadillo are limited as the species is not easily trapped.

Coyotes are also present on the area and are believed to have expanded their range from the western United States into Florida through natural range expansion. Attempts to control coyote populations on a large scale have not been successful in other parts of the country. CRWMA occasionally has a large coyote population, likely due to their preference for the open and semi-open pasture and old field areas. Coyotes are legal to hunt during the archery, supervised small hunt, muzzleloading gun, general gun, and small game seasons.

Invasive red fire ants have been found on CRWMA and are known to impact ground nesting wildlife species by attacking hatching eggs and/or newly born young. On CRWMA, this may include a number of common and focal species such as Northern bobwhites and gopher tortoises. Red fire ants often attracted to nest sites by the disturbance and moisture associated with the nesting activity. The FWC will continue to evaluate and implement appropriate control measures for invasive exotic species as necessary.

5.6 Public Access and Recreational Opportunities

5.6.1 Americans with Disabilities Act

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

5.6.2 Recreation Master Plan

The FWC has adopted a comprehensive approach to the planning and administration of fish and wildlife resource based public outdoor recreational opportunities for CRWMA. To accomplish this, the FWC worked with recreational stakeholders and the general public to develop a Recreation Master Plan for CRWMA that will be used to further design and develop appropriate infrastructure that will support the recreational use of the area by the general public. The Recreation Master Plan for CRWMA was finalized in December 2013 (Appendix 13.12). This Recreation Master Plan includes planning for parking, trail design and expansion, and area resource interpretation.

5.6.3 Public Access Carrying Capacity

Baseline carrying capacities for users on FWC-managed lands are established by conducting a site specific sensitivity analysis using available data for the site. The intent of the carrying capacity analysis is to minimize wildlife and habitat disturbance and provide the experience of being “immersed in nature” that visitors to FWC-managed areas desire.

Carrying capacities are just a first step; management of recreational use requires a means of monitoring visitor impacts. Responding to these impacts may require adjusting the carrying capacities as necessary. The carrying capacities generated though 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, the FWC has determined that CRWMA can support 568 visitors per day. However, an objective to increase the carrying capacity to 653 visitors per day has been proposed in Section 6.5 of this Management Plan. This public access carrying capacity will be periodically reevaluated, and additional capacity may be contemplated as part of the Recreation Master Plan (Section 5.6.2) development and implementation process.

It is important to note that public access carrying capacities are not developed to serve as a goal for expanding the public use of a particular area to match the established carrying capacity. Rather, they are developed to establish maximum thresholds for public use of the respective area in order to protect the natural and cultural resources on every area and to ensure that visitors will have a high-quality visitor experience.

5.6.4 Wildlife Viewing

The CRWMA affords a wide variety of native wildlife species, both resident and seasonally migratory, that are available for visitors' enjoyment for observation and photography. The quality and diversity of habitats found on CRWMA attract an equally diverse suite of wildlife species including waterfowl and wading bird species in the wetlands, passerine bird species in the uplands, and various mammalian, reptilian, and amphibian wildlife throughout CRWMA. CRWMA is part of the Great Florida Birding Trail, a network of 515 sites throughout Florida selected for their excellent bird watching, wildlife viewing or educational opportunities.

5.6.5 Hunting

The CRWMA currently offers hunting opportunities during archery, special-opportunity dove, supervised small game, muzzleloading gun, general gun, small game, youth spring turkey, spring turkey, and migratory bird hunting seasons. An evaluation of the hunting opportunities

Wild turkey at CRWMA, *FWC*

offered on CRWMA is performed by the FWC periodically.

5.6.6 Fishing

Fishing is available at all water bodies within the CRWMA. Shoreline fishing for bass, catfish, and panfish is available on Camp Branch Creek and large concrete culverts provide a stable place to fish. There is no boating access on the WMA but there are boat ramps at the nearby Rodman Reservoir and the Ocklawaha River.

5.6.7 Boating

There are no boating or paddling opportunities on the CRWMA but there is excellent paddling on the St. Johns River along the eastern boundary and Ocklawaha River along the southern boundary. There are boat ramps at the nearby Rodman Reservoir and on the Ocklawaha River.

5.6.8 Trails

Currently, there are 5.5 miles of multi-use trails on the CRWMA. All of these trails are accessed from the walk-in entrance on SR19. These trails are well-shaded and traverse the hammocks along the Ocklawaha River floodplain. There are two picnic shelters located on the trails. Although there are no designated recreational trails west of SR19, hiking, bicycling and horseback riding are permitted on all open areas of the CRWMA. The FWC plans to s develop approximately four miles of additional trails on the area. The FWC will continue to periodically reevaluate the potential for trail connectivity to other conservation areas and will monitor trails for user impacts to natural communities. An adjacent trail resource is the congressionally-designated Florida National Scenic Trail, located on the OGT-lead managed portion of the CRWMA north of the FWC lead-managed area.

5.6.8.1 Equestrian

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

5.6.9 Camping

Currently, primitive camping on the CRWMA is permitted at the designated location on State Road 19. Camping is allowed at the site for no more than 14 days within a 30-day period. This primitive camping area will continue to be monitored for user impacts and maintained appropriately. Additional full service and primitive camping opportunities exist on the OGT-lead managed portion of the CRWMA.

5.6.10 Geocaching

Geocaching, also known as Geographic Positioning System (GPS) Stash Hunt or GeoStash, is a contemporary combination of orienteering and scavenger hunting generally utilizing a GPS receiver unit. Geocache websites routinely promote good stewardship. However, the potential exists for resource damage, user conflicts or safety issues caused by

inappropriately placed caches and/or links that do not provide adequate information about the area.

Geocaching is allowed on CRWMA. There are currently no permitted geocaches on CRWMA. Approval of new geocaches and disposition of existing geocaches is at the discretion of the site manager and coordinated by the FWC's Office of Public Access and Wildlife Viewing.

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

5.6.11 Astronomy

Many of the open upland areas of CRWMA provide for a broad view of the nighttime sky and afford a relatively low level of nighttime light pollution. These conditions are conducive to the viewing of stars, planets, comets, and other celestial bodies by amateur astronomers. Astronomy is conditionally approved at CRWMA.

5.6.12 Interpretation

Interpretive signage, resource interpretation materials, trail guides, and area regulation information are provided at the main entrance on SR 19 and the walk-in entrance on the east side of SR 19, approximately 1.5 miles south of the main entrance. Additional interpretive materials including a Recreation Guide for the CRWMA will be developed.

5.7 Hydrological Preservation and Restoration

5.7.1 Hydrological Assessment, Restoration, and Management

In cooperation with the SJRWMD, a Hydrology Assessment and Restoration Plan will be completed. Pursuant to the recommendations of the Hydrology Assessment and Restoration Plan, the FWC will implement hydrological restoration as feasible and appropriate. Part of this assessment will address the possibility of negative impacts on private property within the area due to any restoration activities that will significantly alter current hydrology. These potential impacts may be the determining factor in deciding what, if any, restoration projects are pursued. Additionally, some of these artificially created areas are now themselves considered functioning wetlands, and will require mitigation if they are negatively altered. Any projects that involve the filling or plugging of ditches have to be weighed against possible damage to infrastructure, in particular roads, during periods of heavy rain and high water.

A hydrological restoration project involving Camp Branch Creek was completed in February 2011. A 5,000 foot portion of the creek ran through a ditch created in the late

1960s that lies just north of the historic creek bed. During periods of normal water flows, this ditch would hold the entire creek flow as it moved toward the St. Johns River. The restoration project returned water to the historic creek channel by filling the ditch.

The State of Florida Canal Authority managed the DEP-OGT portion of the CRWMA during the 1930s. The canal authority was authorized to construct and maintain the barge canal in 1933[5]. This property is currently under sublease to the FWC from the OGT. The barge canal bisects the DEP-OGT property and connects the St. Johns River to the Rodman reservoir. Currently, a structure with a flap gate, located on the south bank of the barge canal, regulates the flow of Camp Branch Creek into the CRWMA. The amount of water flowing through Camp Branch Creek is affected by the water level in the barge canal and the position of the gate, restricting natural hydrology to the CRWMA. When levels in the canal are high, water levels in the creek also stay high. During drawdowns, the structure is exposed and the creek is cut off from its headwaters. The FWC will continue to work with the DEP to resolve functioning of this structure to improve hydrological function of Camp Branch.

The FWC will continue to maintain five water control structures as an alternative to filling ditches pending the hydrological assessment of offsite impacts. These structures allow the FWC to retain some water on the property while still being able to release it during significant weather events that may damage state or private infrastructure.

To maintain acceptable access to the area for visitors and staff during all weather conditions, the FWC will continue to install, repair, and maintain low-water crossings and culverts as appropriate.

The Coastal Plains Institute and the University of Florida, Gulf Coast Research and Education Center conducted and developed a report titled, "Inventory, Assessment, and Restoration Potential of Ephemeral Wetlands on FWC Wildlife Management Areas." The project serves to assist land managers by identifying, inventorying, and assessing the restoration need of ephemeral wetlands on the CRWMA.

Researchers visited 120 potential wetlands on CRWMA, 88 of which were identified as ephemeral (2008). Following identification and assessment, specific management recommendations were made for each of the wetlands in order to restore or maintain their proper form and function. Below is the compiled list of recommended management actions that may be applied as necessary to maintain the long-term viability of the ephemeral wetland systems on CRWMA:

- Landscape (or ecosystem) management
- Prescribed growing season fire
- Prescribed dormant season fire

- Fireline placement
- Spot use of herbicide on exotic or invasive flora
- Filling or plugging of drainage ditches
- Physical elimination/reduction of damaging exotic wildlife (e.g., hogs)
- Grazing reduction/elimination
- Hand removal of encroaching vegetation
- Mechanical removal of encroaching vegetation
- Mechanical flattening of bedding or windrows
- Re-routing roads

5.7.2 Water Resource Monitoring

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

5.8 Forest Resource Management

A Timber Assessment of the timber resources of CRWMA was completed by the FFS in 2000 and will be updated by 2015 (Appendix 13.5). Additionally, a Forest Management Plan is being developed by the FWC through a contract with The Forestry Company. The management of timber resources will be considered in the context of the Timber Assessment, the Forest Management Plan and the overall land management goals and activities.

Pursuant to OBVM management goals, the FWC will continue to manage timber resources for wildlife benefits and natural community restoration. Current management activities include the use of timber harvesting for habitat improvement in the mesic and wet flatwoods. There is a timber contract currently in place with The Forestry Company through June 30, 2015 (Appendix 13.13). This contract will result in the thinning of approximately 1,375 acres of pine in +/- 20 management units that were selected based on pre-harvest assessments. The primary management technique for encouraging reforestation is protection of young trees and seedlings on these sites from damage. However, where natural regeneration is lacking, artificial reforestation may be implemented. Planting trees on these selected sites is used to increase the rate of reforestation and to ensure diversity. Forested wetlands are managed for stands with old growth characteristics. Snags will be protected to benefit cavity-nesting species.

5.8.1 Forest Management Plan

The FWC has contracted with The Forestry Company to produce a Forest Management Plan and implement forest management activities.

5.9 Cultural and Historical Resources

The FWC will monitor the seven known recorded sites (Appendix 13.14) and submit updates of additional located sites to the DHR for inclusion in their Master Site file. The FWC will refer to and follow DHR's Management Procedures for Archaeological and Historical Sites and Properties on State-Owned or Controlled Properties for management of these resources, and prior to any facility development, ground disturbing activities. The FWC will continue to consult with DHR in an attempt to locate other features on the area. In addition, the FWC will ensure management staff has DHR Archaeological Resources Monitoring training.

5.10 Capital Facilities and Infrastructure

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

Current capital facilities and infrastructure on CRWMA include 20 facilities, as shown in Figure 9 (e.g., check station, pole barn, main house, large house, small house, pump house, office complex, equipment shed). Additionally, there are 22.2 miles of roads and 5.5 miles of trails existing on CRWMA that the FWC will continue to maintain. The condition of the buildings and structures of CRWMA will be assessed (e.g., equipment shed at the terminus of Shop Road, check stations, administrative buildings, staff residences) and improved, repaired, or will construct and replace as necessary. Trails and infrastructure will be monitored biannually for visitor impacts.

Pursuant to the new RMP, the FWC plans to design and develop four more miles of multiple use trails. The main entrance will be upgraded with a new kiosk and signage, and plans call for the construction of a new parking facility at the Wet Road entrance across SR 19 from the main entrance. The walk-in entrance east of SR19 will be updated with picnic tables, improved signage, and kiosk reorientation. As described in Section 5.6.1, the FWC complies with the Americans with Disabilities Act (Public Law 101-336) for any public facilities that are developed on areas managed by the FWC.

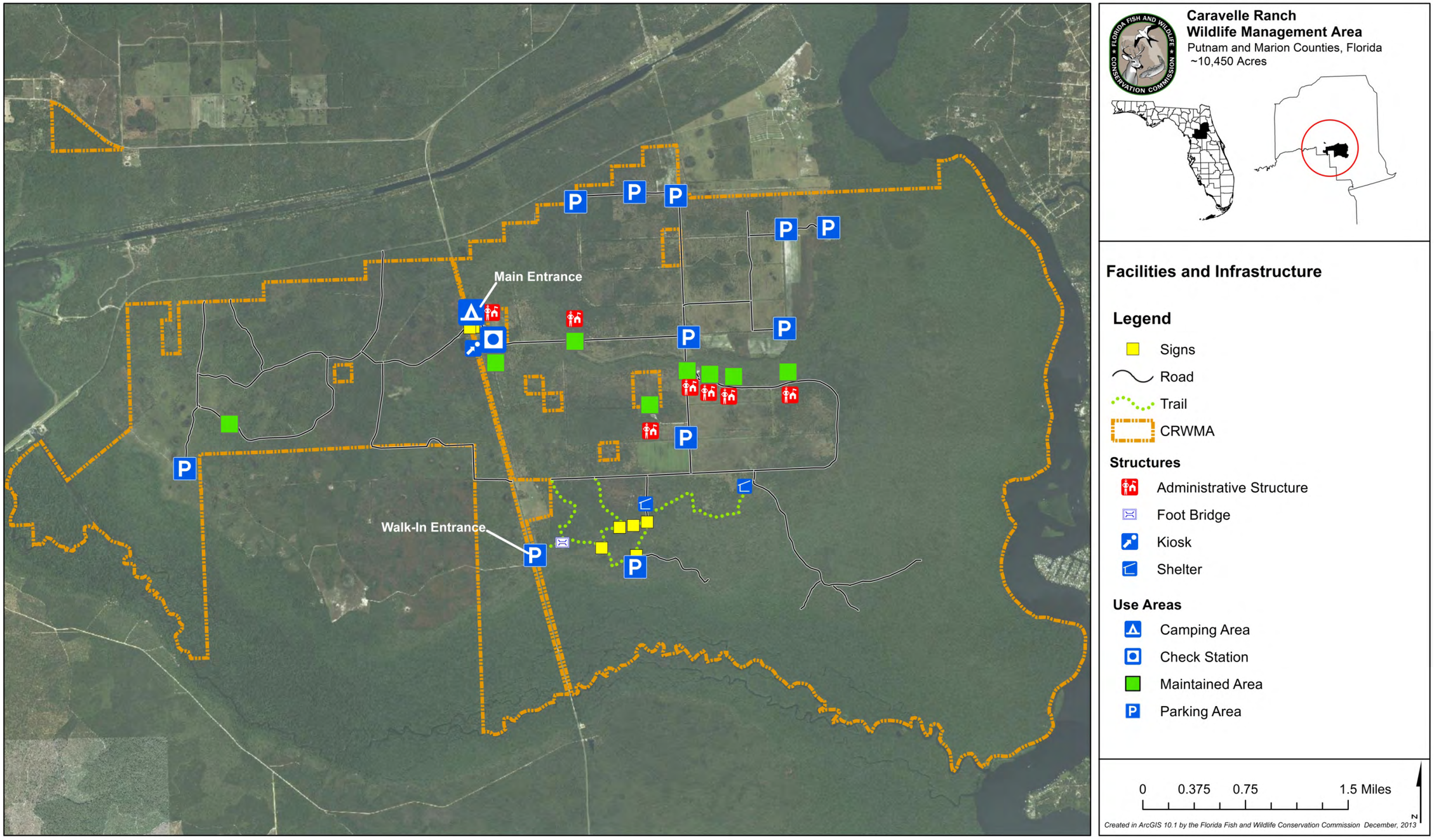


Figure 9. Facilities and Infrastructure

5.11 Land Conservation and Stewardship Partnerships

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

5.11.1 Optimal Resource Boundary

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

5.11.2 Optimal Conservation Planning Boundary

The second tier is known as the OCPB, shown in Figure 10. The OCPB combines the regional natural resources identified in the ORB, as well as regional and local area conservation planning, including: habitat conservation and restoration; habitat linkages; management challenges; land use and zoning issues; infrastructure, including roads and developments; access improvements; inholdings; prescribed burn buffers; resolving boundary irregularities; water resource protection; and conserving other important natural and cultural resources.

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

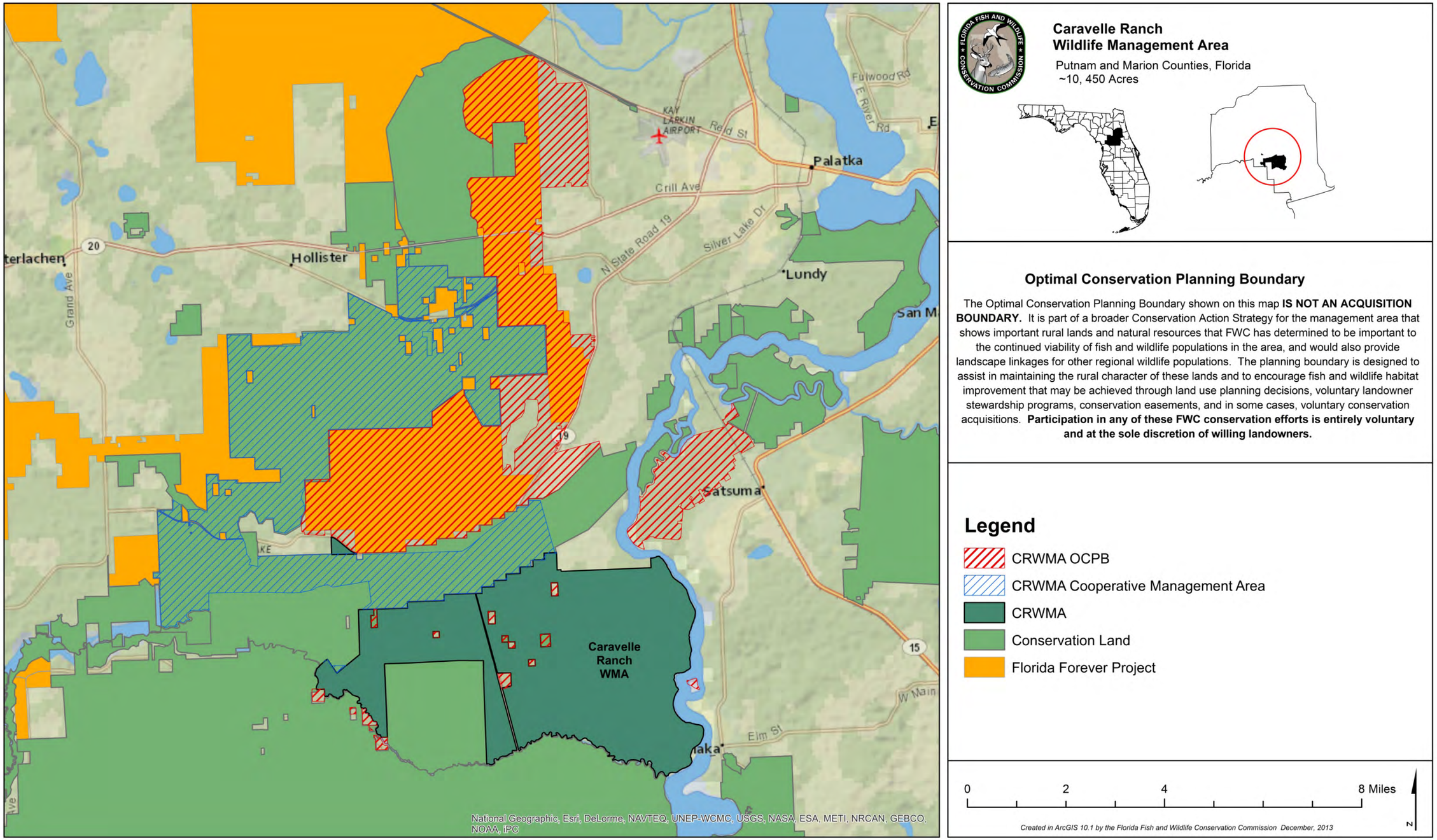


Figure 10. Optimal Conservation Planning Boundary

5.11.3 Conservation Action Strategy

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

Primary components of the CAS may include:

- FWC Landowner Assistance Program
- FWC conservation planning
- FWC Additions and Inholdings Program Land Conservation Work Plan
- Forest Stewardship Program proposals
- Florida Forever 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 the 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 the FWC's LAP program and online habitat management tools are available online at: http://myfwc.com/conservation/special-initiatives/lap/ .

5.11.4 FWC Florida Forever Additions and Inholdings Acquisition List

Currently, the FWC has identified approximately 214.5 acres of potential additions or privately held inholdings for CRWMA. In addition, 66,302 acres of the Etoniah/Cross Florida Greenway Florida Forever project remain to be acquired, with 17,384 acres within the Etoniah Caravelle Florida Forever Board of Trustees project specifically. Upon completion of the CAS, additions to the FWC Florida Forever Additions and Inholdings acquisition list may be recommended.

5.12 Research Opportunities

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

5.13 Cooperative Management and Special Uses

5.13.1 Cooperative Management

The FWC is responsible for the overall management and operation of CRWMA as set forth in the lease agreements with the Board of Trustees and the SJRWMD. The FWC cooperates with DEP-OGT to provide hunting and recreation opportunities on the CRWMA portion for which DEP-OGT has lead management responsibility. 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 13.14) are followed with regard to any ground-disturbing activities. In addition, the FFS is a designated cooperating agency, and assists the FWC by providing technical assistance on forest resource management. Also, FWC cooperates and consults with the SJRWMD and the DEP for the monitoring and management of both ground and surface water resources and the overall management of CRWMA.

5.13.2 First Responder and Military Training

First-responder (public governmental police department or agency, fire and emergency medical service personnel) training and military training are conditionally allowed on CRWMA. Such activities are considered allowable uses only when undertaken intermittently and in a manner that does not impede the management and public use of CRWMA, or cause unreasonable impact to the natural resources of the area. Additionally, FWC staff must be notified prior to any such training taking place on CRWMA. 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 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, the 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, the 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 the 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, the FWC will participate in organizations such as the Peninsular Florida Land Conservation Cooperative or similar organizations so that the FWC continues to gain understanding and share knowledge of key issues related to potential climate change. In addition, the 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.

To address the potential impacts of climate change on the CRWMA, Goals and Objectives have been developed as a component of this Management Plan (Section 6.11). Depending on the recommendations of the adaptive management strategies described above, additional specific goals and objectives to mitigate potential climate change impacts may be developed for the CRWMA Management Plan in the future.

5.15 Soil and Water Conservation

Soil disturbing activities will be confined to areas that have the least likelihood of experiencing erosion challenges. On areas that have been disturbed prior to acquisition, continued assessments 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 5.7 above.

6 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 CRWMA. The objectives listed within each management goal offer more specific management guidance and measures, and are considered the necessary steps to be completed to accomplish the management goals (Figure 10). 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 (2014-2016)** or **long-term (2016-2024)** timelines for completion.

6.1 Habitat Restoration and Improvement

Goal: Improve extant habitat and restore disturbed areas.

Short-term

6.1.1 Prescribe burn 2,075 acres of designated pyrogenic communities on the area per year.

6.1.2 Maintain 6,289 acres (100% of designated pyrogenic communities on the area) within 3 - 4 year target fire return interval

6.1.3 Implement the prescribed burn plan.

6.1.4 Initiate habitat/natural community improvement through timber thinning on approximately 1,375 acres of mesic and wet flatwoods (Figure 11).

6.1.5 Continue to implement OBVM.

6.1.6 Continue to evaluate the need to utilize cattle grazing as a fuel management technique (Figure 11).

6.1.7 To enhance pollination of native vegetative communities, initiate procedure for leasing privately operated apiary operations.

Long-term

6.1.8 Prescribe burn 2,075 acres per year of designated pyrogenic communities on the area.

6.1.9 Maintain 6,289 acres (100% of designated pyrogenic communities on the area) within 3 - 4 year target fire return interval.

6.1.10 Continue to implement OBVM.

6.1.11 Continue to roller-chop and mow as needed for habitat maintenance/ fuel management.

6.1.12 Initiate habitat/natural community restoration activities including site preparations, tree planting, seed collection, seeding on at least 80 acres east of Dove Field Two East and Tyler Pasture (Figure 11).

6.1.13 In conjunction with OBVM and the Forest Management plan, continue to convert mesic and wet flatwoods communities to a desired future condition of uneven-aged forest.

6.1.14 Continue to evaluate the need to utilize cattle grazing as a fuel management technique (Figure 11).

6.1.15 To enhance pollination of native vegetative communities, continue to issue leases for privately operated apiary operations.

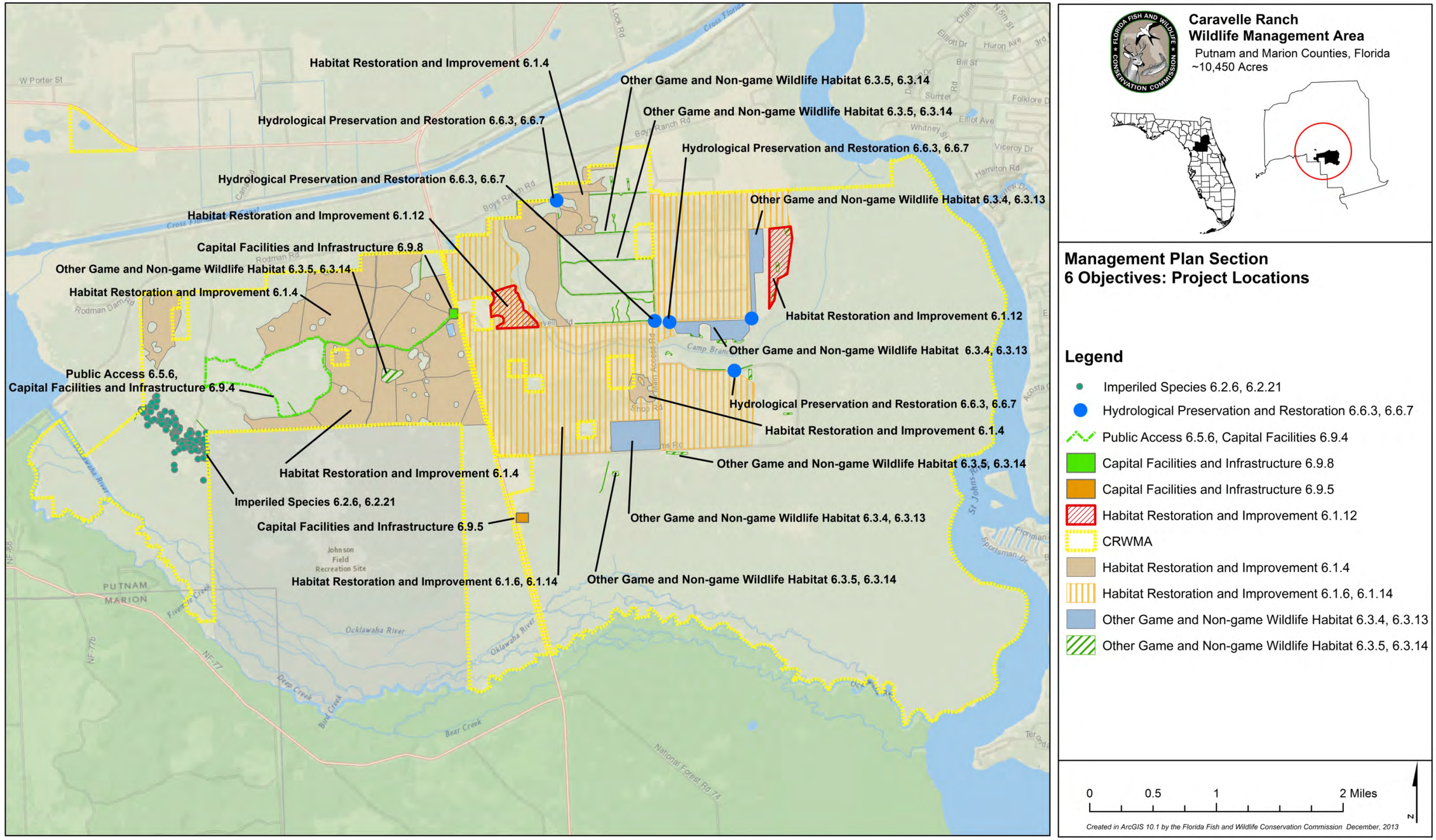


Figure 11. Project Locations

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

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

Short-term

6.2.1 Continue to implement WCPR strategy by managing identified natural communities for focal wildlife species.

6.2.2 As described in the WCPR strategy, monitor gopher frog, striped newt, gopher tortoise, Bachman's sparrow, brown-headed nuthatch, Northern bobwhite, and Southeastern American kestrel.

6.2.3 As described in the WCPR strategy, continue to maintain and monitor use of American kestrel nest boxes and the bat house by Rafinesque's big-eared bat.

6.2.4 Conduct dip-net survey by 2015 to determine the baseline distribution of breeding ponds for gopher frog on FWC lead areas.

6.2.5 Conduct annual call counts to determine relative abundance and distribution of gopher frog.

6.2.6 Conduct burrow-scoping survey by 2014 on FWC lead areas to determine the baseline abundance and distribution of gopher tortoise (Figure 11).

6.2.7 Conduct spring call-back counts annually to track population distribution of Bachman's sparrow.

6.2.8 Conduct spring call-back counts annually to track population distribution of brown-headed nuthatch.

6.2.9 Continue to collect opportunistic wildlife species occurrence data.

6.2.10 Continue periodic aerial surveys for bald eagle nesting activity.

6.2.11 As guided by the Florida Black Bear Management Plan continue to cooperate with research and monitoring efforts for the Ocala National Forest/St. Johns population.

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

Long-term

6.2.13 Continue to implement WCPR strategy by managing identified natural communities for focal wildlife species.

6.2.14 As described in the WCPR strategy, monitor gopher frog, striped newt, gopher tortoise, Bachman's sparrow, brown-headed nuthatch, Northern bobwhite, and Southeastern American kestrel.

6.2.15 As described in the WCPR strategy, continue to maintain and monitor use of American kestrel nest boxes and the bat house by Rafinesque's big-eared bat.

6.2.16 Conduct call counts for gopher frog every three years with sufficient rainfall to determine relative abundance and distribution.

6.2.17 Conduct dip-net survey by 2020 to determine the presence of striped newt and flatwoods salamander on FWC lead areas.

6.2.18 Continue to conduct dip-net survey for striped newt and flatwoods salamander in years with sufficient rainfall.

6.2.19 Continue to conduct spring call-back counts annually for Bachman's sparrow.

6.2.20 Continue to conduct spring call-back counts annually for brown-headed nuthatch.

6.2.21 Repeat gopher tortoise burrow-scoping survey every five years to track changes in population distribution (Figure 11).

6.2.22 Continue to collect opportunistic wildlife species occurrence data.

6.2.23 Continue periodic aerial surveys for bald eagle nesting activity.

6.2.24 By 2021, revise and update WCPR strategy.

6.2.25 As guided by the Florida Black Bear Management Plan continue to cooperate with research and monitoring efforts for the Ocala National Forest/St. Johns population.

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

* For additional information, please see the CRWMA WCPR Strategy (Appendix 13.6)

6.3 Other 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 conduct annual spotlight monitoring surveys for white-tailed deer.

6.3.2 Continue to collect biological harvest data at check station.

6.3.3 Continue to collect opportunistic wildlife occurrence data.

6.3.4 Continue to maintain ~125 acres of dove fields (Figure 11).

6.3.5 Continue to maintain ~50 acres of wildlife food plots (Figure 11).

6.3.6 Continue to maintain 12 bluebird boxes.

6.3.7 Continue to maintain 10 wood duck boxes.

6.3.8 Conduct spring whistle counts annually for Northern bobwhite to track trends in population size for harvest.

6.3.9 Maintain Southeastern American kestrel and Rafinesque's big-eared bat houses annually.

Long-term

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

6.3.11 Continue to collect biological harvest data at check station.

6.3.12 Continue to collect opportunistic wildlife occurrence data.

6.3.13 Continue to maintain ~125 acres of dove fields (Figure 11).

6.3.14 Continue to maintain ~50 acres of wildlife food plots (Figure 11).

6.3.15 Continue to maintain 12 bluebird boxes.

6.3.16 Continue to maintain 10 wood duck boxes.

6.3.17 Continue annual spring call count Northern bobwhite quail surveys.

6.3.18 Maintain Southeastern American kestrel and Rafinesque's big-eared bat houses annually.

6.4 Exotic and Invasive Species Maintenance and Control

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

Short-term

6.4.1 Annually treat at least five acres of EPPC Category I and Category II invasive exotic plant species, including tropical soda apple, camphor tree, cogon grass, Chinese tallow, Japanese climbing fern, air potato, natal grass and torpedo grass.

6.4.2 Continue to implement control measures (hunting) on two exotic animal species

(wild hog and nine-banded armadillo).

6.4.3 Continue to monitor for occurrences of exotic animals, including armored catfish and greenhouse frog.

6.4.4 Evaluate the need to conduct a survey and mapping for exotic and invasive plants on the SJRWMD-owned portion of CRWMA.

Long-term

6.4.5 Annually treat at least five acres of EPPC Category I and Category II invasive exotic plant species, including tropical soda apple, camphor tree, cogon grass, Chinese tallow, Japanese climbing fern, air potato, natal grass and torpedo grass

6.4.6 Continue to implement control measures (hunting) on two exotic animal species (wild hog and nine-banded armadillo).

6.4.7 Continue to monitor for occurrences of exotic animals, including armored catfish and greenhouse frog.

6.5 Public Access and Recreational Opportunities

Goal: Provide public access and recreational opportunities.

Short-term

6.5.1 Maintain public access and recreational opportunities to allow for a recreational carrying capacity of 568 visitors per day.

6.5.2 Develop additional public access and recreational opportunities to allow for a carrying capacity of 653 visitors/day.

6.5.3 Continue to provide website, two two-panel kiosks, trail brochure, bird list, and SJRWMD recreation guide for interpretation and education.

6.5.4 Develop an FWC Recreation Guide.

6.5.5 Continue to maintain 5.5 miles of multi-use trails.

6.5.6 Design/develop four miles of trails (Figure 11).

6.5.7 Implement recommendations from Recreation Master Plan.

6.5.8 Monitor trails for visitor impacts biannually.

6.5.9 Continue to provide hunting opportunities during archery, special-opportunity dove, supervised small game, muzzleloading, general gun, small game, youth spring turkey, spring turkey, and migratory bird hunting seasons.

6.5.10 Continue to provide recreational opportunities including fishing, frogging, hiking, wildlife viewing, horseback riding, bicycling, and primitive camping.

Long-term

6.5.11 Continue to monitor trails biannually for visitor impacts.

6.5.12 Continue to maintain 9.5 miles of trails.

6.5.13 Continue to provide website, two two-panel kiosks, trail brochure, bird list, SJRWMD recreation guide and FWC recreation guide for interpretation and education.

6.5.14 Reassess recreational opportunities every three years.

6.5.15 Continue to provide hunting opportunities during archery, special-opportunity dove, supervised small game, muzzleloading, general gun, small game, youth spring turkey, spring turkey, and migratory bird hunting seasons.

6.5.16 Continue to provide recreational opportunities including fishing, frogging, hiking, wildlife viewing, horseback riding, bicycling, and primitive camping.

6.5.17 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.

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

6.5.19 To assist with promotion and marketing of CRWMA, continue to cooperate with County Tourism Development Councils, Chamber of Commerce, and other related tourism organizations; link FWC recreation web site resources to appropriate local and regional tourism web sites.

6.6 Hydrological Preservation and Restoration

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

Short-term

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

6.6.2 Continue to cooperate with the SJRWMD and DEP for the monitoring of surface and ground water quality and quantity.

6.6.3 Continue to maintain five water control structures (Figure 11).

Long-term

6.6.4 Conduct or obtain a site Hydrology Assessment and Restoration Plan to identify potential hydrology restoration needs by 2019.

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

6.6.6 Implement additional restoration activities recommended by the Hydrology Assessment and Restoration Plan where appropriate and feasible.

6.6.7 Continue to maintain five water control structures (Figure 11).

6.7 Forest Resource Management

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

Short-term

6.7.1 Cooperate with the FFS to complete a Timber Assessment by 2015.

6.7.2 Continue contract with The Forestry Company regarding forest management activities and develop a Forest Management Plan by 2015.

Long-term

6.7.3 Implement the Forest Management Plan including reforestation and harvesting, to meet the restoration and maintenance needs of the natural communities and other goals established for management of CRWMA.

6.7.4 Continue contract with the FFS or a professional forestry consultant regarding forest management activities.

6.8 Cultural and Historical Resources

Goal: Protect, preserve, and maintain the cultural resources of CRWMA.

Short-term

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

6.8.2 As recommended by the DHR, continue to annually monitor, protect, and preserve seven identified sites as necessary.

6.8.3 Coordinate with the DHR to assess the need for conducting a cultural resource survey and to reevaluate the need to continue to monitor select cultural sites.

6.8.4 Continue to cooperate with the DHR or utilize trained FWC Staff in designing site plans for development of infrastructure.

Long-term

6.8.5 Continue to ensure all known sites are recorded in the DHR Master Site file.

6.8.6 As recommended by the DHR, continue to annually monitor, protect, and preserve seven identified sites as necessary.

6.8.7 As necessary, coordinate with the DHR for FWC staff to receive Archeological Resource Management training.

6.8.8 Continue to cooperate with the DHR or utilize trained FWC Staff in designing site plans for development of infrastructure.

6.9 Capital Facilities and Infrastructure

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

Short-term

6.9.1 Continue to maintain 20 facilities (e.g., check station, pole barn).

6.9.2 Continue to maintain 22.2 miles of roads.

6.9.3 Continue to maintain 5.5 miles of trails existing on site.

6.9.4 Design/develop 4 miles of trails (Figure 11).

6.9.5 Improve walk-in entrance east of SR19 with picnic tables, improved signage, and kiosk reorientation (Figure 11).

6.9.6 Assess the condition of CRWMA buildings and structures (e.g., equipment shed at the terminus of Shop Road, check stations, administrative buildings, staff residences).

Long-term

6.9.7 Monitor trails and infrastructure biannually for visitor impacts.

6.9.8 Construct parking facility west of SR19 (Figure 11, refer to RMP Appendix 13.12).

6.9.9 Continue to maintain 20 facilities.

6.9.10 Continue to maintain 22.2 miles of roads.

6.9.11 Continue to maintain 9.5 miles of trails existing on site.

6.9.12 Improve or repair five facilities (two picnic, outhouse hammock, main entrance, walk-in entrance) by 2019.

6.9.13 Based on results of the assessment of CRWMA buildings and structures, improve, repair, or construct and replace as necessary and feasible.

6.10 Land Conservation and Stewardship Partnerships

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

Short-term

6.10.1 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.

6.10.2 Develop a Conservation Action Strategy.

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

6.10.4 Identify and recommend parcels for addition to the FWC acquisition list.

6.10.5 Identify potential non-governmental organization partnerships and grant program opportunities.

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

6.10.7 Obtain an updated digitized survey and GIS shapefile of the CRWMA boundary.

6.10.8 Apply for a lease from DEP's Division of State Lands for the sovereign submerged lands adjacent CRWMA's survey boundary and the St. Johns River.

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

Long-term

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

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

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

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

6.10.14 Periodically (at least every three to five years) continue to contact and meet with adjacent landowners for willingness to participate in the Conservation Action Strategy.

6.11 Climate Change

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

Long-term

6.11.1 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 CRWMA.

6.11.2 Incorporate appropriate climate change monitoring protocols and management strategies into the OBVM program for the CRWMA.

6.11.3 Incorporate appropriate climate change adaptation strategies into the WCPR for CRWMA.

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

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

6.12 Research and Educational Opportunities

Goal: Explore and pursue cooperative research and educational opportunities.

Short-term

6.12.1 Continue to utilize the cattle grazing vegetation research and monitoring efforts to determine the affects of cattle grazing on natural communities.

6.12.2 Continue to monitor adaptive management research plots through the FWC FWRI.

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

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

6.12.5 Continue to cooperate with University of Florida to provide a student internship program and access to CRWMA for academic field classes.

Long-term

6.12.6 Continue to monitor adaptive management research plots through the FWC FWRI.

6.12.7 Explore and pursue cooperative research opportunities through universities, FWRI, etc.

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

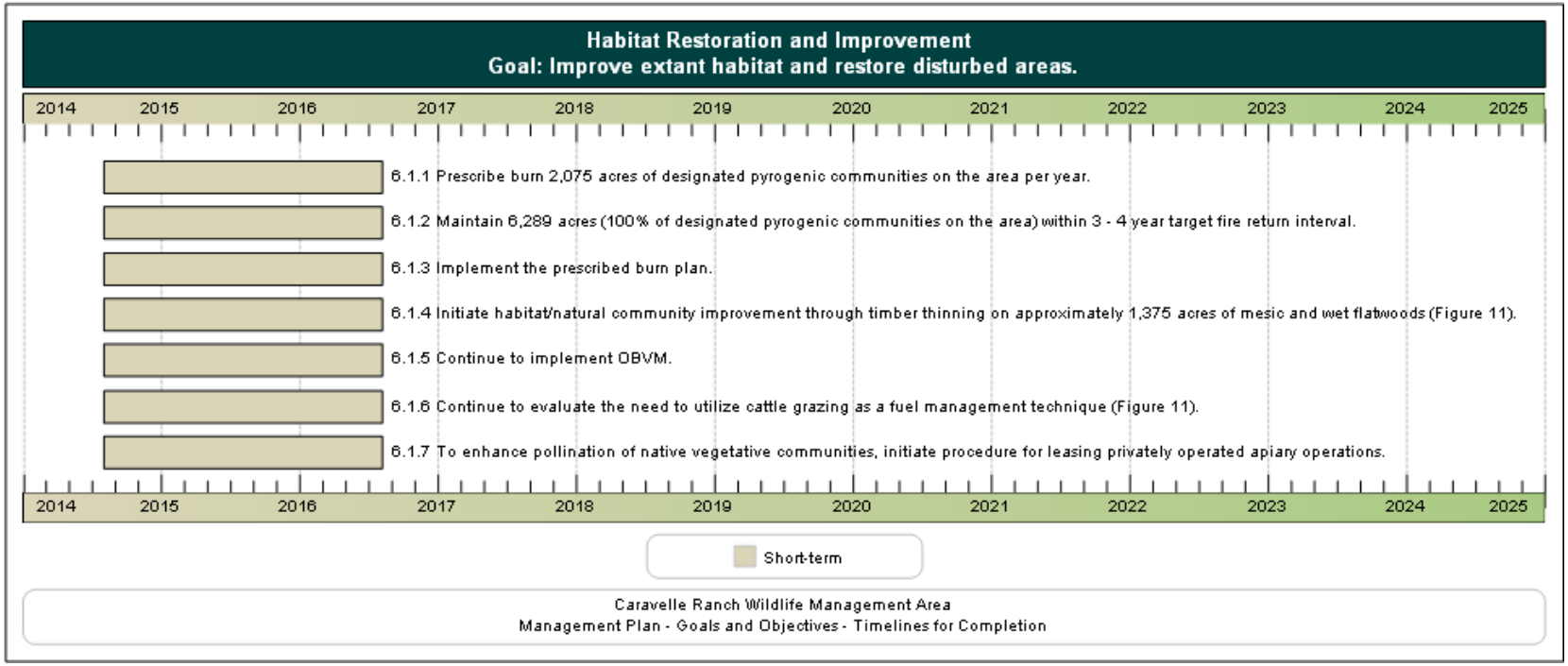
6.12.9 Continue to assess the need for and pursue research and environmental education partnership opportunities as appropriate.

6.12.10 Continue to utilize the cattle grazing vegetation research and monitoring efforts to determine the affects of cattle grazing on natural communities.

6.12.11 Continue to cooperate with University of Florida to provide a student internship program and access to CRWMA for academic field classes.

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 CRWMA graphically in a timeline format. These timelines directly reflect the short- and long-term goals and objectives presented above in Section 6.


Habitat Restoration and Improvement
Goal: Improve extant habitat and restore disturbed areas.
2014
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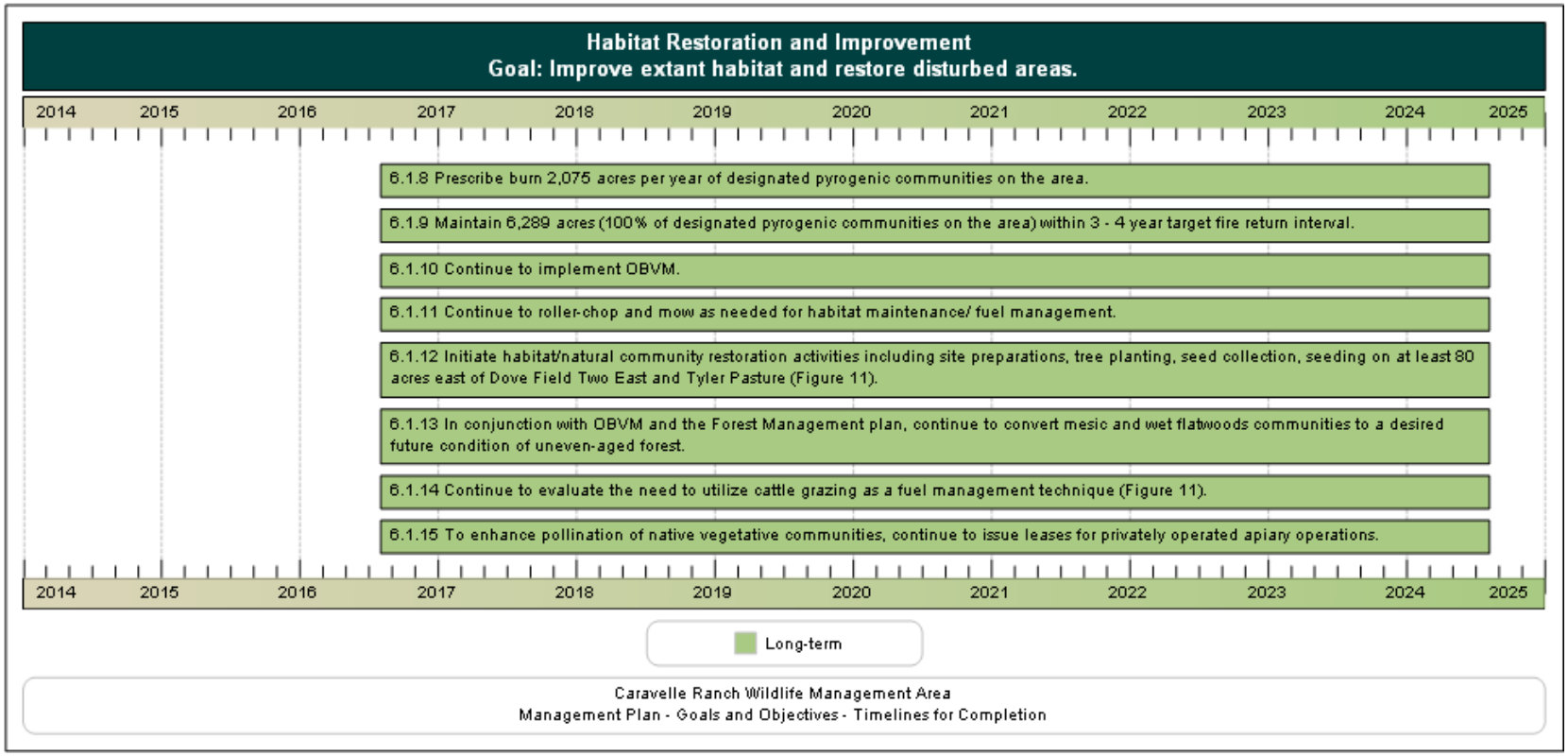
2024
2025
6.1.1 Prescribe burn 2,075 acres of designated pyrogenic communities on the area per year.
6.1.2 Maintain 6,289 acres (100% of designated pyrogenic communities on the area) within 3 - 4 year target fire return interval.
6.1.3 Implement the prescribed burn plan.
6.1.4 Initiate habitat/natural community improvement through timber thinning on approximately 1,375 acres of mesic and wet flatwoods (Figure 11).
6.1.5 Continue to implement OBVM.
6.1.6 Continue to evaluate the need to utilize cattle grazing as a fuel management technique (Figure 11).
6.1.7 To enhance pollination of native vegetative communities, initiate procedure for leasing privately operated apiary operations.
Short-term
Caravelle Ranch Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion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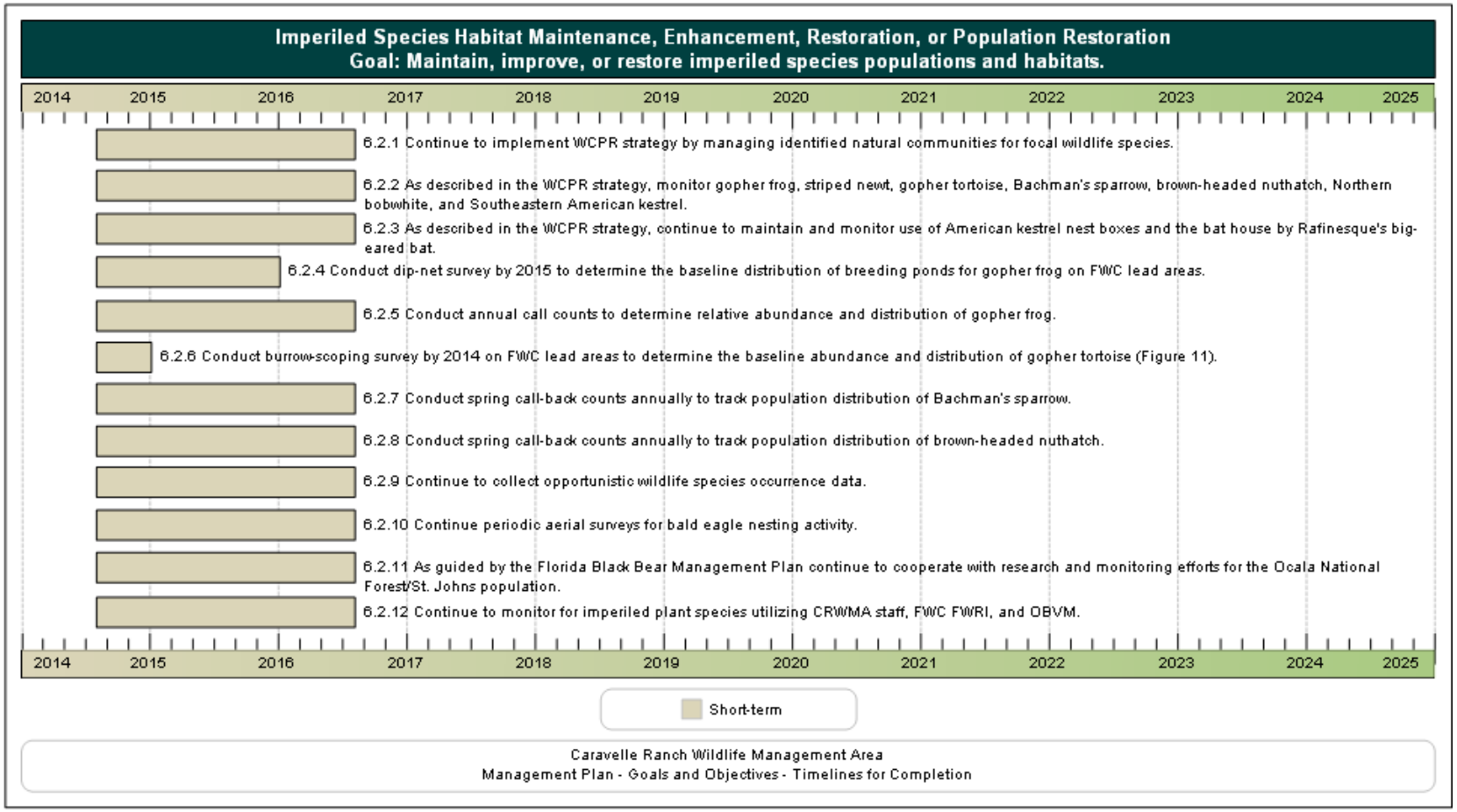
6.1.15 To enhance pollination of native vegetative communities, continue to issue leases for privately operated apiary operations.
Long-term
Caravelle Ranch Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion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Goal: Maintain, improve, or restore imperiled species populations and habitats.
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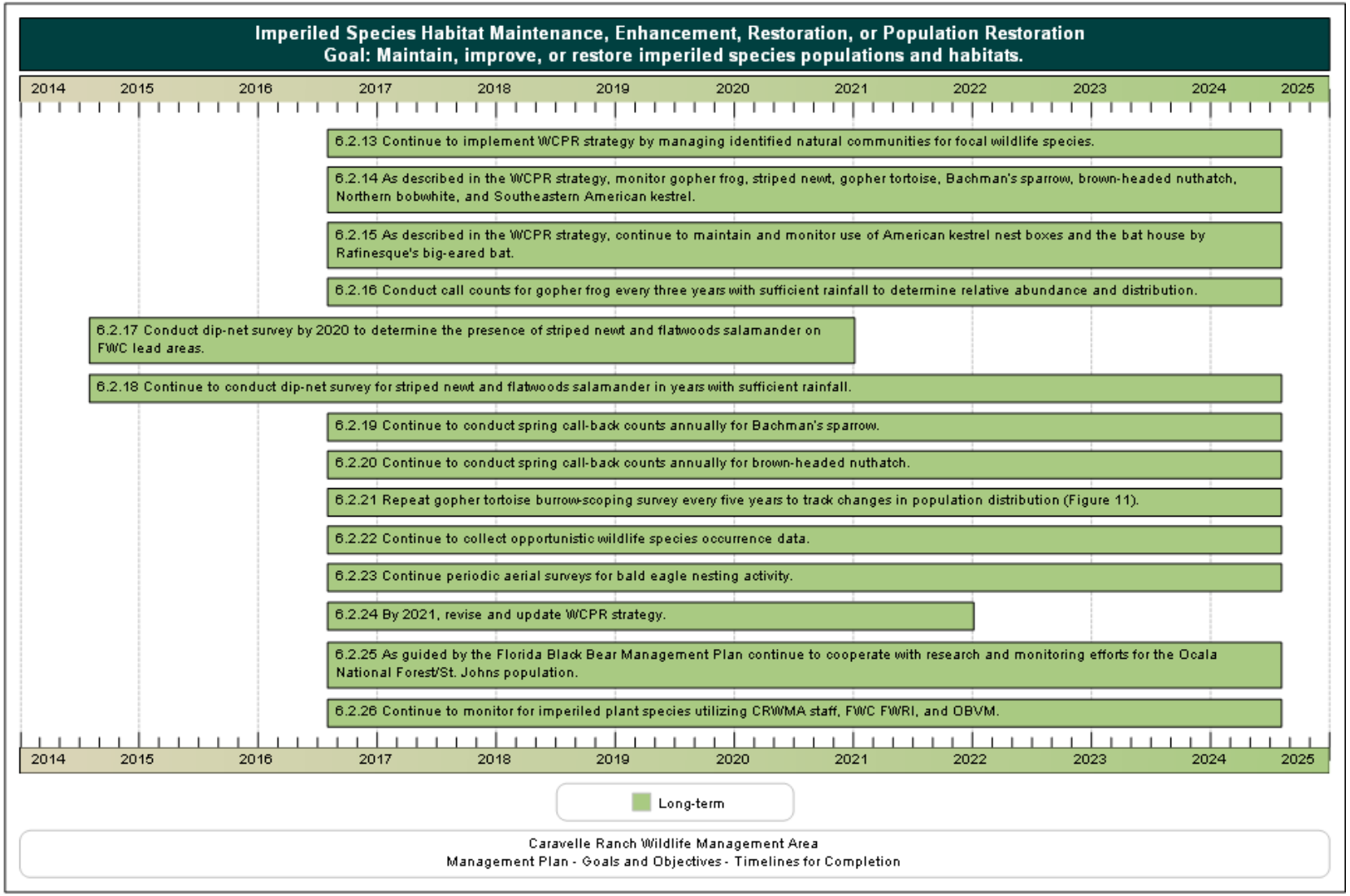
6.2.3 As described in the WCPR strategy, continue to maintain and monitor use of American kestrel nest boxes and the bat house by Rafinesque's big-eared bat.
6.2.4 Conduct dip-net survey by 2015 to determine the baseline distribution of breeding ponds for gopher frog on FWC lead areas.
6.2.5 Conduct annual call counts to determine relative abundance and distribution of gopher frog.
6.2.6 Conduct burrow-scoping survey by 2014 on FWC lead areas to determine the baseline abundance and distribution of gopher tortoise (Figure 11).
6.2.7 Conduct spring call-back counts annually to track population distribution of Bachman's sparrow.
6.2.8 Conduct spring call-back counts annually to track population distribution of brown-headed nuthatch.
6.2.9 Continue to collect opportunistic wildlife species occurrence data.
6.2.10 Continue periodic aerial surveys for bald eagle nesting activity.
6.2.11 As guided by the Florida Black Bear Management Plan continue to cooperate with research and monitoring efforts for the Ocala National Forest/St. Johns population.
6.2.12 Continue to monitor for imperiled plant species utilizing CRWMA staff, FWC FWRI, and OBVM.
Short-term
Caravelle Ranch Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion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6.2.17 Conduct dip-net survey by 2020 to determine the presence of striped newt and flatwoods salamander on FWC lead areas.
6.2.18 Continue to conduct dip-net survey for striped newt and flatwoods salamander in years with sufficient rainfall.
6.2.19 Continue to conduct spring call-back counts annually for Bachman's sparrow.
6.2.20 Continue to conduct spring call-back counts annually for brown-headed nuthatch.
6.2.21 Repeat gopher tortoise burrow-scoping survey every five years to track changes in population distribution (Figure 11).
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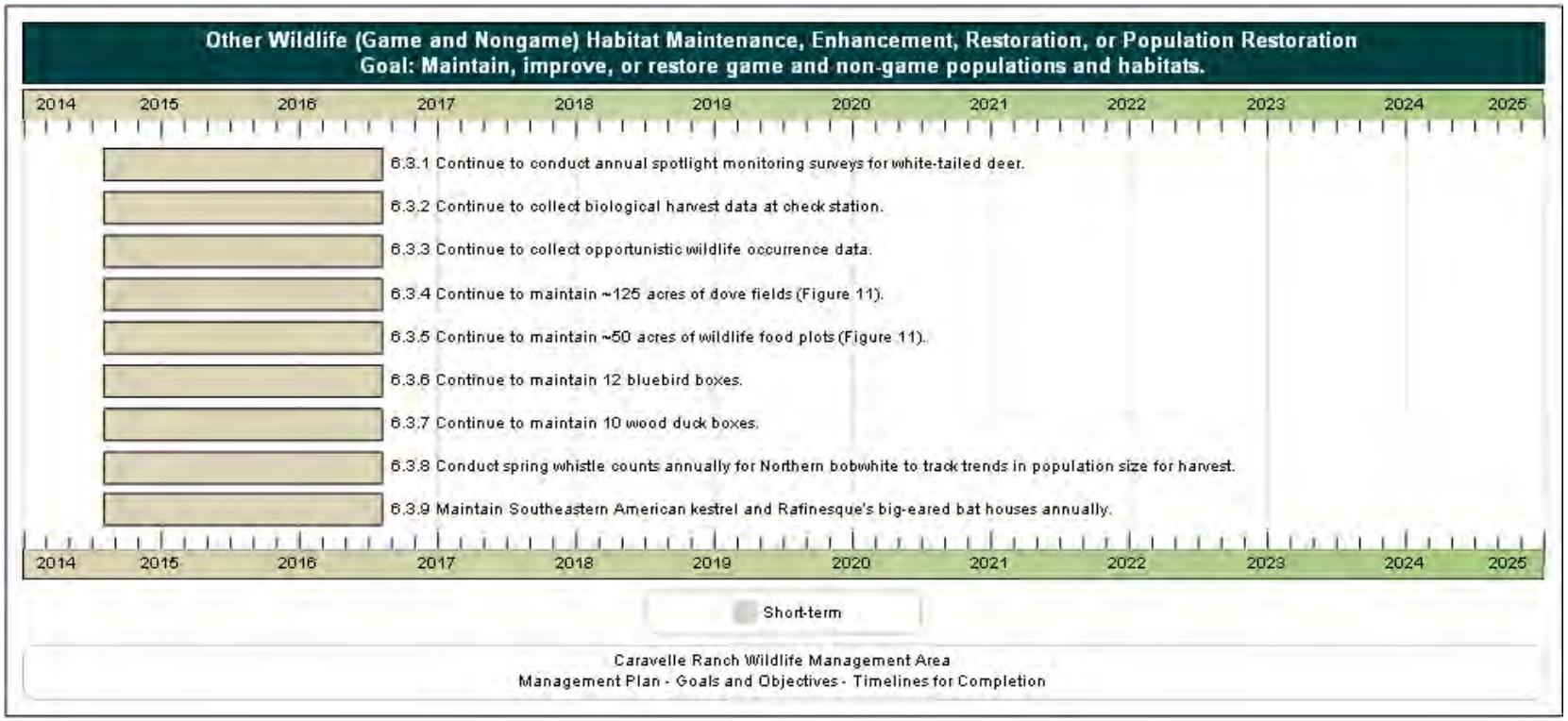
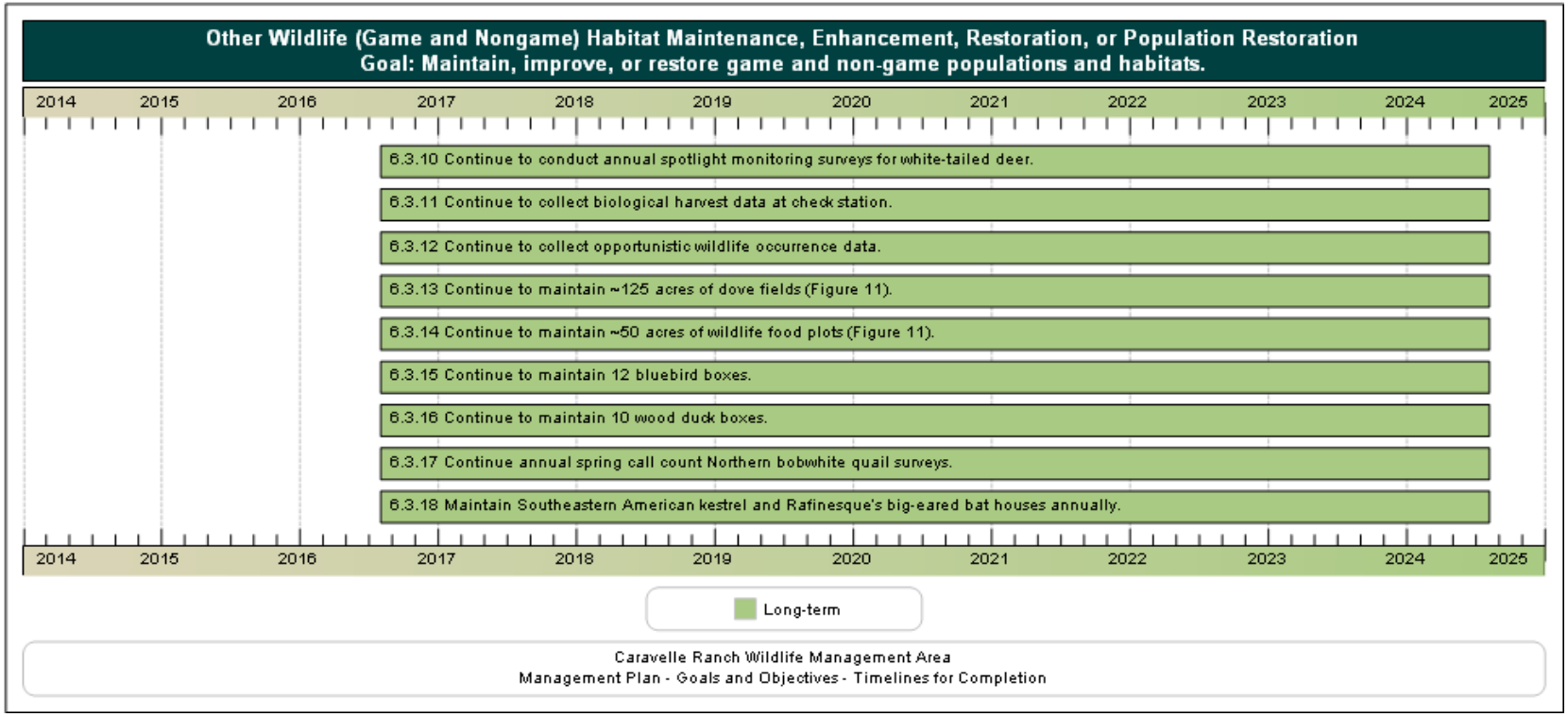
6.2.26 Continue to monitor for imperiled plant species utilizing CRWMA staff, FWC FWRI, and OBVM.
Long-term
Caravelle Ranch Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion


Other Wildlife (Game and Nongame) Habitat Maintenance, Enhancement, Restoration, or Population Restoration
Goal: Maintain, improve, or restore game and non-game populations and habitats.
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
6.3.1 Continue to conduct annual spotlight monitoring surveys for white-tailed deer.
6.3.2 Continue to collect biological harvest data at check station.
6.3.3 Continue to collect opportunistic wildlife occurrence data.
6.3.4 Continue to maintain ~125 acres of dove fields (Figure 11).
6.3.5 Continue to maintain ~50 acres of wildlife food plots (Figure 11).
6.3.6 Continue to maintain 12 bluebird boxes.
6.3.7 Continue to maintain 10 wood duck boxes.
6.3.8 Conduct spring whistle counts annually for Northern bobwhite to track trends in population size for harvest.
6.3.9 Maintain Southeastern American kestrel and Rafinesque's big-eared bat houses annually.
Short-term
Caravelle Ranch Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion


Other Wildlife (Game and Nongame) Habitat Maintenance, Enhancement, Restoration, or Population Restoration
Goal: Maintain, improve, or restore game and non-game populations and habitats.
2014
2015
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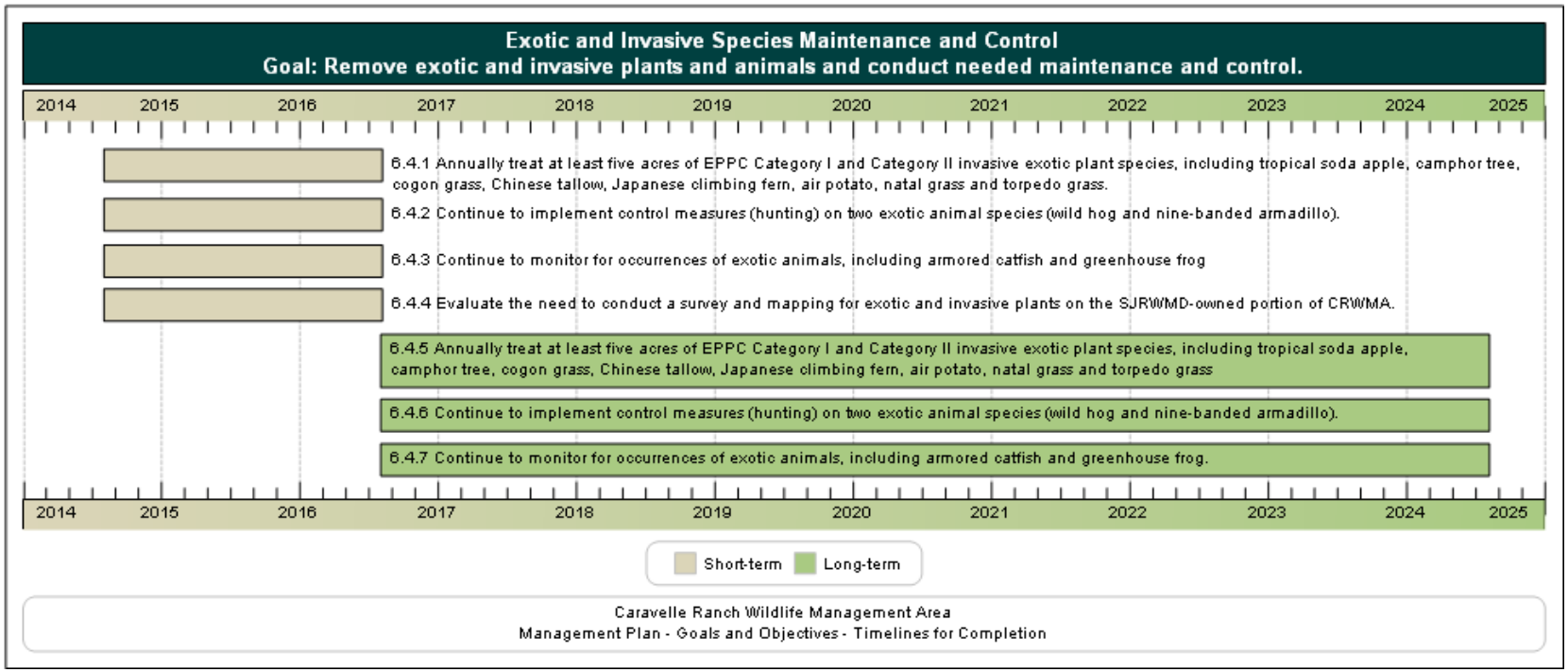
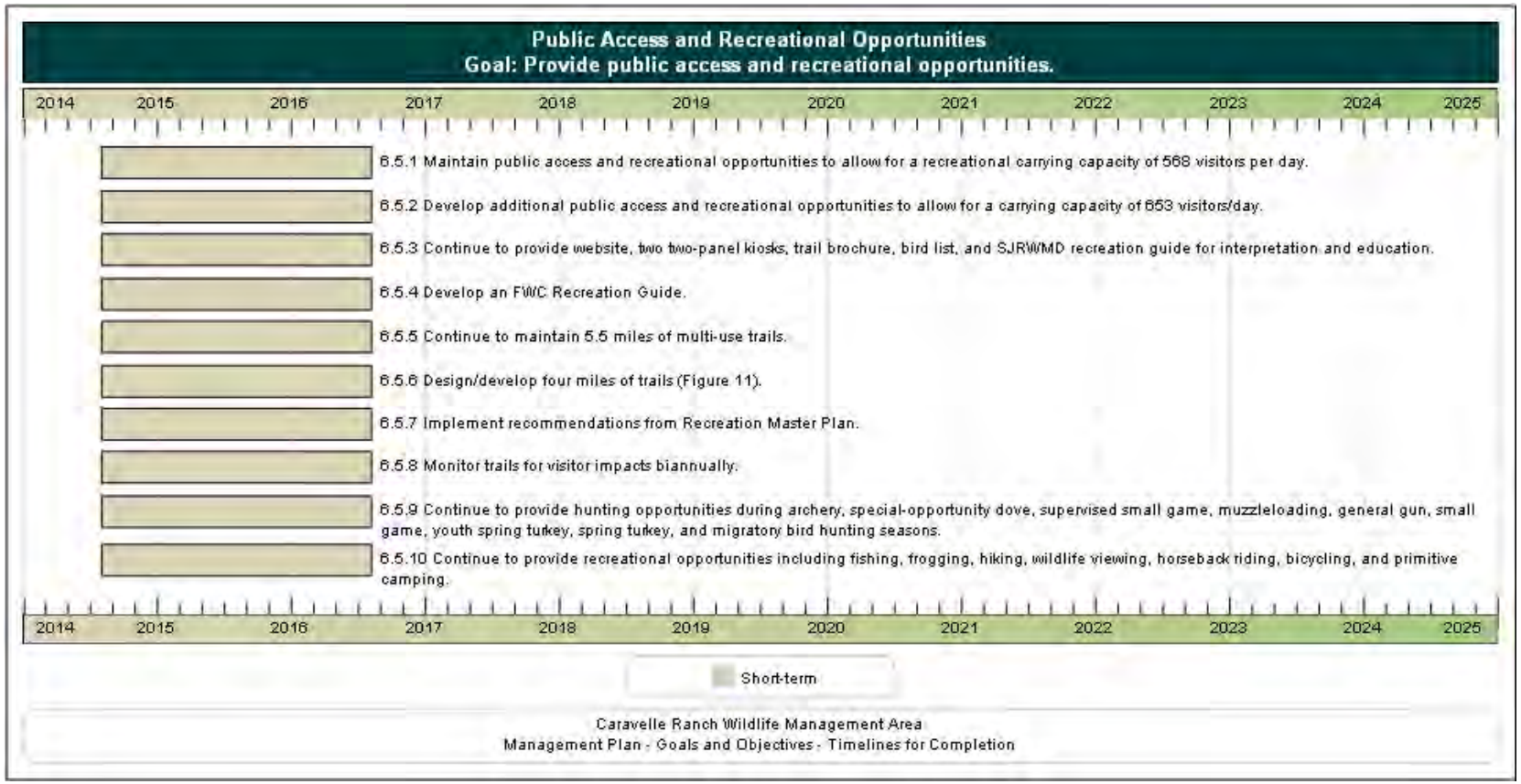
2021
2022
2023
2024
2025
6.3.10 Continue to conduct annual spotlight monitoring surveys for white-tailed deer.
6.3.11 Continue to collect biological harvest data at check station.
6.3.12 Continue to collect opportunistic wildlife occurrence data.
6.3.13 Continue to maintain ~125 acres of dove fields (Figure 11).
6.3.14 Continue to maintain ~50 acres of wildlife food plots (Figure 11).
6.3.15 Continue to maintain 12 bluebird boxes.
6.3.16 Continue to maintain 10 wood duck boxes.
6.3.17 Continue annual spring call count Northern bobwhite quail surveys.
6.3.18 Maintain Southeastern American kestrel and Rafinesque's big-eared bat houses annually.
Long-term
Caravelle Ranch Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion


Exotic and Invasive Species Maintenance and Control
Goal: Remove exotic and invasive plants and animals and conduct needed maintenance and control.
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
6.4.1 Annually treat at least five acres of EPPC Category I and Category II invasive exotic plant species, including tropical soda apple, camphor tree, cogon grass, Chinese tallow, Japanese climbing fern, air potato, natal grass and torpedo grass.
6.4.2 Continue to implement control measures (hunting) on two exotic animal species (wild hog and nine-banded armadillo).
6.4.3 Continue to monitor for occurrences of exotic animals, including armored catfish and greenhouse frog
6.4.4 Evaluate the need to conduct a survey and mapping for exotic and invasive plants on the SJRWMD-owned portion of CRWMA.
6.4.5 Annually treat at least five acres of EPPC Category I and Category II invasive exotic plant species, including tropical soda apple, camphor tree, cogon grass, Chinese tallow, Japanese climbing fern, air potato, natal grass and torpedo grass
6.4.6 Continue to implement control measures (hunting) on two exotic animal species (wild hog and nine-banded armadillo).
6.4.7 Continue to monitor for occurrences of exotic animals, including armored catfish and greenhouse frog.
Short-term
Long-term
Caravelle Ranch Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion


Public Access and Recreational Opportunities
Goal: Provide public access and recreational opportunities.
2014
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2021
2022
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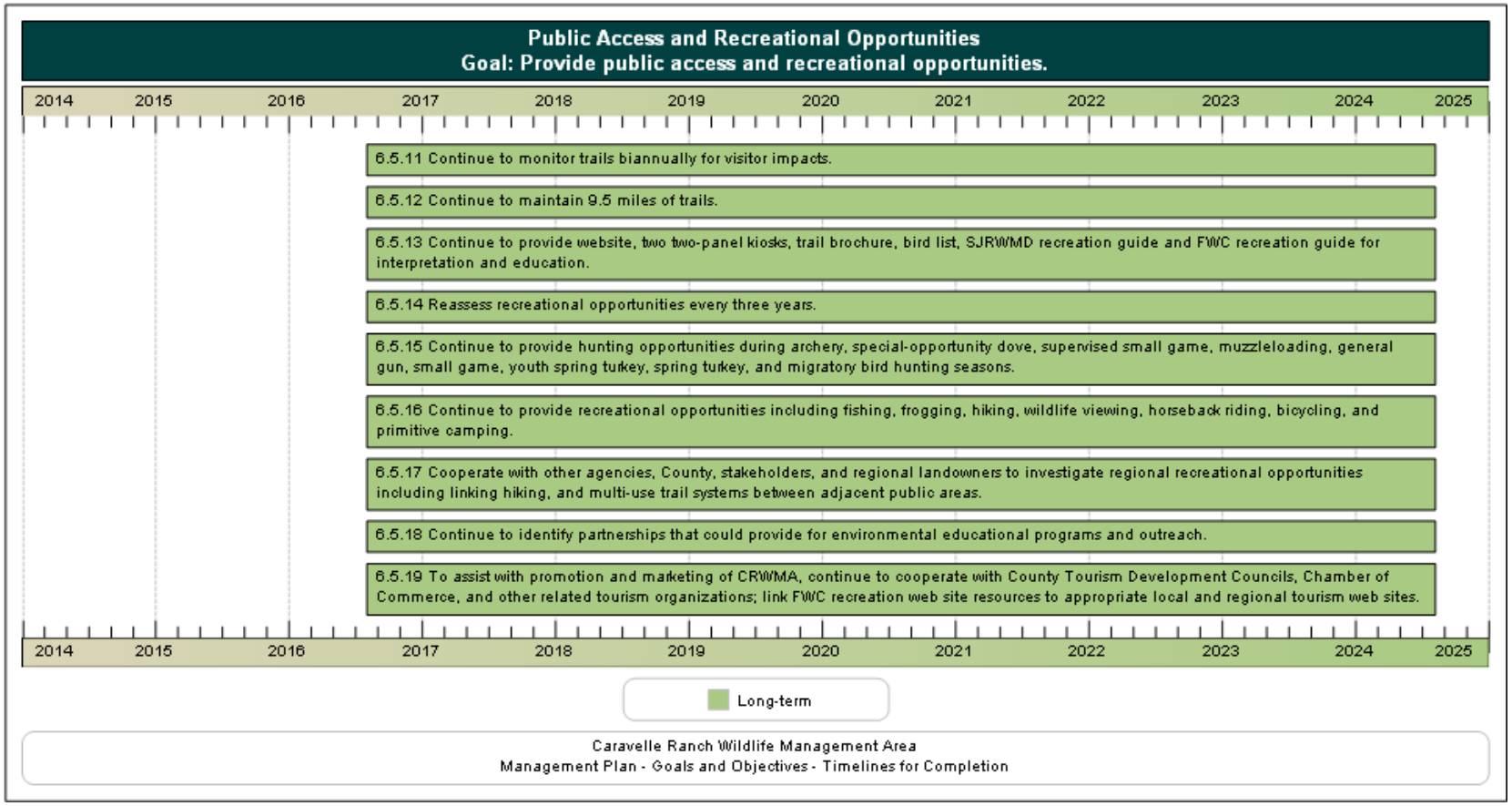
2024
2025
6.5.1 Maintain public access and recreational opportunities to allow for a recreational carrying capacity of 568 visitors per day.
6.5.2 Develop additional public access and recreational opportunities to allow for a carrying capacity of 653 visitors/day.
6.5.3 Continue to provide website, two two-panel kiosks, trail brochure, bird list, and SJRWMD recreation guide for interpretation and education.
6.5.4 Develop an FWC Recreation Guide.
6.5.5 Continue to maintain 5.5 miles of multi-use trails.
6.5.6 Design/develop four miles of trails (Figure 11).
6.5.7 Implement recommendations from Recreation Master Plan.
6.5.8 Monitor trails for visitor impacts biannually.
6.5.9 Continue to provide hunting opportunities during archery, special-opportunity dove, supervised small game, muzzleloading, general gun, small game, youth spring turkey, spring turkey, and migratory bird hunting seasons.
6.5.10 Continue to provide recreational opportunities including fishing, frogging, hiking, wildlife viewing, horseback riding, bicycling, and primitive camping.
Short-term
Caravelle Ranch Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion


Public Access and Recreational Opportunities
Goal: Provide public access and recreational opportunities.
2014
2015
2016
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2022
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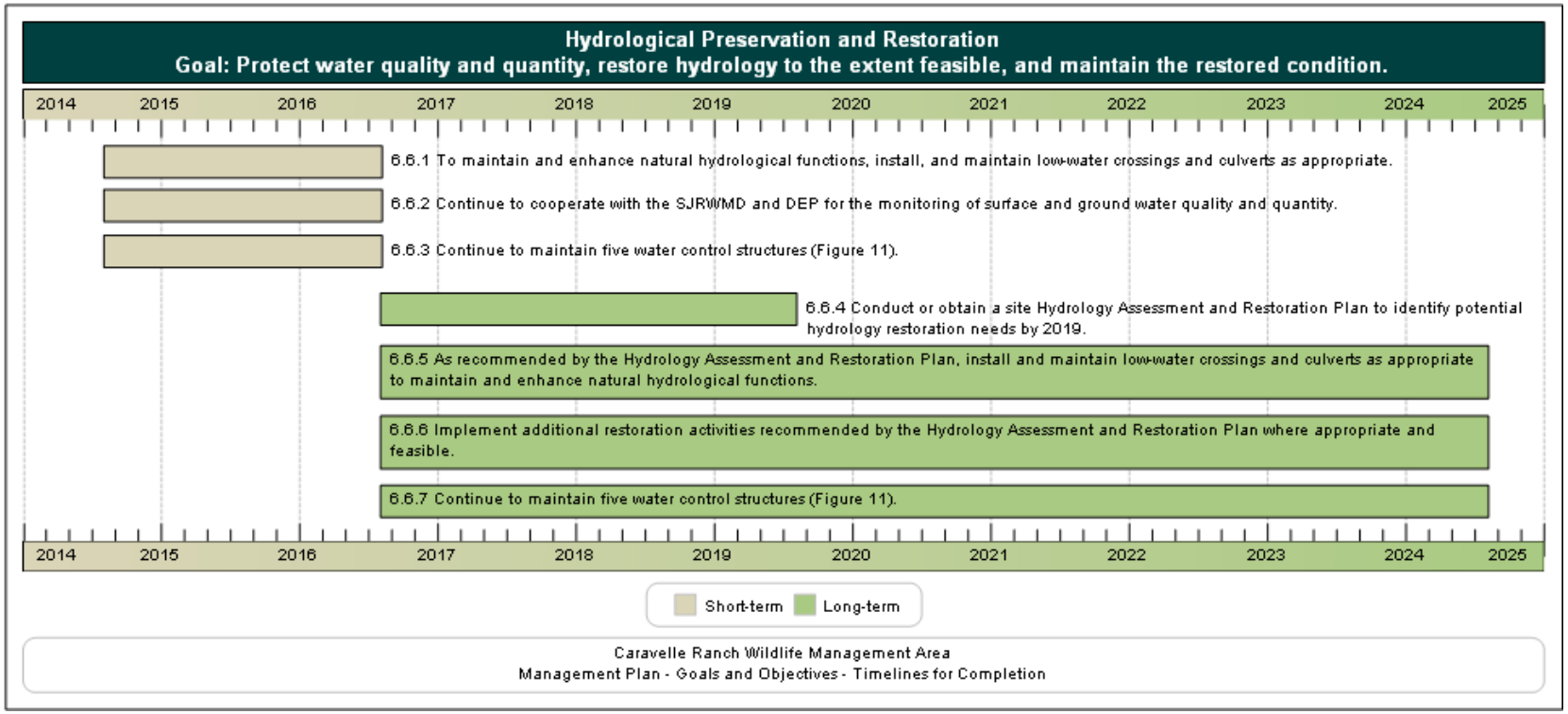
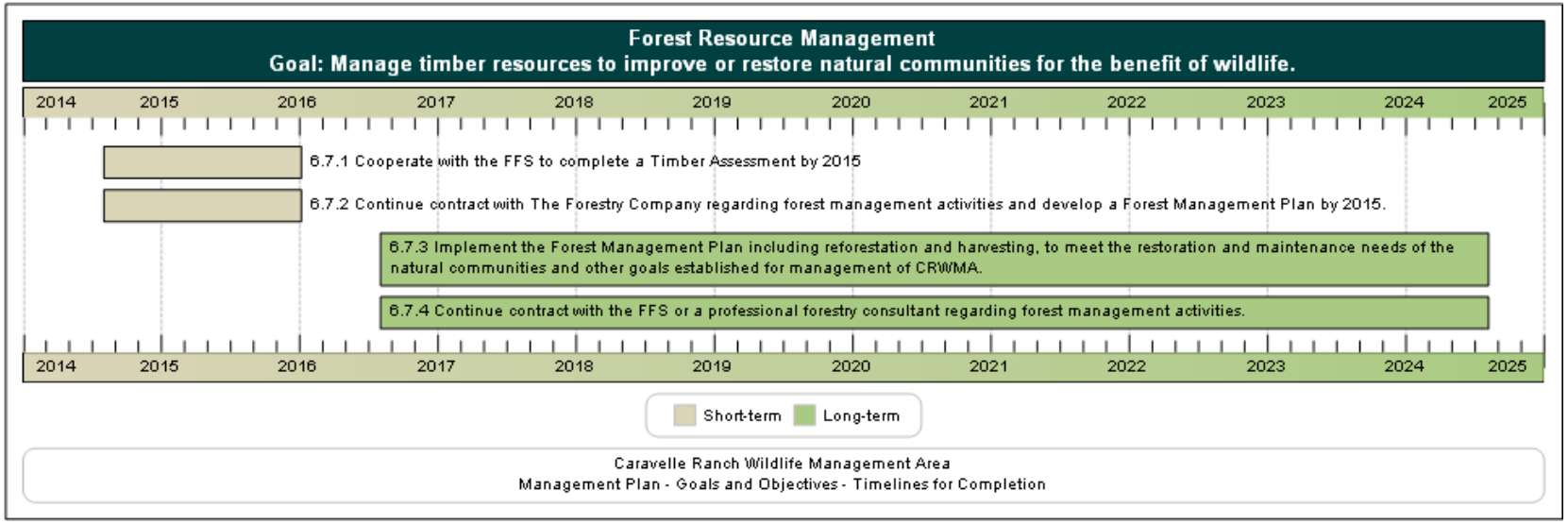
2024
2025
6.5.11 Continue to monitor trails biannually for visitor impacts.
6.5.12 Continue to maintain 9.5 miles of trails.
6.5.13 Continue to provide website, two two-panel kiosks, trail brochure, bird list, SJRWMD recreation guide and FWC recreation guide for interpretation and education.
6.5.14 Reassess recreational opportunities every three years.
6.5.15 Continue to provide hunting opportunities during archery, special-opportunity dove, supervised small game, muzzleloading, general gun, small game, youth spring turkey, spring turkey, and migratory bird hunting seasons.
6.5.16 Continue to provide recreational opportunities including fishing, frogging, hiking, wildlife viewing, horseback riding, bicycling, and primitive camping.
6.5.17 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.
6.5.18 Continue to identify partnerships that could provide for environmental educational programs and outreach.
6.5.19 To assist with promotion and marketing of CRWMA, continue to cooperate with County Tourism Development Councils, Chamber of Commerce, and other related tourism organizations; link FWC recreation web site resources to appropriate local and regional tourism web sites.
Long-term
Caravelle Ranch Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion


Hydrological Preservation and Restoration
Goal: Protect water quality and quantity, restore hydrology to the extent feasible, and maintain the restored condition.
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
6.6.1 To maintain and enhance natural hydrological functions, install, and maintain low-water crossings and culverts as appropriate.
6.6.2 Continue to cooperate with the SJRWMD and DEP for the monitoring of surface and ground water quality and quantity.
6.6.3 Continue to maintain five water control structures (Figure 11).
6.6.4 Conduct or obtain a site Hydrology Assessment and Restoration Plan to identify potential hydrology restoration needs by 2019.
6.6.5 As recommended by the Hydrology Assessment and Restoration Plan, install and maintain low-water crossings and culverts as appropriate to maintain and enhance natural hydrological functions.
6.6.6 Implement additional restoration activities recommended by the Hydrology Assessment and Restoration Plan where appropriate and feasible.
6.6.7 Continue to maintain five water control structures (Figure 11).
Short-term
Long-term
Caravelle Ranch Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion


Forest Resource Management
Goal: Manage timber resources to improve or restore natural communities for the benefit of wildlife.
2014
2015
2016
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2018
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2020
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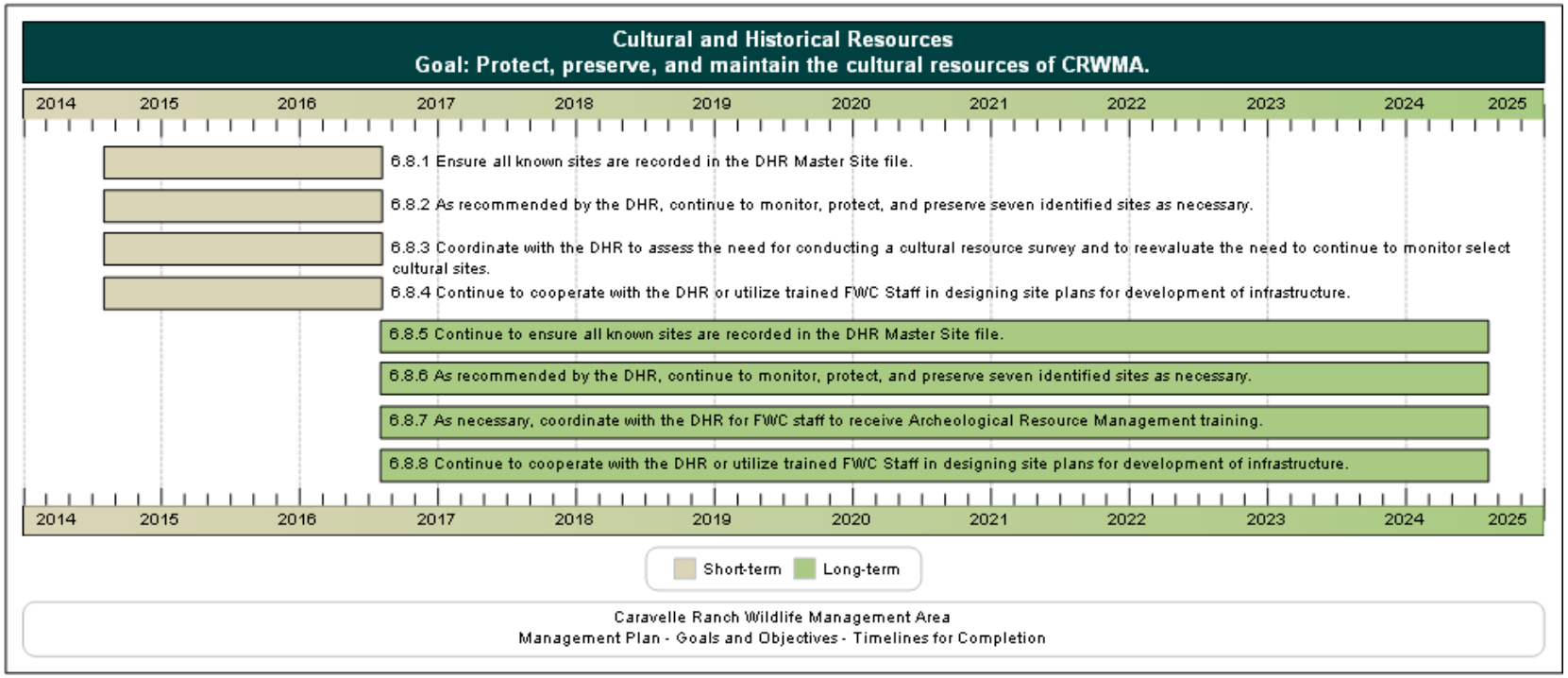
2022
2023
2024
2025
6.7.1 Cooperate with the FFS to complete a Timber Assessment by 2015
6.7.2 Continue contract with The Forestry Company regarding forest management activities and develop a Forest Management Plan by 2015.
6.7.3 Implement the Forest Management Plan including reforestation and harvesting, to meet the restoration and maintenance needs of the natural communities and other goals established for management of CRWMA.
6.7.4 Continue contract with the FFS or a professional forestry consultant regarding forest management activities.
Short-term
Long-term
Caravelle Ranch Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion


Cultural and Historical Resources
Goal: Protect, preserve, and maintain the cultural resources of CRWMA.
2014
2015
2016
2017
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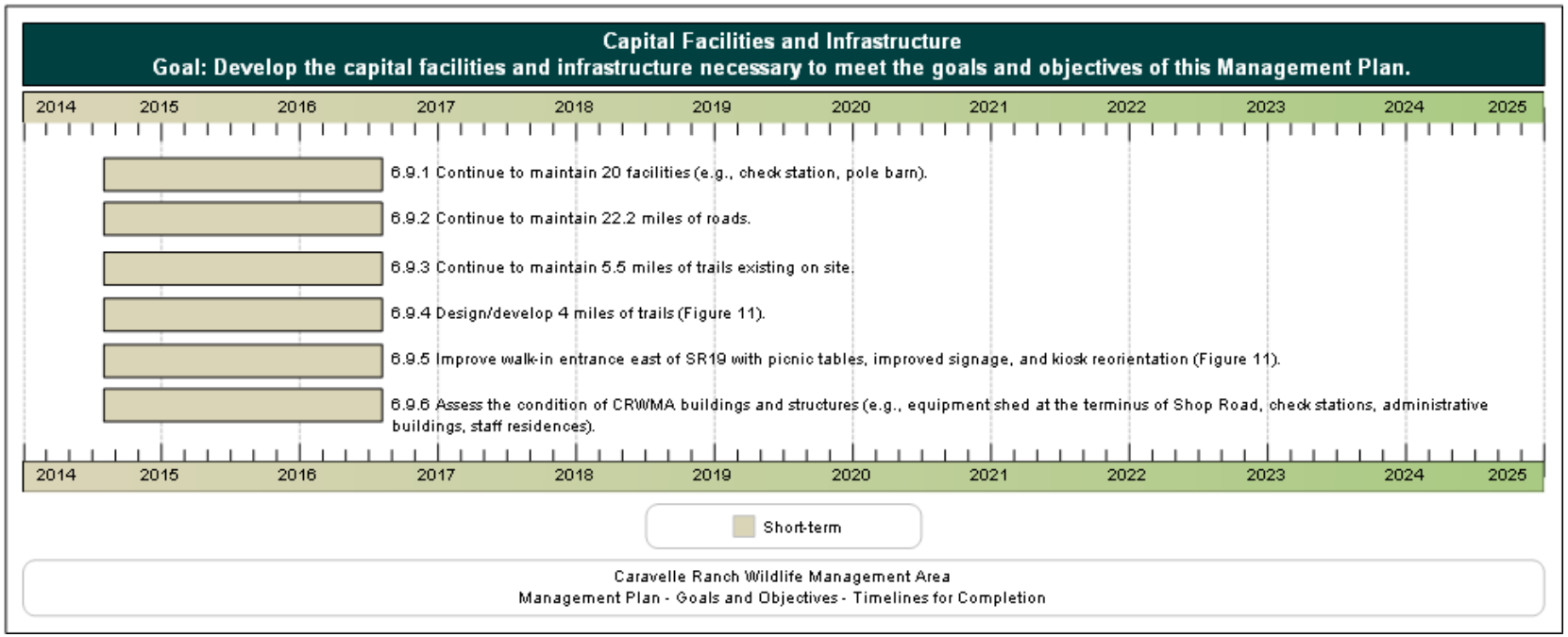
2019
2020
2021
2022
2023
2024
2025
6.8.1 Ensure all known sites are recorded in the DHR Master Site file.
6.8.2 As recommended by the DHR, continue to monitor, protect, and preserve seven identified sites as necessary.
6.8.3 Coordinate with the DHR to assess the need for conducting a cultural resource survey and to reevaluate the need to continue to monitor select cultural sites.
6.8.4 Continue to cooperate with the DHR or utilize trained FWC Staff in designing site plans for development of infrastructure.
6.8.5 Continue to ensure all known sites are recorded in the DHR Master Site file.
6.8.6 As recommended by the DHR, continue to monitor, protect, and preserve seven identified sites as necessary.
6.8.7 As necessary, coordinate with the DHR for FWC staff to receive Archeological Resource Management training.
6.8.8 Continue to cooperate with the DHR or utilize trained FWC Staff in designing site plans for development of infrastructure.
Short-term
Long-term
Caravelle Ranch Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion


Capital Facilities and Infrastructure
Goal: Develop the capital facilities and infrastructure necessary to meet the goals and objectives of this Management Plan.
2014
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2016
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2022
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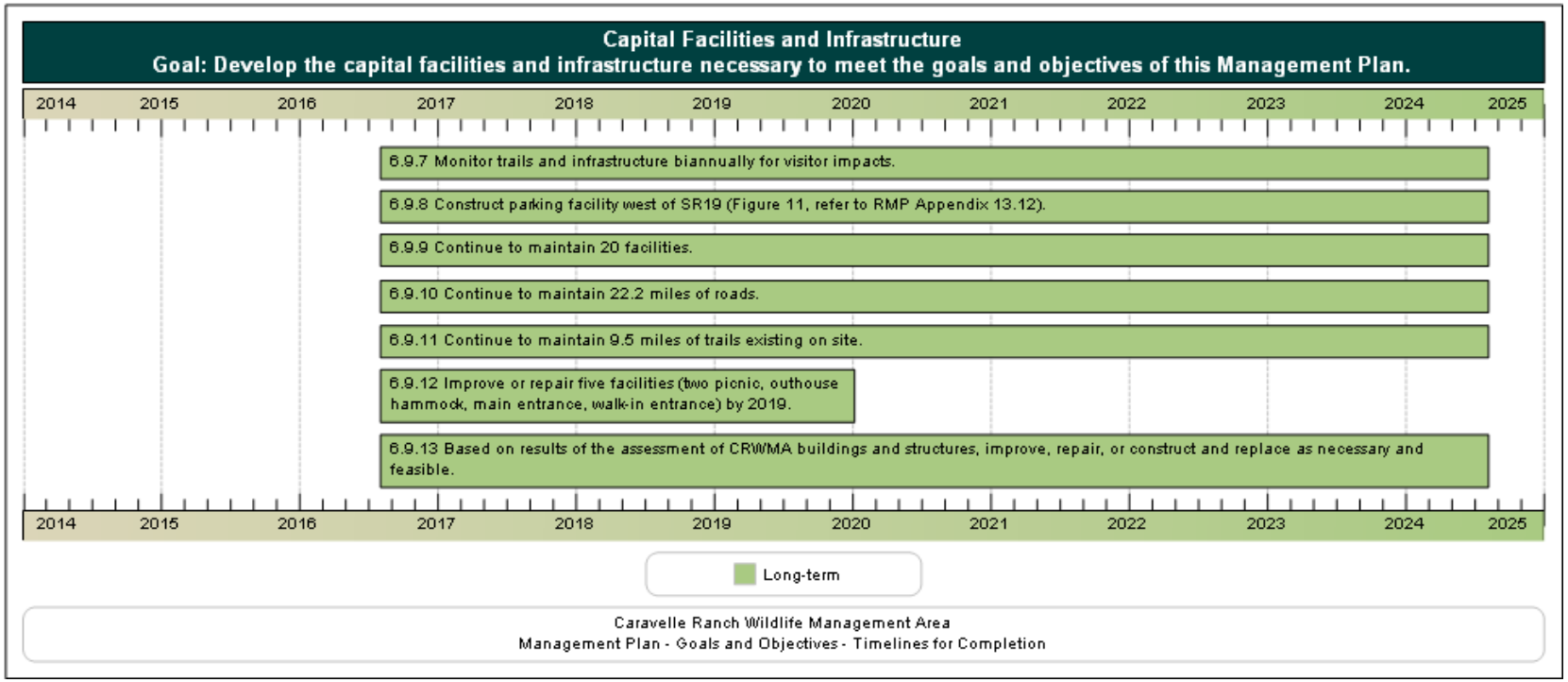
2025
6.9.1 Continue to maintain 20 facilities (e.g., check station, pole barn).
6.9.2 Continue to maintain 22.2 miles of roads.
6.9.3 Continue to maintain 5.5 miles of trails existing on site.
6.9.4 Design/develop 4 miles of trails (Figure 11).
6.9.5 Improve walk-in entrance east of SR19 with picnic tables, improved signage, and kiosk reorientation (Figure 11).
6.9.6 Assess the condition of CRWMA buildings and structures (e.g., equipment shed at the terminus of Shop Road, check stations, administrative buildings, staff residences).
Short-term
Caravelle Ranch Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion


Capital Facilities and Infrastructure
Goal: Develop the capital facilities and infrastructure necessary to meet the goals and objectives of this Management Plan.
2014
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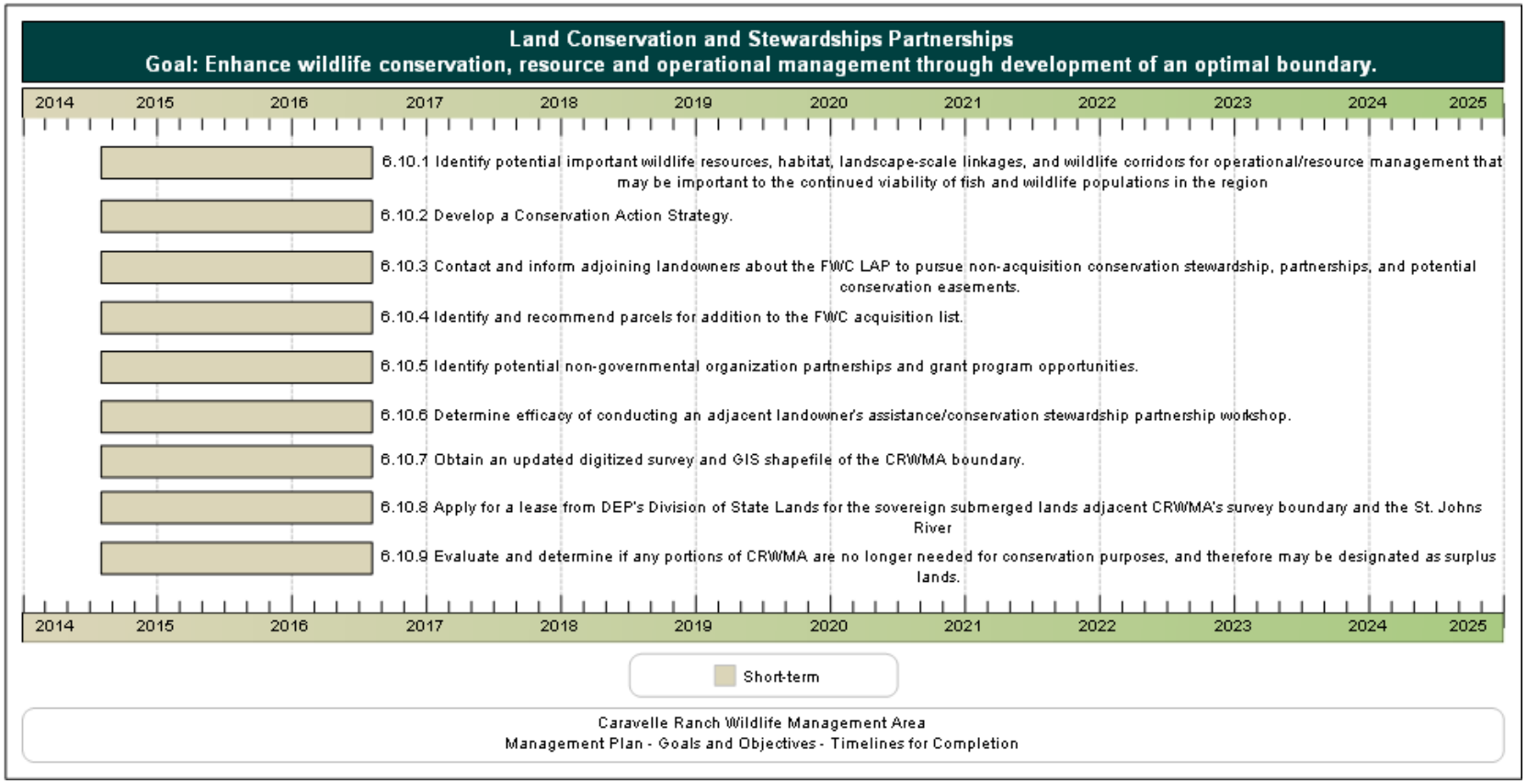
2020
2021
2022
2023
2024
2025
6.9.7 Monitor trails and infrastructure biannually for visitor impacts.
6.9.8 Construct parking facility west of SR19 (Figure 11, refer to RMP Appendix 13.12).
6.9.9 Continue to maintain 20 facilities.
6.9.10 Continue to maintain 22.2 miles of roads.
6.9.11 Continue to maintain 9.5 miles of trails existing on site.
6.9.12 Improve or repair five facilities (two picnic, outhouse hammock, main entrance, walk-in entrance) by 2019.
6.9.13 Based on results of the assessment of CRWMA buildings and structures, improve, repair, or construct and replace as necessary and feasible.
Long-term
Caravelle Ranch Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion


Land Conservation and Stewardships Partnerships
Goal: Enhance wildlife conservation, resource and operational management through development of an optimal boundary.
2014
2015
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2020
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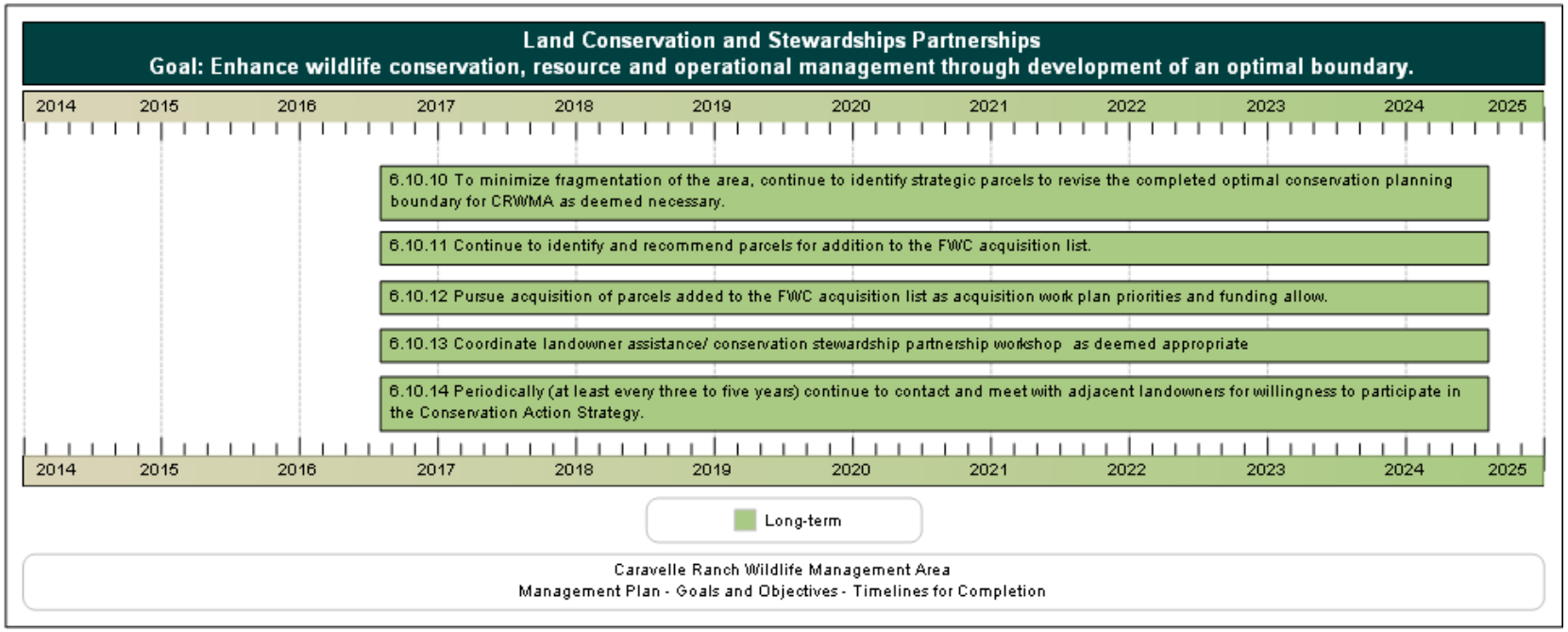
2022
2023
2024
2025
6.10.1 Identify potential important wildlife resources, habitat, landscape-scale linkages, and wildlife corridors for operational/resource management that may be important to the continued viability of fish and wildlife populations in the region
6.10.2 Develop a Conservation Action Strategy.
6.10.3 Contact and inform adjoining landowners about the FWC LAP to pursue non-acquisition conservation stewardship, partnerships, and potential conservation easements.
6.10.4 Identify and recommend parcels for addition to the FWC acquisition list.
6.10.5 Identify potential non-governmental organization partnerships and grant program opportunities.
6.10.6 Determine efficacy of conducting an adjacent landowner's assistance/conservation stewardship partnership workshop.
6.10.7 Obtain an updated digitized survey and GIS shapefile of the CRWMA boundary.
6.10.8 Apply for a lease from DEP's Division of State Lands for the sovereign submerged lands adjacent CRWMA's survey boundary and the St. Johns River
6.10.9 Evaluate and determine if any portions of CRWMA are no longer needed for conservation purposes, and therefore may be designated as surplus lands.
Short-term
Caravelle Ranch Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion


Land Conservation and Stewardships Partnerships
Goal: Enhance wildlife conservation, resource and operational management through development of an optimal boundary.
2014
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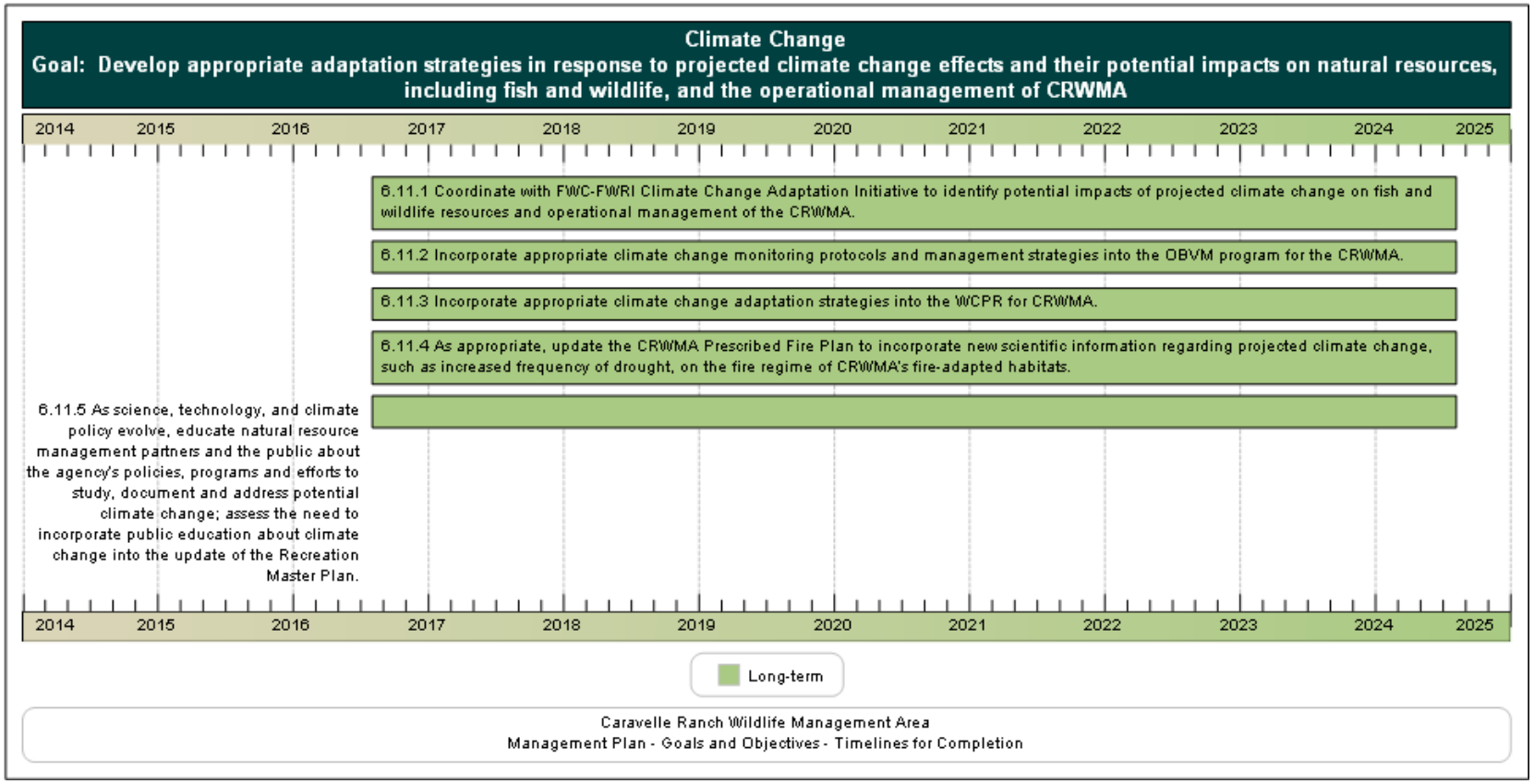
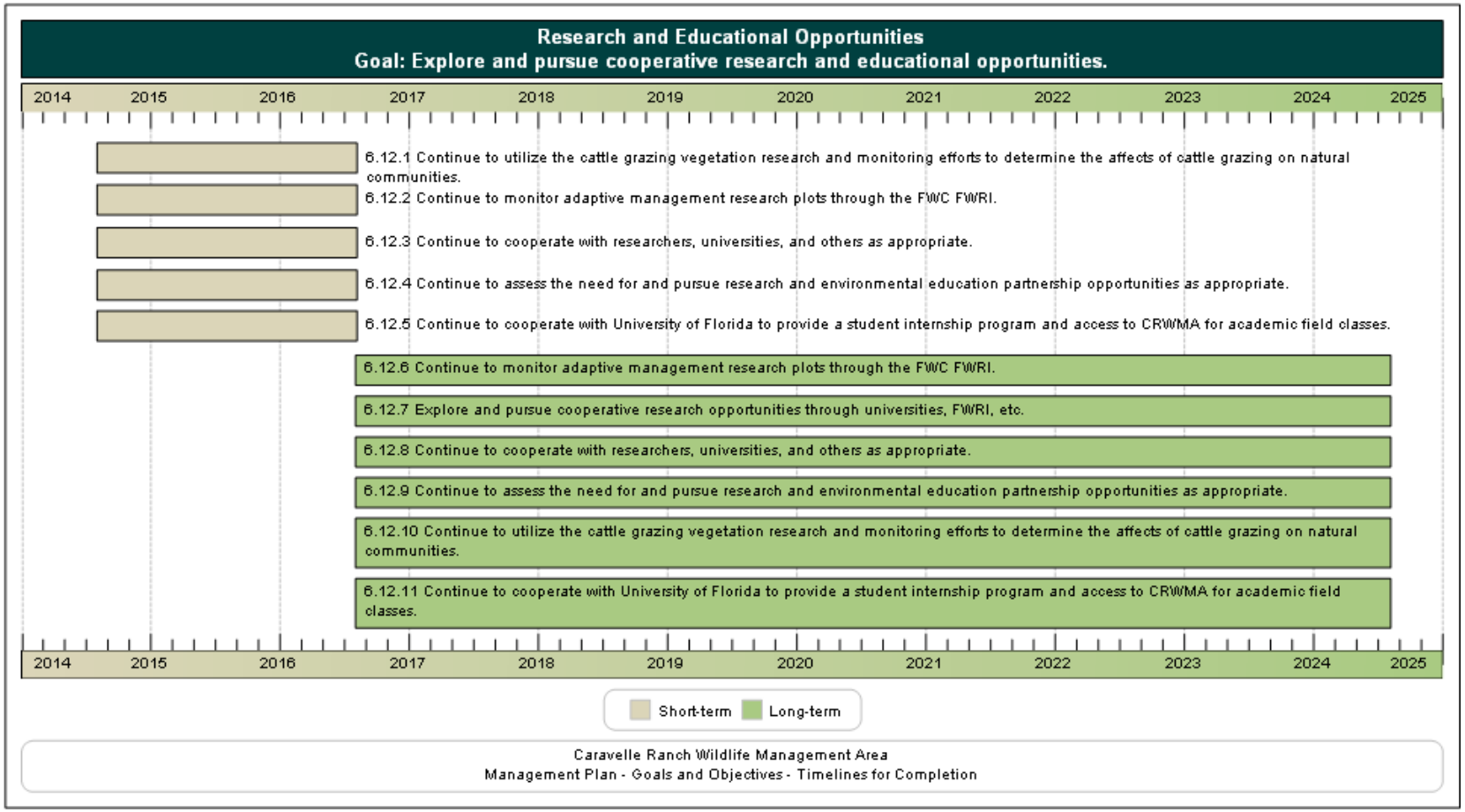
2022
2023
2024
2025
6.10.10 To minimize fragmentation of the area, continue to identify strategic parcels to revise the completed optimal conservation planning boundary for CRWMA as deemed necessary.
6.10.11 Continue to identify and recommend parcels for addition to the FWC acquisition list.
6.10.12 Pursue acquisition of parcels added to the FWC acquisition list as acquisition work plan priorities and funding allow.
6.10.13 Coordinate landowner assistance/ conservation stewardship partnership workshop as deemed appropriate
6.10.14 Periodically (at least every three to five years) continue to contact and meet with adjacent landowners for willingness to participate in the Conservation Action Strategy.
Long-term
Caravelle Ranch Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion


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 CRWMA
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
6.11.1 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 CRWMA.
6.11.2 Incorporate appropriate climate change monitoring protocols and management strategies into the OBVM program for the CRWMA.
6.11.3 Incorporate appropriate climate change adaptation strategies into the WCPR for CRWMA.
6.11.4 As appropriate, update the CRWMA Prescribed Fire Plan to incorporate new scientific information regarding projected climate change, such as increased frequency of drought, on the fire regime of CRWMA's fire-adapted habitats.
6.11.5 As science, technology, and climate policy evolve, educate natural resource management partners and the public about the agency's policies, programs and efforts to study, document and address potential climate change; assess the need to incorporate public education about climate change into the update of the Recreation Master Plan.
Long-term
Caravelle Ranch Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion


Research and Educational Opportunities
Goal: Explore and pursue cooperative research and educational opportunities.
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
6.12.1 Continue to utilize the cattle grazing vegetation research and monitoring efforts to determine the affects of cattle grazing on natural communities.
6.12.2 Continue to monitor adaptive management research plots through the FWC FWRI.
6.12.3 Continue to cooperate with researchers, universities, and others as appropriate.
6.12.4 Continue to assess the need for and pursue research and environmental education partnership opportunities as appropriate.
6.12.5 Continue to cooperate with University of Florida to provide a student internship program and access to CRWMA for academic field classes.
6.12.6 Continue to monitor adaptive management research plots through the FWC FWRI.
6.12.7 Explore and pursue cooperative research opportunities through universities, FWRI, etc.
6.12.8 Continue to cooperate with researchers, universities, and others as appropriate.
6.12.9 Continue to assess the need for and pursue research and environmental education partnership opportunities as appropriate.
6.12.10 Continue to utilize the cattle grazing vegetation research and monitoring efforts to determine the affects of cattle grazing on natural communities.
6.12.11 Continue to cooperate with University of Florida to provide a student internship program and access to CRWMA for academic field classes.
Short-term
Long-term
Caravelle Ranch 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 CRWMA, and provide solution strategies that will address these challenges. These specific challenges may not be fully addressed in the broader goals and objectives section above, and are thereby provided here.

8.1 Challenge: Off-site water control structure on the Cross Florida Barge Canal restricts natural hydrology to CRWMA.

8.1.1 Strategy: Continue to work with DEP to resolve functioning of the off-site water control structure to improve hydrological function of Camp Branch.

8.2 Challenge: Swamp is important natural feature on CRWMA but is largely inaccessible.

8.2.1 Strategy: Through publications and signage, interpret the swamp communities and direct visitors to opportunities to view the community from the Ocklawaha River.

8.3 Challenge: Ground cover restoration (GCR) seed source is not currently available locally.

8.3.1 Strategy: As GCR proceeds on CRWMA, onsite seed sources will become available.

8.4 Challenge: Privately owned inholdings impede management activities related to hydrological restoration and prescribed burns

8.4.1 Strategy: Pursue acquisitions of inholdings as funding becomes available consistent with FWC priorities and landowner approval and agreement. .

9 Cost Estimates and Funding Sources

The following represents the actual and unmet budgetary needs for managing the lands and resources of CRWMA. This cost estimate was developed using data developed by the 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 the FWC typically receives through the appropriations process, is consistent with the direction taken by current operational planning for CRWMA. 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 2012-2013 operational plan showing detailed cost estimates by activity and categories of expenditures, may be found in Appendix 13.15.

Roller chopping restoration work at CRWMA, *FWC*

Prescribed burn at CRWMA, *FWC*

Caravelle Ranch WMA Management Plan Cost Estimate
Maximum expected one year expenditure

Resource Management		
Exotic Species Control	$14,438	Priority Schedule:
Prescribed Burning	$48,618	**Immediate (annual)**
Cultural Resource Management	$4,765	Intermediate (3-4 years)
Timber Management	$7,971	*Other (5+ years)*
Hydrological Management	$31,201	
Other (Restoration, Enhancement, Surveys, Monitoring, etc.)	$187,595	
Subtotal	**$294,588**	
Administration		
General administration	**$4,510**	
Support		
Land Management Planning	$68,303	
Land Management Reviews	$0	
Training/Staff Development	$10,779	
Vehicle Purchase	$1,503	
Vehicle Operation and Maintenance	$141,030	
Other (Technical Reports, Data Management, etc.)	$1,503	
Subtotal	**$223,119**	
Capital Improvements		
New Facility Construction	$0	
Facility Maintenance	$102,579	
Subtotal	**$102,579**	
Visitor Services/Recreation		
Info./Education/Operations	**$20,156**	
Law Enforcement		
Resource protection	**$11,261**	
Total	**$656,213**	

* Based on the characteristics and requirements of this area, 3 FTE positions would be optimal to fully manage this area.

Caravelle Ranch WMA Management Plan Cost Estimate
Ten-year projection

Resource Management		
Exotic Species Control	$126,852	Priority Schedule:
Prescribed Buring	$427,162	**Immediate (annual)**
Cultural Resource Management	$41,868	Intermediate (3-4 years)
Timber Management	$70,031	*Other (5+ years)*
Hydrological Management	$274,138	
Other (Restoration, Enhancement, Surveys, Monitoring, etc.)	$1,648,233	
Subtotal	**$2,588,285**	
Administration		
General administration	**$39,626**	
Support		
Land Management Planning	$600,116	
Land Management Reviews	$14,927	
Training/Staff Development	$94,703	
Vehicle Purchase	$5,290	
Vehicle Operation and Maintenance	$1,239,108	
Other (Technical Reports, Data Management, etc.)	$13,209	
Subtotal	**$1,967,353**	
Capital Improvements		
New Facility Construction	$160,230	
Facility Maintenance	$901,268	
Subtotal	**$1,061,498**	
Visitor Services/Recreation		
Info./Education/Operations	**$177,094**	
Law Enforcement		
Resource protection	**$98,945**	
Total	**$5,932,802**	

* Based on the characteristics and requirements of this area, 3 FTE positions would be optimal to fully manage this area.

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

Uses planned for CRWMA 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 13.16). 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 CRWMA in compliance with Chapter 388.4111 F.S. (Appendix 13.17). This plan was developed in cooperation with the local Putnam County arthropod control agency. This plan is also in conformance with the Local Government Comprehensive Plan as approved and adopted for CRWMA in Putnam County, Florida and Marion County, Florida (Appendix 13.18).

12 Endnotes

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