

A Management Plan for the
J.W. Corbett
Wildlife Management Area
2015-2025



Palm Beach County, 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
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Governor

Carlos Lopez-Cantera
Lt. Governor

Jonathan P. Steverson
Interim Secretary

July 7, 2015

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

RE: J. W. Corbett Wildlife Management Area - Lease #2606

Dear Mr. Cochran:

On **June 19, 2015**, the Acquisition and Restoration Council recommended approval of the **J. W. Corbett Wildlife Management Area** management plan. Therefore, the Division of State Lands, Office of Environmental Services, acting as agent for the Board of Trustees of the Internal Improvement Trust Fund, hereby approves the J. W. Corbett Wildlife Management Area management plan. The next management plan update is due June 19, 2025.

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

Sincerely,

A handwritten signature in black ink, appearing to read "M. S. Gengenbach", written over a horizontal line.

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

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**A Management Plan
For The
J.W Corbett Wildlife Management Area**

Palm Beach County, Florida

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



May 2015

Approved Thomas H. Eason

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 Name of Property: J.W. Corbett Wildlife Management Area

Location: Palm Beach County, Florida

Acreage Total: 60,478 Acres

Acreage Breakdown:

<u>Land Cover Classification</u>	<u>Acres</u>	<u>Percent of Total Area</u>
Basin marsh	1,395	2.29%
Depression marsh	13,752	22.56%
Dome swamp	2,189	3.59%
Hydric hammock	65	0.11%
Mesic flatwoods	16,867	27.68%
Mesic hammock	319	0.52%
Ruderal, agriculture	1,361	2.23%
Ruderal, canal/ditch	400	0.66%
Ruderal, clearing/regeneration	694	1.14%
Ruderal, developed	71	0.12%
Ruderal, road	28	0.05%
Ruderal, utility corridor	1,177	1.93%
Strand swamp	11,772	19.32%
Wet flatwoods	9,253	15.18%
Wet prairie	1,603	2.63%

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

Lease/Management Agreement No.: 2606 (Appendix 13.1)

Use: Single _____ Management Responsibilities:
 Multiple X Agency FWC Responsibilities

LEAD, SUBLESSEE (Wildlife Management Area, resource protection, law enforcement)

Designated Land Use: Wildlife Management Area

Sublease (s): None

Encumbrances: List: Canal, flowage, power and road easements to South Florida Water Management District; Gulfstream Natural Gas System Utility easement; lease/contract with the Everglades Youth Camp; lease/easement with Pratt and Whitney Aircraft; and an Electrical and Utility Maintenance transmission line easement with Florida Power and Lights.

Type Acquisition: Pittman-Robertson Wildlife Restoration Act; P-2000 Inholdings & Additions Acquisition Program, and mitigation donation.

Unique Features: Natural: Landscape natural area, Natural communities: Depression marsh, Mesic flatwoods, Strand swamp

Archaeological/Historical: Big Mound City (PB48PB6292) (Big Gopher), PB15939 (Colwell 1), and PB 15940 (Colwell 2). The last historic resources on the site is PB12917 (Seaboard Airline RR) PB15984 (JCI) and PB15989 (JC II).

Management Needs: Habitat restoration and improvement; public access and recreational opportunities; Everglades Youth Camp infrastructure(s) refurbishment/replacement, hydrological preservation and restoration; exotic and invasive species maintenance and control; imperiled species habitat maintenance, enhancement, and restoration.

Acquisition Needs/Acreage: 26,417 acres on the FWC Additions and Inholdings list; (Figure 11).

Surplus Lands/Acreage: None

Public Involvement: Management Advisory Group consensus building meeting and Public Hearing (Appendix 13.3)

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

ARC Approval Date _____ BTIITF Approval Date: _____

Comments: _____

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Land Management Plan Compliance Checklist

Required for State-owned conservation lands over 160 acres

Section A: Acquisition Information Items

Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
1	The common name of the property.	18-2.018 & 18-2.021	1
2	The land acquisition program, if any, under which the property was acquired.	18-2.018 & 18-2.021	3-4
3	Degree of title interest held by the Board, including reservations and encumbrances such as leases.	18-2.021	5
4	The legal description and acreage of the property.	18-2.018 & 18-2.021	3
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	10, 94
6	An assessment as to whether the property, or any portion, should be declared surplus. <i>Provide Information regarding assessment and analysis in the plan, and provide corresponding map.</i>	18-2.021	66
7	Identification of other parcels of land within or immediately adjacent to the property that should be purchased because they are essential to management of the property. <i>Please clearly indicate parcels on a map.</i>	18-2.021	100-101
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)	3,63
10	Proximity of property to other significant State, local or federal land or water resources.	18-2.021	6, 11, 61

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	64, 66
12	A description of past and existing uses, including any unauthorized uses of the property.	18-2.018 & 18-2.021	62-63
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	65
14	A description of the management responsibilities of each entity involved in the property's management and how such responsibilities will be coordinated.	18-2.018	4
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	62
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	65

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)	3
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	146
19	Letter of compliance from the local government stating that the LMP is in compliance with the Local Government Comprehensive Plan.	BOT requirement	639
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	17, 61
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	64, 96, 110
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	96-97, 574
23	A statement regarding incompatible use in reference to Ch. 253.034(10).	253.034(10)	66

*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	16, 412-421
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)	424-475

26	LMPs and LMP updates for parcels over 160 acres shall be developed with input from an advisory group who must conduct at least one public hearing within the county in which the parcel or project is located. <i>Include the advisory group members and their affiliations, as well as the date and location of the advisory group meeting.</i>	259.032(10)	421-423, 476-483
27	Summary of comments and concerns expressed by the advisory group for parcels over 160 acres	18-2.021	412-420
28	During plan development, at least one public hearing shall be held in each affected county. Notice of such public hearing shall be posted on the parcel or project designated for management, advertised in a paper of general circulation, and announced at a scheduled meeting of the local governing body before the actual public hearing. <i>Include a copy of each County's advertisements and announcements (meeting minutes will suffice to indicate an announcement) in the management plan.</i>	253.034(5) & 259.032(10)	421-423
29	The manager shall consider the findings and recommendations of the land management review team in finalizing the required 10-year update of its management plan. <i>Include manager's replies to the team's findings and recommendations.</i>	259.036	74
30	Summary of comments and concerns expressed by the management review team, if required by Section 259.036, F.S.	18-2.021	491-502
31	If manager is not in agreement with the management review team's findings and recommendations in finalizing the required 10-year update of its management plan, the managing agency should explain why they disagree with the findings or recommendations.	259.036	N/A

Section D: Natural Resources

Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
32	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding soil types. <i>Use brief descriptions and include USDA maps when available.</i>	18-2.021	17-20, 484-489
33	Insert FNAI based natural community maps when available.	ARC consensus	42
34	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding outstanding native landscapes containing relatively unaltered flora, fauna and geological conditions.	18-2.021	17, 31, 53-55, 60
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	61, 43
36	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding beaches and dunes.	18-2.021	61
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	61

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	43-60
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	31, 53-54
40	The identification or resources on the property that are listed in the Natural Areas Inventory. <i>Include letter from FNAI or consultant where appropriate.</i>	18-2.021	55-57, 60
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)	75-76
42	Habitat Restoration and Improvement	259.032(10) & 253.034(5)	76
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.	↓	76-80
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.		110
42-C.	The associated measurable objectives to achieve the goals.		110
42-D.	The related activities that are to be performed to meet the land management objectives and their associated measures. <i>Include fire management plans - they can be in plan body or an appendix.</i>		121, 156
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.		142-144, 540-556
43	***Quantitative data description of the land regarding an inventory of forest and other natural resources and associated acreage. <i>See footnote.</i>	253.034(5)	574
44	Sustainable Forest Management, including implementation of prescribed fire management		77-80, 96-97
44-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).		111-115
44-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).	18-2.021, 253.034(5) & 259.032(10) ↓	111-115
44-C.	Measurable objectives (see requirement for #42-C).		111-115
44-D.	Related activities (see requirement for #42-D).		121, 561
44-E.	Budgets (see requirement for #42-E).		142-144, 540-556
45	Imperiled species, habitat maintenance, enhancement, restoration or population restoration	259.032(10) & 253.034(5)	53, 81-83

45-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	81-83
45-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		111
45-C.	Measurable objectives (see requirement for #42-C).		111, 123
45-D.	Related activities (see requirement for #42-D).		111, 139
45-E.	Budgets (see requirement for #42-E).		142-144, 539-555
46	***Quantitative data description of the land regarding an inventory of exotic and invasive plants and associated acreage. <i>See footnote.</i>		253.034(5)
47	Place the Arthropod Control Plan in an appendix. If one does not exist, provide a statement as to what arrangement exists between the local mosquito control district and the management unit.	BOT requirement via lease language	556
48	Exotic and invasive species maintenance and control	259.032(10) & 253.034(5)	85-86
48-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	85-86
48-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		112-113
48-C.	Measurable objectives (see requirement for #42-C).		112-113
48-D.	Related activities (see requirement for #42-D).		112, 113
48-E.	Budgets (see requirement for #42-E).		142-144, 539-555

Section E: Water Resources

Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
49	A statement as to whether the property is within and/or adjacent to an aquatic preserve or a designated area of critical state concern or an area under study for such designation. <i>If yes, provide a list of the appropriate managing agencies that have been notified of the proposed plan.</i>	18-2.018 & 18-2.021	61
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	61
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	95-96, 110
52	***Quantitative description of the land regarding an inventory of hydrological features and associated acreage. <i>See footnote.</i>	253.034(5)	61
53	Hydrological Preservation and Restoration	259.032(10) & 253.034(5)	95-96, 110
53-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	114

53-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		114, 123
53-C.	Measurable objectives (see requirement for #42-C).		114, 123
53-D.	Related activities (see requirement for #42-D).		114, 123
53-E.	Budgets (see requirement for #42-E).		142-144, 540-556

Section F: Historical, Archeological and Cultural Resources

Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
54	**Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding archeological and historical resources. <i>Include maps of all cultural resources except Native American sites, unless such sites are major points of interest that are open to public visitation.</i>	18-2.018, 18-2.021 & per DHR's request	62, 97-98
55	***Quantitative data description of the land regarding an inventory of significant land, cultural or historical features and associated acreage.	253.034(5)	97-98
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	97-98, 116, 535
57	Cultural and Historical Resources	259.032(10) & 253.034(5)	62, 97-98
57-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	97-98
57-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		116, 123
57-C.	Measurable objectives (see requirement for #42-C).		116, 123
57-D.	Related activities (see requirement for #42-D).		116, 123
57-E.	Budgets (see requirement for #42-E).		142-144, 540-556

**While maps of Native American sites should not be included in the body of the management plan, the DSL urges each managing agency to provide such information to the Division of Historical Resources for inclusion in their proprietary database. This information should be available for access to new managers to assist them in developing, implementing and coordinating their management activities.

Section G: Facilities (Infrastructure, Access, Recreation)

Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
58	***Quantitative data description of the land regarding an inventory of infrastructure and associated acreage. <i>See footnote.</i>	253.034(5)	94, 98
59	Capital Facilities and Infrastructure	259.032(10) & 253.034(5)	98-99
59-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	85-87
59-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		116-117
59-C.	Measurable objectives (see requirement for #42-C).		116-117, 123
59-D.	Related activities (see requirement for #42-D).		116-117, 123

59-E.	Budgets (see requirement for #42-E).		142-144, 540-556
60	*** Quantitative data description of the land regarding an inventory of recreational facilities and associated acreage.	253.034(5)	93-94
61	Public Access and Recreational Opportunities	259.032(10) & 253.034(5)	87-94
61-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	87-94
61-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		113-114
61-C.	Measurable objectives (see requirement for #42-C).		113-114, 123
61-D.	Related activities (see requirement for #42-D).		113-114, 123
61-E.	Budgets (see requirement for #42-E).		142-144, 540-556

Section H: Other/ Managing Agency Tools

Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
62	Place this LMP Compliance Checklist at the front of the plan.	ARC and managing agency consensus	II-VII
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	66-73
65	Key management activities necessary to achieve the desired outcomes regarding other appropriate resource management.	259.032(10)	74-119
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)	142-144, 540-556
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)	142-144, 540-556
68	A statement of gross income generated, net income and expenses.	18-2.018	64, 142-144

*** = 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

One of Florida's oldest wildlife management areas, the J.W. Corbett Wildlife Management Area (JWCWMA) is named after James Wiley Corbett, a former Florida Game and Freshwater Fish Commission, now Florida Fish and Wildlife Conservation Commission (FWC), Commissioner who was a lifelong wildlife conservation advocate and played an important role in conserving the area. Set within Palm Beach County between Florida's expanding urban Gold Coast to the east and south, and more rural orange groves and agricultural fields to the west, the 60,478-acre JWCWMA serves as a transitional zone for the uplands of Central Florida and the relatively flat Everglades, within some of the highest quality, relatively undisturbed pine flatwoods, hammocks and marshes that remain in South Florida. Along with the Hungryland Wildlife and Environmental Area (WEA) and Palm Beach County's Dupuis Reserve abutting the JWCWMA on the north, the JWCWMA conserves one of the largest remaining ecotones or transition zones between the pine flatwoods of interior Southeast Florida and the sawgrass marshes of the Everglades. This natural landscape provides crucial habitat for a large assemblage of imperiled, rare and more common wildlife species including snail kites, Florida sandhill cranes, southeastern kestrels, Audubon's caracaras, red-cockaded woodpeckers, deer, and turkey, that are just a few of the species that thrive on the area.

The JWCWMA also protects important wetlands that are a part of the larger Everglades ecosystem. Providing important watershed protection for Hungryland Slough and the Loxahatchee River into which it flows, the JWCWMA also fulfills a critical role in conserving South Florida water quality along with a diverse assemblage of natural communities that sustain a large variety of wildlife. Extensive wet flatwoods and wet prairies in association with depression marshes creates good habitat conditions for far-ranging species such as the Florida Black bear and the occasional, more secretive Florida panther and allows seasonal movement of animals in response to fluctuating water levels and available food supplies.

Providing an important hub within a network of adjacent conservation lands, the JWCWMA serves as an integral part of larger system of parks, greenways, and wildlife management areas within this region of Florida that provides important water quality protection, conserves vital wildlife habitat, and enhances the quality of life in the region and State.

The JWCWMA is managed by the FWC for the purpose of operating a wildlife management area, providing ecological diversity, providing managed habitat for both imperiled and common wildlife, and for providing the public with fish and wildlife-oriented outdoor recreational opportunities. The lands of the JWCWMA offer one of only a few public hunting areas in the vicinity. Along with hunting, fishing, wildlife viewing, camping, horseback-riding, scenic



driving, bicycling, and hiking are included among the outstanding recreational opportunities offered on the JWCWMA.

Through its management of the JWCWMA, FWC works to conserve and restore natural wildlife habitat for an array of endemic, imperiled, and other native wildlife, while also providing high-quality opportunities for hunting, fishing, hiking, wildlife viewing, camping, and other fish and wildlife-based public outdoor recreation opportunities.

1.1 Management Plan Purpose

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

This Management Plan is submitted for review to the Acquisition and Restoration Council (ARC) acting on behalf of the Board of Trustees of the Internal Improvement Trust Fund (Board of Trustees) of the State of Florida through the Florida Department of Environmental Protection’s Division of State Lands (DSL), in compliance with paragraph seven of Lease No. 2606 (Appendix 13.1) and pursuant to Chapters 253 and 259, Florida Statutes (F.S.), and Chapters 18-2 and 18-4, Florida Administrative Code (F.A.C). Format and content were drafted in accordance with ARC requirements for management plans and the model plan outline provided by the staff of DSL. Terms (Appendix 13.10) 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

FWC’s planning philosophy includes emphasizing management recommendation consensus-building among stakeholders and input from user groups and the general public at the beginning of the planning process. FWC engages stakeholders by convening a Management Advisory Group (MAG) and solicits additional input from user groups and the general public at a public hearing (Appendix 13.3). FWC also engages area, district, and regional agency staff, as well as other FWC staff expertise, in developing this Management Plan, thereby facilitating area biologist and manager “ownership” of the Management Plan, and thus the development of meaningful management intent language, goals with associated measurable objectives, timelines for



completion, and the identification of challenges and solution strategies for inclusion in the JWCWMA Management Plan (Sections 5 – 8).

Further management planning input is received through Land Management Reviews (LMR) conducted every five years, which includes a review of the previous Management Plan, as well as a field review of the JWCWMA. The LMR report (Section 5.1, Appendix 13.5) provides FWC staff with important information and guidance provided by a diverse team of land management auditors, and communicates the recommendations of the LMR team to FWC so they may be adequately addressed in this Management Plan, and thus guides the implementation of the LMR team recommendations on the JWCWMA.

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

1.2 Location

The JWCWMA is located in north central Palm Beach County approximately five miles south (using straight-line distance) of Indiantown (Figure 1) and nearby the cities of Jupiter, Canal Point, and West Palm Beach lying directly east of Lake Okeechobee and west of West Palm Beach. Encompassing 60,348 acres that span approximately 13 miles from north to south and 12 miles from west to east, all the lands comprising the JWCWMA can be found in one contiguous zone. Bee Line Highway borders the northeastern edge of the JWCWMA. The northern border of the JWCWMA lies along the northern border of the Palm Beach County in Townships 40 and 42S, Ranges 39 and 40E.

1.3 Acquisition

1.3.1 Purposes for Acquisition of the Property

The vast majority of the land within JWCWMA was acquired by the FWC for wildlife conservation, restoration and management and public wildlife recreational opportunities that include hunting using funds from the Federal Aid and Wildlife Restoration Act (Pittman-Robertson Act). Subsequently, additional acquisitions were made under the State of Florida’s Preservation 2000 Land Acquisition Program (P-2000) and Conservation and Recreation Lands Acquisition (CARL) program to conserve additional lands within the area that are important to natural and cultural resources. In accordance with the requirements of those funding programs, the FWC will continue to manage the JWCWMA for the original purposes for acquisition and to conserve and restore natural wildlife habitat for an array of imperiled

and other native wildlife, and to provide opportunities for fish and wildlife-based public outdoor recreation.

1.3.2 Acquisition History

In 1947, the Florida Game and Freshwater Fish Commission, now FWC, purchased approximately 52,000 acres from the Southern States Land and Timber Company LLC and established it as the JWCWMA. In 1956, FWC completed a land exchange with the Pratt and Whitney Aircraft Division of United Aircraft Corporation conveying 6,000 acres of land in the northern portion JWCWMA for a contiguous 9,000 acre strip along the southern boundary. Since 1958, the JWCWMA has been further consolidated through long-term leases on approximately 1,200 interior acres of “Section 16 lands” from the Florida Board of Education and the Board of Trustees. In addition, several small inholding parcels have been purchased from private landowners. Presently, private landowners own several inholdings in the Big Mound portion of the JWCWMA. In 1993, 2,331 acres adjacent to the southern boundary were acquired through the CARL Program and leased to FWC by the Board of Trustees. In 2012, Palm Beach County donated 60 acres to FWC and the SFWMD added another 130 acres to allow access to the L-8 levee that was previously adjacent to JWCWMA. The JWCWMA presently comprises approximately 60,478 acres as detailed below.

FWC Acquisitions:	56,440 Acres
Donated Lands:	60 Acres
Other State of Florida Acquisitions:	
Lease Number 2606:	168 Acres
Amendment 1:	171 Acres
Amendment 2:	2,331 Acres
Amendment 3:	1,118 Acres
Amendment 4:	60 Acres
Contract Number 09126:	130 Acres

1.4 Management Authority

FWC is the designated lead managing agency for the JWCWMA under the authority granted by Lease Number 2606 from the Board of Trustees agent, DSL. Further management authority derives from Article IV, Section 9 of the Florida Constitution as well as the guidance and directives of Chapters 253, 259, 327, 370, 372, 373, 375, 378, 403, 487, 870, and 597 and of the F.S. These constitutional provisions and laws provide FWC the authority to protect, conserve, and manage the State’s fish and wildlife resources.

1.5 Management Directives

The 50-year Board of Trustees’ Lease Agreement Number 2606 with FWC directs FWC to “manage the leased premises only for the conservation and protection of natural and historical resources and resource-based, public outdoor recreation which is compatible with the conservation and protection of these public lands, as set forth in subsection 253.023(11), F. S...” The lease agreement further directs FWC to “implement applicable Best

Management Practices for all activities under this lease in compliance with paragraph 18-2.018(2)(h), F.A.C, which have been selected, developed, or approved by lessor, lessee, or other land managing agencies for the protection and enhancement of the leased premises.”

1.6 Title Interest and Encumbrances

The FWC holds fee-simple title to the lands acquired by FWC through the federal Pittman-Robertson Act, and as required, those lands are vested in the FWC. Additional lands were acquired through the P-2000 and CARL programs and donations are owned in fee-simple title by the Board of Trustees. The lands acquired in the area of Big Mound, the Section 16 lands, are held in trust for the Department of Education. FWC has lead management authority for all resources within the established boundary.

Current encumbrances include an apiary agreement, electrical easement, a utility maintenance easement with Florida Power and lights, Gulfstream Natural Gas System easement, two housing agreements, communication tower agreement with the SFWMD, M-O Canal and flowage easements granted to the SFWMD, a lease/easement with Pratt and Whitney Aircraft, license agreement with the SFWMD for Levee L-8 access, and a lease agreement with FWC for management and operation of the Everglades Youth Conservation Camp (EYCC) facilities and programs.

Listed below are the contractual easements currently in place on the JWCWMA:

Name	Type	Easement #
FWC & FL Power and Light	Electrical Ingress/Egress	1999
FWC & FL Power and Light	Utility Access and Maintenance - OPS Trailers	08314
FWC & Gulfstream Natural Gas System	Access/Installation	10327
FWC & Gulfstream Natural Gas System	Amendment A -Easement & Mitigation Land Approval	10327A
FWC & Gulfstream Natural Gas System	Amendment B -Temporary Access/Pipeline Construction	10327B
FWC & Gulfstream Natural Gas System	Amendment C - USFWS Approval Process	10327C
FWC & Gulfstream Natural Gas System	Amendment D -IITF Pipeline	10327D
FWC & SFWMD	Water Flowage	89034
FWC & SFWMD	M-O Canal Access/Canal ~76.02 ac	13164A
FWC & SFWMD	M-O Canal Easement Access/Canal ~16.46 ac	32706
FWC & SFWMD	Temporary Access Easement ~8.48 ac	32790
FWC & SFWMD	Corbett/Moss Flowage Easement ~ 2,331.47 ac	32705
FWC & SFWMD	Linear Facility	13510
FWC & SFWMD	Perpetual Access Road Easement	88993
FWC & SFWMD	Eastern Perimeter Linear Facilities/Scripps Facility	13510A

Additionally, when FWC purchased the original 52,000 acres of the JWCWMA from Southern States Land and Timber Company in 1947, the company retained one-half the mineral rights. Furthermore, Indian Trail Groves retained certain drainage rights on property sold to the Board of Trustees in 1993 (i.e., right to pump excess water from their current property onto

that sold to the Trustees). Each encumbrance, lease or easement on the JWCWMA can be seen in greater detail in the lease section of the appendices (13.1).

1.7 Proximity to Other Public Conservation Lands

As noted above, the JWCWMA is located in the vicinity of an extensive network of conservation lands, including lands managed by the South Florida Water Management District (SFWMD) (e.g., Dupuis Reserve, River of Grass, C-51/L-8 Reservoir); lands managed by the United States Fish and Wildlife Service (USFWS) within the Loxahatchee National Wildlife Refuge (NWR); and lands managed by Palm Beach County (e.g., J.W. Corbett to Loxahatchee NWR Connector, Royal Palm Beach Pines Natural Area, Acreage Pines Natural Area, Loxahatchee Slough Natural Area, Sweetbay Natural Area, Pines Glades Natural Area). FWC also manages the nearby John C. and Mariana Jones/Hungryland WEA. Private land owners manage the nearby R.G. Reserve Mitigation Bank. Also, the Florida Department of Environmental Protection (DEP), USFWS, Department of Interior (DOI), Martin County, local municipalities, and private as well as public conservation organizations manage lands within the extensive network of conservation lands within the vicinity of the JWCWMA. Additionally, there are two Florida Forever projects located adjacent to the JWCWMA (Table 1, Figure 2).

Table 2 lists the conservation lands within a 15-mile radius of the JWCWMA, including lands managed by public and private entities, that conserve cultural and natural resources within this region of Florida. Most of the conservation lands are owned in full-fee title by a public entity. However, some of these areas fall within a less-than-fee ownership classification where the land is owned and being managed by a private landowner while a public agency or not-for-profit organization holds a conservation easement on the land.

Table 1. Florida Forever Projects in the Vicinity (within 15 miles)

Project Name	GIS Acres
Pal-Mar Florida Forever BOT Project	36,229
Atlantic Ridge Ecosystem Florida Forever BOT Project	14,403

Table 2. Conservation Lands in the Vicinity (within 15 miles)

Federal Government	Managing Agency
Arthur R. Marshall Loxahatchee NWR	DOI, USFWS
Hobe Sound NWR	DOI, USFWS
Jupiter Inlet Lighthouse Outstanding Natural Area	DOI, Bureau of Land Management
Loxahatchee Slough Research Natural Area	DOI, FWS
State of Florida	Managing Agency
Atlantic Ridge Preserve State Park	DEP, Div. of Recreation and Parks
John C. and Mariana Jones/Hungryland WEA	FWC
John D. MacArthur Beach State Park	DEP, Div. of Recreation and Parks

Table 2. Conservation Lands in the Vicinity (within 15 miles)

Jonathan Dickinson State Park	DEP, Div. of Recreation and Parks
Pine Jog Environmental Education Center	Florida Atlantic University
Water Management District	Managing Agency
Allapattah Flats	SFWMD
Atlantic Ridge Ecosystem	SFWMD
C-44 Storm Water Treatment Area	SFWMD
C-51 and L-8 Reservoir	SFWMD
Cypress Creek/Loxahatchee	SFWMD
Dupuis Reserve	SFWMD
Gentle Ben Flowage Easement	SFWMD
Herbert Hoover Dike	SFWMD
Hungryland/SFWMD Parcels	SFWMD
Lake Okeechobee Watershed Water Quality Treatment Facilities	SFWMD
Lakeside Ranch Storm Treatment Area	SFWMD
River of Grass	SFWMD
Storm Water Treatment Areas	SFWMD
Strazzulla Tract	SFWMD
Martin County	Managing Agency
Atlantic Ridge Parcels	Martin County
Banner Lake Park Conservation Area	Martin County
C-44 Park Parcel	Martin County
County Line Scrub Conservation Area	Martin County
Delaplane Peninsula Blueway Preserve	Martin County
Halpatiokee Regional Park Conservation Area	Martin County
Hawks Hammock	Martin County
Kitching Creek	Martin County
Lake Okeechobee Ridge	Martin County
Loxahatchee River Park	Martin County
Orchid Island	Martin County
Oxbow	Martin County
Phipp's Park Conservation Area	Martin County
South Fork Addition	Martin County
Timer Powers Park Conservation Area	Martin County
Palm Beach County	Managing Agency
Acreage Pines Natural Area	Palm Beach County
C-18 Triangle Natural Area	Palm Beach County
Carlin Park	Palm Beach County
Coral Cove Park	Palm Beach County
Cypress Creek Natural Area	Palm Beach County

Table 2. Conservation Lands in the Vicinity (within 15 miles)

Delaware Scrub Natural Area	Palm Beach County
DuBois Park	Palm Beach County
Frenchman's Forest	Palm Beach County
Hungryland Slough Natural Area	Palm Beach County
J. W. Corbett to Loxahatchee NWR Connector	Palm Beach County
Jackson Riverfront Pines Natural Area	Palm Beach County
Juno Dunes Natural Area	Palm Beach County
Juno Park	Palm Beach County
Jupiter Beach Park	Palm Beach County
Jupiter Mangroves Natural Area	Palm Beach County
Jupiter Ridge Natural Area	Palm Beach County
Lake Okeechobee Connector	Palm Beach County
Lake Park Scrub Natural Area	Palm Beach County
Limestone Creek Natural Area	Palm Beach County
Loggerhead Park	Palm Beach County
Loxahatchee Slough Natural Area	Palm Beach County
North Jupiter Flatwoods Natural Area	Palm Beach County
Okeeheelee Park North	Palm Beach County
Okeeheelee Park South	Palm Beach County
Paw-Paw Preserve	Palm Beach County
Pine Glades Natural Area	Palm Beach County
Pond Cypress Natural Area	Palm Beach County
Radnor	Palm Beach County
Riverbend Park	Palm Beach County
Royal Palm Beach Pines Natural Area	Palm Beach County
Sweetbay Natural Area	Palm Beach County
Winding Waters Natural Area	Palm Beach County
City	Managing Agency
Grassy Waters Preserve	City of West Palm Beach
Pahokee Marina and Campground	City of Pahokee
Wellington Environmental Preserve	Village of Wellington
Private/Public Conservation Organization	Managing Agency
Barley Barber Swamp	Florida Power & Light Company
Blowing Rocks Preserve	The Nature Conservancy
Citrus Boulevard Nature Sanctuary	Audubon of Martin County, Inc.
Four Rivers Nature Sanctuary	Audubon of Martin County, Inc.
R. G. Reserve Mitigation Bank	R. G. Reserve, LLC
South Fork Nature Sanctuary	Audubon of Martin County, Inc.

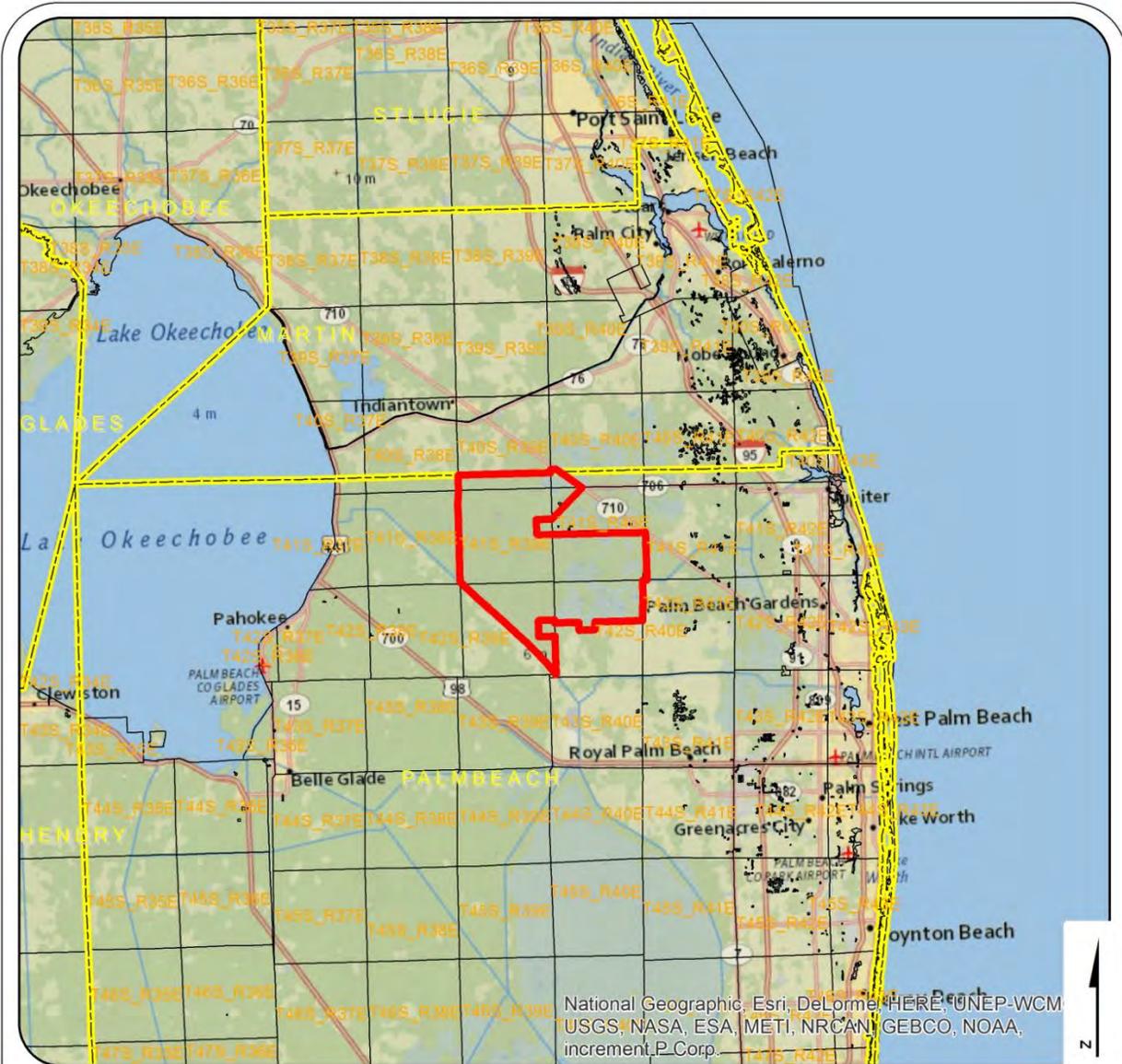
Acronym Key	Agency Name
DEP	Florida Department of Environmental Protection
DOI	Department of Interior
FWC	Florida Fish and Wildlife Conservation Commission
USFWS	U.S. Fish and Wildlife Service
NWR	National Wildlife Refuge
SFWMD	South Florida Water Management District
WEA	Wildlife and Environmental Area

1.8 Adjacent Land Uses

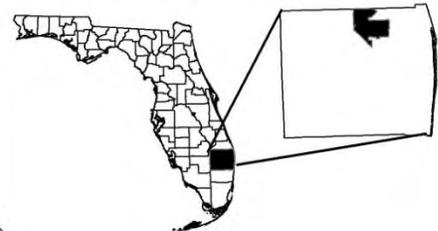
The JWCWMA is contained entirely within the north center section of Palm Beach County and borders the southern edge of Martin County. As previously stated, the JWCWMA lies in a larger network of conservation lands. Located on the south end of the JWCWMA is the J.W. Corbett to Loxahatchee NWR Connector that serves as a link to the C-51 and L-8 Reservoir and further south to the large Arthur R. Loxahatchee NWR. The Everglades Agricultural Area, a vast area of sugar cane fields, vegetable croplands, and groves that were originally part of the Everglades River of Grass system that were “reclaimed” as part of the original Lake Okeechobee Flood Control projects lies further to the west and south.

The property that lies adjacent to the JWCWMA consists mainly of the Pratt and Whitney United Aircraft Corporation facility, other conservation lands, agricultural lands, rural lands, and two airports. The Palm Beach County Comprehensive Plan shows the lands surrounding the JWCWMA fall within the Glades Tier and Rural Tier zoning categories. The Glades Tier, located west of the JWCWMA, encompasses lands that are primarily used for specialized agricultural operations. While, the Rural Tier, located east of the JWCWMA, encompasses lands mainly used for agricultural operations and single-family residences.

According to the 1998 Palm Beach County Comprehensive Plan revised in 2013, “Due to the declining availability of land and the increase in population in the Urban and Exurban Tiers, the Rural Tier is beginning to experience pressure for urban densities and nonresidential intensities normally associated with a more urban area. The strategies in the Rural Tier are established to protect and enhance rural settlements that support agricultural uses and equestrian uses.” In addition to these land uses, there are two airports that lie east of the JWCWMA including the William P. Gwinn Airport and the North Palm Beach Co. General Aviation Airport.



JW Corbett WMA
 ~60,478 Acres
 Palm Beach County, Florida



0 5 10 20 Miles

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

JW Corbett WMA Locator Map

Legend

- JW Corbett WMA
- County
- Township/Range

Figure 1. JWCWMA Locator Map

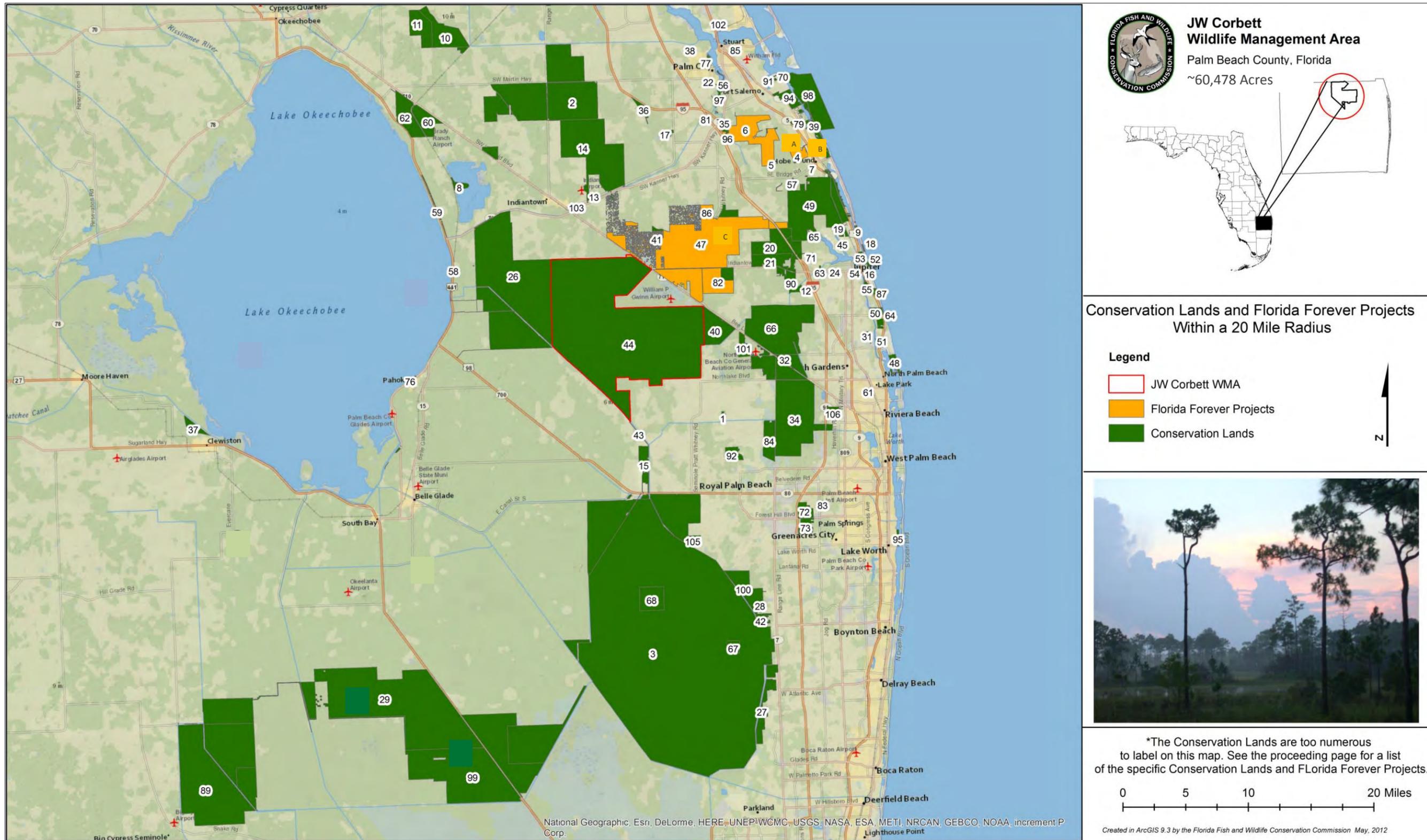


Figure 2. Florida Forever Projects and Conservation near the JWCWMA

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

Map Label	Florida Forever Projects
A	Atlantic Ridge Ecosystem
B	Indian River Lagoon Blueway
C	Pal-Mar
Map Label	Conservation Lands
1	Acreage Pines Natural Area
2	Allapattah Flats
3	Arthur R. Marshall Loxahatchee National Wildlife Refuge
4	Atlantic Ridge Ecosystem
5	Atlantic Ridge Parcels
6	Atlantic Ridge Preserve State Park
7	Banner Lake Park Conservation Area
8	Barley Barber Swamp
9	Blowing Rocks Preserve
10	Bluefield Ranch
11	Bluefield Ranch Mitigation Bank
12	C-18 Triangle Natural Area
13	C-44 Park Parcel
14	C-44 Stormwater Treatment Area
15	C-51 and L-8 Reservoir
16	Carlin Park
17	Citrus Boulevard Nature Sanctuary
18	Coral Cove Park
19	County Line Scrub Conservation Area
20	Cypress Creek and Loxahatchee River Management Area
21	Cypress Creek Natural Area
22	Danforth Park
23	Delaplane Peninsula Blueway Preserve
24	Delaware Scrub Natural Area
25	DuBois Park
26	Dupuis Reserve
27	East Coast Buffer
28	East Conservation Area
29	Everglades Agricultural Area
30	Four Rivers Nature Sanctuary
31	Frenchman's Forest
32	Gentle Ben Flowage Easement
33	Gomez
34	Grassy Waters Preserve
35	Halpatiokee Regional Park Conservation Area
36	Hawks Hammock

37	Herbert Hoover Dike
38	Hidden Bay Nature Sanctuary
39	Hobe Sound National Wildlife Refuge
40	Hungryland Slough Natural Area
41	Hungryland/SFWMD Parcels
42	Indian Mounds
43	J. W. Corbett to Loxahatchee NWR Connector
44	J. W. Corbett Wildlife Management Area
45	Jackson Riverfront Pines Natural Area
46	Jimmy Graham Park
47	John C. and Mariana Jones/Hungryland Wildlife and Environmental Area
48	John D. MacArthur Beach State Park
49	Jonathan Dickinson State Park
50	Juno Dunes Natural Area
51	Juno Park
52	Jupiter Beach Park
53	Jupiter Inlet Lighthouse Outstanding Natural Area
54	Jupiter Mangroves Natural Area
55	Jupiter Ridge Natural Area
56	Kiplinger
57	Kitching Creek
58	Lake Okeechobee Connector
59	Lake Okeechobee Ridge
60	Lake Okeechobee Watershed Water Quality Treatment Facilities
61	Lake Park Scrub Natural Area
62	Lakeside Ranch STA
63	Limestone Creek Natural Area
64	Loggerhead Park
65	Loxahatchee River Park
66	Loxahatchee Slough Natural Area
67	Loxahatchee Slough Public Use Natural Area
68	Loxahatchee Slough Research Natural Area
69	Maplewood Nature Sanctuary
70	Martin County Spoil Islands
71	North Jupiter Flatwoods Natural Area
72	Okeehoelee Park North
73	Okeehoelee Park South
74	Orchid Island
75	Oxbow
76	Pahokee Marina and Campground
77	Palm City Park Conservation Area
78	Paw-Paw Preserve
79	Peck Lake Park

80	Pendarvis Cove Park
81	Phipp's Park Conservation Area
82	Pine Glades Natural Area
83	Pine Jog Environmental Education Center
84	Pond Cypress Natural Area
85	Possum Long Nature Center
86	R. G. Reserve Mitigation Bank
87	Radnor
88	Rio Nature Park
89	River of Grass
90	Riverbend Park
91	Rocky Point Hammock Park
92	Royal Palm Beach Pines Natural Area
93	Scrub Oak
94	Seabranck Preserve State Park
95	Snook Islands Natural Area
96	South Fork Addition
97	South Fork Nature Sanctuary
98	St. Lucie Inlet Preserve State Park
99	Stormwater Treatment Areas
100	Strazzulla Tract
101	Sweetbay Natural Area
102	Tilton
103	Timer Powers Park Conservation Area
104	Twin Rivers Park
105	Wellington Environmental Preserve
106	Winding Waters Natural Area

1.9 Public Involvement

FWC conducted a MAG meeting in North Palm Beach, Florida on September 18, 2013 to obtain input from both public and private stakeholders regarding management of the JWCWMA. Results of this meeting were used by FWC to develop management goals and objectives and to identify opportunities and strategies for inclusion in this Management Plan. A summary of issues and opportunities raised by the MAG, as well as a listing of participants, is included as Appendix 13.3. Further, a public hearing, as required by Chapter 259.032(10), F.S. was held in Palm Beach County, Florida on October 30th, 2013. The report of that hearing is also contained in Appendix 13.3. Additionally, a website is also maintained for receipt of public input at <http://myfwc.com/conservation/terrestrial/management-plans/develop-mps/> . Further testimony and input is received at a public hearing held by ARC. Input received from all public involvement efforts has been considered in the development of this Management Plan.

2 Natural and Cultural Resources

2.1 Physiography

The JWCWMA falls within the Atlantic Coastal Ridge physiographic province. The Atlantic Coastal Ridge, which runs from Mahogany Hammock northeast to Miami, was formed as longshore currents pushed ooids up into a long ridge. Ooids are small (2 mm in diameter), spheroidal, coated (layered) sedimentary grains, usually composed of sand and calcium carbonate. The ooids later cemented into the multi-layered sedimentary rock known as Miami Oolite (Miami Limestone). Cross-bedding is typical of sedimentary structures, and is defined as horizontal units that are composed of visible inclined layers. The Cocoplum Area, where this Earthcache is located along the Atlantic Coastal Ridge, can be as much as 30 feet above sea-level. The ridge continues south through an area known as Cutler Ridge (so named because it is perched atop the ridge).

2.1.1 Climate

The climate is characterized by a long, warm, humid summer and a mild winter. Summer temperatures are tempered by the ocean breeze and by the frequent formation of cumulus clouds, which shade the land somewhat without completely obscuring the sun. August is the warmest month and has an average maximum temperature of about 90 degrees F, but temperatures from June to September are similar. Mean annual rainfall is 57 inches, with June through October being the wettest period.

2.1.2 Topography

On the JWCWMA ground elevations generally range from less than 17 feet above mean sea level (MSL) adjacent to the L-8 Canal, to 25 feet MSL in the northeast corner of the area. Water depths in the ponds and sloughs may range from a few inches to 7 feet deep.

Scattered hardwood hammocks may be as high as 3 feet above surrounding ground elevations.

2.1.3 Soils

The Palm Beach County soil survey prepared by Natural Resources Conservation Service (NRCS) shows 22 series occurring on sites of the JWCWMA. Most soils are poorly-drained fine sands, medium sands, or sandy loams. However, there is an area of Everglades muck soil located in the southwest corner of the area. Nearly ninety percent of the soil areas are subject to frequent flooding, and are therefore rated fair to very poor for woodland wildlife species, but good for wetland wildlife. The taxonomic and physical descriptions of the series found within the boundaries of the lands leased to FWC are found in Appendix 13.4.

The U.S. Department of Agriculture, NRCS defines a soil map unit as: “a collection of soil areas or non-soil areas (miscellaneous areas) delineated in a soil survey.” Soil map units may contain multiple soil components, which are given names that are unique identifiers. Figure 3 provides aggregation data for the JWCWMA soils’ map units, including a more complete listing of attributes and soil minor components. Figure 4 provides depth to water table information for the soil types found at the JWCWMA.

2.1.4 Geologic Conditions

Three geologic conditions exist on the JWCWMA.

Miami Limestone (Pleistocene)

Miami Limestone - The Miami Limestone (formerly the Miami Oolite), named by Sanford (1909), occurs at or near the surface in southeastern peninsular Florida from Palm Beach County to Dade and Monroe counties. It forms the Atlantic Coastal Ridge and extends beneath the Everglades where it is commonly covered by thin organic and freshwater sediments. The Miami Limestone occurs on the mainland and in the southern Florida Keys from Big Pine Key to the Marquesas Keys. From Big Pine Key to the mainland, the Miami Limestone is replaced by the Key Largo Limestone. To the north, in Palm Beach County, the Miami Limestone grades laterally northward into the Anastasia Formation. The Miami Limestone consists of two facies, an oolitic facies and a bryozoan facies (Hoffmeister et al. [1967]). The oolitic facies consists of white to orangish gray, poorly to moderately indurated, sandy, oolitic limestone (grainstone) with scattered concentrations of fossils. The bryozoan facies consists of white to orangish gray, poorly to well indurated, sandy, fossiliferous limestone (grainstone and packstone). Beds of quartz sand are also present as unindurated sediments and indurated limey sandstones. Fossils present include mollusks, bryozoans, and corals. Molds and casts of fossils are common. The highly porous and permeable Miami Limestone forms much of the Biscayne Aquifer of the surficial aquifer system.

Beach ridge and dune (Pleistocene/Holocene)

Beach ridge and dune - Undifferentiated Quaternary Sediments - Much of Florida's surface is covered by a varying thickness of undifferentiated sediments consisting of siliciclastics, organics and freshwater carbonates. Where these sediments exceed 20 feet (6.1 meters) thick, they were mapped as discrete units. In an effort to subdivide the undifferentiated sediments, those sediments occurring in flood plains were mapped as alluvial and flood plain deposits. Sediments showing surficial expression of beach ridges and dunes were mapped separately as were the sediments composing Trail Ridge. Terrace sands were not mapped (refer to Healy [1975] for a discussion of the terraces in Florida). The subdivisions of the Undifferentiated Quaternary Sediments are not lithostratigraphic units, but are utilized in order to facilitate a better understanding of the State's geology. The siliciclastics are light gray, tan, brown to black, unconsolidated to poorly consolidated, clean to clayey, silty, unfossiliferous, variably organic-bearing sands to blue green to olive green, poorly to moderately consolidated, sandy, silty clays. Gravel is occasionally present in the panhandle. Organics occur as plant debris, roots, disseminated organic matrix and beds of peat. Freshwater carbonates, often referred to as marls in the literature, are scattered over much of the State. In southern Florida, freshwater carbonates are nearly ubiquitous in the Everglades. 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.

Anastasia Formation (Pleistocene)

Anastasia Formation - The Atlantic Coastal Ridge is underlain by the Anastasia Formation from St. Johns County southward to Palm Beach County. Excellent exposures occur in Flagler County in Washington Oaks State Park, in Martin County at the House of Refuge on Hutchinson Island and at Blowing Rocks in Palm Beach County. An impressive exposure of Anastasia Formation sediments occurs along Country Club Road in Palm Beach County (Lovejoy, 1992). The Anastasia Formation generally is recognized near the coast but extends inland as much as 20 miles (32 kilometers) in St. Lucie and Martin counties. The Anastasia Formation, named by Sellards (1912), is composed of interbedded sands and coquinaoid limestones. The most recognized facies of the Anastasia sediments is an orangish brown, unindurated to moderately indurated, coquina of whole and fragmented mollusk shells in a matrix of sand often cemented by sparry calcite. Sands occur as light gray to tan and orangish brown, unconsolidated to moderately indurated, unfossiliferous to very fossiliferous beds. The Anastasia Formation forms part of the surficial aquifer system.

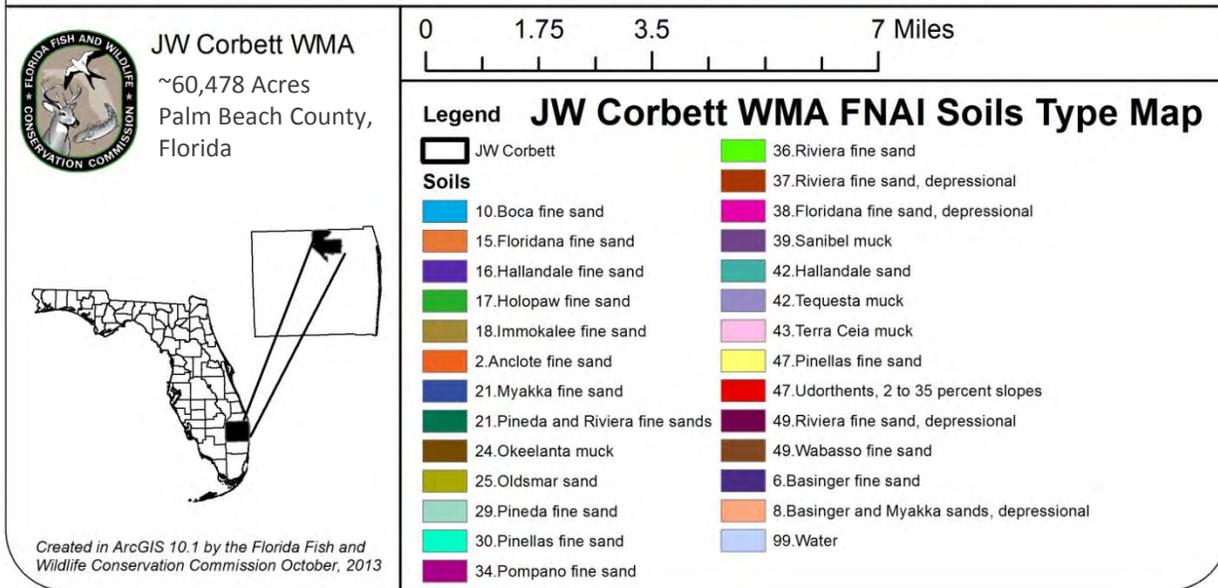
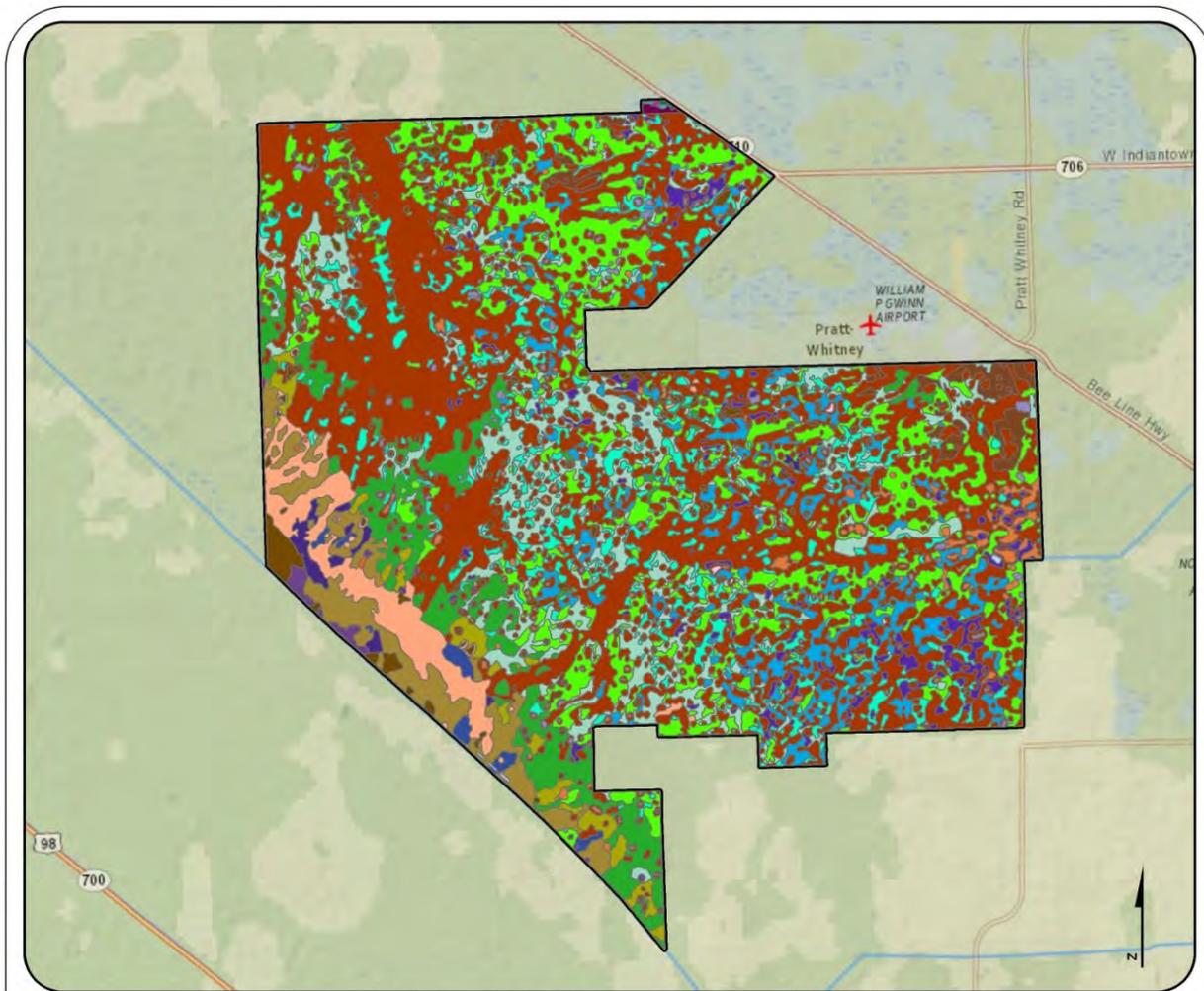


Figure 3. Soils Map of the JWCWMA

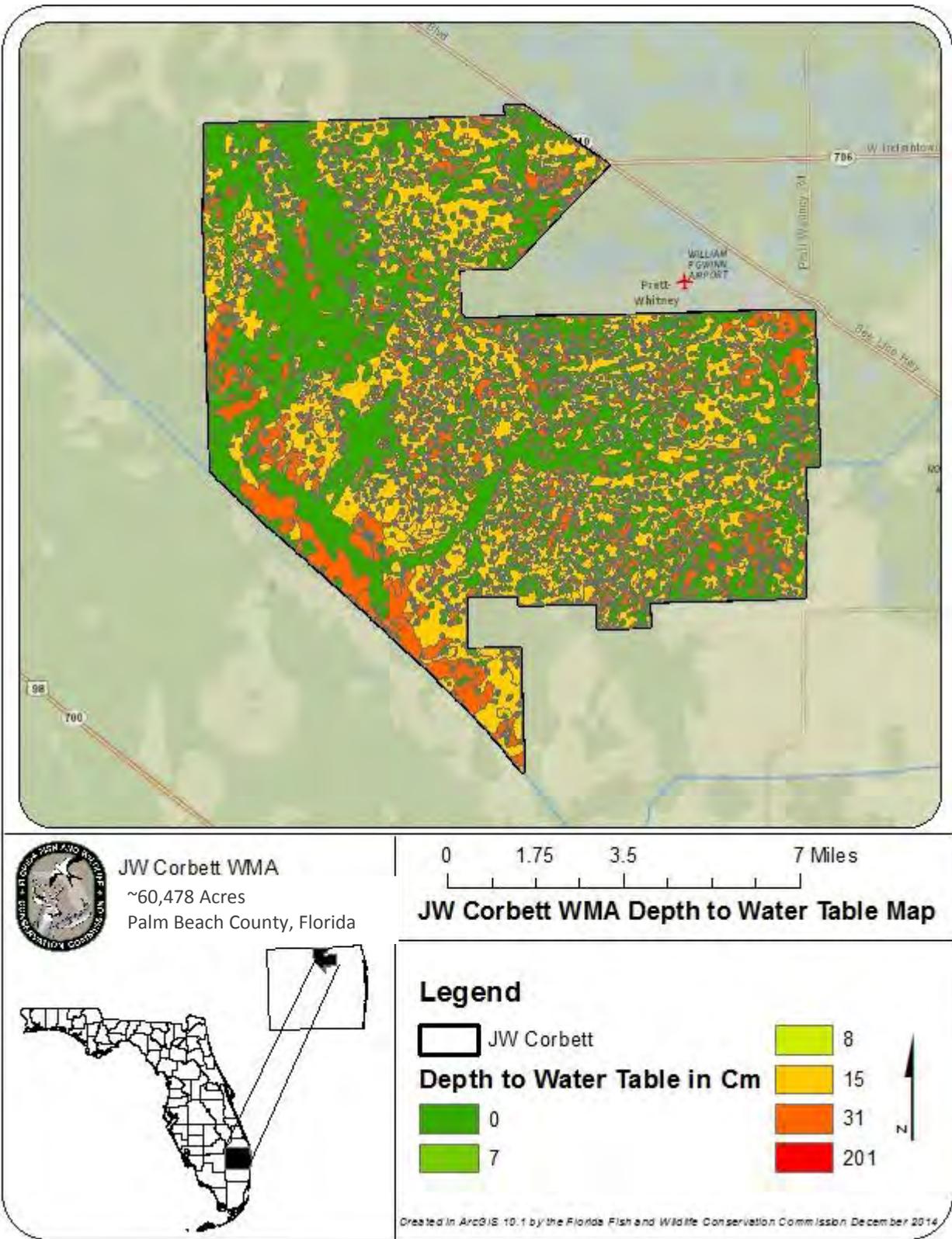


Figure 4. Soils Map - Depth to Water Table for the JWCWM

2.2 Vegetation

Through the services of the Florida Natural Areas Inventory (FNAI), FWC has mapped the natural and anthropogenic communities of JWCWMA, which describes ten natural and anthropogenic community types existing on JWCWMA (Table 4, Figure 6). FWC biologists, along with contracted surveys through FNAI, have documented the native plants species (Table 5) known or expected to occur on the JWCWMA, as well as a variety of imperiled and rare plant species (Table 6) and exotic plant species (Table 7) occurring on the area. Following the plant lists are descriptions of all of the plant community types that are found on the area.

Table 4. Natural Community Types on the JWCWMA

Community Type	Acres*	Percentage
Basin marsh	1,395	2.29%
Depression marsh	13,752	22.56%
Dome swamp	2,189	3.59%
Hydric hammock	65	0.11%
Mesic flatwoods	16,867	27.68%
Mesic hammock	319	0.52%
Ruderal, agriculture	1,361	2.23%
Ruderal, canal/ditch	400	0.66%
Ruderal, clearing/regeneration	694	1.14%
Ruderal, developed	71	0.12%
Ruderal, road	28	0.05%
Ruderal, utility corridor	1,177	1.93%
Strand swamp	11,772	19.32%
Wet flatwoods	9,253	15.18%
Wet prairie	1,603	2.63%

*Approximate acreage for natural community type is calculated through GIS and may differ from the total acreage listed in the Establishment Order or other documents.

Table 5. Native Plant Species Known or Expected to Occur on the JWCWMA

Common name	Scientific name
Alabama supplejack	<i>Berchemia scandens</i>
Alabama swamp flatsedge	<i>Cyperus ligularis</i>
Alligator lily	<i>Hymenocallis palmeri</i>
American beautyberry	<i>Callicarpa americana</i>
American black nightshade	<i>Solanum americanum</i>
American bluehearts	<i>Buchnera americana</i>
American cupscale	<i>Sacciolepis striata</i>
American pokeweed	<i>Phytolacca americana</i>
American white waterlily	<i>Nymphaea odorata</i>
Annual salt marsh aster	<i>Symphotrichum subulatum</i>

Table 5. Native Plant Species Known or Expected to Occur on the JWCWMA

Common name	Scientific name
Arrowfeather threeawn	<i>Aristida purpurascens</i>
Artillery plant	<i>Pilea microphylla</i>
Axilflower	<i>Mecardonia acuminata subsp. peninsularis</i>
Bald cypress	<i>Taxodium distichum</i>
Baldwin's eryngo	<i>Eryngium baldwinii</i>
Baldwin's flatsedge	<i>Cyperus croceus</i>
Baldwin's milkwort	<i>Polygala balduinii</i>
Baldwin's nutrush	<i>Scleria baldwinii</i>
Ballmoss	<i>Tillandsia recurvata</i>
Bandana-of-the-Everglades	<i>Canna flaccida</i>
Bartram's rosegentian	<i>Sabatia decandra</i>
Beach false foxglove	<i>Agalinis fasciculata</i>
Beggar's-ticks	<i>Desmodium incanum</i>
Big carpet grass	<i>Axonopus furcatus</i>
Big floatingheart	<i>Nymphoides aquatica</i>
Bighead rush	<i>Juncus megacephalus</i>
Black bogrush	<i>Schoenus nigricans</i>
Blackeyed Susan	<i>Rudbeckia hirta</i>
Blackroot	<i>Pterocaulon pycnostachyum</i>
Blue maidencane	<i>Amphicarpum muhlenbergianum</i>
Blue mistflower	<i>Conoclinium coelestinum</i>
Blue water-hyssop	<i>Bacopa caroliniana</i>
Bluejoint panicum	<i>Panicum tenerum</i>
Bog smartweed	<i>Polygonum setaceum</i>
Bog white violet	<i>Viola lanceolata</i>
Bottlebrush threeawn	<i>Aristida spiciformis</i>
Perennial saltmarsh aster	<i>Symphyotrichum tenuifolium</i>
Brazilian satintail	<i>Imperata brasiliensis</i>
Broadleaf arrowhead	<i>Sagittaria latifolia</i>
Broomsedge bluestem	<i>Andropogon virginicus</i>
Browne's blechum	<i>Ruellia blechum</i>
Bulltongue arrowhead	<i>Sagittaria lancifolia</i>
Bushy bluestem	<i>Andropogon glomeratus var. hirsutior</i>
Button rattlesnake-master	<i>Eryngium yuccifolium</i>
Cabbage palm	<i>Sabal palmetto</i>
Calusa grape	<i>Vitis shuttleworthii</i>
Camphorweed	<i>Heterotheca subaxillaris</i>
Canada spikerush	<i>Eleocharis geniculata</i>
Canada toadflax	<i>Linaria canadensis</i>
Carolina cranesbill	<i>Geranium carolinianum</i>

Table 5. Native Plant Species Known or Expected to Occur on the JWCWMA

Common name	Scientific name
Carolina mosquito fern	<i>Azolla filiculoides</i>
Carolina redroot	<i>Lachnanthes carolina</i>
Carolina wild petunia	<i>Ruellia caroliniensis</i>
Carolina yelloweyed grass	<i>Xyris caroliniana</i>
Chaffhead	<i>Carphephorus corymbosus</i>
Chalky bluestem	<i>Andropogon virginicus</i> var. <i>glaucus</i>
Chamber bitter	<i>Phyllanthus urinaria</i>
Chapman's beaksedge	<i>Rhynchospora chapmanii</i>
Chapman's goldenrod	<i>Solidago odora</i> var. <i>chapmanii</i>
Chestnutleaf falsecrotan	<i>Caperonia castaneifolia</i>
Cinnamon fern	<i>Osmunda cinnamomea</i>
Climbing aster	<i>Symphyotrichum carolinianum</i>
Climbing hempvine	<i>Mikania scandens</i>
Clustered bushmint	<i>Hyptis alata</i>
Clustered mille graine	<i>Oldenlandia uniflora</i>
Coast cockspur	<i>Echinochloa walteri</i>
Coastal sandbur	<i>Cenchrus spinifex</i>
Coastalplain milkwort	<i>Polygala setacea</i>
Coastalplain St. John's-wort	<i>Hypericum brachyphyllum</i>
Coastalplain staggerbush	<i>Lyonia fruticosa</i>
Coastalplain willow	<i>Salix caroliniana</i>
Coastalplain yelloweyed grass	<i>Xyris ambigua</i>
Coco-plum	<i>Chrysobalanus icaco</i>
Combleaf mermaidweed	<i>Proserpinaca pectinata</i>
Common bushy bluestem	<i>Andropogon glomeratus</i> var. <i>pumilus</i>
Common buttonbush	<i>Cephalanthus occidentalis</i>
Common carpetgrass	<i>Axonopus fissifolius</i>
Common dayflower	<i>Commelina diffusa</i>
Common persimmon	<i>Diospyros virginiana</i>
Common ragweed	<i>Ambrosia artemisiifolia</i>
Common reed	<i>Phragmites australis</i>
Common wireweed	<i>Sida acuta</i>
Common yellow woodsorrel	<i>Oxalis corniculata</i>
Corkystem passionflower	<i>Passiflora suberosa</i>
Creeping primrosewillow	<i>Ludwigia repens</i>
Cuban jute	<i>Sida rhombifolia</i>
Cypress panicgrass	<i>Dichantherium dichotomum</i>
Dahoon	<i>Ilex cassine</i>
Dense gayfeather	<i>Liatris spicata</i>
Denseflower knotweed	<i>Polygonum glabrum</i>

Table 5. Native Plant Species Known or Expected to Occur on the JWCWMA

Common name	Scientific name
Devil's gut	<i>Cassythia filiformis</i>
Ditch fimbry	<i>Fimbristylis schoenoides</i>
Dixie iris	<i>Iris hexagona</i>
Dog fennel	<i>Eupatorium capillifolium</i>
Dog's-tongue	<i>Pseudelephantopus spicatus</i>
Drumheads	<i>Polygala cruciata</i>
Canadian horseweed	<i>Conyza canadensis</i>
Dwarf St. John's-wort	<i>Hypericum mutilum</i>
Earleaf greenbrier	<i>Smilax auriculata</i>
Early paspalum	<i>Paspalum praecox</i>
Early whitetop fleabane	<i>Erigeron vernus</i>
Eastern gamagrass	<i>Tripsacum dactyloides</i>
Eastern poison-ivy	<i>Toxicodendron radicans</i>
Eastern purple bladderwort	<i>Utricularia purpurea</i>
Elderberry	<i>Sambucus nigra ssp. canadensis</i>
Elliott's aster	<i>Symphotrichum elliottii</i>
Elliott's bluestem	<i>Andropogon gyrans</i>
Elliott's lovegrass	<i>Eragrostis elliottii</i>
Elliott's milk pea	<i>Galactia elliottii</i>
Elliott's yelloweyed grass	<i>Xyris elliottii</i>
Erect leaf witch grass	<i>Dichantherium erectifolium</i>
Everglades morning-glory	<i>Ipomoea sagittata</i>
False daisy	<i>Eclipta prostrata</i>
False mastic	<i>Sideroxylon foetidissimum</i>
False nettle	<i>Boehmeria cylindrica</i>
False fennel	<i>Eupatorium leptophyllum</i>
Farkleberry	<i>Vaccinium arboreum</i>
Fetterbush	<i>Lyonia lucida</i>
Fewflower milkweed	<i>Asclepias lanceolata</i>
Fireflag	<i>Thalia geniculata</i>
Fire-on-the-Mountain	<i>Poinsettia cyathophora</i>
Fireweed	<i>Erechtites hieraciifolius</i>
Flattened pipewort	<i>Eriocaulon compressum</i>
Flaxleaf false foxglove	<i>Algalinis linifolia</i>
Floating-heart	<i>Nymphoides cordata</i>
Florida butterfly orchid	<i>Encyclia tampensis</i>
Florida hammock sedge	<i>Carex vexans</i>
Florida ironweed	<i>Vernonia blodgettii</i>
Florida pellitory	<i>Parietaria floridana</i>
Florida threeawn	<i>Aristida rhizomophora</i>

Table 5. Native Plant Species Known or Expected to Occur on the JWCWMA

Common name	Scientific name
Florida tickseed	<i>Coreopsis floridana</i>
Forked fimbry	<i>Fimbristylis dichotoma</i>
Fourleaf vetch	<i>Vicia acutifolia</i>
Fourpetal St. John's-wort	<i>Hypericum tetrapetalum</i>
Fragrant beaksedge	<i>Rhynchospora odorata</i>
Fragrant ladies tresses	<i>Spiranthes odorata</i>
Fringed nutrush	<i>Scleria ciliata</i>
Fringed yellow stargrass	<i>Hypoxis juncea</i>
Gallberry	<i>Ilex glabra</i>
Gaping panicum	<i>Panicum hians</i>
Giant cut-grass	<i>Zizaniopsis miliacea</i>
Giant leather fern	<i>Acrostichum danaeifolium</i>
Giant whitetop	<i>Rhynchospora latifolia</i>
Glabrescent roughhair witchgrass	<i>Dichantherium strigosum var. glabrescens</i>
Glade lobelia	<i>Lobelia glandulosa</i>
Glassleaf rush	<i>Juncus marginatus</i>
Golden polypody	<i>Phlebodium aureum</i>
Gophertail love grass	<i>Eragrostis ciliaris</i>
Grassleaf lettuce	<i>Lactuca graminifolia</i>
Green arrow arum	<i>Peltandra virginica</i>
Greenvein ladies tresses	<i>Spiranthes praecox</i>
Groundnut	<i>Apios americana</i>
Groundsel bush	<i>Baccharis halimifolia</i>
Guinea hen weed	<i>Petiveria alliacea</i>
Gulf coast spikerush	<i>Eleocharis cellulosa</i>
Gulf graytwig	<i>Schoepfia chrysophylloides</i>
Gulfdune paspalum	<i>Paspalum monostachyum</i>
Hackberry	<i>Celtis laevigata</i>
Hairy partridge-pea	<i>Chamaecrista nictitans var. aspera</i>
Hairy pod cowpea	<i>Vigna luteola</i>
Harper's beaksedge	<i>Rhynchospora harperi</i>
Haspan flatsedge	<i>Cyperus haspan</i>
Hedge false bindweed	<i>Calystegia sepium subsp. limnophila</i>
Hemlock witchgrass	<i>Dichantherium portoricense</i>
Herb-of-Grace	<i>Bacopa monnieri</i>
Hilograss	<i>Paspalum conjugatum</i>
Horned bladderwort	<i>Utricularia cornuta</i>
Hottentot fern	<i>Thelypteris interrupta</i>
Hurricane-grass	<i>Fimbristylis cymosa</i>
Husk tomato	<i>Physalis pubescens</i>

Table 5. Native Plant Species Known or Expected to Occur on the JWCWMA

Common name	Scientific name
Innocence	<i>Houstonia procumbens</i>
Jack-in-the-bush	<i>Chromolaena odorata</i>
Juba's bush	<i>Iresine diffusa</i>
Juniperleaf	<i>Polypremum procumbens</i>
Lacy bracken fern	<i>Pteridium aquilinum var. caudatum</i>
Lancewood	<i>Ocotea coriacea</i>
Largeflower rosegentian	<i>Sabatia grandiflora</i>
Lateflowering thoroughwort	<i>Eupatorium serotinum</i>
Laurel greenbrier	<i>Smilax laurifolia</i>
Laurel oak	<i>Quercus laurifolia</i>
Lax hornpod	<i>Mitreola petiolata</i>
Leafy bladderwort	<i>Utricularia foliosa</i>
Leatherleaf airplant	<i>Tillandsia variabilis</i>
Leavenworth's tickseed	<i>Coreopsis leavenworthii</i>
Licorice weed	<i>Scoparia dulcis</i>
Lilac tassleflower	<i>Emilia sonchifolia</i>
Limestone sandmat	<i>Chamaesyce blodgettii</i>
Little floating bladderwort	<i>Utricularia radiata</i>
Live oak	<i>Quercus virginiana</i>
Lizard's tail	<i>Saururus cernuus</i>
Long strap fern	<i>Campyloneurum phyllitidis</i>
Longleaf threeawn	<i>Aristida palustris</i>
Lopsided Indiangrass	<i>Sorghastrum secundum</i>
Low flatsedge	<i>Cyperus pumilus</i>
Low nutrush	<i>Scleria verticillata</i>
Maidencane	<i>Panicum hemitomon</i>
Manyspike flatsedge	<i>Cyperus polystachyos</i>
Marlberry	<i>Ardisia escallonioides</i>
Marsh fern	<i>Thelypteris palustris var. pubescens</i>
Marsh gentain	<i>Eustoma exaltatum</i>
Marsh mermaidweed	<i>Proserpinaca palustris</i>
Mexican primrosewillow	<i>Ludwigia octovalvis</i>
Mexican sprangletop	<i>Leptochloa fusca ssp. uninervia</i>
Millet beaksedge	<i>Rhynchospora miliacea</i>
Mohr's thoroughwort	<i>Eupatorium mohrii</i>
Moonflowers	<i>Ipomoea alba</i>
Muhly grass	<i>Muhlenbergia capillaris</i>
Muscadine	<i>Vitis rotundifolia</i>
Myrsine	<i>Myrsine cubana</i>
Narrowfruit horned beaksedge	<i>Rhynchospora inundata</i>

Table 5. Native Plant Species Known or Expected to Occur on the JWCWMA

Common name	Scientific name
Narrowleaf silkgrass	<i>Pityopsis graminifolia</i>
Narrowleaf yellowtops	<i>Flaveria linearis</i>
Narrow-leaved waterwillow	<i>Justicia angusta</i>
Needleleaf witchgrass	<i>Dichanthelium aciculare</i>
Needlepod rush	<i>Juncus scirpoides</i>
Netted nutrush	<i>Scleria reticularis</i>
Nodding club-moss	<i>Lycopodiella cernua</i>
Nuttall's meadowbeauty	<i>Rhexia nuttallii</i>
Oakleaf fleabane	<i>Erigeron quercifolius</i>
Openflower witchgrass	<i>Dichanthelium laxiflorum</i>
Orange milkwort	<i>Polygala lutea</i>
Ovateleaf Indian plantain	<i>Arnoglossum ovatum</i>
Pale meadow-beauty	<i>Rhexia mariana</i>
Pan-American balsamscale	<i>Elionurus tripsacoides</i>
Papaya	<i>Carica papaya</i>
Paradisetree	<i>Simarouba glauca</i>
Partridge pea	<i>Chamaecrista fasciculata</i>
Pepper vine	<i>Ampelopsis arborea</i>
Pickerelweed	<i>Pontederia cordata</i>
Piedmont marshholder	<i>Iva microcephala</i>
Pigeonplum	<i>Coccoloba diversifolia</i>
Pinebarren goldenrod	<i>Solidago fistulosa</i>
Pine-hyacinth	<i>Clematis baldwinii</i>
Pineland daisy	<i>Chaptalia tomentosa</i>
Pineland heliotrope	<i>Heliotropium polyphyllum</i>
Pineland snakeherb	<i>Dyschoriste angusta</i>
Pinewoods fingergrass	<i>Eustachys petraea</i>
Pink sundew	<i>Drosera capillaris</i>
Pond cypress	<i>Taxodium ascendens</i>
Pond-apple	<i>Annona glabra</i>
Potatotree	<i>Solanum erianthum</i>
Potbelly airplant	<i>Tillandsia paucifolia</i>
Procession flower	<i>Polygala incarnata</i>
Purple bluestem	<i>Andropogon glomeratus var. glaucopsis</i>
Purple passionflower	<i>Passiflora incarnata</i>
Purple thistle	<i>Cirsium horridulum</i>
Water toothleaf	<i>Stillingia aquatica</i>
Queensdelight	<i>Stillingia sylvatica</i>
Rabbitbells	<i>Crotalaria rotundifolia</i>
Recline Florida bully	<i>Sideroxylon reclinatum</i>

Table 5. Native Plant Species Known or Expected to Occur on the JWCWMA

Common name	Scientific name
Red bay	<i>Persea borbonia</i>
Red cedar	<i>Juniperus virginiana</i>
Red maple	<i>Acer rubrum</i>
Red mulberry	<i>Morus rubra</i>
Redtop panicum	<i>Panicum rigidulum</i>
Resurrection fern	<i>Pleopeltis polypodioides</i> var. <i>michauxiana</i>
Rhizomatus bluestem	<i>Schizachyrium rhizomatum</i>
Rice button aster	<i>Symphotrichum dumosum</i>
Richard's yelloweyed grass	<i>Xyris jupicai</i>
Road-side flatsedge	<i>Cyperus sphacelatus</i>
Rock Carolina leafflower	<i>Phyllanthus caroliniensis</i> subsp. <i>saxicola</i>
Rosy camphorweed	<i>Pluchea baccharis</i>
Rougeplant	<i>Rivina humilis</i>
Rough witchgrass	<i>Dichantherium leucothrix</i>
Roundpod St. John's-wort	<i>Hypericum cistifolium</i>
Royal fern	<i>Osmunda regalis</i> var. <i>spectabilis</i>
Rusty staggerbush	<i>Lyonia ferruginea</i>
Saltmarsh fingergrass	<i>Eustachys glauca</i>
Saltmarsh umbrellasedge	<i>Fuirena breviseta</i>
Sand cordgrass	<i>Spartina bakeri</i>
Saw palmetto	<i>Serenoa repens</i>
Sawgrass	<i>Cladium jamaicense</i>
Scarlet milkweed	<i>Asclepias curassavica</i>
Seagrape	<i>Coccoloba uvifera</i>
Seaside brookweed	<i>Samolus valerandi</i> subsp. <i>parviflorus</i>
Seaside goldenrod	<i>Solidago sempervirens</i>
Seaside primrosewillow	<i>Ludwigia maritima</i>
Semaphore thoroughwort	<i>Eupatorium mikanioides</i>
Shiny blueberry	<i>Vaccinium myrsinites</i>
Shoe-button ardisia	<i>Ardisia elliptica</i>
Shoestring fern	<i>Vittaria lineata</i>
Shortbeak beaksedge	<i>Rhynchospora nitens</i>
Shortleaf wild coffee	<i>Psychotria sulzneri</i>
Showy milkwort	<i>Asemeia violacea</i>
Shrubby false buttonweed	<i>Spermacoce verticillata</i>
Sicklepod	<i>Senna obtusifolia</i>
Silver dwarf morning-glory	<i>Evolvulus sericeus</i>
Skyflower	<i>Hydrolea corymbosa</i>
Slender fimbry	<i>Fimbristylis autumnalis</i>
Slender goldenrod	<i>Euthamia caroliniana</i>

Table 5. Native Plant Species Known or Expected to Occur on the JWCWMA

Common name	Scientific name
Slenderfruit nutrush	<i>Scleria georgiana</i>
Smallfruit beggarticks	<i>Bidens mitis</i>
Smallfruit primrosewillow	<i>Ludwigia microcarpa</i>
Small's bogbutton	<i>Lachnocaulon minus</i>
Small's yelloweyed grass	<i>Xyris smalliana</i>
Snow squarestem	<i>Melanthera nivea</i>
Sourgrass	<i>Digitaria insularis</i>
Slash pine	<i>Pinus elliotii</i>
Southeastern primrosewillow	<i>Ludwigia linifolia</i>
Southeastern sneezeweed	<i>Helenium pinnatifidum</i>
Southern beaksedge	<i>Rhynchospora microcarpa</i>
Southern beeblossom	<i>Oenothera simulans</i>
Southern cattail	<i>Typha domingensis</i>
Southern club-moss	<i>Lycopodiella appressa</i>
Southern crabgrass	<i>Digitaria ciliaris</i>
Southern cutgrass	<i>Leersia hexandra</i>
Southern dewberry	<i>Rubus trivialis</i>
Southern needleleaf	<i>Tillandsia setacea</i>
Southern pineland rayless goldenrod	<i>Bigelovia nudata susp. australis</i>
Southern sandbur	<i>Cenchrus echinatus</i>
Southern shield fern	<i>Thelypteris kunthii</i>
Southern umbrellasedge	<i>Fuirena scirpoidea</i>
Wiregrass	<i>Aristida stricta var. beyrichiana</i>
Spadeleaf	<i>Centella asiatica</i>
Spanish moss	<i>Tillandsia usneoides</i>
Spanish needles	<i>Bidens alba var. radiata</i>
Spatterdock	<i>Nuphar lutea subsp. advena</i>
Splitbeard bluestem	<i>Andropogon ternarius</i>
Spotted water-hemlock	<i>Cicuta maculata</i>
Spreading beaksedge	<i>Rhynchospora divergens</i>
Spring ladies tresses	<i>Spiranthes vernalis</i>
St. Andrew's-cross	<i>Hypericum hypericoides</i>
St. Augustine grass	<i>Stenotaphrum secundatum</i>
St. John's-wort	<i>Hypericum fasciculatum</i>
Starrush whitetop	<i>Rhynchospora colorata</i>
Stiff marsh bedstraw	<i>Galium tinctorium</i>
Stiff yellow flax	<i>Linum medium var. texanum</i>
Stinking camphorweed	<i>Pluchea foetida</i>
Strangler fig	<i>Ficus aurea</i>
Sugarcane plumegrass	<i>Saccharum giganteum</i>

Table 5. Native Plant Species Known or Expected to Occur on the JWCWMA

Common name	Scientific name
Swamp bay	<i>Persea palustris</i>
Swamp dock	<i>Rumex verticillatus</i>
Swamp dogwood	<i>Cornus foemina</i>
Swamp fern	<i>Blechnum serrulatum</i>
Swamp flatsedge	<i>Cyperus distinctus</i>
Swamp hornpod	<i>Mitreola sessilifolia</i>
Swamp lily	<i>Crinum americanum</i>
Swamp rosemallow	<i>Hibiscus grandiflorus</i>
Swamp smartweed	<i>Polygonum hydropiperoides</i>
Swamp sunflower	<i>Helianthus angustifolius</i>
Sweet bay	<i>Magnolia virginiana</i>
Sweetscent	<i>Pluchea odorata</i>
Switchgrass	<i>Panicum virgatum</i>
Tailed bracken fern	<i>Pteridium aquilinum var. pseudocaudatum</i>
Tall pinebarren milkwort	<i>Polygala cymosa</i>
Tall threeawn	<i>Aristida patula</i>
Taperleaf waterhoarhound	<i>Lycopus rubellus</i>
Tarflower	<i>Bejaria racemosa</i>
Tenangle pipewort	<i>Eriocaulon decangulare</i>
Thin paspalum	<i>Paspalum setaceum</i>
Toothachegrass	<i>Ctenium aromaticum</i>
Toothcup	<i>Rotala ramosior</i>
Toothpetal false reinorchid	<i>Habenaria floribunda</i>
Tracy's beaksedge	<i>Rhynchospora tracyi</i>
Tropical flatsedge	<i>Cyperus surinamensis</i>
Tuberous grasspink	<i>Calopogon tuberosus</i>
Turkey tangle frogfruit	<i>Phyla nodiflora</i>
Twisted airplant	<i>Tillandsia flexuosa</i>
Twistedleaf goldenrod	<i>Solidago tortifolia</i>
Variable witchgrass	<i>Dichanthelium commutatum</i>
Vente conmigo	<i>Croton glandulosus</i>
Virginia buttonweed	<i>Diodia virginiana</i>
Virginia chain fern	<i>Woodwardia virginica</i>
Virginia creeper	<i>Parthenocissus quinquefolia</i>
Virginia marsh St. John's-wort	<i>Triadenum virginicum</i>
Virginia pepperweed	<i>Lepidium virginicum</i>
Walter's groundcherry	<i>Physalis walteri</i>
Wand goldenrod	<i>Solidago stricta</i>
Warty panicgrass	<i>Panicum verrucosum</i>
Warty sedge	<i>Carex verrucosa</i>

Table 5. Native Plant Species Known or Expected to Occur on the JWCWMA

Common name	Scientific name
Water cowbane	<i>Oxypolis filiformis</i>
Water oak	<i>Quercus nigra</i>
Waterspider false reinorchid	<i>Habenaria repens</i>
Wax myrtle	<i>Myrica cerifera</i>
White crownbeard	<i>Verbesina virginica</i>
White lobelia	<i>Lobelia paludosa</i>
White mulberry	<i>Morus alba</i>
White stopper	<i>Eugenia axillaris</i>
White sunnybell	<i>Schoenolirion albiflorum</i>
White twinevine	<i>Sarcostemma clausum</i>
Whitehead bogbutton	<i>Lachnocaulon anceps</i>
Whorled marshpennywort	<i>Hydrocotyle verticillata</i>
Whorled milkweed	<i>Asclepias verticillata</i>
Wild Boston fern	<i>Nephrolepis exaltata</i>
Wild coffee	<i>Psychotria nervosa</i>
Wild lime	<i>Zanthoxylum fagara</i>
Wild pennyroyal	<i>Piloblephis rigida</i>
Wild-coco	<i>Eulophia alta</i>
Winged loosestrife	<i>Lythrum alatum var. lanceolatum</i>
Winged primrosewillow	<i>Ludwigia alata</i>
Winged sumac	<i>Rhus copallinum</i>
Wood sage	<i>Teucrium canadense</i>
Woodland false buttonweed	<i>Spermacoce assurgens</i>
Woodsgrass	<i>Oplismenus hirtellus</i>
Wrinkled jointtail grass	<i>Coelorachis rugosa</i>
Yellow alamand	<i>Allamanda cathartica</i>
Yellow bristlegrass	<i>Setaria parviflora</i>
Yellow colic-root	<i>Aletris lutea</i>
Yellow flatsedge	<i>Cyperus flavescens</i>
Yellow hatpins	<i>Syngonanthus flavidulus</i>
Zigzag bladderwort	<i>Utricularia subulata</i>

Table 6. Threatened and Endangered Plant Species of the JWCWMA

Common Name	Scientific Name
Cardinal airplant	<i>Tillandsia fasciculata var. densispica</i>
Catesby's lily	<i>Lilium catesbaei</i>
Celestial lily	<i>Nemastylis floridana</i>
Giant airplant	<i>Tillandsia utriculata</i>
Giant orchid	<i>Pteroglossaspis ecristata</i>
Giant sword fern	<i>Nephrolepis biserrata</i>

Hand fern	<i>Ophioglossum palmatum</i>
Lacelip ladies tresses	<i>Spiranthes laciniata</i>
Leafless beaked orchid	<i>Sacoila lanceolata var. lanceolata</i>
Manyflower grasspink	<i>Calopogon multiflorus</i>
Northern needleleaf	<i>Tillandsia balbisiana</i>
Pinepink	<i>Bletia purpurea</i>
Satinleaf	<i>Chrysophyllum oliviforme</i>
Snakemouth orchid	<i>Pogonia ophioglossoides</i>
Snowy orchid	<i>Habenaria nivea</i>
West Indian mahogany	<i>Swietenia mahagoni</i>

Table 7. Exotic Plant Species Known or Expected to Occur on the JWCWMA

Common name	Scientific name
Asian sword fern	<i>Nephrolepis brownii</i>
Australian pine	<i>Casuarina equisetifolia</i>
Bahiagrass	<i>Paspalum notatum</i>
Balsampear	<i>Momordica charantia</i>
Bermudagrass	<i>Cynodon dactylon</i>
Brazilian pepper	<i>Schinus terebinthifolius</i>
Burmareed	<i>Neyraudia reynaudiana</i>
Caesar's weed	<i>Urena lobata</i>
Castorbean	<i>Ricinus communis</i>
Catclaw mimosa	<i>Mimosa pigra</i>
Centipede grass	<i>Eremochloa ophiuroides</i>
Chinese brake fern	<i>Pteris vittata</i>
Cogongrass	<i>Imperata cylindrica</i>
Columbian waxweed	<i>Cuphea carthagenensis</i>
Common air-potato	<i>Dioscorea bulbifera</i>
Common water-hyacinth	<i>Eichhornia crassipes</i>
Downy rose myrtle	<i>Rhodomyrtus tomentosa</i>
Durban crowfootgrass	<i>Dactyloctenium aegyptium</i>
Dwarf papyrus	<i>Cyperus prolifer</i>
Earleaf acacia	<i>Acacia auriculiformis</i>
Elephantgrass	<i>Pennisetum purpureum</i>
Florida tassleflower	<i>Emilia fosbergii</i>
Grapefruit	<i>Citrus paradisi</i>
Guava	<i>Psidium guajava</i>
Guineagrass	<i>Panicum maximum</i>
Hydrilla	<i>Hydrilla verticillata</i>
Indian cupscale	<i>Sacciolepis indica</i>
Indian goosegrass	<i>Eleusine indica</i>
Indian laurel	<i>Ficus microcarpa</i>

Table 7. Exotic Plant Species Known or Expected to Occur on the JWCWMA

Common name	Scientific name
Jaragua	<i>Hyparrhenia rufa</i>
Java plum	<i>Syzygium cumini</i>
Javanese bishopwood	<i>Bischofia javanica</i>
Lanceleaf rattlebox	<i>Crotalaria lanceolata</i>
Lantana	<i>Lantana camara</i>
Lawn orchid	<i>Zeuxine strateumatica</i>
Lemon	<i>Citrus limon</i>
Limpograss	<i>Hemarthria altissima</i>
Llima	<i>Sida cordifolia</i>
Loquat	<i>Eriobotrya japonica</i>
Malaysian false pimpernel	<i>Lindernia crustacea</i>
Melaleuca	<i>Melaleuca quinquenervia</i>
Mexican petunia	<i>Ruellia simplex</i>
Mexican tea	<i>Dysphania ambrosioides</i>
Old World climbing fern	<i>Lygodium microphyllum</i>
Para grass	<i>Urochloa mutica</i>
Peruvian primrosewillow	<i>Ludwigia peruviana</i>
Pouzolz's bush	<i>Pouzolzia zeylanica</i>
Rosary pea	<i>Abrus precatorius</i>
Rose apple	<i>Syzygium jambos</i>
Rose natalgrass	<i>Melinis repens</i>
Sea hibiscus	<i>Talipariti tiliaceum</i>
Smooth rattlebox	<i>Crotalaria pallida var. obovata</i>
Smut grass	<i>Sporobolus indicus</i>
Sour orange	<i>Citrus aurantium</i>
Suckering Australian-pine	<i>Casuarina glauca</i>
Surinam cherry	<i>Eugenia uniflora</i>
Sweet orange	<i>Citrus sinensis</i>
Thalia lovegrass	<i>Eragrostis atrovirens</i>
Threeflower ticktrefoil	<i>Desmodium triflorum</i>
Torpedograss	<i>Panicum repens</i>
Tropical Mexican clover	<i>Richardia brasiliensis</i>
Tropical soda apple	<i>Solanum viarum</i>
Tuberous sword fern	<i>Nephrolepis cordifolia</i>
Vaseygrass	<i>Paspalum urvillei</i>
Water spangles	<i>Salvinia minima</i>
Water-lettuce	<i>Pistia stratiotes</i>
Wedelia	<i>Wedelia trilobata (syn. Sphagneticola trilobata)</i>
West Indian chickweed	<i>Drymaria cordata</i>
West Indian dropseed	<i>Sporobolus indicus var. pyramidalis</i>

Table 7. Exotic Plant Species Known or Expected to Occur on the JWCWMA

Common name	Scientific name
West Indian marsh grass	<i>Hymenachne amplexicaulis</i>
Wild bushbean	<i>Macroptilium lathyroides</i>
Woman's tongue	<i>Albizia lebbek</i>
Yellow nutsedge	<i>Cyperus esculentus</i>

2.2.1 FNAI Natural Community Descriptions

Basin marshes are regularly inundated freshwater herbaceous wetlands that may occur in a variety of isolated or mostly isolated situations but, in contrast to depression marshes, are not small or shallow inclusions within a fire-maintained matrix community. They occur around fluctuating shorelines of lakes, on the former lake bottoms of “disappearing” lakes, at the head of broad, low basins which were former embayments of the sea during times of higher sea level, and as large deep inclusions within pyrogenic upland communities, or as inclusions in non-pyrogenic communities such as hardwood forests or basin swamps. They are regularly inundated with water originating from localized rainfall.

On the JWCWMA, basin marshes range in size from less than one acre to over 500 acres.

They are usually imbedded in swamp communities.

Nearly all basin marshes have some type of included community, ranging from small shrubby patches of willow, dahoon, swamp bay, wax myrtle, and pond apple to well developed “islands” of mesic flatwoods or mesic hammock that occupy slightly elevated areas within the basin. In some marshes, dense patches of sawgrass or cattail occupy the deeper areas.



Basin marshes are usually dominated by grasses and sedges, although extensive stands of St. John’s-wort and queen’s delight are found in some marshes. The most frequently encountered grass species is maidencane; the most common sedge is Tracy’s beaksedge. Other common grasses include blue maidencane and one of the low panic grass species. A variety of herbaceous species occur in basin marshes, sometimes creating beautiful flowering displays. These include purple and yellow bladderworts, blue water-hyssop, Leavenworth’s tickseed, hatpins, redroot, floating-hearts, yellow-eyed grass, and Baldwin’s milkwort.

Frequency of fire varies depending on the hydrology of the marsh and its exposure to fire from surrounding areas. Occasional fire maintains an open herbaceous character of basin marshes by restricting shrub invasion.

Depression marshes are distinguished from basin marshes by their generally more shallow depth and occurrence in a matrix of fire dependent natural communities. They form where sand has slumped around or over a sinkhole and thereby created a conical

depression subsequently filled by direct rain fall, runoff, or seepage from surrounding uplands. The substrate is usually acid sand with deepening peat toward the center. Hydrological conditions vary, with most depression marshes drying in most years. Hydroperiods range widely from as few as 50 days or less to more than 200 days per year. Depression marshes occur as included communities in nearly of all of the JWCWMA's pine dominated natural community types, but are more abundant in the eastern half of the area. Because water depth in depression marshes usually increases toward the center, vegetation typically forms distinctive zones corresponding to depth.

On the JWCWMA, there is usually an inner, central zone occupied by sawgrass, cattail, or fireflag or even a small shrubby hammock of pond apple, willow, wax myrtle, and dahoon. The zone encircling the center is often dominated by maidencane or Tracy's beaksedge, followed by an outer herbaceous zone that often includes dense to scattered St. John's-wort and queen's delight. Most of the herbaceous and graminoid species found in basin marshes also occur in depression marshes.

Almost all of the depression marshes on the JWCWMA are rutted from ORV use which cuts the marsh off from natural fire processes and directly destroys vegetation.

Dome swamps are isolated, forested, depression wetlands occurring within a fire-maintained community such as mesic flatwoods. Dome swamps are generally smaller in size and circular or oval in shape. They form where sand has slumped around or over a sinkhole and thereby created a conical depression subsequently filled by peat accumulation. These cypress-dominated communities present the classic domed profile, with taller trees toward the wetter center and shorter trees around the periphery which is exposed to fire.

On the JWCWMA, dome swamps are dominated by bald cypress; with an occasional slash pine. The tall shrub layer consists of myrsine, wax myrtle, dahoon, buttonbush, willow, and pond apple. Sawgrass, swamp fern, and sword fern are usually common. Herbs, such as hatpins, tall milkwort, bladderwort, maidencane, blue maidencane, Tracy's beaksedge, umbrella sedge, and white-topped sedge, are diverse around the sunnier edges, but become less frequent toward the center. In many domes, the center is occupied by a shrub hammock, sawgrass marsh, or "flag marsh" of fireflag or pickerelweed.



The hydroperiod of dome swamps is generally 200 - 300 days per year. They may have a perched water table or be connected with underground channels to the water table. Occasional light fires are essential to prevent the conversion of dome swamps into hardwood-dominated communities such as a bayhead or hydric hammock. Cypress is tolerant of light surface fires but deep-burning peat fires will kill root systems and trees, thus converting the swamp into a pond, marsh, or shrub hammock. As with most of the

isolated wetlands on the JWCWMA, most dome swamps are ringed by ORV tracks or firebreaks, thus severing the fire connection with surrounding communities.

Mesic flatwoods are upland forests that, in South Florida, are dominated by an open slash pine canopy, scattered cabbage palm subcanopy, and understory of saw palmetto or gallberry, with a wide variety of other shrubs, herbs, ferns, grasses, and sedges. Mesic flatwoods comprise approximately 16,867 acres on the JWCWMA, primarily as extensive matrix communities that contain small open patches of wet flatwoods.

There are also hundreds of small “pine-palm islands” contained within strand swamps, basin marshes, and wet flatwoods. Approximately 90 of the larger “pine-palm islands” were delineated for this project and were classified as mesic flatwoods although they are not matrix communities. They total approximately 370 acres, with an average size of about four acres. Pine-palm islands go for long periods without fire and are very dense with shrubs and small trees.

Mesic flatwoods that have been frequently burned on the JWCWMA – primarily those that support red-cockaded woodpecker colonies – are of high quality and have very high numbers of grass, sedge, and forb species. Some of the common or characteristic species of these high quality mesic flatwoods are: wiregrass, toothache grass, blue maidencane, muhly grass, beaksedges, saw grass, bracken fern, wild pennyroyal, rattlesnake-master, Leavenworth’s tickseed, yellow-tops, rosy camphorweed, chaffhead, and semaphore thoroughwort.

Less frequently burned mesic flatwoods on the area have dense understories of saw palmetto, gallberry, myrsine, tarflower, wax myrtle, and fetterbush. The high shrub density generally precludes the development of a diverse herbaceous layer.

Two rare plant species, both orchids, occur in mesic flatwoods on the JWCWMA: many-flowered grass-pink and giant orchid. Both respond to fire by flowering and will disappear in the long-term absence of fire. Mesic flatwoods are fragmented on the JWCWMA by roads and ORV trails.

Mesic hammocks are evergreen, closed-canopy forests dominated primarily by live oak and/or cabbage palm with a diverse shrub layer that may include many tropical species. Mesic hammocks are naturally protected from fire by their position on the landscape, typically as a “tree island” in a wetland. Soils in mesic hammocks are moist due to a dense litter layer and the humid conditions that prevail under the closed canopy, but are rarely inundated. Mesic hammocks with significant tropical components are found as far north in coastal Florida as Brevard County. However, the mesic hammocks on the JWCWMA are among some of the furthest north of the known inland “tropical” hammocks. Hammocks on the JWCWMA occur on elevated islands that are part of a narrow curving swathe of hammocks that runs from the Loxahatchee River southwest through the Hungryland Slough to the eastern edge of the Everglades (Cox 1988).

On the JWCWMA, the canopy and subcanopy of mesic hammocks contain live oak, laurel oak, persimmon, cabbage palm, red bay, sweet bay, or hackberry. Some of the tropical species found in the understory of JWCWMA mesic hammocks include myrsine, strangler fig, wild lime, marlberry, wild coffee, white stopper, lancewood, and graytwig. Saw palmetto, wax myrtle, and groundsel bush are also found in the shrub layer of mesic hammocks.

Hydric hammocks are a very minor component of the landscape on the JWCWMA, occurring in only six locations and totaling less than 40 acres. They occur as inclusions in low, wet areas of mesic hammocks, or in fire-protected areas within strand swamps and basin marshes. Their vegetative structure resembles mesic hammocks, although some lack the canopy of oaks and are dominated by bayhead species, such as sweetbay and redbay. On the JWCWMA, they tend to have a weedy, disturbed aspect and may represent an advanced stage of fire suppression.

Ruderal Communities are lands that have experienced heavy anthropogenic disturbances are referred to as ruderal. On the JWCWMA, over 3,700 acres are classified, by FNAI, as ruderal and are divided into six different categories: agriculture, clearing/ditch, clearing/regeneration, developed, road, and utility corridor.

Ruderal, agriculture

FNAI defines agriculture areas as including row crops, citrus groves, and sod fields that are generally being maintained to grow products for human or domesticated animal use. On the JWCWMA, agricultural land, managed as wildlife openings, account for approximately 1,361 acres. Within the JWCWMA are a number of disturbed areas including 700 acres of old tomato fields, which are being left as wildlife openings.



Ruderal, clearing/ditch

Canal/ditch ruderal areas are areas where the historic natural community has been altered by an artificial drainage way. Approximately 400 acres of the JWCWMA fall into this category due to the presence of canals and ditches.

Ruderal, clearing/regeneration

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. Wildlife food plots make up the vast majority of the approximately 694 acres that are classified as clearing/regeneration on the JWCWMA.

Ruderal, 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, and recreation, industrial, and residential areas. There are approximately 71 acres of developed land on the JWCWMA, which consists of offices, check stations, campgrounds, and the EYCC that are located on the area.

Ruderal, road

The JWCWMA contains approximately 28 acres that are classified as road, due to the presence of either paved or unpaved roads or trails.

Ruderal, utility corridor

FNAI classifies land as a utility corridor if it contains electric, gas, or telephone right-of-ways. The JWCWMA contains several such right-of-ways, with approximately 1,177 acres classified as utility corridor.

Strand swamps are forested wetlands that occupy shallow, elongated depressions or channels. Water may flow in some strand swamps, although on the JWCWMA water movement is imperceptibly slow if at all. The normal hydroperiod for a strand swamp is 200 - 300 days per year with water reaching a maximum depth of 18 - 30 inches in the center of the strand.

On the JWCWMA, strand swamps are most extensive in the south and west, perhaps flowing imperceptibly toward Lake Okeechobee or the Everglades. Two types of strand swamp are recognized on the JWCWMA. A typical deep-water strand swamp, with full-sized bald cypress occupies channels, flats, and depressions; because the tallest trees occur toward the center, these strands have the classic domed profile of most cypress communities. The second strand type is applied to the extensive plains or savannas of widely spaced, dwarfed cypress that occur largely (although not exclusively) in broad swathes alongside deep strands in the western half of the JWCWMA. Although small (6 - 15 feet tall), the large size of the buttresses attest to their maturity.

Full-sized cypress strands on the JWCWMA have a dense understory of shrubs, ferns, and graminoids. Dominant shrubs and subcanopy species include myrsine, wax myrtle, dahoon, St. John's-wort, pond apple, cabbage palm, slash pine, and red maple. Swamp fern and sword fern are usually common. Some strand swamps are impenetrable due to a thick understory of sawgrass. One of the most striking aspects of strand swamps is the abundance of epiphytes; at least nine species of bromeliad have been observed on the JWCWMA (Institute for Regional Conservation 2003), most in strand swamps. Soils in the

center of the strand are highly organic, with deep peat accumulations that wick water from the groundwater table during droughts. Fires occur infrequently in deep water strand swamps, usually only burning into the outer edges. Occasional fires help to prevent conversion of the community to a hydric hammock.

Except for the dominance of cypress, dwarf cypress savannas have more in common vegetatively with wet prairies and flatwoods than with strand swamps. The herbaceous and low shrub layers are diverse and are maintained by frequent fire. Shrub species in the savannas – St. John’s-wort, wax myrtle, dahoon, and queen’s delight – are low and scattered. Maidencane, blue maidencane, Tracy's beaksedge, umbrella sedge, and white-topped sedge are common. Dwarf cypress savannas have little or no organic accumulation over a sandy to marly soil. Without frequent fire, savannas are invaded by slash pines.

On the JWCWMA, strand swamps have been largely protected from fire by firebreaks and broad bands of ORV tracks.

Wet flatwoods in South Florida typically have a sparse canopy of widely scattered slash pine, usually less than 25% coverage, with a relatively open understory of scattered shrubs, typically with less than 50% coverage. Saw palmetto is lacking or with very low coverage. Wet flatwoods support a rich ground layer of grasses, forbs, and sedges. Wet flatwoods occur on Corbett primarily as extensive matrix communities or in smaller patches interspersed with mesic flatwoods.

On the western half of JWCWMA, wet flatwoods form broad ecotones around strand swamps. These communities are inundated for at least a month each year, with soils saturated to the surface for 3 - 4 months in some years. They are dependent on frequent fire, every 2 to 4 years, to prevent shrub invasion and conversion to hammock vegetation.

Wet prairies are herbaceous communities found on continuously wet, but not inundated, soils on somewhat flat or gentle slopes between lower lying marshes or swamps and slightly higher flatwoods. Wet flatwoods often include or grade into wet prairie and share many of the same species. Wet prairies have less than 5% cover of slash pine or cypress, and these are usually small and stunted. Shrubs, usually St. John’s-wort and queen’s-delight, are common, but small and sparsely distributed. The ground cover in wet flatwoods and prairies is usually dominated by wiregrass, muhly grass, and blue maidencane. Frequently burned wet flatwoods have a highly diverse ground layer of grasses and sedges including three-awns, toothache-grass, beaksedges, umbrella-sedges, white-topped sedges, nutrushes, and plumegrass. Black bogrush occurs in some wet flatwoods and prairies and is an indicator of marl, less acid, soils. On JWCWMA, wet prairies usually occupy ecotones around marshes or small openings within wet flatwoods. Wet prairies are seasonally inundated or saturated for 50 to 100 days each year and burn every 2 to 4 years.

The diversity of flowering forb species in wet flatwoods and prairies on the JWCWMA is high, especially in frequently burned areas. Tall milkwort, yellow colic-root, white

sunnybells, rattlesnake-master, blazing-star, hatpins, yellow-eyed grass, and many others put on an impressive display throughout the year.

Algal mats (periphyton layer), composed of many species of blue-green algae, are characteristic of wet flatwoods and wet prairies on JWCWMA. During the rainy season, mats can be up to 1.6 inches thick, blanketing the ground and low vegetation (USFWS 1998). During the dry season, the periphyton layer is a dry, crunchy layer underfoot.

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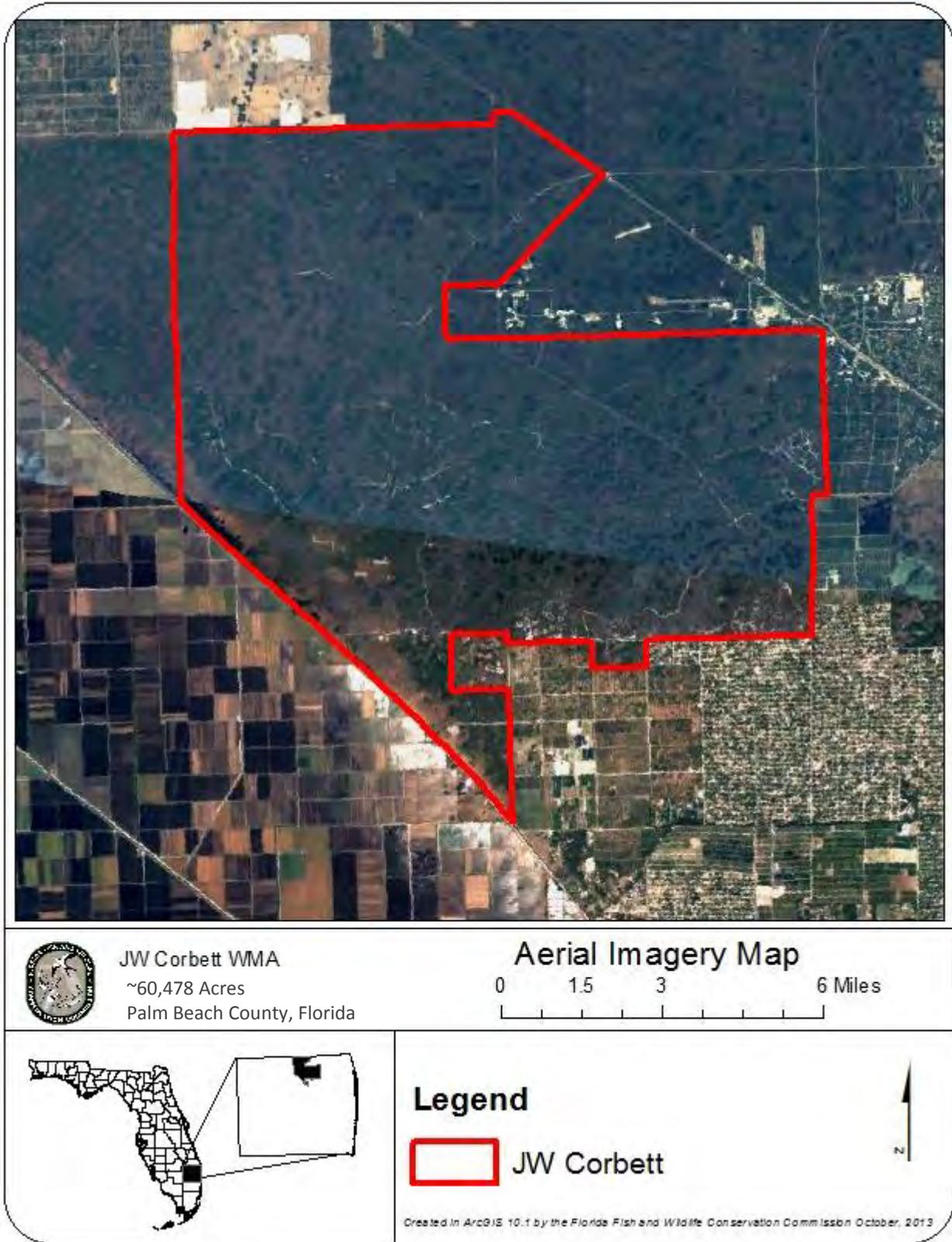
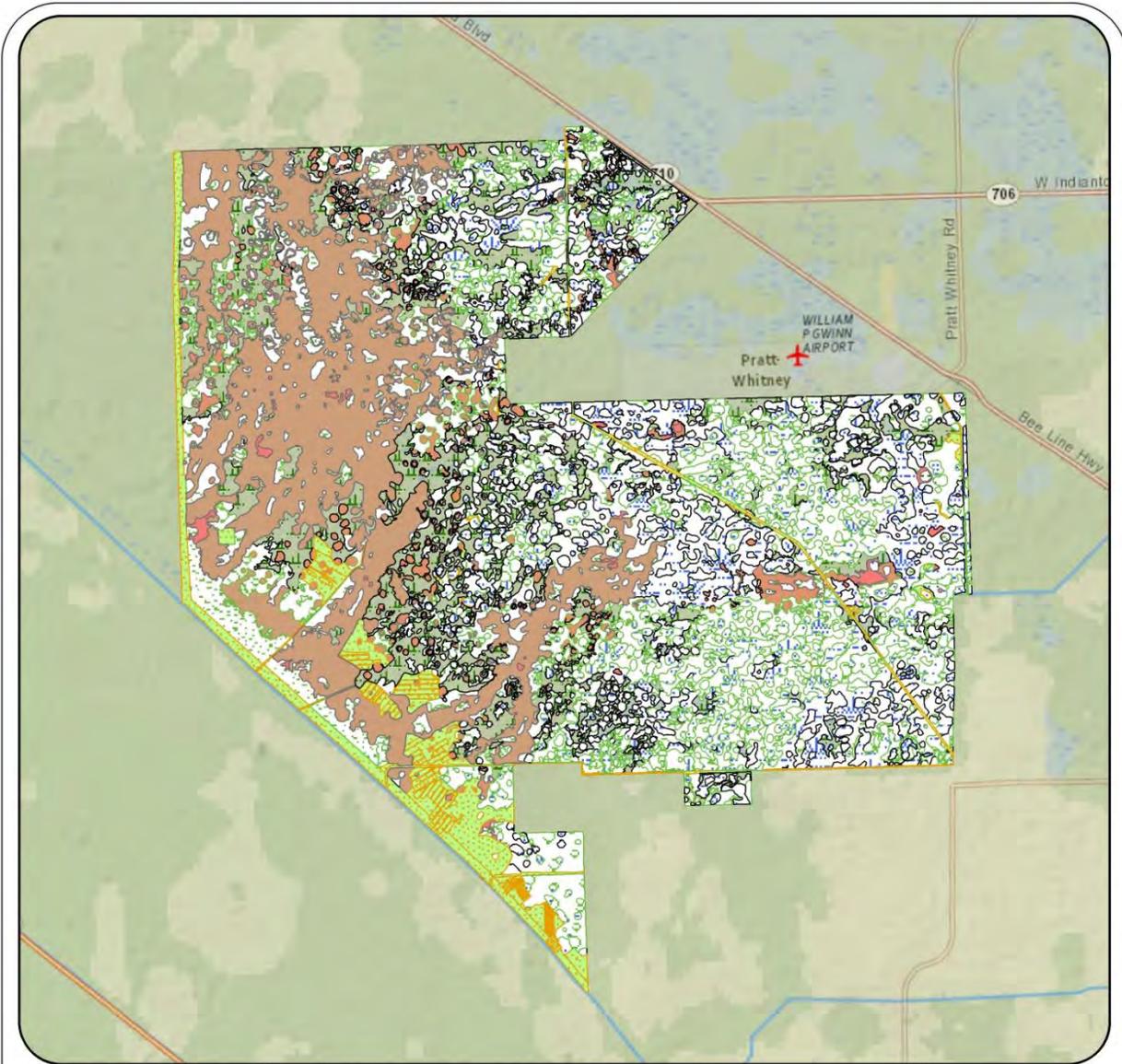
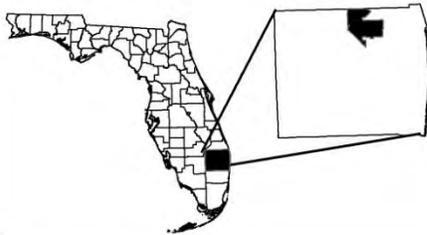


Figure 5. Aerial Imagery of the JWCWMA and Surrounding Areas



JW Corbett WMA
 ~60,478 Acres
 Palm Beach County, Florida



0 1.25 2.5 5 Miles

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

Legend FNAI Vegetation Cover Map

FNAI Vegetation Cover		mesic flatwoods
FNAI_NC		mesic hammock
		ruderal
		strand swamp
		wet flatwoods
		wet prairie



Figure 6. FNAI Vegetation Cover Map

2.2.2 Forest Resources

The JWCWMA's forested resources include a landscape mosaic of intact south Florida pine, flatwoods and cypress swamps. In 2009, the Florida Forest Service (FFS) provided an updated Timber Assessment for the area (Appendix 13.13). Additionally, the FWC contracted with the FFS to prepare and implement a Forest Management Plan which included silvicultural activities based on restoration and maintenance needs of the natural communities and other forest management goals established for management of the JWCWMA.

Thinning of the forest over-story and prescribed burning are the most important factors in re-establishment of natural communities and the enhancement of wildlife habitats in these forested communities.

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



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 to accomplish ecosystem management objectives, personnel from the FFS or a professional forestry consultant will be consulted.

2.3 Fish and Wildlife Resources

The JWCWMA has a variety of natural communities and currently supports a diverse assemblage of imperiled, endemic and other native wildlife species. Active wildlife

management practices and a diversity of natural communities make the JWCWMA an excellent place to view wildlife. Following are lists of mammals (Table 8), amphibians (Table 9), reptiles (Table 10), fish (Table 11), birds (Table 12), and exotic species (Table 13) that occur on the area.

Table 8. Mammal Species Known or Expected to Occur on the JWCWMA

Common name	Scientific name
Big brown bat	<i>Eptesicus fuscus</i>
Bobcat*	<i>Lynx rufus</i>
Brazilian free-tailed bat*	<i>Tadarida brasiliensis</i>
Cotton mouse	<i>Peromyscus gossypinus</i>
Eastern cottontail*	<i>Sylvilagus floridanus</i>
Eastern fox squirrel*	<i>Sciurus niger shermani</i>
Eastern gray squirrel*	<i>Sciurus carolinensis</i>
Eastern mole	<i>Scalopus aquaticus</i>
Eastern pipistrelle*	<i>Perimyotis subflavus</i>
Eastern spotted skunk	<i>Spilogale putorius</i>
Eastern yellow bat	<i>Lasiurus intermedius</i>
Evening bat*	<i>Nycticeius humeralis</i>
Florida black bear*	<i>Ursus americanus floridanus</i>
Florida mouse	<i>Peromyscus floridanus</i>
Florida panther	<i>Puma concolor coryi</i>
Gray fox*	<i>Urocyon cinereoargenteus</i>
Hispid cotton rat	<i>Sigmodon hispidus</i>
Least shrew*	<i>Cryptotis parva</i>
Long-tailed weasel	<i>Mustela frenata</i>
Marsh rabbit*	<i>Sylvilagus palustris</i>
Marsh rice rat	<i>Oryzomys palustris</i>
Mink	<i>Neovison vison</i>
Northern yellow bat*	<i>Lasiurus intermedius</i>
Nutria	<i>Myocastor coypus</i>
Oldfield mouse	<i>Peromyscus polionotus</i>
Raccoon*	<i>Procyon lotor</i>
Red fox	<i>Vulpes vulpes</i>
River otter*	<i>Lontra canadensis</i>
Round-tailed muskrat*	<i>Neofiber alleni</i>
Seminole bat*	<i>Lasiurus seminolus</i>
Sherman's fox squirrel*	<i>Sciurus niger shermani</i>
Short-tailed shrew	<i>Blarina carolinensis</i>
Southeastern big-eared bat	<i>Corynorhinus rafinesquii</i>
Southern flying squirrel*	<i>Glaucomys volans</i>
Spotted skunk	<i>Spilogale putorius</i>
Striped skunk	<i>Mephitis mephitis</i>
Southern short-tailed shrew	<i>Blarina carolinensis</i>

Table 8. Mammal Species Known or Expected to Occur on the JWCWMA

Common name	Scientific name
Virginia possum*	<i>Didelphis virginiana</i>
Wagner's mastiff bat	<i>Eumops glaucinus</i>
White-tailed deer*	<i>Odocoileus virginianus</i>

* = species which have been verified as occurring on the JWCWMA

Table 9. Amphibian Species Known or Expected to Occur on the JWCWMA

Common name	Scientific name
Barking treefrog	<i>Hyla gratiosa</i>
Dwarf salamander	<i>Eurycea quadridigitata simplex</i>
Eastern narrowmouth toad*	<i>Gastrophryne carolinensis</i>
Eastern spadefoot	<i>Scaphiopus holbrookii</i>
Everglades dwarf siren	<i>Pseudobranchius axanthus belli</i>
Southern chorus frog	<i>Pseudacris nigrita</i>
Florida cricket frog*	<i>Acris gryllus dorsalis</i>
Florida leopard frog	<i>Lithobates sphenoccephalus</i>
Greater siren	<i>Siren lacertina complex</i>
Green treefrog*	<i>Hyla cinerea</i>
Greenhouse frog*	<i>Eleutherodactylus planirostris</i>
Little grass frog	<i>Pseudacris ocularis</i>
Oak toad*	<i>Anaxyrus quercicus</i>
Peninsula newt	<i>Notophthalmus viridescens piaropicola</i>
Pig frog*	<i>Lithobates grylio</i>
Pine woods treefrog	<i>Hyla femoralis</i>
Southern leopard frog*	<i>Lithobates sphenoccephalus</i>
Southern chorus frog	<i>Pseudacris nigrita verrucosa</i>
Southern toad	<i>Anaxyrus terrestris</i>
Squirrel treefrog*	<i>Hyla squirrela</i>
Two-toed amphiuma*	<i>Amphiuma means</i>

* = species which have been verified as occurring on the JWCWMA

Table 10. Reptile Species Known or Expected to Occur on the JWCWMA

Common name	Scientific name
American alligator*	<i>Alligator mississippiensis</i>
Alligator snapping turtle	<i>Macrolemys temminckii</i>
Banded water snake*	<i>Nerodia fasciata fasciata</i>
Brown water snake*	<i>Nerodia taxispilota</i>
Common musk turtle	<i>Sternotherus odoratus</i>
Eastern corn snake*	<i>Pantherophis guttatus</i>
Dusky pygmy rattlesnake*	<i>Sistrurus miliarius barbouri</i>

Table 10. Reptile Species Known or Expected to Occur on the JWCWMA

Common name	Scientific name
Eastern coachwhip	<i>Masticophis flagellum flagellum</i>
Eastern coral snake*	<i>Micrurus fulvius</i>
Eastern diamondback rattlesnake*	<i>Crotalus adamanteus</i>
Eastern garter snake*	<i>Thamnophis sirtalis sirtalis</i>
Eastern glass lizard*	<i>Ophisaurus ventralis</i>
Eastern hognose snake	<i>Heterodon platirhinos</i>
Eastern kingsnake*	<i>Lampropeltis getula getula</i>
Eastern mud snake*	<i>Farancia abacura abacura</i>
Eastern rat snake*	<i>Pantherophis alleghaniensis</i>
Eastern slender glass lizard*	<i>Ophisaurus attenuatus longicaudus</i>
Florida box turtle*	<i>Terrapene carolina bauri</i>
Florida chicken turtle	<i>Deirochelys reticularia chrysea</i>
Florida cottonmouth*	<i>Agkistrodon piscivorus conanti</i>
Florida green water snake	<i>Nerodia floridana</i>
Florida kingsnake	<i>Lampropeltis getula floridana</i>
Florida mud turtle	<i>Kinosternon subrubrum steindachneri</i>
Florida redbelly turtle*	<i>Pseudemys nelsoni</i>
Florida scarlet snake	<i>Cemophora coccinea coccinea</i>
Florida snapping turtle*	<i>Chelydra serpentina osceola</i>
Florida softshell*	<i>Apalone ferox</i>
Florida water snake*	<i>Nerodia fasciata pictiventris</i>
Gopher tortoise*	<i>Gopherus polyphemus</i>
Green anole*	<i>Anolis carolinensis</i>
Ground skink*	<i>Scincella lateralis</i>
Indo-Pacific gecko*	<i>Hemidactylus garnotti</i>
Island glass lizard	<i>Ophisaurus compressus</i>
Northern curlytail lizard	<i>Leiocephalus carinatus armouri</i>
Peninsula cooter*	<i>Pseudemys peninsularis</i>
Peninsula mole skink	<i>Eumeces egregius onocrepis</i>
Peninsula ribbon nake*	<i>Thamnophis sauritus sackenii</i>
Rough green snake*	<i>Opheodrys aestivus</i>
Scarlet kingsnake	<i>Lampropeltis elapsoides</i>
Six-lined racerunner	<i>Aspidoscelis sexlineata</i>
South Florida swamp snake*	<i>Seminatrix pygaea cyclas</i>
Southeastern five-lined skink*	<i>Plestiodon inexpectatus</i>
Southern black racer*	<i>Coluber constrictor priapus</i>
Southern ringneck snake*	<i>Diadophis punctatus punctatus</i>
Striped crayfish snake	<i>Regina alleni</i>
Striped mud turtle*	<i>Kinosternon baurii</i>
Yellow rat snake*	<i>Elaphe obsoleta quadrivittata</i>

* = species which have been verified as occurring on the JWCWMA

Table 11. Fish Species Known or Expected to Occur on the JWCWMA

Common name	Scientific name
Black crappie*	<i>Pomoxis nigromaculatus</i>
Bluefin killifish	<i>Lucania goodei</i>
Bluegill*	<i>Lepomis macrochirus</i>
Bluespotted sunfish*	<i>Enneacanthus gloriosus</i>
Bowfin*	<i>Amia calva</i>
Brook silverside*	<i>Labidesthes sicculus</i>
Chain pickerel	<i>Esox niger</i>
Channel catfish*	<i>Ictalurus punctatus</i>
Dollar sunfish*	<i>Lepomis marginatus</i>
Flagfish*	<i>Jordanella floridae</i>
Florida gar*	<i>Lepisosteus platyrhincus</i>
Golden shiner*	<i>Notemigonus crysoleucas</i>
Golden topminnow*	<i>Fundulus chrysotus</i>
Lake chubsucker*	<i>Erimyzon sucetta</i>
Largemouth bass*	<i>Micropterus salmoides</i>
Least killifish	<i>Heterandria formosa</i>
Marsh killifish*	<i>Fundulus confluentus</i>
Mosquitofish*	<i>Gambusia holbrooki</i>
Redear sunfish*	<i>Lepomis microlophus</i>
Sailfin molly*	<i>Poecilia latipinna</i>
Seminole killifish*	<i>Fundulus seminolis</i>
Spotted sunfish*	<i>Lepomis punctatus</i>
Striped bass x. white bass hybrid*	<i>Morone saxatilis x. chrysops</i>
Taillight shiner*	<i>Notropis maculatus</i>
Warmouth*	<i>Lepomis gulosus</i>
Yellow bullhead*	<i>Ameiurus natalis</i>

* = species which have been verified as occurring on the JWCWMA

Table 12. Bird Species Known or Expected to Occur on the JWCWMA

Common name	Scientific name
America woodcock**	<i>Scolopax minor</i>
American avocet	<i>Recurvirostra americana</i>
American bittern*	<i>Botaurus lentiginosus</i>
American coot	<i>Fulica americana</i>
American crow	<i>Corvus brachyrhynchos</i>
American goldfinch*	<i>Carduelis tristis</i>
American redstart*	<i>Setophaga ruticilla</i>
American robin*	<i>Turdus migratorius</i>
American widgeon	<i>Anas americana</i>
Anhinga*	<i>Anhinga anhinga</i>

Table 12. Bird Species Known or Expected to Occur on the JWCWMA

Common name	Scientific name
Bachman's sparrow*	<i>Aimophila aestivalis</i>
Baltimore oriole	<i>Icterus galbula</i>
Barn owl*	<i>Tyto alba</i>
Barn swallow*	<i>Hirundo rustica</i>
Barred owl*	<i>Strix varia</i>
Belted kingfisher*	<i>Megaeryle alcyon</i>
Black-bellied whistling ducks*	<i>Dendrocygna autumnalis</i>
Blackpoll warbler*	<i>Dendroica striata</i>
Black-throated green warbler*	<i>Dendroica virens</i>
Black vulture*	<i>Coragyps atratus</i>
Black-and-white warbler*	<i>Mniotilta varia</i>
Black-crowned night heron*	<i>Nycticorax nycticorax</i>
Black-necked stilt	<i>Himantopus mexicanus</i>
Blue jay*	<i>Cyanocitta cristata</i>
Blue-gray gnatcatcher*	<i>Polioptila caerulea</i>
Blue-headed vireo*	<i>Vireo solitarius</i>
Blue-winged teal*	<i>Anas discors</i>
Boat-tailed grackle*	<i>Quiscalus major</i>
Brown thrasher*	<i>Toxostoma rufum</i>
Brown-headed cowbird*	<i>Molothrus ater</i>
Brown-headed nuthatch*	<i>Sitta pusilla</i>
Bufflehead*	<i>Bucephala albeola</i>
Cape may warbler*	<i>Dendroica tigrina</i>
Carolina wren*	<i>Thryothorus ludovicianus</i>
Cattle egret*	<i>Bubulcus ibis</i>
Cedar waxwing*	<i>Bombycilla cedrorum</i>
Chimney swift	<i>Chaetura pelagica</i>
Chipping sparrow	<i>Spizella passerina</i>
Chuck-will's-widow*	<i>Caprimulgus carolinensis</i>
Common grackle*	<i>Quiscalus quiscula</i>
Common ground dove*	<i>Columbina passerina</i>
Common moorhen*	<i>Gallinula chloropus</i>
Common nighthawk*	<i>Chordeiles minor</i>
Common snipe*	<i>Gallinago gallinago</i>
Common yellowthroat*	<i>Geothlypis trichas</i>
Cooper's hawk	<i>Accipiter cooperii</i>
Crested caracara**	<i>Caracara cheriway</i>
Double-crested cormorant*	<i>Phalacrocorax auritus</i>
Downy woodpecker*	<i>Picoides pubescens</i>
Eastern bluebird*	<i>Sialia sialis</i>
Eastern kingbird*	<i>Tyrannus tyrannus</i>
Eastern meadowlark*	<i>Sturnella magna</i>

Table 12. Bird Species Known or Expected to Occur on the JWCWMA

Common name	Scientific name
Eastern phoebe*	<i>Sayornis phoebe</i>
Eastern screech owl*	<i>Megascops asio</i>
Eastern towhee*	<i>Pipilo erythrophthalmus</i>
European starling*	<i>Sturnus vulgaris</i>
Field sparrow	<i>Spizella pusilla</i>
Fish crow*	<i>Corvus ossifragus</i>
Florida mottled duck	<i>Anas fulvigula</i>
Florida sandhill crane*	<i>Grus canadensis pratensis</i>
Forster's tern	<i>Sterna forsteri</i>
Fulvous whistling-duck*	<i>Dendrocygna bicolor</i>
Gadwall	<i>Anas strepera</i>
Glossy ibis*	<i>Plegadis falcinellus</i>
Golden-winged arbler*	<i>Vermivora chrysoptera</i>
Grasshopper sparrow	<i>Ammodramus savannarum</i>
Gray catbird*	<i>Dumetella carolinensis</i>
Gray-cheeked thrush*	<i>Catharus minimus</i>
Great blue heron*	<i>Ardea herodias</i>
Great crested flycatcher*	<i>Myiarchus crinitus</i>
Great egret*	<i>Ardea alba</i>
Greater yellowlegs*	<i>Tringa melanoleuca</i>
Great-horned owl*	<i>Bubo virginianus</i>
Green heron*	<i>Butorides virescens</i>
Green-winged teal	<i>Anas crecca</i>
Hairy woodpecker*	<i>Picoides villosus</i>
Hermit thrush	<i>Catharus guttatus</i>
Herring gull	<i>Larus argentatus</i>
Hooded merganser*	<i>Lophodytes cucullatus</i>
House wren	<i>Troglodytes aedon</i>
Indigo bunting	<i>Passerina cyanea</i>
Kentucky warbler*	<i>Oporornis formosus</i>
Killdeer*	<i>Charadrius vociferus</i>
King rail*	<i>Rallus elegans</i>
Lark sparrow	<i>Chondestes grammacus</i>
Least bittern*	<i>Ixobrychus exilis</i>
Least sandpiper	<i>Calidris minutilla</i>
Lesser black-backed gull	<i>Larus fuscus</i>
Lesser scaup	<i>Aythya affinis</i>
Lesser yellowlegs*	<i>Tringa flavipes</i>
Limpkin*	<i>Aramus guarauna</i>
Lincoln's sparrow	<i>Melospiza lincolnii</i>
Little blue heron*	<i>Egretta caerulea</i>
Loggerhead shrike*	<i>Lanius ludovicianus</i>

Table 12. Bird Species Known or Expected to Occur on the JWCWMA

Common name	Scientific name
Long-billed dowitcher	<i>Limnodromus scolopaceus</i>
Mallard*	<i>Anas platyrhynchos</i>
Marbled godwit	<i>Limosa fedoa</i>
Marsh wren	<i>Cistothorus palustris</i>
Merlin	<i>Falco columbarius</i>
Mottled duck*	<i>Anas fulvigula</i>
Mourning dove*	<i>Zenaida macroura</i>
Mourning warbler**	<i>Oporornis philadelphia</i>
Northern bobwhite*	<i>Colinus virginianus</i>
Northern cardinal*	<i>Cardinalis cardinalis</i>
Northern flicker*	<i>Colaptes auratus</i>
Northern harrier*	<i>Circus cyaneus</i>
Northern mockingbird*	<i>Mimus polyglottos</i>
Northern parula*	<i>Setophaga americana</i>
Northern pintail	<i>Anas acuta</i>
Northern roughwinged swallow*	<i>Stelgidopteryx serripennis</i>
Northern shoveler	<i>Anas clypeata</i>
Northern waterthrush	<i>Parkesia noveboracensis</i>
Orange-crowned warbler	<i>Oreothlypis celata</i>
Osceola wild turkey*	<i>Meleagris gallopavo osceola</i>
Osprey*	<i>Pandion haliaetus</i>
Ovenbird	<i>Seiurus aurocapilla</i>
Painted bunting	<i>Passerina ciris</i>
Palm warbler*	<i>Dendroica palmarum</i>
Peregrine falcon	<i>Falco peregrinus</i>
Pied-billed grebe*	<i>Podilymbus podiceps</i>
Pileated woodpecker*	<i>Dryocopus pileatus</i>
Pine warbler*	<i>Setophaga pinus</i>
Prairie warbler*	<i>Setophaga discolor</i>
Purple gallinule	<i>Porphyrio martinica</i>
Red-bellied woodpecker*	<i>Melanerpes carolinus</i>
Red-cockaded woodpecker*	<i>Picodes borealis</i>
Red-eyed vireo*	<i>Vireo olivaceus</i>
Red-headed woodpecker*	<i>Melanerpes erythrocephalus</i>
Red-shouldered hawk*	<i>Buteo lineatus</i>
Red-tailed hawk*	<i>Buteo jamaicensis</i>
Red-winged blackbird*	<i>Agelaius phoeniceus</i>
Ring-billed gull	<i>Larus delawarensis</i>
Ring-necked duck	<i>Aythya collaris</i>
Rose-breasted grosbeak*	<i>Pheucticus ludovicianus</i>
Roseate spoonbill**	<i>Ajaja ajaja</i>
Ruby-crowned kinglet	<i>Regulus calendula</i>

Table 12. Bird Species Known or Expected to Occur on the JWCWMA

Common name	Scientific name
Ruby-throated hummingbird	<i>Archilochus colubris</i>
Savannah sparrow	<i>Passerculus sandwichensis</i>
Scarlet tanager*	<i>Piranga olivacea</i>
Sedge wren	<i>Cistothorus platensis</i>
Semi-palmated sandpiper*	<i>Calidris pusilla</i>
Sharp-shinned hawk	<i>Accipiter striatus</i>
Short-tailed hawk*	<i>Buteo brachyurus</i>
Smooth-billed ani*	<i>Crotophaga ani</i>
Snail kite**	<i>Rostrhamus sociabilis</i>
Snowy egret*	<i>Egretta thula</i>
Solitary sandpiper*	<i>Tringa solitaria</i>
Song sparrow*	<i>Melospiza melodia</i>
Sora*	<i>Porzana carolina</i>
Southern bald eagle*	<i>Haliaeetus leucocephalus</i>
Spotted sandpiper	<i>Actitis macularius</i>
Stilt sandpiper	<i>Calidris himantopus</i>
Summer tanager*	<i>Piranga rubra</i>
Swainson's thrush*	<i>Catharus ustulatus</i>
Swallow-tailed kite*	<i>Elanoides forficatus</i>
Swamp sparrow	<i>Melospiza georgiana</i>
Tennessee warbler*	<i>Vermivora peregrina</i>
Thick-billed vireo**	<i>Vireo crassirostris</i>
Tree swallow*	<i>Tachycineta bicolor</i>
Tricolored heron*	<i>Egretta tricolor</i>
Tufted titmouse	<i>Baeolophus bicolor</i>
Turkey vulture*	<i>Cathartes aura</i>
Virginia rail	<i>Rallus limicola</i>
Veery*	<i>Catharus fuscescens</i>
Western sandpiper	<i>Calidris mauri</i>
Western spindalis*	<i>Spindalis zena</i>
Whip-poor-will*	<i>Caprimulgus vociferus</i>
White pelican*	<i>Pelecanus erythrorhynchos</i>
White-eyed vireo*	<i>Vireo griseus</i>
White ibis*	<i>Eudocimus albus</i>
White-winged dove	<i>Zenaida asiatica</i>
Wild turkey*	<i>Meleagris gallopavo</i>
Willet	<i>Tringa semipalmata</i>
Winter wren*	<i>Troglodytes troglodytes</i>
Wood duck*	<i>Aix sponsa</i>
Wood stork*	<i>Mycteria americana</i>
Worm-eating warbler*	<i>Helmitheros vermivorum</i>
Yellow rail	<i>Coturnicops noveboracensis</i>

Table 12. Bird Species Known or Expected to Occur on the JWCWMA

Common name	Scientific name
Yellow-bellied sapsucker*	<i>Sphyrapicus varius</i>
Yellow-billed cuckoo*	<i>Coccyzus americanus</i>
Yellow-crowned night heron*	<i>Nyctanassa violacea</i>
Yellow-throated vireo*	<i>Vireo flavifrons</i>
Yellow-throated warbler*	<i>Setophaga dominica</i>

* = species which have been verified as occurring on the JWCWMA

** = rare sightings

Table 13. Exotic Fauna Known or Expected to Occur on the JWCWMA

Common name	Scientific name
Amphibians	
Giant toad*	<i>Rhinella marina</i>
Cuban treefrog*	<i>Osteopilus septentrionalis</i>
Birds	
Common peafowl*	<i>Pavo cristatus</i>
Eurasian collared dove	<i>Streptopelia decaocto</i>
European starling	<i>Sturnus vulgaris</i>
House sparrow	<i>Passer domesticus</i>
Rock dove	<i>Columba livia</i>
Fish	
Grass carp*	<i>Ctenopharyngodon idella</i>
Spotted tilapia	<i>Tilapia mariae</i>
Sunshine bass*	<i>Morone saxatilis x. chrysops</i>
Walking catfish*	<i>Clarias batrachus</i>
Mammals	
Black rat*	<i>Rattus rattus</i>
Coyote* ¹	<i>Canis latrans</i>
House mouse	<i>Mus musculus</i>
Nine-banded armadillo* ¹	<i>Dasypus novemcinctus</i>
Norway rat	<i>Rattus norvegicus</i>
Wild hog*	<i>Sus scrofa</i>
Reptiles	
Brown anole*	<i>Anolis sagrei</i>
Green iguana*	<i>Iguana iguana</i>
Indo-Pacific gecko*	<i>Hemidactylus garnotii</i>
Nile monitor*	<i>Varanus niloticus</i>

Table 13. Exotic Fauna Known or Expected to Occur on the JWCWMA

Common name	Scientific name
Northern curlytail lizard	<i>Leiocephalus carinatus</i>

* = Species which have been verified as occurring on the JWCWMA

¹ = Native to North America

2.3.1 Integrated Wildlife Habitat Ranking System

The FWC has developed the Integrated Wildlife Habitat Ranking System (IWHRS) as a Geographic Information Systems (GIS)-based assessment tool that incorporates a wide variety of land cover and wildlife species data. The IWHRS evaluates the Florida landscape based upon the habitat needs of wildlife as a way to identify ecologically significant lands in the state, and to assess the potential impacts of management and land-use changes. The IWHRS was developed to provide technical assistance to various local, regional, state, and federal agencies, and entities interested in wildlife needs and conservation in order to: (1) determine ways to avoid or minimize project impacts by evaluating alternative placements, alignments, and transportation corridors during early planning stages, (2) assess direct, secondary, and cumulative impacts to habitat and wildlife resources, and (3) identify appropriate parcels for public land acquisition for wetland and upland habitat mitigation purposes. The IWHRS (2009) indicates that the JWCWMA has a very high mean wildlife value of 8.3 (Figure 7).

2.3.2 Imperiled Species

As described above, the JWCWMA has a rich diversity of natural communities and currently supports many wildlife species. Active wildlife management practices and a diversity of natural communities make the JWCWMA an excellent place to view wildlife. The JWCWMA has a variety of wildlife indigenous to the mesic flatwoods, depression marsh, and strand swamp. Table 14 lists some of the rare and imperiled wildlife species that have been documented as occurring on or in the vicinity of the JWCWMA.



Table 14. Rare and Imperiled Wildlife Species Occurring on or near the JWCWMA

Common Name	Scientific Name	Status
Amphibians		
Gopher frog	<i>Lithobates capito</i>	SSC
Birds		
Limpkin	<i>Aramus guarauna</i>	SSC
Little blue heron	<i>Egretta caerulea</i>	SSC
Snowy egret	<i>Egretta thula</i>	SSC
Tricolored heron	<i>Egretta tricolor</i>	SSC
White ibis	<i>Eudocimus albus</i>	SSC

Southeastern American kestrel	<i>Falco sparverius paulus</i>	ST
Sandhill crane	<i>Grus canadensis</i>	ST
Wood stork	<i>Mycteria americana</i>	FT
Red-cockaded woodpecker	<i>Picoides borealis</i>	FE
Roseate spoonbill	<i>Ajaja ajaja</i>	SSC
Crested caracara	<i>Caracara cheriway</i>	FT
Snail kite	<i>Rostrhamus sociabilis</i>	FE
Least tern	<i>Sternula antillarum</i>	ST
Mammals		
Silver rice rat	<i>Oryzomys palustris natator</i>	FE
Florida mouse	<i>Podomys floridanus</i>	SSC
Florida panther	<i>Puma concolor coryi</i>	FE
Reptiles		
American alligator	<i>Alligator mississippiensis</i>	FT(S/A)
Eastern indigo snake	<i>Drymarchon couperi</i>	FT
Gopher tortoise	<i>Gopherus polyphemus</i>	ST
Florida pine snake	<i>Pituophis melanoleucus mugitus</i>	SSC

Acronym	Status
FE	Federally-designated Endangered
FT	Federally-designated Threatened
FT(S/A)	Federally-designated Threatened species due to similarity of appearance
ST	State-designated Threatened
SSC	State Species of Special Concern

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

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

2.3.3 FWC Wildlife Observations and FNAI Element Occurrences

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



The FWC wildlife observations and FNAI element occurrences are shown in Figure 8. The FNAI Element Occurrence Data Usage Letter (Appendix 13.6).

Table 15. FWC Wildlife Observations Displayed on Figure 8

Common name	Scientific name	# of Observations
American bittern	<i>Botaurus lentiginosus</i>	2
American coot	<i>Fulica americana</i>	1
American redstart	<i>Setophaga ruticilla</i>	4
American white pelican	<i>Pelecanus erythrorhynchos</i>	2
American woodcock	<i>Scolopax minor</i>	3
Bachman's sparrow	<i>Aimophila aestivalis</i>	12
Bald eagle	<i>Haliaeetus leucocephalus</i>	20
Barn owl	<i>Tyto alba</i>	5
Barred owl	<i>Strix varia</i>	4
Belted kingfisher	<i>Megaceryle alcyon</i>	2
Black vulture	<i>Coragyps atratus</i>	2
Black-and-white warbler	<i>Mniotilta varia</i>	3
Black-crowned night-heron	<i>Nycticorax nycticorax</i>	6
Black-necked stilt	<i>Himantopus mexicanus</i>	1
Blackpoll warbler	<i>Setophaga striata</i>	1
Black-throated blue warbler	<i>Setophaga caerulescens</i>	2
Black-throated green	<i>Setophaga virens</i>	2
Blue-headed vireo	<i>Vireo solitarius</i>	2
Blue-winged teal	<i>Anas discors</i>	2
Bobcat	<i>Lynx rufus</i>	1
Brown thrasher	<i>Toxostoma rufum</i>	3
Bufflehead	<i>Bucephala albeola</i>	2

Table 15. FWC Wildlife Observations Displayed on Figure 8

Common name	Scientific name	# of Observations
Cape may warbler	<i>Setophaga tigrina</i>	1
Carolina wren	<i>Thryothorus ludovicianus</i>	4
Chuck-will's-widow	<i>Caprimulgus carolinensis</i>	2
Common ground-dove	<i>Columbina passerina</i>	2
Common yellowthroat	<i>Geothlypis trichas</i>	4
Cottonmouth	<i>Agkistrodon piscivorus</i>	4
Crested caracara	<i>Caracara cheriwaycheriway</i>	15
Cuban treefrog	<i>Osteopilus septentrionalis</i>	4
Downy woodpecker	<i>Picoides pubescens</i>	3
Eastern bluebird	<i>Sialia sialis</i>	8
Eastern diamondback rattlesnake	<i>Crotalus adamanteus</i>	2
Eastern indigo snake	<i>Drymarchon corais</i>	1
Eastern kingbird	<i>Tyrannus tyrannus</i>	2
Eastern meadowlark	<i>Sturnella magna</i>	1
Eastern screech-owl	<i>Megascops asio</i>	14
Evening bat	<i>Nycticeius humeralis</i>	1
Florida sandhill crane	<i>Grus canadensis pratensis</i>	54
Florida softshell turtle	<i>Apalone ferox</i>	1
Glossy ibis	<i>Plegadis falcinellus</i>	2
Golden-winged warbler	<i>Vermivora chrysoptera</i>	1
Gopher tortoise	<i>Gopherus polyphemus</i>	7
Gray-cheeked thrush	<i>Catharus minimus</i>	1
Great blue heron	<i>Ardea herodias</i>	12
Great egret	<i>Ardea alba</i>	6
Great horned owl	<i>Bubo virginianus</i>	1
Greater yellowlegs	<i>Tringa melanoleuca</i>	1
Green anole	<i>Anolis carolinensis</i>	1
Green heron	<i>Butorides striata</i>	2
Green treefrog	<i>Hyla cinerea</i>	1
Hairy woodpecker	<i>Picoides villosus</i>	3
Hooded merganser	<i>Lophodytes cucullatus</i>	6
House wren	<i>Troglodytes aedon</i>	2
Killdeer	<i>Charadrius vociferus</i>	1
Least tern	<i>Sternula antillarum</i>	1
Lesser yellowlegs	<i>Tringa flavipes</i>	2
Limpkin	<i>Aramus guarauna</i>	25
Little blue heron	<i>Egretta caerulea</i>	17
Loggerhead shrike	<i>Lanius ludovicianus</i>	2
Marsh wren	<i>Cistothorus palustris</i>	12
Merlin	<i>Falco columbarius</i>	3
Mottled duck	<i>Anas fulvigula</i>	2

Table 15. FWC Wildlife Observations Displayed on Figure 8

Common name	Scientific name	# of Observations
Northern bobwhite	<i>Colinus virginianus</i>	3
Northern flicker	<i>Colaptes auratus</i>	2
Northern waterthrush	<i>Parkesia noveboracensis</i>	2
Osprey	<i>Pandion haliaetus</i>	6
Ovenbird	<i>Seiurus aurocapilla</i>	2
Painted bunting	<i>Passerina ciris</i>	2
Palm warbler	<i>Setophaga palmarum</i>	3
Perigrine falcon	<i>Falco peregrinus</i>	1
Pileated woodpecker	<i>Dryocopus pileatus</i>	2
Pine warbler	<i>Setophaga pinus</i>	1
Prairie warbler	<i>Setophaga discolor</i>	6
Red-bellied woodpecker	<i>Melanerpes carolinus</i>	2
Red-eyed vireo	<i>Vireo olivaceus</i>	4
Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>	2
Red-shouldered hawk	<i>Buteo lineatus</i>	16
Red-tailed hawk	<i>Buteo jamaicensis</i>	4
Ring-necked duck	<i>Aythya collaris</i>	2
River otter	<i>Lontra canadensis</i>	38
Roseate spoonbill	<i>Platalea ajaja</i>	6
Rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>	2
Ruby-crowned kinglet	<i>Regulus calendula</i>	2
Semipalmated sandpiper	<i>Calidris pusilla</i>	1
Snail kite	<i>Rostrhamus sociabilis</i>	33
Snowy egret	<i>Egretta thula</i>	2
Song sparrow	<i>Melospiza melodia</i>	1
Southern black racer	<i>Coluber constrictor priapus</i>	1
Southern cricket frog	<i>Acris gryllus</i>	2
Southern flying squirrel	<i>Glaucomys volans</i>	1
Summer tanager	<i>Piranga rubra</i>	2
Swainson's thrush	<i>Catharus ustulatus</i>	1
Swallow-tailed kite	<i>Elanoides forficatus</i>	34
Swamp sparrow	<i>Melospiza georgiana</i>	2
Tree swallow	<i>Tachycineta bicolor</i>	1
Tricolored heron	<i>Egretta tricolor</i>	8
Turkey vulture	<i>Cathartes aura</i>	1
Veery	<i>Catharus fuscescens</i>	1
Western sandpiper	<i>Calidris mauri</i>	1
White ibis	<i>Eudocimus albus</i>	2
White-tailed deer	<i>Odocoileus virginianus</i>	2
Wild turkey	<i>Meleagris gallopavo</i>	7
Winter wren	<i>Troglodytes hiemalis</i>	1

Table 15. FWC Wildlife Observations Displayed on Figure 8

Common name	Scientific name	# of Observations
Wood duck	<i>Aix sponsa</i>	4
Wood stork	<i>Mycteria americana</i>	4
Worm-eating warbler	<i>Helmitheros vermivorum</i>	1
Yellow rat snake	<i>Elaphe obsoleta</i>	1
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	1
Yellow-rumped warbler	<i>Setophaga coronata</i>	1

Table 16. FNAI Element Occurrences Displayed on Figure 8

Common name	Scientific name	Occurrences
Bald eagle	<i>Haliaeetus leucocephalus</i>	3
Banded wild-pine	<i>Tillandsia flexuosa</i>	1
Eastern indigo snake	<i>Drymarchon couperi</i>	1
Florida panther	<i>Puma concolor coryi</i>	1
Florida sandhill crane	<i>Grus canadensis pratensis</i>	1
Giant orchid	<i>Pteroglossaspis ecristata</i>	2
Great egret	<i>Ardea alba</i>	1
Little blue heron	<i>Egretta caerulea</i>	1
Many-flowered grass-pink	<i>Calopogon multiflorus</i>	6
Red-cockaded woodpecker	<i>Picoides borealis</i>	8
Swallow-tailed kite	<i>Elanoides forficatus</i>	1
Toothed maiden fern	<i>Thelypteris serrata</i>	1

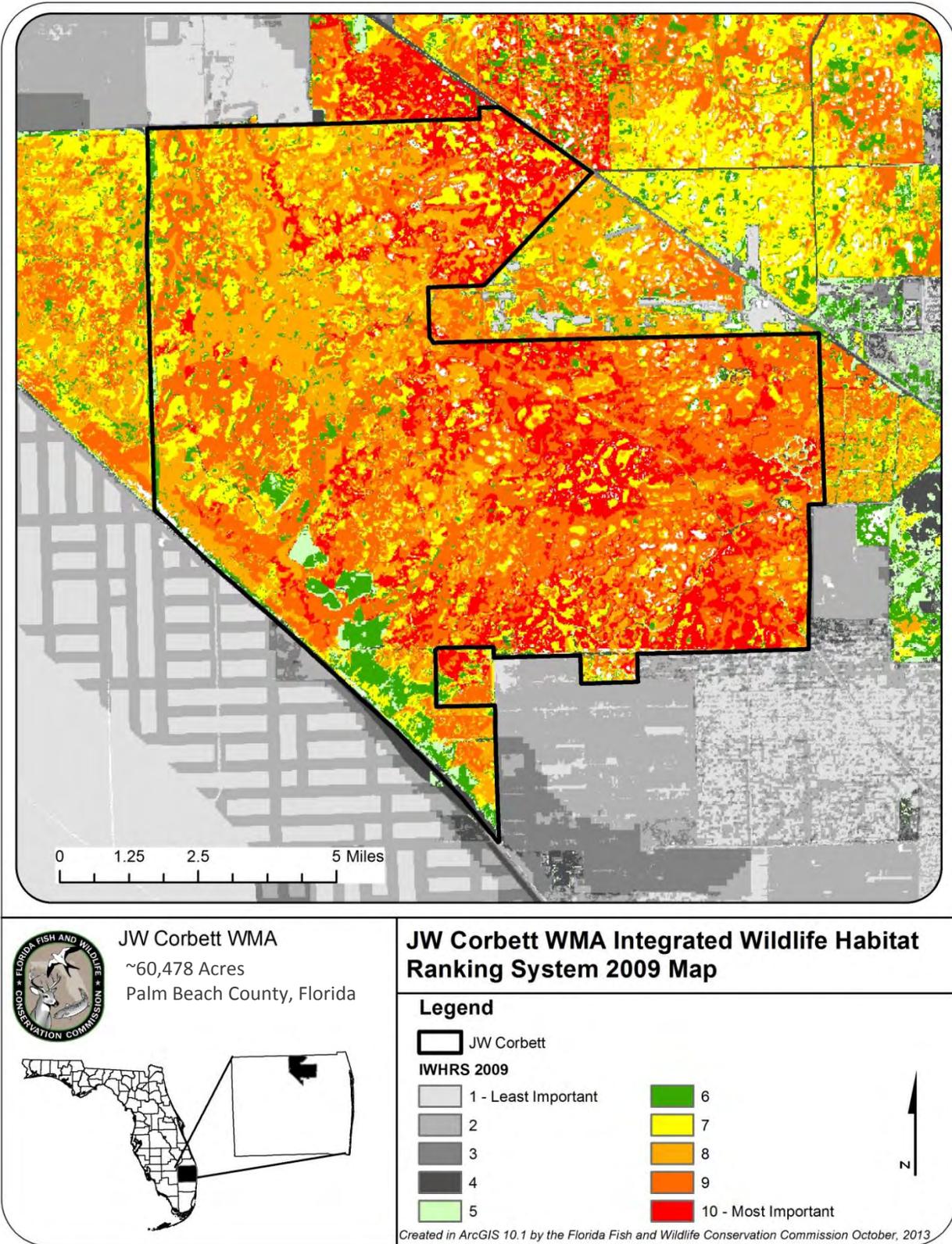


Figure 7. IWHRS for the JWCWMA



Figure 8. FNAI Element Occurrence and FWC Wildlife Observation Map

2.4 Native Landscapes

As noted above, the JWCWMA is in the transitional zone between the uplands of central Florida and the nearly level Everglades. The most extensive natural communities on the area are pine flatwoods, marshes and wet prairies, and cypress sloughs and domes. Hammocks are found in isolated locations throughout the JWCWMA.

2.5 Water Resources

The DEP considers all waters on the JWCWMA, including isolated wetlands, Class III waters. None of these waters are designated as Outstanding Florida Waters. The U.S. Army Corps of Engineers (ACOE) estimates the average annual evapo-transpiration loss to be approximately 38 inches. In extremely wet years, losses range as high as 55 inches. Maximum rates occur during the rainy season (June to October) when day length, temperature and water availability are at their maximums. Rainfall accumulation during the wet season may average up to approximately 0.2 inch per day, with resultant accumulation of surface water and significant periods of inundation. Sheet flow during these periods is discharged from the JWCWMA through either the L-8 Canal (Everglades' drainage basin) or the C-18 Canal (Hungryland basin). During the drier portions of the cycle, the deepest sloughs, ponds and marshes are the only water resource areas available to wildlife, other than artificial ditches and canals.



Although FWC attempted to drain a large portion of the area in the 1960s, agency policy changed in the early 1980s to preserve the wetland values associated with the JWCWMA. In 1990, a hydrological restoration project was initiated by the FWC. Simultaneously however, the renovation and maintenance of certain canals have been deemed necessary to protect campsites from flooding, to protect the public investment in the EYCC and its capital facilities, and for diverting water to, and thus maintaining, the L-8 sawgrass marsh. The JWCWMA is not within or adjacent to any aquatic preserve, designated an area of critical state concern, nor is it an area under study for such designation.

2.6 Beaches and Dunes

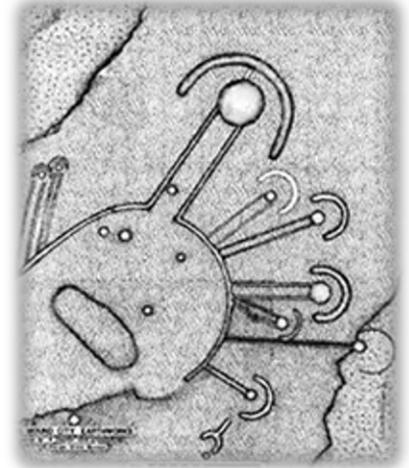
The JWCWMA does not contain any beaches or dunes.

2.7 Mineral Resources

As described above, there are three geologic units present at the JWCWMA. Currently, the only major mineral resources of Palm Beach County which have been, or potentially could be, economically important are limestone and sand. Limestone, sand and gravel are mined for use in construction and various other industrial purposes.

2.8 Cultural Resources

The Florida Department of State's Division of Historical Resources (DHR) observations are broken down into five categories: archeological sites, resource groups, historical structures, historic bridges, and historic cemeteries. Currently there are six archaeological sites, one resource group and 17 archaeological and historical surveys recorded for the JWCWMA. DHR indicates there are seven archaeological sites on the property. The first is Big Mound City (PB48). It is listed in the National Register of Historic Places and contains human remains of Native Americans. Other sites, all of which are earthworks, include the following: PB6292 (Big Gopher), PB15939 (Colwell 1), and PB 15940 (Colwell 2). Two prehistoric campsites, PB15984 (JCI) and PB15989 (JC II) have been documented on the area. The last historic resource on the site is PB12917 (Seaboard Airline RR). Approximately fifteen additional cultural sites were discovered on the area during the last planning period. Preliminary shovel tests showed that these sites were used for habitation during the formative period, from 2000 to 4000 years ago, and are probably associated with the Big Mound City Complex. All Master Site recordings, assessments, and preservation strategies are coordinated with the DHR.



2.9 Scenic Resources

A verdant landscape mosaic of forests, prairies, marshes and swamps within JWCWMA, provides a plethora of scenic resources for its visitors. Whether one is admiring the vibrant colors of the prominent wildflowers throughout the seasons or viewing wildlife along one of its many remote woodland trails, the area offers a host of scenic vistas.

The entire area comprises a vast wetlands complex, including wet prairie and marsh areas, as well as cypress sloughs and domes, all of which have been described above. Hardwood hammocks, also as described above, are considered important environmentally sensitive areas.

3 Uses of the Property

3.1 Previous Use and Development

Prior to European settlement, the landscape of Florida, including this area of Florida, was settled and used by a variety of aboriginal peoples whose culture relied mainly on hunting, fishing, and subsistence agriculture. On the JWCWMA two significant archeological sites are known including Big Mound City and Big Gopher. Big Mound City covers 143 acres and consists of at least 23 mounds, some with radiating causeways and crescent-shaped manmade ponds. At least two of the 23 mounds are burial mounds. Big Gopher is one of the best-preserved earthwork sites in the Lake Okeechobee basin and consists of linear ridges,

crescents, mounds, and middens. The mounds date from approximately 500 B.C. up through the 1500s. Other Native American groups were in the general vicinity until the 1800s including the Seminole Indians fleeing the onslaught of the U. S. Army while seeking refuge in the Everglades.

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

Prior to the original acquisition of the area by the FWC for conservation, the area's timber was harvested, native range was grazed, and a few small parcels were farmed, primarily for vegetables. In the 1950s, an additional 300 acres were cleared for planting. Farming was later discontinued, with the last fields abandoned in the early 1990s. In the 1960s, 23 miles of drainage canals and related water control structures were installed as part of an area water management plan. The FWC leased 29,000 acres of this area for cattle grazing, with the leases expiring in 1971. In 1986, a 25-year stumping lease terminated. In 1990, a hydroperiod restoration plan was completed, providing increased water retention and control capabilities. During the 1993 acquisition of the CARL addition, drainage rights were retained by the seller, reserving use of the land as a water detention area for a citrus operation.

3.2 Current Use of the Property

Currently, the JWCWMA is managed for the conservation and protection of fish and wildlife habitat and fish and wildlife based public outdoor recreation. A wide range of operational and resource management actions are conducted on the JWCWMA 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.

The EYCC occupies approximately 252 acres within JWCWMA. The current land use designation for the JWCWMA is Conservation and Recreation.

Current and anticipated resource uses of the property are diverse. Hunting continues to be a popular recreational activity on the JWCWMA as it is one of only a few public areas for people along the highly populated Gold Coast to hunt. The area also offers excellent opportunities for bird watching, especially at the L-8 Canal; where large numbers of migratory warblers, roseate spoonbills, wood storks, ibis, tri-colored herons, great blue herons, and other wading birds are seen in spring and fall. 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, sight-seeing, horseback riding, and camping.

Due to the proximity of population centers in Palm Beach County, public use can be expected to increase as public awareness of opportunities increases. Annual use of the JWCWMA is estimated to be 145,080 user-days for all activities combined. FWC administers hunts in the fall and spring for various species including small game, deer, turkey, fur-bearers and feral hogs, which accounts for a little more than half of the user-days.

3.2.1 Visitation and Economic Benefits

Visitation and public use of the area for fish and wildlife based public outdoor recreational opportunities is the primary source of economic benefits from the JWCWMA, and contribute to the overall economy for region of Florida. In Fiscal Year 2013-14, a 153,756 estimated people visited the JWCWMA. Primarily, as a result of this visitation and use of the area, FWC economic analysis estimates indicate that the JWCWMA generated an estimated annual economic impact of \$17,566,623 for the State and South Florida region. This estimated annual economic impact has aided in the creation of an estimated 305 jobs.

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

3.3 Single- or Multiple-use Management

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

3.3.1 Analysis of Multiple-use Potential

The following actions or activities have been considered under the multiple-use concept as possible uses to be allowed on the JWCWMA. Uses classified as “Approved” are considered to be in accordance with the purposes for acquisition, as well as with the Conceptual State Lands Management Plan, and with the FWC agency mission, goals and objectives as expressed in the Agency Strategic Plan (Appendix 13.7). Uses classified as "Conditional" indicate that the use may be acceptable but will be allowed only if approved through a process other than the management plan development and approval process (e.g., special-use permitting, managed-area regulation and rule development). Uses classified as “Rejected” are not considered to be in accordance with the original purpose of acquisition or one or more of the various forms of guidance available for planning and management:

	<u>Approved</u>	<u>Conditional</u>	<u>Rejected</u>
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 Incompatible Uses and Linear Facilities

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

3.3.3 Assessment of Impact of Planned Uses of the Property

To communicate FWC's planned uses and activities, specific management intentions, long- and short-term goals and with associated objectives, identified challenges, and solution strategies have been developed for the JWCWMA (Sections 6 -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 Potential Surplus Land Assessment

On conservation lands where FWC is the lead manager, FWC evaluates and identifies recommended areas for a potential surplus designation by DSL, ARC, and the Board of Trustees. This evaluation consists of GIS modeling and analysis, aerial photography interpretation, analysis of fish and wildlife resources, a review of resource and operational management needs, and a review of public access and recreational use of the area. Also, FWC considers recommendations for surplus lands as they relate to Florida's "No Net Loss of Hunting Lands" legislation (Ch. 379.3001 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 the JWCWMA by FWC has determined that all portions of the area are being managed and operated for the original purposes of acquisition, and remain integral to the continued conservation of important fish and wildlife resources, and continue to provide good fish and wildlife resource based public outdoor recreational opportunities. Therefore, no portion of the JWCWMA is recommended for a potential surplus land designation.

4 Accomplished Goals and Objectives from the JWCWMA Management Plan 2003-2013

This section is dedicated to reporting the extent to which the objectives described in the JWCWMA Management Plan 2003-2013 (pages 33-42) were successfully completed. Accomplishments for the JWCWMA during the previous planning timeframe are further

discussed in more comprehensive detail throughout Section 5 *Management Activities and Intent* of this Management Plan. The following *Resource Management Goals and Objectives* from the 2003-2013 the JWCWMA Management Plan describe the planned activities for the JWCWMA during this prior planning period. The degree to which FWC was able to accomplish the planned activities during this period is reflected as **Percent Accomplished** for each associated Objective.

Objectives Accomplished from the 2003 J.W. JWCWMA Management Plan		
Goals and Objectives	Percent Accomplished	Comments
Goal 1: Enhance distribution and condition of native plant communities using a rainfall-based hydroperiod strategy.		
Objective 1: Continue to participate in the implementation of the Northern Palm Beach County portion of the Comprehensive Everglades Restoration Plan (CERP).	100%	Ongoing
Objective 2: Continue working with the U.S. Army Corps of Engineers (ACOE), South Florida Water Management District (SFWMD), Indian Trails Improvement District (ITID), and Palm Beach County to build a canal along the east side of Corbett, connecting the C-18 and ITID water system, to reduce extended hydroperiods on the eastern portion of the JWCWMA.	100%	Ongoing
Objective 3: Install four water level gauges to monitor water levels in Pratt Canal and adjacent wetlands for use in SFWMD hydrologic modeling efforts by 2003.	100%	
Objective 4: By 2003, install two additional water control structures (currently permitted) to allow discharge of excess water from southwest JWCWMA, thus alleviating unnatural hydroperiods.	100%	
Objective 5: Install at least two additional low water crossings on the main grade by 2003.	100%	

Objective 6: By 2004, install at least five continuous-reading water level monitoring devices at strategic locations inside the JWCWMA.	80%	Four Stevens gauge monitoring systems were installed. FWC is continuing to study the feasibility of installing additional water level monitoring stations.
Objective 7: By 2004, complete removal of vegetation and sediment from internal canals to restore their ability to transport water.	100%	
Objective 8: By 2004, investigate and assess the feasibility of marsh restoration on the CARL portion of the JWCWMA.	100%	
Objective 9: Develop a contract for development of a hydrologic model to establish appropriate water levels by 2005.	20%	FWC has requested the funding to develop a hydrological assessment and associated hydrologic modeling and will request the funding for a hydrological assessment in the management plan update and will continue to work with the SFWMD on hydrological assessment and restoration.
Objective 10: By 2007, acquire additional permits necessary for installation of new water control structures and operation of existing structures.	100%	
Objective 11: By 2007, continue to work with the ACOE and SFWMD to reduce the hydroperiods in the L-8 Flatwoods and in the southeast JWCWMA.	100%	
Goal 2: Manage plant communities to provide optimum diversity, abundance, and distributions of indigenous wildlife species to promote hunting and nature-based recreational opportunities consistent with Pittman-Robertson acquisition program.		
Objective 1: Submit annual project proposals to Dept. of Environmental Protection's (DEP) Bureau of Invasive Plant Management, or other sources, for funding to control exotic plant species including melaleuca, Old World climbing fern, Australian pine, Brazilian pepper, downy rosemyrtle, Java plum and various exotic grasses.	100%	Ongoing.

Objective 2: In addition to DEP's exotic plant control effort, commit substantial FWC resources annually to control exotic plant species including melaleuca, wetland nightshade, climbing ferns, Australian pine, Brazilian pepper, downy rosemyrtle, Java plum and various exotic grasses.	100%	Ongoing.
Objective 3: Utilizing the JWCWMA burn plan (Appendix L) or its modification, continue to employ a diverse fire regime designed to achieve a desired future condition (as determined by vegetative management objectives) on existing fire-dependent plant communities.	100%	Ongoing.
Objective 4: Through wildlife observations and historic data accounts, using Global Positioning System (GPS) and Geographic Information System (GIS) technologies, establish locations of known species and update existing animal lists.	100%	Ongoing.
Objective 5: Initiate herpetofaunal surveys on the area by 2003.	100%	
Objective 6: Develop and implement a red-cockaded woodpecker species management plan by 2003.	100%	
Objective 7: Using GIS technology, establish baseline exotic plant species maps by 2003.	100%	
Objective 8: Using the silvicultural guidelines developed by the Division of Forestry (Appendix M), implement forest management practices to improve wildlife habitats by 2003.	100%	
Objective 9: Contract with Florida Natural Areas Inventory (FNAI) to identify historic and current vegetative community types pursuant to objective-based vegetation management by 2003.	100%	
Objective 10: Use mechanical and prescribed fire treatments to control invasive wax myrtle on 320 acres of Tomato Field 2 by 2003.	100%	
Objective 11: Develop quantifiable vegetative management objectives by 2004.	100%	

Objective 12: By 2007, treat 80% of existing melaleuca and 25% of existing old world climbing fern with herbicides.	100%	
Goal 3: Increase public awareness of environmental and recreational values through public conservation education.		
Objective 1: Continue to work with the Friends of Corbett Citizen Support Organization (CSO), outdoor recreation clubs, and conservation groups to raise public awareness of JWCWMA's environmental and recreational values.	100%	
Objective 2: Continue offering 7 one-week summer youth camp sessions, the Families Understanding Nature Camp (FUN Camp), Becoming an Outdoors Woman (BOW), Hunter Education courses, and continue supporting Florida Sportsman Conservation Association's Youth Day.	100%	Ongoing.
Objective 3: As part of a public education campaign, continue to locally disseminate information about prescribed fire. (ongoing)	100%	
Objective 4: Develop a JWCWMA web page promoting recreational opportunities on the area by 2003.	100%	
Objective 5: Establish informational signs along Hungryland Boardwalk by 2003.	100%	
Objective 6: Install informational kiosks at the two entrances to the area by 2003.	100%	
Objective 7: Develop the JWCWMA Nature-Based Recreation (NBR) Master Plan by 2003.	0%	FWC is currently drafting a Recreation Master Plan for the JWCWMA.
Objective 8: Develop a JWCWMA birding brochure by 2003.	100%	
Objective 9: Develop and install large scale, high quality maps at the two entrances to the area by 2004.	100%	

Goal 4: Protect the JWCWMA's resources from destructive activity.		
Objective 1: Increase law enforcement patrol to the extent feasible.	100%	Ongoing.
Objective 2: Continue enforcing all laws regarding registration of camping and buggy trailers on the WMA.	100%	Ongoing.
Objective 3: Continue to utilize the Trustees' Incompatible Use Policy and the FWC Inholdings and Additions Acquisition Program to protect area resources from linear facilities, urban development or encroachment and other incompatible uses.	100%	Ongoing.
Objective 4: Continue to evaluate methods to reduce negative impacts caused by off road vehicles.	100%	Ongoing.
Objective 5: Identify locations for pump-out dump stations for RVs at readily accessible locations by 2003.	100%	FWC studied the feasibility of installing pump stations for RVs and determined the use of port-a-johns were less environmentally impacted and more feasible on JWCWMA.
Objective 6: In cooperation with the Friends of Corbett CSO, develop a litter prevention campaign by 2003.	100%	
Objective 7: Install gates at intersections of trails on main grade to be locked when trail use is prohibited by 2003.	100%	FWC installed gates; however, they were vandalized and destroyed and FWC has determined they are unfeasible to continue to maintain gates.
Objective 8: By 2003, determine the cost for contracting a survey to establish the internal and external boundaries of the area (including Big Mound, the Youth Camp and other internal boundaries).	100%	FWC completed some survey work (i.e., Big Mound). Also, FWC explored the feasibility of contracting for additional surveys. At present, it is unfeasible due to the cost; however, FWC will identify this need/challenge in the management plan update.
Objective 9: Evaluate the potential to assign and monitor individual campsites during hunting seasons by 2004.	100%	

Goal 5: Assure an optimum boundary for JWCWMA by continuing to identify and pursue acquisition needs.		
Objective 1: Maintain a GIS shapefile, acreage, and other necessary data to facilitate nominations for the FWC Inholdings and Additions Program.	100%	Ongoing.
Objective 2: To minimize fragmentation of the area, continue to identify strategic parcels for acquisition.	100%	Ongoing.
Goal 6: Identify and protect cultural resources.		
Objective 1: Utilize the Inholdings and Additions Program to purchase private lands around the Big Mound site.	100%	Ongoing.
Objective 2: Involve DHR staff in planning and development of NBR interpretive information regarding cultural resources. (ongoing)	0%	FWC will continue to work with DHR to develop interpretation of cultural sites. FWC will explore the feasibility of conducting additional cultural survey work and assessment. FWC will request a cultural survey and assessment in the management plan update.
Objective 3: When conducting restoration activities, request assistance from the DHR to prevent the disturbance of archaeological sites.	100%	Ongoing. Ongoing.
Objective 4: To supplement surveys done at Big Mound, contact the DHR to complete a comprehensive cultural survey, to include Big Gopher and Little Gopher mound systems, by 2006.	25%	FWC will continue to work with DHR to develop interpretation of cultural sites. FWC will explore the feasibility of conducting additional cultural survey work and assessment. FWC will request a cultural survey and assessment in the management plan update.
Goal 7: Provide appropriate recreational opportunities, consistent with the purposes for land acquisition.		

Objective 1: As a part of the NBR planning effort, identify appropriate pathways and regional integration considerations for bicycling, canoeing, horseback riding, bird watching, and hiking.	100%	Ongoing.
Objective 2: Continue to provide appropriate and traditional vehicular access as a legitimate recreational pursuit on the area for hunting and wildlife observation.	100%	Ongoing.
Objective 3: As a part of the NBR planning process, investigate establishment of camping and fishing opportunities near the south entrance in the vicinity of the powerline and Stumpers Grade by 2003.	100%	FWC investigated establishment of camping and fishing opportunities near the south entrance and determined not feasible.
Objective 4: Establish fishing piers at selected campsites by 2007.	100%	
Goal 8: Provide adequate manpower and infrastructure to support quality recreational and educational programs, and to properly manage the resources.		
Objective 1: Continue to utilize volunteers to aid in management activities, such as development of food plots and assistance with wildlife surveys or infrastructure maintenance.	100%	Ongoing.
Objective 2: Continue to utilize the funding sources and staff support made available through the CSO.	100%	Ongoing.
Objective 3: By 2003, complete the check station infrastructure project (installation of septic tanks, well, electricity, telephones, entrance kiosks, and removal of old buildings).	100%	
Objective 4: By 2003, clearly delineate and enforce the boundary of the EYCC in order to operate the activities and programs as established by current policies and procedures, and to ensure the safety of camp users.	75%	The boundary is clearly delineated except through cypress. FWC continues to analyze and determine the most appropriate and environmentally feasible method of delineating and establishing boundaries for the EYCC.

Objective 5: By 2004, complete removal of vegetation and sediment from internal canals to restore their ability to transport water.	100%	
Objective 6: By 2004, seek funding for at least two year-round conservation education instructors at the EYCC.	100%	FWC requested funding and received one education instructor. FWC will continue to request funding for the EYCC and staff.
Objective 7: By 2004, request funding for a passenger swamp buggy and school bus for educational purposes at the EYCC.	100%	
Objective 8: By 2004, provide at least five housing structures for youth camp staff.	30%	FWC, through contract with FAU, provided temporary housing with trailers on site. The trailers are no longer feasible for use. FWC will explore the feasibility of providing housing for youth camp staff. A funding cost estimate will be included in the management plan update.
Objective 9: By 2005, complete capping of the entire Main Grade.	100%	

5 Management Activities and Intent

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

5.1 Land Management Review

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

The recommendations of 2011 Land Management Review (Appendix 13.5) were considered and addressed in the drafting of this Management Plan. This includes the development of

management intent language, goals and objectives, and identification of management challenges and development of solution strategies (Sections 4 -8).

5.2 Adaptive Management

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

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

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

5.2.1 Monitoring

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

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

For natural communities, monitoring protocols are established through FWC's Objective-Based Vegetation Management (OBVM, Section 5.5.1) program, which monitors how specific vegetative attributes are responding to FWC management. For imperiled and focal fish and wildlife species, monitoring protocols are established through FWC's Wildlife Conservation Prioritization and Recovery Strategy (WCPR, Section 5.4.2) program. FWC staff may monitor additional fish and wildlife species when deemed appropriate. Exotic

and invasive plant and animal species (Section 5.7) are also monitored as needed and appropriate. Recreational uses are monitored through FWC's Public Access and Wildlife Viewing Program, and work in conjunction with the establishment and adjustment of public access carrying capacities (Section 5.8.3). Cultural and historical resources (Section 5.11) are monitored with guidance from the DHR.

5.2.2 Performance Measures

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

5.2.3 Implementation

The JWCWMA Management Plan serves as the guiding framework to implement this adaptive management process. It serves as the underpinning for the integration of management programs (OBVM, WCPR, Public Access and Wildlife Viewing, Recreation Master Plans, etc.) underway to accomplish needed conservation actions that are planned to manage the natural resources of the JWCWMA, 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 the JWCWMA, FWC will focus on managing for native habitat diversity, emphasizing maintenance of high-quality natural communities, and improvement of disturbed areas. Restoration may be achieved on disturbed areas by the re-introduction of fire, restoring historic hydrological conditions and the use of mechanical or chemical land management techniques as appropriate. Retention of the native old growth component of forests, while also providing for natural regeneration, remains an important consideration. The JWCWMA has high-quality native communities including depression marsh, mesic flatwoods, strand swamp, and wet flatwoods that FWC will continue to manage and protect. On disturbed upland sites, not being utilized as intentional food plots, FWC intends to initiate ground cover and natural community restoration.



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

There are no specific restoration plans underway on the ruderal acres of the JWCWMA. Ruderal acres on the area are utilized in a wildlife forage program identified in Figure 14. These fields are planted and/or mowed each year; on average 550 acres are mowed and 269 acres of supplemental wildlife forage annually as part of a combined effort with the National Wild Turkey Federation. The EYCC occupies 253 acres of the JWCWMA. The additional ruderal acreage, as identified by FNAI, is accounted for in road systems and trails.

Staff and volunteers will conduct habitat improvement on at least 25 acres every year. These improvements will include palmetto mowing, and the application of fire in areas designated as RCW habitat. At least 20,116 acres will be treated annually for control and eradication of FLEPPC Category I and II invasive exotic species. Additionally, staff will apply a prescribed burn plan to 8,121 acres per year, to mimic the natural fires regimes that have been altered through suppression, ditching, and alteration of the natural hydrologic function in the area. Specific goals and objectives (6.1.2, and 6.1.10) have been designed to place the fire adapted communities into a maintenance condition. During the next 10-year planning period a total of 32,486 acres of fire-adapted communities on the area (100%) will be burned within a target 3 - 5 year fire return interval.

5.3.1 Objective-Based Vegetation Management

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

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

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

insight about the condition of the natural community. Because FWC is interested in the overall effect of management on the natural communities, OBVM data is analyzed at the natural community level.

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

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

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

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

5.3.2 Prescribed Fire and Fire Management

Periodic spring and summer fires occurred in fire-adapted communities under natural conditions. Plant species composition reflects the frequency and intensity of these fires. In the absence of fire, fallow fields on former and current 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.

Hydrological alteration and fire exclusion have all combined to alter the plant species composition of the area resulting in a change in the structure of the fuel, from accessible

fine fuels to large woody fuels that inhibit the movement of fire across the landscape. Site-specific combinations of prescribed fire, mechanical and chemical vegetation control, reforestation, and restoration of natural water regimes are likely necessary actions needed to restore the area to historic natural communities.

The FWC employs a fire management regime to increase both species and habitat diversity and will continue a prescribed fire program on the JWCWMA in accordance with vegetation 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 fuel loads or wetland areas inundated with water typically will not carry fire as evenly, and usually burn at a lower intensity. Employing a prescribed fire program with different frequencies, intensities, and seasonality (dormant season vs. growing season) of burns creates habitat diversity and a mosaic of vegetation patterns. This mosaic is designed to have both frequently burned and infrequently burned aspects.

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

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

The transitional areas between two adjacent but different vegetative cover types, such as forests and wetlands, are known as ecotones. With the possible exception of wildfire suppression, mechanical soil disturbance in ecotones will be avoided in order to protect habitats for 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 Fire Plan will be developed and implemented for the JWCWMA. This plan will include, but not be limited to, delineation of burn units, detailed descriptions of prescribed fire methodology, safety, and smoke management guidelines.

During the previous planning period, a total of 7,310 acres were burned on the JWCWMA. Due to past fire exclusion, some areas of the JWCWMA contain saw palmetto plants over

10 feet in height; prescribed fire alone will not reduce such palmetto density. Mechanical management methods (roller-chopping and mowing) will continue to be used to reduce the tall palmetto understory to allow managers to apply prescribed fire with less tree mortality. During the 2012-2014 recording period, 560 acres of palmetto understory were mowed to improve the prescribed fire program.

Currently, staff maintains approximately 10,000 acres in a 3-year fire interval, 17,000 acres are in a 5-year interval, 28,000 acres are in a 10-year interval, and the remaining acreage has not been burned in over 10 years or is not managed with fire. Future burn goals involve reducing areas on 5-year intervals to 3-year. A combination of growing and dormant season burns is preferred; however, since 2003, growing season burns have accounted for 75-80% of prescribed fire. JWCWMA's recent increase in growing season burns are a result of fuel reduction in units with frequent fire intervals coupled with environmental conditions more suitable for burning during the growing season. Objectives in these units have changed from fuel reduction to promoting growth and diversity of herbaceous plants to accommodate the area's wildlife.

In addition to prescribed fire, managers contracted for the mechanical mowing of saw palmetto and hardwoods in 1,722 acres of red-cockaded woodpecker habitat during 2004-2009.

The State of Florida suffered drought conditions during the previous reporting period, which resulted in several wildfires within JWCWMA and across the state. Area staff assisted and provided equipment for fire suppression activities, working in cooperation with the FF S to fight wildfires on 9,290 acres of the JWCWMA.

5.3.3 Habitat Restoration

On the JWCWMA, FWC will focus on managing for habitat diversity, emphasizing the maintenance of high-quality natural communities, and restoration of disturbed areas (Figure 14), not being directly utilized as agricultural food plots. Restoration may be achieved on areas by the re-introduction of fire, restoring historic hydrological conditions and the use of mechanical or chemical land management techniques as appropriate. Retention of the native habitat component of the area, while also providing for natural regeneration, remains an important consideration. The most extensive natural communities on the JWCWMA are pine flatwoods, marshes, wet prairies, and cypress sloughs and domes.

On disturbed upland sites, FWC intends to initiate ground cover and natural community restoration where it is feasible such as cleared areas, but on other disturbed areas such as, utility corridors, EYCC sites and structures, etc., restoration is not possible due to the ongoing authorized uses of the land.



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

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

5.4.1 Fish and Wildlife

As described earlier, due to the variety of natural communities, a diversity of associated wildlife, including rare, imperiled, common game, and non-game species, can be found on the JWCWMA. In managing for wildlife species, an emphasis will be placed on conservation, protection and management of natural communities. As noted above, natural communities important to wildlife include depression marsh, mesic flatwoods, strand swamp, and wet flatwoods. Natural communities that are less represented on the JWCWMA include basin marsh, dome swamp, and wet prairie.

The size and natural community diversity of the JWCWMA creates a habitat mosaic for a wide variety of wildlife species. Resident wildlife will be managed for optimum species richness, diversity and abundance. In addition to resident wildlife, the JWCWMA provides resources critical to many migratory birds including waterfowl, passerines, raptors, shorebirds and others including roseate spoonbills, wood storks, ibis, tri-colored herons, great blue herons, and other wading birds. Habitats important to migratory species will be protected, maintained or enhanced.

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

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

5.4.2 Imperiled 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 Strategy to ensure management is having the desired effect on wildlife.

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

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

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

As noted earlier, the FWC completed the JWCWMA WCPR Strategy in 2011, (Appendix 13.14). The FWC will continue to implement management actions outlined in the strategy and further delineated in Section 6.2 of this plan to conserve and enhance imperiled species conservation on JWCWMA.

In summary, for FWC-managed areas, the WCPR Strategy helps assess imperiled and focal wildlife species needs and opportunities, prioritize what FWC does for imperiled and focal species, prescribe management actions to aid in species recovery, prescribe monitoring protocols to allow evaluation of the species' response to management, and ensure the information is shared with others. Through the actions of this program, FWC will facilitate fulfilling the needs of focal and imperiled wildlife species on the JWCWMA. In the long-term, by implementing these strategies on FWC-managed lands and continuing to assess wildlife species' needs, FWC will continue to play an integral role in aiding the recovery of imperiled species and preventing the future imperilment of declining wildlife species.

5.4.3 Focal Species Selection and Management

As noted above, FWC completed the WCPR Strategy for the JWCWMA in 2011. Table 17 lists the focal species that have been identified as having potential habitat on JWCWMA. This plan addresses issues surrounding imperiled flora and fauna found within the management area. Several accomplishments have been achieved as detailed in section 4 of this plan. Additional accomplishments, studies and species' profiles are explained in greater detail as part of the complete WCPR Strategy; attached in its' entirety in Appendix 13.14.

One of the most noteworthy accomplishments during the previous planning period was facilitating the territory expansion of the federally endangered red cockaded woodpecker (RCW). Consequently, interagency translocation and intensive management have doubled the RCW population on the JWCWMA.

All monitoring and management of the red-cockaded woodpecker is conducted by FWC. As per the recommendations of the USFWS RCW Recovery Plan, staff monitors the number of active clusters, surveys active clusters for nests, color-bands nestlings and adults, and determines fledging success. Artificial cavities are installed, replaced, and maintained in existing clusters in order to maintain a minimum number of four suitable cavities. Habitat management includes maintaining a three year growing season burn rotation within RCW clusters and foraging habitat and treating exotic plant species. Palmetto mowing is regularly conducted in order to reduce fuel loads in areas where fire suppression has resulted in an excessive midstory growth.

While the core of the population achieved a stable number of breeding groups, FWC's goal is to rebuild historic RCW clusters and establish breeding groups on the south end of the area as well as expand clusters westward in order to encourage genetic exchange with the RCW population at the DuPuis Reserve. New recruitment clusters are installed in order to increase connectivity between clusters as well as to expand the range of the current population. Due to the susceptibility of small populations to genetic stochasticity, pairs of yearling RCWs are translocated to JWCWMA in the fall from larger, more stable populations. About half of these birds remain on the area as breeders by the end of the following summer.

Currently, there is ongoing annual upland avian species monitoring on the JWCWMA, Hungryland WEA, and DuPuis WEA. The surveys that are conducted focus on the northern bobwhite; however, staff incidentally record observations of Bachman's sparrows while surveying. A protocol is being developed to systematically include targeted songbird observations as part of the traditional northern bobwhite surveys, and avian monitoring that includes Bachman's sparrows is recommended (Section 5.2.1 of the WCPR Strategy).

Additionally, a local school group donated seven woodduck nest boxes to the JWCWMA (Section 5.1.1 of the WCPR Strategy), which were placed along the basin marsh on west side of the JWCWMA. There has been very little research on mottled duck use of nest boxes; however, species experts support the project as an exploratory venture and indicate data on use and nest success would be useful. The boxes were placed along the L-8 canal in areas where water levels are typically around 7.9 inches (20 cm) deep during peak hatching season (May – June). Boxes will be monitored on an annual basis to determine whether the nesting structures are used and monitor success (Section 5.2.5 of the WCPR Strategy).

The goal for JWCWMA is to maintain high quality wetland habitats that allow the individuals occurring on the WMA to function as part of a regional Florida mottled duck population. In South Florida, patterns of habitat use, movement, and population size are poorly known. Therefore, it would be inappropriate to designate specific area-level management objectives; however, measurable objectives may be adopted following the completion of the FWRI study. Communication with FWRI will be a priority, and Section 6.1.3 of the WCPR Strategy describes coordination efforts. Opportunistic observations of nesting activity and juveniles will be recorded (Section 5.2.6 of the WCPR Strategy) and hen houses will be monitored annually (Section 5.2.5 of the WCPR Strategy).

In 2009, staff initiated a marsh bird survey that included limpkins as a target species on the JWCWMA. The protocol was based on the National Marsh Bird Monitoring Program. These surveys also occur biannually on the nearby Hungryland WEA. On the JWCWMA, the surveys have been temporarily modified during 2010 and 2011 to participate in a USFWS pilot marsh bird study, coordinated in Florida by the Florida Fish and Wildlife Research Institute (FWRI). For the JWCWMA, the decreased number of points and random locations resulted in less detection, and while results will be useful on a statewide basis, uses of the results at the WMA-level are limited. The original marsh bird surveys that include limpkins as a target species will be continued in 2012, and repeated at least biannually using the 2009 points which are more compatible with WMA-level needs (Section 5.2.3 of the WCPR Strategy). Opportunistic observations of juveniles or nesting will be recorded (Section 5.2.6 of the WCPR Strategy).

Table 17. Focal Species Identified as having Potential Habitat on the JWCWMA

Common name	Scientific name	Status
Crested caracara	<i>Caracara cheriway</i>	FT
Bachman's sparrow	<i>Aimophila aestivalis</i>	NL
Cooper's hawk	<i>Accipiter cooperii</i>	NL
Florida black bear	<i>Ursus americanus floridanus</i>	NL
Florida mottled duck	<i>Anas fulvigula</i>	NL
Florida sandhill crane	<i>Grus canadensis pratensis</i>	ST
Gopher tortoise	<i>Gopherus polyphemus</i>	ST
Limpkin	<i>Aramus guarauna</i>	SSC
Northern bobwhite	<i>Colinus virginianus</i>	NL
Red-cockaded woodpecker	<i>Picoides borealis</i>	FE
Sherman's fox squirrel	<i>Sciurus niger shermani</i>	SSC
Short-tailed hawk	<i>Buteo brachyurus</i>	NL
Snail kite	<i>Rostrhamus sociabilis</i>	FE
Southeastern American kestrel	<i>Falco sparverius paulus</i>	ST
Southern bald eagle	<i>Haliaeetus leucocephalus</i>	NL
Swallow-tail kite	<i>Elanoides forficatus</i>	NL
Wading birds	<i>Multiple spp.</i>	NL

Abbreviation	Status
FE	Federal Endangered
FT	Federal Threatened
NL	Not Listed
SSC	State Species of Special Concern
ST	State 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 the JWCWMA. Control technologies may include mechanical, chemical, biological, and other appropriate treatments. Treatments utilizing herbicides will comply with instructions found on the herbicide label and employ the Best Management Practices for their application.

Exotic and invasive plant species known to occur on the JWCWMA and treated annually by the FWC include but are not limited to cogongrass, old world climbing fern, Peruvian primrosewillow, Asian sword fern, suckering Australian-pine, tropical Mexican clover, melaleuca, Brazilian pepper, java plum, earleaf acacia, and water-lettuce. An inclusive list was provided earlier in Table 7. Exotic and invasive plant species have been identified as occurring at varying densities on approximately 52,216 acres of the JWCWMA. However, the FWC's methodology for determining the number of acres "infested" with invasive exotic

plants only represents a cumulative acreage, and does not reflect the degree of the invasive exotic occurrence. The degree of infestation among areas identified with invasive exotic plant occurrences often varies substantially by species, level of disturbance, environmental conditions, and the status of ongoing eradication and control efforts. The FWC will continue to focus treatments on areas identified as having invasive exotic plant occurrences, as well as treating any new occurrences as they are identified through continued monitoring.

Exotic plant treatment acreage decreased from the previous biennial period due to reductions in funding. After many years of effort and substantial monetary investment, initial treatment of invasive plants has occurred on 80% the area. During the previous reporting period a total of 56,360 acres of invasive exotics have been treated. The JWCWMA has achieved a level of maintenance condition, wherein management units are rotated in multi-year treatment cycles.

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

Table 13 above provides a list of exotic fauna observed on the area. Section 6 provides specific goals and objectives for exotic species control and monitoring measures that will be implemented on the area.

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

5.6 Public Access and Recreational Opportunities

5.6.1 Americans with Disabilities Act

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

1. Compliance will cause harm to 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 the JWCWMA. To accomplish this, FWC will work with recreational stakeholders and the general public to develop a Recreation Master Plan for the JWCWMA that will be used to further design and develop appropriate infrastructure that will support the recreational use of the area by the general public. This Recreation Master Plan will include planning for parking, trail design, and area resource interpretation.

5.6.3 Public Access Carrying Capacity

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

Based on an analysis of the overall approved uses and supported public access user opportunities, and the anticipated proportional visitation levels of the various user groups, FWC has determined that the JWCWMA can currently support 965 visitors per day. An

objective to maintain the public access carrying capacity at 965 visitors per day has been proposed in Section 6.3 of this Management Plan.

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

5.6.4 Wildlife Viewing

The JWCWMA provides a wide variety of native wildlife species, both resident and seasonally migratory, that are available for visitors' enjoyment for observation and photography. The quality of habitat found on the JWCWMA attracts a variety of species including various birds, mammals, reptiles, and amphibians. The area's outstanding wildlife habitats, including managed wildlife openings and food plots, support significant populations of imperiled, rare and more common wildlife.

One of the best places to view wildlife year-round is the Hungryland Boardwalk and Trail. The 1.2-mile trail is away from the hunt areas and has interpretive signs describing the plant and animal communities. This area is part of the Florida Trail Association's Ocean to Lake Trail (OLT). You may also request a copy or download or print the JWCWMA Birdlist (http://myfwc.com/media/305201/JWCorbett_birdlist.pdf). Visit the FWC Wildlife page (<http://myfwc.com/viewing/recreation/wmas/lead/jw-corbett/wildlife>) for more information about the area's wildlife.

5.6.5 Hunting

The JWCWMA is one of the few public conservation areas along the highly populated Gold Coast for the public to hunt deer, turkey, small game, fur-bearers and wild hogs. Approximately 600 acres of old tomato fields are managed with a comprehensive food plot and mowing program to improve wildlife forage. Harvest is monitored at check stations and changes to hunting regulations are made with stakeholder input. Current hunting regulations may be found at: <http://www.myfwc.com/hunting/wma-brochures>.

Vehicles may be operated on improved roads and Trail 6 year-round. During archery and spring turkey seasons, vehicles may also be operated on named and numbered trails. During muzzleloading gun, general gun, and small game seasons, vehicles are not limited to the restrictions above while participating in the hunts. An evaluation of the hunting opportunities offered on the JWCWMA is routinely performed periodically by the FWC.



5.6.6 Fishing

Fishing opportunities within JWCWMA are found primarily on semi-circular ponds that have been constructed at Camps A, B, G, H, I, and K where bluegill, redear, bass, catfish, warmouth, and spotted sunfish can be caught. In rainy seasons, the marshes can be fished for largemouth bass.



5.6.7 Trails/Hiking

On the Hungryland Slough Boardwalk and Trail, the normally inaccessible cypress swamp can be explored. The trail begins in slash pine flatwoods with coco-plums, dahoons, and wiregrasses. Along the boardwalk are cypress, pond apples, and red maples. Numerous bromeliads (needle-leaved wildpine, cardinal airplant, giant wild pine, twisted air plant, ballmoss, Spanish moss) and 13 species of ferns (including strap, swamp, giant leather, chain, royal, bracken, and resurrection) are present. The open wetlands visible from the trail are dominated by sawgrass. In the hardwood hammock are oaks, paradise trees, wild coffees, red bays, and stoppers.

The JWCWMA portion of the OTL traverses the area west from the South Entrance of JWCWMA, 17 miles to Dupuis Reserve through wet pine flatwoods. Along the way are two primitive campsites (at 6 and 12 miles). A blue blazed trail from the Hungryland Boardwalk parking lot junctions with the OLT. FWC plans to construct and maintain a Pratt canal pedestrian crossing bridge to provide visitors and through trail users with non-vehicular access to Dupuis Reserve.

There are 132 miles of designated recreational trails and roads maintained within JWCWMA. As part of the JWCWMA Recreational Master Plan update, FWC will continue to evaluate the potential for additional trails, as well as trail connectivity opportunities to other regional public conservation areas, and will monitor existing and new trails biannually for user impacts to natural communities.

5.6.8 Bicycling

Biking is permitted on all interior roads and trails except the Hungryland Boardwalk.

5.6.9 Equestrian

Horses are allowed on the area throughout the year except from the Sunday 2 weeks prior to the opening of archery season until 8:00 a.m. the day prior to the archery season. The JWCWMA offers 132 miles of roads and trails for horseback riding. Parking for trailers is available at the south check station entrance and at campsites A, B, H, I, K, and N. No water is available. Horseback riding is prohibited on the Hungryland Boardwalk.

Children under the age of 16 are required to wear a helmet when riding on public lands. For more detailed information refer to Nicole's Law. All horseback riders must have proof of current negative Coggins Test results for their horses when on state lands.

5.6.10 Camping

Camping is permitted only in designated campsites on the area. During archery season through general gun season camping is permitted seven days a week. However, camping is only permitted on weekends throughout the rest of the year. Campsites are available on a first-come, first-served basis. During archery season, camping areas L and M and half of B are designated for short-term camping (no longer than three days). Additional camping opportunities will be contemplated as part of the JWCWMA RMP development process.

5.6.11 Geocaching

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

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

5.6.12 Scenic Driving

Roads pass through a variety of natural communities on the area and offer the exploring driver excellent opportunities to observe the outstanding scenic resources described earlier, including its wildlife, wild flowers, and much more on Florida's JWCWMA wild lands.

Visit the FWC website for vehicle use regulations (<http://myfwc.com/viewing/recreation/wmas/lead/jw-corbett/visitor-information>).

5.6.13 Programs

The JWCWMA has the first and only “Friends of” group within the FWC. Established in 2000, the Friends of Corbett (FOC) meets monthly to discuss assistance for the JWCWMA and the EYCC, located within JWCWMA. In the past, FOC has raised monies for dumpsters, clothes washers/driers, refrigerators, signs, lawn mowers and repairs to the EYCC and the JWCWMA, including \$75,000 for vehicular roads. They hold an annual banquet each June for board elections, member recruitment and socializing. FOC presents volunteer awards and plaques at the banquet and volunteer approximately 450 hours themselves. The day before the banquet, the Florida Sportsmen Conservation Association cleans and mows the Youth Camp in preparation for summer camp. FOC biannually sponsors a Tales of Corbett banquet where speakers present topics of historic nature about the JWCWMA.

5.6.14 Everglades Youth Conservation Camp

The EYCC was developed by FWC and partnership with organizations and individuals in the late 1960s. The EYCC is committed to the conservation of South Florida's unique ecology and providing youth with conservation education opportunities by learning more about conservation, protecting wild natural areas and the animals in natural habitats, and preserving the heritage of conservation and conservation related activities hunting, fishing, amateur naturalists, and wildlife viewing with our youth for generations to come. For decades, FWC employees and others have volunteered work at the camp each summer as counselors, guides, and teachers to provide the youth campers with a wide variety of conservation education activities to ensure its continuing success. A map showing the layout and location of the facility on the area is displayed in Figure 9.

Since its initial establishment more 50 years ago, over 25,000 youth have participated in the EYCC programs. The camp facility is managed by FWC. The residential summer camp program is for campers 8 to 14 years old. The EYCC also offers a Junior Counselor program for campers 15 to 17 years old. Summer camp activities challenge campers' physical, mental, and social growth. Cabin counselors serve as guides through camp life and instructors are mentors and role models. The EYCC's summer programs feature a unique environmental education theme with outdoor adventure activities in the Florida Everglades and other recreational activities. In 1995 the Youth Conservation Camp expanded to a capacity of 96 campers per week.

In addition to the summer camp, the EYCC also provides for diverse public use, which have included frequent hunter safety courses, bow hunting courses, firearms familiarization courses, youth hunter education challenge (advanced hunter safety), boy and girl scout groups, school programs, Becoming an Outdoors Woman programs, National Wild Turkey Federation's Women in the Outdoors program, and county school programs.



As outlined in Section 6.8 the FWC plans to complete extensive enhancements, renovations or replacement of many or all of the EYCC facilities due to ongoing maintenance and management concerns. The FWC is working with funding partners to facilitate these new infrastructure improvements, extensive enhancements, renovations and replacements within the life cycle of this management plan.

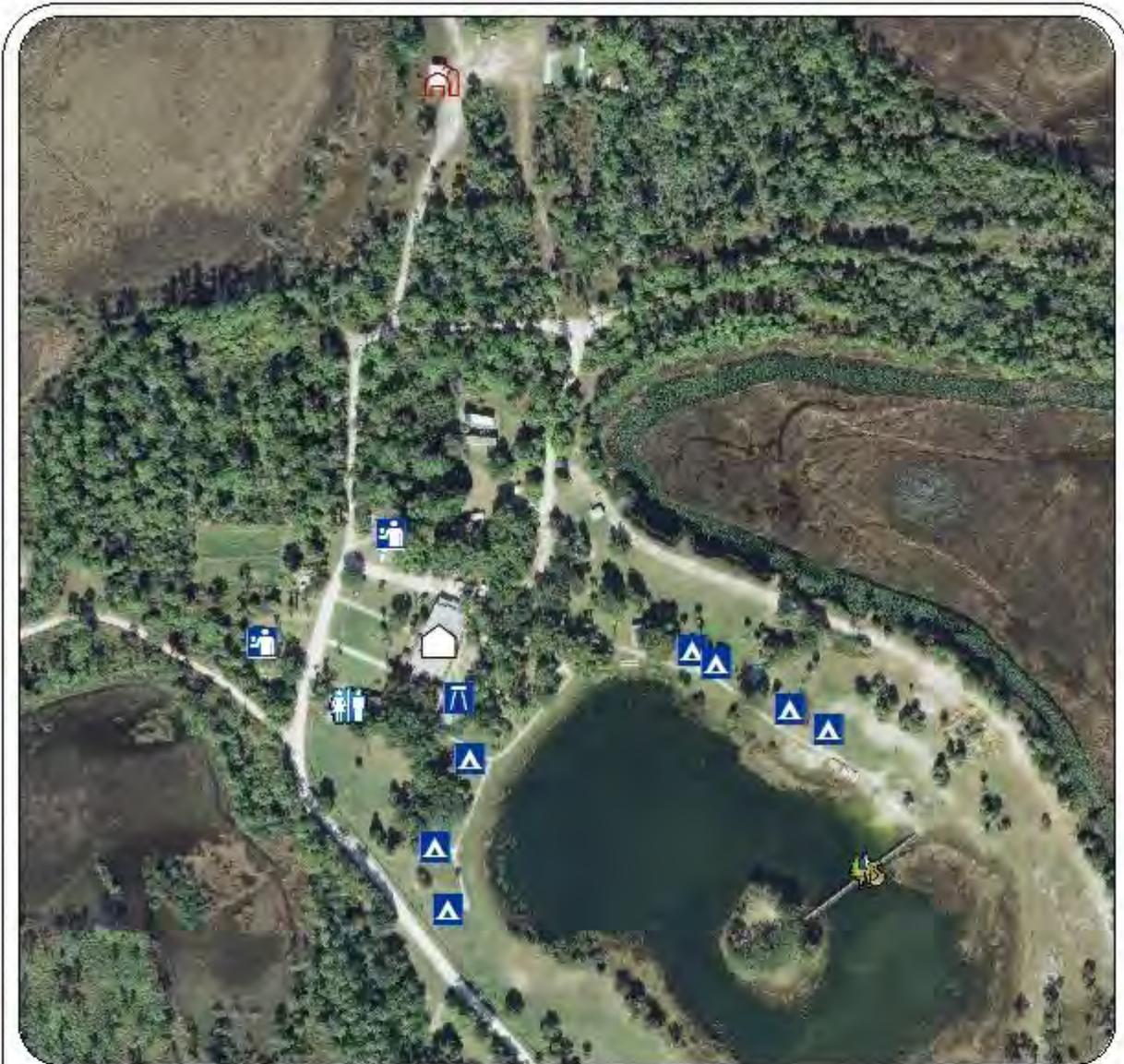
The EYCC is an American Camp Association (ACA) accredited facility, meeting all ACA health, safety, and program quality standards. Some of the EYCC features include:

- 252 acres surrounded by 60,000 acres of Everglades habitat
- Air conditioned cabins and dining hall
- Cafeteria style dining
- Gender and age appropriate accommodations
- Aquatic activity lake
- Archery and rifle range
- Boardwalk and hiking trails
- Campfire pits
- Fishing pond
- 1:8 staff to camper ratio
- 24 hour onsite medical care

For the past sixteen years local clubs have sponsored an annual clean-up, logging approximately 500 volunteer hours annually and filling four 20-cubic yard dumpsters before noon. At noon, all participants meet at a designated camp to have lunch provided by the clubs. Local club involvement includes: Florida Sportsmen Conservation Association, National Wild Turkey Federation, Florida Trails Association, Palm Beach Airboat and Halftrack Association, Wellington Radio Club, Pine Jog Environmental Center and Friends of Corbett.

EYCC is located on the JWCWMA. The Youth Camp was created by individuals who cared deeply about conservation, protecting wilderness areas, wildlife in natural habitats and preserving a way of life. The camp facility is managed by the Florida Youth Conservation Centers Network, Florida Fish and Wildlife Conservation Commission.

The residential summer camp program is for children completing 3rd – 8th grade. The EYCC also offers a Leadership Camp for youth completing grades 9th – 12th grade. Summer camp activities challenge camper’s physical, mental and social growth. Group leaders and instructors serve as guides through camp life and activities, mentors and role models. EYCC’s summer programs feature a unique conservation education theme with outdoor adventure activities in the Florida Everglades, as well as time to relax, have fun, and make new friends.



JW Corbett WMA
 ~60,478 Acres
 Palm Beach County, Florida



0 0.0375 0.075 0.15 Miles
 Created in ArcGIS 10.1 by the Florida Fish and Wildlife Conservation Commission October, 2013

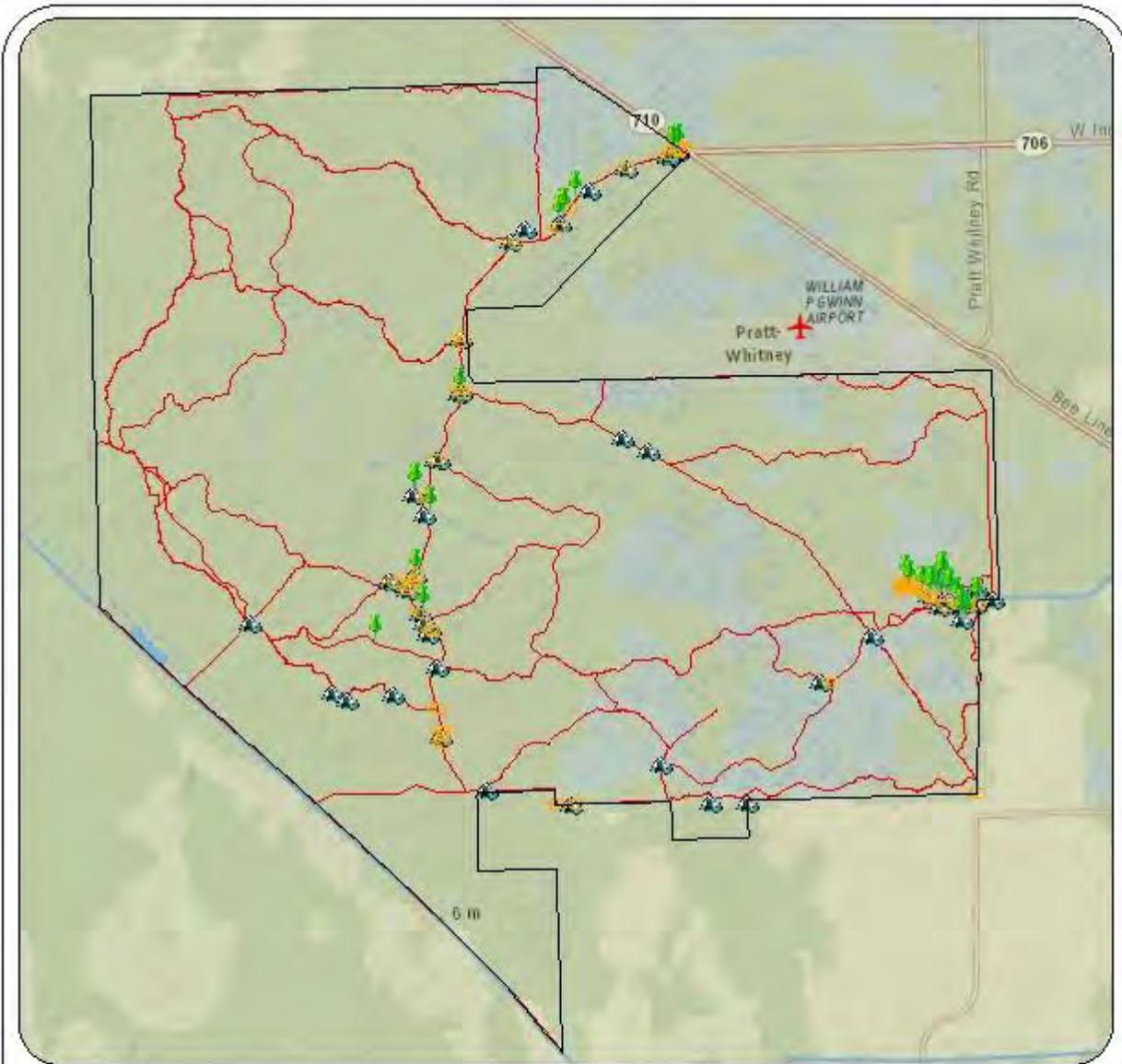
EYCC Facilities and Structures on the JWCWMA

Legend

- Everglades Youth Conservation Camp
- Structure Type
 - Picnic Shelter
 - Conference Center Dining Hall
 - Classroom
 - Bathrooms
 - Boardwalk
 - Cabin 1
 - Cabin 2
 - Cabin 3
 - Cabin 4
 - Cabin 5
 - Cabin 6
 - Cabin 7
 - Residence 1
 - Residence 2



Figure 9. Everglades Youth Conservation Facilities on the JWCWMA



JW Corbett WMA
 ~60,478 Acres
 Palm Beach County, Florida



0 1 2 4 Miles
 Created in ArcGIS 10.1 by the Florida Fish and Wildlife Conservation Commission October, 2013

Infrastructure and Facilities Map

Legend

- JW Corbett
- Structures
- Signs
- Use Areas
- Roads and Trails



Figure 10. Facilities and Infrastructure Map of the JWCWMA

5.7 Hydrological Preservation and Restoration

Much of the hydrology of the of the JWCWMA and surrounding topography was originally altered through many of the historic drainage and water improvement projects that were undertaken during the early part of Florida's development period. In the 1960s, 23 miles of drainage canals and related water control structures were installed as part of an area water management plan. However, subsequent research and study and overall improved understanding in the importance of natural hydrology to restore and maintain the natural functioning of ecosystems revealed that such changes may result in substantial impacts to native flora and fauna and on overall water quality.

Accordingly, in the 1990s the FWC began hydrological restoration on a broader scale across the area to begin to reestablish the original hydrology to the greatest extent practicable and where such restoration is feasible and would not result in unacceptable downstream impacts to other landowners. To preserve and improve the integrity of natural resources in the JWCWMA, the FWC also began providing technical assistance and support to the ACOE, SFWMD, DEP, and other responsible agencies in their efforts to improve the quantity and quality of water entering the JWCWMA. That effort is ongoing and immediately crucial with respect to the southern boundary of the JWCWMA along the Indian Trail M-O Canal and Levee.

In fact, the critical importance of that effort was confirmed in August 2012, when Tropical Storm Isaac brought 15-20 inches of rain in 72 hours over much of central Palm Beach County including the JWCWMA and communities served by the Indian Trails Improvement District (ITID) resulted in extensive flooding along the southern boundary of the JWCWMA and much of the surrounding communities. Additionally, substantial ponding or backing up of water behind the berm on the JWCWMA resulted in water being retained on the area far longer than recommended for the natural hydroperiod potentially impacting the native habitat and associated wildlife. Although, apparently the existing berm of the M-O Canal/Levee did not breach during this flooding event, subsequent study revealed the integrity of the berm is insufficient and needed to be strengthened to meet current engineering standards for levee systems.

In September of 2012, Governor Rick Scott directed the SFWMD to convene a multi-agency working group including FWC to develop a timely plan to further strengthen the existing berm. Subsequently, the SFWMD convened a multi-agency working group that included the FWC to begin to study the issues and develop plans to help resolve them. After convening and studying many potential ways to begin to address the issues, a plan was developed. Eventually, the interagency team selected a proposed plan and associated project design to strengthen and expand the M-O Canal/Levee to aid in addressing the flooding problems.

Consequently, the USFWS, ARC, the Board of Trustees, and the SFWMD approved the M-O Canal/Levee/Water Management Project, Leon Moss Tract Flowage Project and

corresponding easements in 2014 to provide the SFWMD with the authority and ability to expand and strengthen the existing M-O Canal berm to meet current levee standards, and also provide a mechanism to draw water that collects behind the levee on the JWCWMA, when it reaches unacceptable water management levels, to the planned reservoir on the Mecca Tract. Thus, the approved project will provide additional needed flood protection while simultaneously providing the ability to manage water levels and restore the hydrology on the JWCWMA and the upper Loxahatchee River watershed, which will also provide important conservation benefits.

Moreover, the approved flowage easement on the Leon Moss tract within the JWCWMA will allow the SFWMD to undertake additional flood protection efforts in the surrounding communities by restoring water flows onto the Leon Moss tract within the JWCWMA. Concurrently, that will provide a mechanism to begin restoring the hydrology on the Leon Moss tract which has become hydrologically isolated through alteration of the surrounding hydrology. This will provide further important conservation benefits by restoring the hydrology to more natural conditions enhancing the overall wildlife habitat that will further benefit fish and wildlife.

5.7.1 Hydrological Assessment

The FWC will conduct or obtain a site-specific Hydrological Assessment to identify potential hydrology restoration needs. Based on the results of the Hydrological Assessment, FWC will develop a Conceptual Hydrological Restoration Plan. In association with the SFWMD, DEP, and the ACOE, FWC will continue to cooperate in the implementation of the Comprehensive Everglades Restoration Plan.

The FWC will continue working with the ACOE, SFWMD, ITID, and Palm Beach County to manage hydroperiods to maintain the natural communities on JWCWMA. Additionally, FWC will continue to maintain, monitor, and manipulate water control structures as specified in the SFWMD permit. To maintain and enhance natural hydrological functions, FWC will maintain and install low-water crossings and culverts as appropriate. Currently, FWC cooperates with DEP and the SFWMD for ground water monitoring. In addition, the FWC will continue to cooperate with DEP and SFWMD to develop and implement any necessary surface water quality and quantity monitoring protocols for JWCWMA. In this capacity, FWC will primarily rely on the expertise of the DEP and SFWMD to facilitate these water monitoring activities. As necessary, FWC may independently conduct or contract for water resource monitoring with guidance from the DEP and the SFWMD.

5.8 Forest Resource Management

As previously mentioned, an updated Timber Assessment of the timber resources of the JWCWMA has been conducted in 2009, by the FFS (Appendix 13.13). Additionally, as noted above, the FWC contracted with the FFS to prepare and implement a Forest Management Plan which included reforestation, harvesting and prescribed burning activities based on restoration and maintenance needs of the natural communities and

other forest management goals established for management of the JWCWMA. The management of timber resources will be considered in the context of the Timber Assessment, Forest Management Plan and the overall land management goals and activities.

Timber resources on the area also include some pine plantations in need of thinning for habitat improvement. Hydrological restoration and reintroduction of prescribed burning are the most important factors in re-establishment of natural communities and the enhancement of wildlife habitats in these areas.

Pursuant to OBVM management goals, FWC will continue to manage timber resources for wildlife benefits and natural community restoration. Management activities may include the use of a number of silvicultural practices. 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.

The forested habitats on JWCWMA are vital for many of its wildlife species. Through regularly scheduled and properly timed burns and mechanical treatment, conditions for ground cover plants will improve as well as the overall health and long-term sustainability of the various forested habitats on the area. The FWC will manage the forest resources on the area consistent with OBVM and WCPR Strategy objectives for the area and in keeping with the purposes of acquisition.

5.8.1 Timber Management Plan

If deemed necessary, the FWC will also develop an update to the existing Forest Management Plan for the area through the FFS or the services of a contracted professional forester. Forest Management Plans are developed by FWC where necessary to provide specific management prescriptions for the management of pine forested communities on the respective area.

5.9 Cultural and Historical Resources Management

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

As noted above, the DHR observations are broken down into five categories: archeological sites, resource groups, historical structures, historic bridges, and historic cemeteries. DRH indicates there are six archeological sites, one resource group and 17 archeological and historical surveys for JWCWMA. The first is Big Mound City (PB48). It is listed in the National Register of Historic Places and contains human remains of Native Americans. Other sites, all of which are earthworks, include the following: PB6292 (Big Gopher), PB15939 (Colwell 1), and PB 15940 (Colwell 2). The last historic resource on the site is PB12917 (Seaboard Airline RR).

The FWC will submit subsequently located cultural sites found on JWCWMA to DHR for inclusion in their Master Site File. In cooperation with DHR, five of the overall known cultural sites on the JWCWMA have been identified as meeting the DHR's special criteria for annual monitoring and reporting; FWC will continue to monitor and report on these sites annually. The FWC will consider ways to determine the feasibility of expanding the monitoring of all archeological and historical resources sites on the JWCWMA on an annual basis. FWC will continue to work with DHR to ensure that the required monitoring of cultural resources is sufficient to manage and protect those resources identified. FWC will also strive to continue to provide adequate monitoring of and accurate information about the cultural resources on this area.

5.10 Capital Facilities and Infrastructure

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

5.10.1 Administrative and Operations Management

FWC will continue to maintain 27 facilities on JWCWMA, including the Hungryland Boardwalk and campsites (Figure 10). FWC also maintains 21 miles of roads and 17 miles of designated non-vehicular recreational trails on the JWCWMA.



Additional facilities and improvements associated with the EYCC are also being planned. This extensive renovation/replacement of the EYCC facilities is further detailed in Sections 5.13.3 and 6.8 (Figure 9).

As described in Section 2.4.1 of this Management Plan, for any public facilities that are developed on areas managed by FWC, every effort is made to comply with the Americans with Disabilities Act (Public Law 101-336).

5.11 Land Conservation and Stewardship Partnerships

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

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

5.11.1 Optimal Resource Boundary

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

5.11.2 Optimal Conservation Planning Boundary

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

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

5.11.3 Conservation Action Strategy

The CAS is the third tier, and implements the results of the ORB and OCPB tiers. This element of the process incorporates the conservation planning recommendations into an

action strategy that prioritizes conservation needs. The CAS is integral to the development of conservation stewardship partnerships and also implements the current approved process for establishing the FWC Florida Forever Inholdings and Additions acquisition list.

Primary components of the CAS may include:

- FWC Landowner Assistance Program (LAP)
- FWC conservation planning
- FWC Additions and Inholdings Program Land Conservation Work Plan
- Forest Stewardship Program proposals
- Florida Forever project proposals and boundary modifications
- Conservation easements
- Federal or State grant conservation proposals
- Regional or local conservation proposals
- Local, state, and federal planning proposals
- Non-governmental organization conservation proposals

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

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

5.11.4 FWC Florida Forever Additions and Inholdings Acquisition List

Currently, FWC has identified 26,417 acres of potential additions or privately held inholdings for the JWCWMA. Upon completion of the CAS, additions to the FWC Florida Forever Additions and Inholdings acquisition list may be recommended.

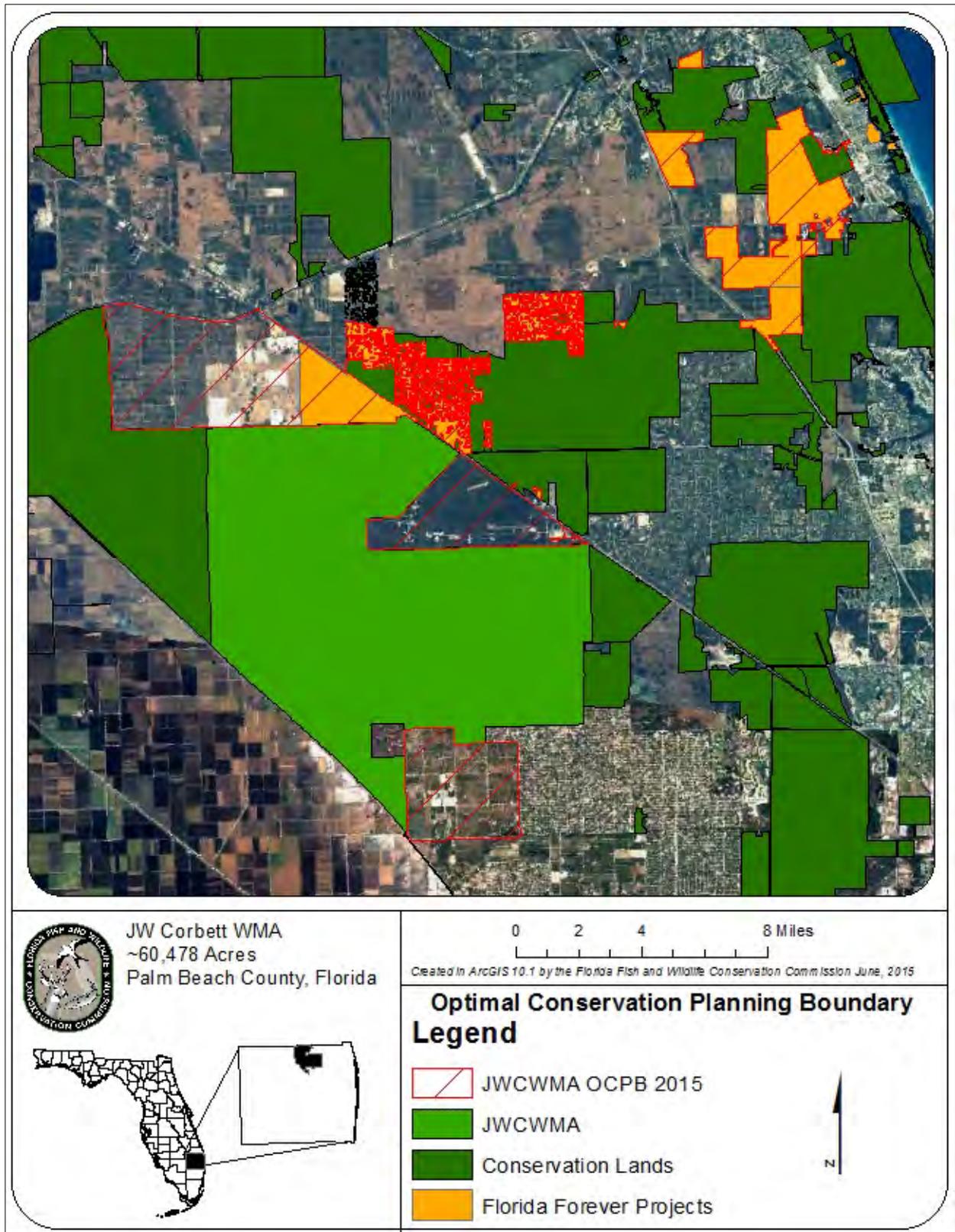


Figure 11. Optimal Planning Conservation Boundary for the JWCWMA

5.12 Research Opportunities

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

5.13 Cooperative Management and Special Uses

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

5.13.1 Cooperative Management

The FWC is responsible for the overall management and operation of the JWCWMA as set forth in the lease agreements with the Board of Trustees and the SFWMD described earlier and the federal Pittman-Robertson Wildlife Restoration Act covenants and requirements discussed earlier. 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 13.9) are followed with regard to any ground-disturbing activities. In addition, the FFS assists FWC by providing technical assistance on forest resource management. Also, FWC cooperates and consults with the SFWMD and DEP for the monitoring and management of both ground and surface water resources and the overall management of the JWCWMA.

5.13.2 M-O Canal Easement and Leon Moss Flowage Easement Projects

As previously noted in Section 5.7 (Hydrology and Restoration), FWC has developed extensive partnerships with the ACOE, SFWMD, DEP, Palm Beach County Board of County Commissioners, ITID, and other supportive agencies in their efforts to improve the quantity and quality of water entering the JWCWMA. That cooperative effort is ongoing and resulted in the approval of the M-O Canal Project and the Leon Moss Tract Flowage Easement Project with the SFWMD on the southern boundary of the JWCWMA along the Indian Trail M-O Canal and Levee and on the Leon Moss Tract of the area.

On November 20, 2014, the FWC, DEP, and the District closed on the JWCWMA M-O Canal Easement Number 32705, the Leon Moss Tract Flowage Easement (Appendix 13.2), and Mecca Public Shooting Park Projects. This closing allows for cooperative management that will aid flood control and protection for the local area, waterway improvement, and hydrological restoration/enhancement. It also facilitated the conveyance a 150 acre parcel

of land from the SFWMD to the FWC located within the SFWMD's Mecca Farms tract adjacent to JWCWMA for the planned development of a public shooting park there by the FWC. The public shooting park parcel and planned facilities are not included within the JWCWMA boundary and are not addressed by this plan. Consequently, the FWC is designing, developing, and operating the public shooting park under a separate operational plan.

The M-O Canal Project and Easement with the SFWMD entails enhancement and development of approximately 6.0 miles of the M-O Canal Levee for improved water management utilizing approximately 92 acres of the of the JWCWMA located along the southern boundary of the area (Figure 12). As noted above, the FWC and BOT granted the SFWMD a flowage easement over approximately 2,300 acres in the southwestern part of the JWCWMA referred to as the "Leon Moss Tract". Development and restoration of the Leon Moss Tract Flowage Easement is contingent on BOT and FWC approval of a hydrology plan for drainage and flowage rights on the Leon Moss Tract.

The FWC will continue to cooperate with the SFWMD to ensure that the overall development and management of the M-O Canal Easement, the Leon Moss Flowage Easement, and their associated projects will provide important public benefits through improved flood protection, hydrological restoration on the JWCWMA, and to the general vicinity for the Loxahatchee River Watershed Restoration project. Together with the conveyance of the proposed Mecca Farms public shooting park parcel to the FWC, they will provide substantial public flood protection, conservation and public outdoor recreation benefits to the State. The Corbett WMA/M-O Canal/Mecca Public Shooting Park Project is shown in Figure 12.

5.13.3 First Responder and Military Training

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

5.13.4 Apiaries

Currently, one apiary is operating on the JWCWMA. New apiary agreement 12428 was established in 2013 and is set to expire in 2016. Use of apiaries is approved for the JWCWMA, and is deemed to be consistent with purposes for acquisition, is in compliance with the Conceptual State Lands Management Plan, and is consistent with the FWC agency mission, goals, and objectives as expressed in the agency Strategic Plan and

priorities document (Appendix 13.7). Location, management, and administration of apiaries on the JWCWMA will be guided by the FWC Apiary Policy (Appendix 13.8).

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J.W. Corbett WMA: M-O Canal/Levee/Water Management Project and Mecca Farms Public Shooting Park Project

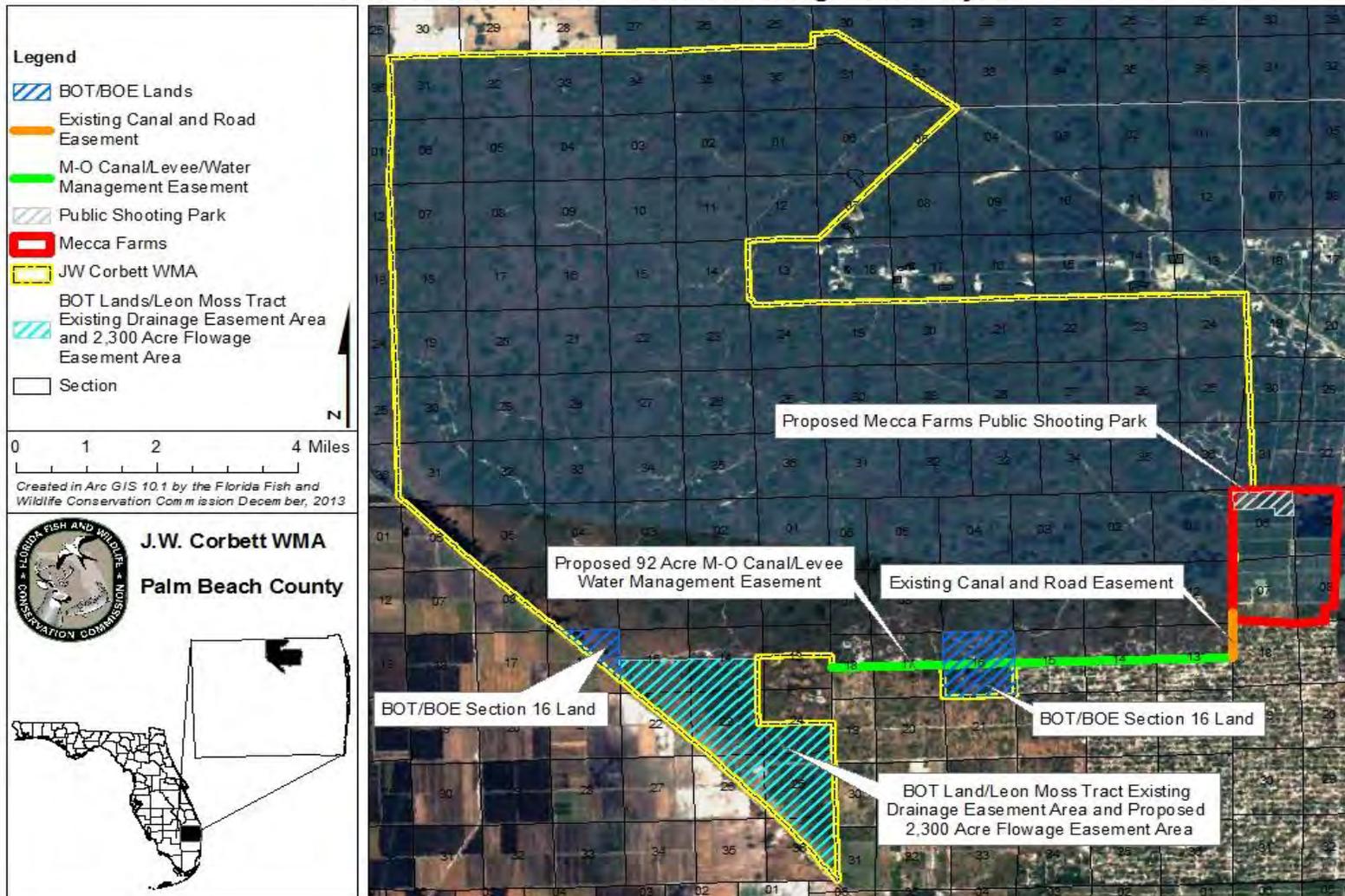


Figure 12. Corbett WMA/M-O Canal/Mecca Public Shooting Park Project

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5.14 Climate Change

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

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

This apparent change in global climate has the potential to disrupt natural processes; in some areas, climate change may cause significant degradation of ecosystems that provide services such as clean and abundant water, sustainable natural resources, protection from flooding, as well as hunting, fishing, and other recreational opportunities. Consequently, climate change is a challenge not only because of its likely direct effects, but also because of its potential to amplify the stress on ecosystems, habitats, and species from existing threats such as exponential increases in surface and ground water use, habitat loss due to increased urbanization, introduction of invasive species, and fire suppression. Potential impacts that may be occurring as a result of climate change include: change in the timing of biological processes, such as flowering, breeding, hibernation, and migration;^{6, 7, 8} more frequent invasions and outbreaks of exotic invasive species;⁹ and loss of habitat in coastal areas due to sea level rise.¹⁰ Some species are projected to adjust to these conditions through ecological or evolutionary adaptation, whereas others are projected to exhibit range shifts as their distributions track changing climatic conditions. Those species that are unable to respond to changing climatic conditions are projected to go extinct. Some estimates suggest that as many as 20% - 30% of the species currently assessed by the IPCC are at risk of extinction within this century if global mean temperatures exceed increases of 2.7 – 4.5° F.¹¹ A number of ecosystems are projected to be affected at temperature increases well below these levels.

At this time, the potential effects of climate change on Florida's conservation lands are just beginning to be studied and are not yet well understood. For example, FWC has begun a process for currently developing climate change adaptation strategies for monitoring, evaluating, and determining what specific actions, if any, may be recommended to ameliorate the projected impacts of climate change on fish and wildlife resources, native vegetation, and the possible spread of exotic and invasive species. Currently, FWC is

continuing its work on the development of these potential adaptation strategies. However, as noted above, the effects of climate change may become more frequent and severe within the time period covered by this Management Plan.

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

Elements of climate change that may potentially affect the JWCWMA include inundation and saltwater intrusion from sea level rise (Figure 13), more frequent and more potent storm events, alteration of vegetation reproductive cycles, and changes in the fire regime. The result of a Sea Level Affecting Marsh Model for the JWCWMA shows habitats that may potentially be impacted. The low-lying coastal habitats, such as salt marsh and hardwood swamp natural communities are projected to face the most direct and dramatic impacts of climate change, particularly from a projected rising sea level and from the projected increased frequency and intensity of coastal storms.^{12, 13, 14, 15} The potential loss of habitat may result in the loss of species using that habitat, including migrating and nesting birds. Storm events also cause considerable physical damage to native vegetation along vulnerable shorelines, impacting nesting habitat for sea life and shorebirds. The projected rise in sea levels may decrease the availability and abundance of prey for wading birds that forage in shallow waters on the expansive tidal flats of the Atlantic Ocean. Climate change may amplify and hasten these effects, potentially at rates that exceed the normal resiliency of plant communities to recover, shift or adapt accordingly.^{16, 17} Projected salt water intrusion into the subsurface freshwater lens from potential sea level rise and saltwater inundation of surface freshwaters from storm surges may alter coastal ecosystems and freshwater marshes, possibly resulting in more salt-tolerant aquatic plant communities.

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

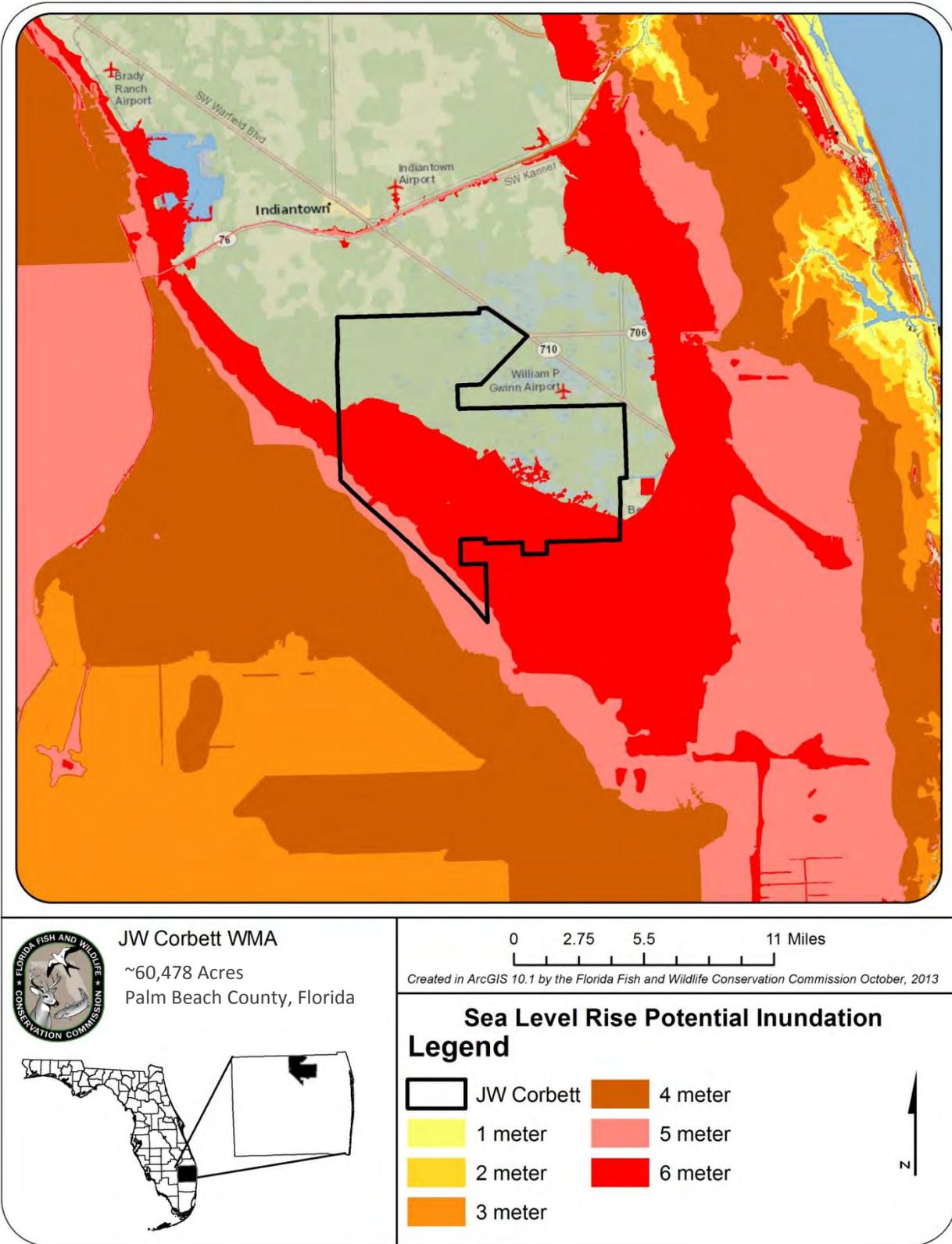


Figure 13. Sea Level Rise Potential Inundation

5.15 Soil and Water Conservation

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

6 Resource Management Goals and Objectives

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

6.1 Habitat Restoration and Improvement

Goal: Improve extant habitat and restore disturbed areas.

Short-term

- 6.1.1 Prescribe burn 8,121 acres of fire-adapted communities on the area per year.
- 6.1.2 Maintain 16,242 acres of fire-adapted communities on the area (50%) per year within 3 - 5 year target fire return interval.
- 6.1.3 Update and implement the area's prescribed burn plan.
- 6.1.4 Conduct habitat/natural community improvement on 25 acres per year including palmetto chopping/mowing.
- 6.1.5 Continue to implement OBVM on the area.
- 6.1.6 Continue to coordinate with FFS to implement prescribed fire on the area.
- 6.1.7 Continue to inform and cooperate with adjacent landowners regarding JWCWMA land management activities including prescribed fire and exotic control.

Long-term

- 6.1.1 Continue to implement the area's prescribed burn plan.
- 6.1.2 Continue to prescribe burn 8,121 acres of fire-adapted communities on the area per year.

- 6.1.3 Continue to implement OBVM on the area.
- 6.1.4 Continue to conduct habitat/natural community improvement on 25 acres per year including possible thinning.
- 6.1.5 Continue to coordinate with FFS to implement prescribed fire on the area.
- 6.1.6 Continue to inform and cooperate with adjacent landowners regarding JWCWMA land management activities including prescribed fire and exotic control.
- 6.1.7 As described in the WCPR Strategy, bring at least 2,000 acres of red-cockaded woodpecker habitat into desired future condition by 2020.

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

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

Short-term

- 6.2.1 Continue to implement the area's WCPR Strategy.
- 6.2.2 As described in the area's WCPR Strategy, monitor 24 imperiled and focal species (i.e., gopher tortoise, American swallow-tailed kite, Bachman's sparrow, Cooper's hawk, crested caracara, Florida mottled duck, Florida sandhill crane, limpkin, Northern bobwhite, red-cockaded woodpecker, short-tailed hawk, snail kite, Southeastern American kestrel, Southern bald eagle, wading birds [white ibis, great egret, snowy egret, little blue heron, roseate spoonbills, wood stork, reddish egret, and tricolored heron], Sherman's fox squirrel, and Florida black bear).
- 6.2.3 As described in the area's WCPR Strategy, evaluate red-cockaded woodpeckers for recruitment cluster installation and needed management actions; coordinate with water managers to obtain appropriate water levels; continue ongoing natural community management including exotic plant control, and prescribed fire activities.
- 6.2.4 Continue to collect opportunistic wildlife species occurrence data on the area.
- 6.2.5 Continue to implement the area's WCPR Strategy by managing identified habitats and monitoring identified species.
- 6.2.6 As described in the area's WCPR Strategy, conduct biannual marsh bird monitoring (if resources are available); wading bird roost/colony surveys (if resources available); mottled duck nest box monitoring and maintenance; red-cockaded woodpecker surveying and monitoring will include: pre-nest checks, banding, fledged checks, and breeding group monitoring.

Long-term

- 6.2.7** WCPR Strategy, continue to evaluate red cockaded woodpeckers for recruitment cluster installation and needed management actions; coordinate with water managers to obtain appropriate water levels; continue ongoing natural community management including exotic plant control, and prescribed fire activities.
- 6.2.8** As described in the WCPR Strategy, increase the number of RCW recruitment clusters by at least 8 prior by 2020.
- 6.2.9** As described in the area's WCPR Strategy, continue to conduct biannual marsh bird monitoring (if resources are available); wading bird roost/colony surveys (if resources available); mottled duck nest box monitoring and maintenance; conduct Northern Bobwhite survey during the 2017-2018 fiscal year and the 2018-2019 fiscal year; red cockaded woodpecker surveying and monitoring will include: pre-nest checks, banding, fledged checks, and breeding group monitoring.
- 6.2.10** Continue to collect opportunistic wildlife species occurrence data on the area.
- 6.2.11** By 2021, revise and update the area's WCPR Strategy.

6.3 Exotic and Invasive Species Maintenance and Control

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

Short-term

- 6.3.1** Annually treat at least 20,116 acres of FLEPPC Category I and Category II invasive exotic plant species on the area including air potato, Australian pine, Brazilian pepper, Burma reed, Caesar's weed, castor bean, catclaw mimosa, cogon grass, downy rose-myrtle, dwarf papyrus, earleaf acacia, guava, Guinea grass, java plum, lantana, limpo grass, melaleuca, natal grass, Old World climbing fern, para grass, rosary pea, sea hibiscus, torpedo grass, tropical soda apple, water spangles, water-lettuce, and wedelia.
- 6.3.2** Continue to implement Early Detection Rapid Response treatments of invasive exotic plant species on the area as needed.
- 6.3.3** Implement control measures on one nuisance animal species (wild hog) on the area.
- 6.3.4** Monitor for exotic animal species and control as necessary including brown anole, Burmese python, cane toad, Cuban tree frog, great green iguana, greenhouse frog, and Nile monitor on the area.

Long-term

- 6.3.5** Continue to annually treat at least 20,116 acres of FLEPPC Category I and Category II invasive exotic plant species on the area, including air potato, Australian pine, Brazilian pepper, Burma reed, Caesar's weed, castor bean, catclaw mimosa, cogon grass, downy rose-myrtle, dwarf papyrus, earleaf acacia, guava, Guinea grass, java plum, lantana, limpo grass, melaleuca, natal grass, Old World climbing fern, para grass, rosary pea, sea hibiscus, torpedo grass, tropical soda apple, water spangles, water-lettuce, and wedelia.
- 6.3.6** Continue to implement Early Detection Rapid Response treatments of invasive exotic plant species on the area as needed.
- 6.3.7** Implement control measures on one nuisance animal species (wild hog) on the area.
- 6.3.8** Monitor for exotic animal species and control as necessary including brown anole, Burmese python, cane toad, Cuban tree frog, great green iguana, greenhouse frog, and Nile monitor on the area.

6.4 Public Access and Recreational Opportunities

Goal: Provide public access and recreational opportunities.

Short-term

- 6.4.1** Maintain public access and recreational opportunities on the area to allow for a recreational carrying capacity of 965 visitors per day.
- 6.4.2** Continue to provide the area's EYCC for interpretation and education.
- 6.4.3** Continue to maintain 17 miles of trails.
- 6.4.4** Develop and implement a Recreation Master Plan.
- 6.4.5** Continue to provide hunting opportunities for deer, turkey, small game, fur-bearers, and wild hogs.
- 6.4.6** Continue to provide paddling opportunities on appropriate water bodies.
- 6.4.7** Continue to provide fishing opportunities on appropriate water bodies.
- 6.4.8** Monitor trails annually for visitor impacts.
- 6.4.9** Continue to maintain ponds within campsites for recreational use.

Long-term

- 6.4.10 Continue to maintain public access and recreational opportunities to allow for a recreational carrying capacity of 965 visitors per day.
- 6.4.11 Continue to provide website, three kiosks, recreation guide, bird list, and youth education programs through the EYCC for interpretation and education.
- 6.4.12 Continue to maintain 17 miles of trails on the area.
- 6.4.13 Continue to provide hunting opportunities for deer, turkey, small game, and wild hogs on the area.
- 6.4.14 Continue to provide paddling opportunities on appropriate water bodies on the area.
- 6.4.15 Continue to provide fishing opportunities on appropriate water bodies on the area.
- 6.4.16 Monitor trails on the area annually for visitor impacts.
- 6.4.17 Continue to maintain ponds within campsites for recreational use on the area.

6.5 Hydrological Preservation and Restoration

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

Short-term

- 6.5.1 Conduct or obtain a hydrological assessment of the area to identify potential hydrology restoration needs.
- 6.5.2 To maintain and enhance natural hydrological functions, install and maintain low-water crossings, canals, and culverts on the area as appropriate.
- 6.5.3 Continue to cooperate with the SFWMD for the monitoring of surface and ground water quality and quantity on the area.
- 6.5.4 Continue to maintain Steven gauge monitoring systems on the area as appropriate.
- 6.5.5 Continue to monitor and maintain rain gauges on the area as appropriate to aide in monitoring hydrologic conditions on JWCWMA.
- 6.5.6 Continue to maintain, monitor, and manipulate water control structures on the area as specified in the SFWMD permit.
- 6.5.7 Continue working with the ACOE, SFWMD, ITID, and Palm Beach County to manage hydroperiods to maintain natural communities on JWCWMA.

- 6.5.8 In association with SFWMD, DEP, and ACOE continue to implement CERP.
- 6.5.9 Cooperate with the SFWMD on the construction development and management of the M-O Canal/Levee/Waterway Project and the Leon Moss Tract Flowage Easement Project.

Long-term

- 6.5.10 To maintain and enhance natural hydrological functions, continue to install and maintain low-water crossings, canals, and culverts on the area as appropriate.
- 6.5.11 Implement the area's hydrological restoration plan as feasible.
- 6.5.12 Continue to maintain Steven gauge monitoring systems on the area as appropriate.
- 6.5.13 Evaluate, assess, and where appropriate improve EYCC drainage functioning.
- 6.5.14 Continue to monitor and maintain rain gauges on the area as appropriate to aide in monitoring hydrologic conditions on the JWCWMA.
- 6.5.15 Continue to maintain, monitor, and manipulate water control structures on the area as specified in the SFWMD permit.
- 6.5.16 Continue working with the ACOE, SFWMD, ITID, and Palm Beach County to manage hydroperiods to maintain natural communities on JWCWMA.
- 6.5.17 In association with SFWMD, DEP, and ACOE continue to implement CERP.
- 6.5.18 Continue to cooperate with the SFWMD on the construction development and management of the M-O Canal/Levee/Waterway Project and the Leon Moss Tract Flowage Easement Project.

6.6 Forest Resource Management

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

Short-term

- 6.6.1 Cooperate with the FFS or a professional forestry consultant to complete a Timber Assessment for the area's forested pine communities.
- 6.6.2 Consult with the FFS or a professional forestry consultant regarding forest management activities as appropriate.

- 6.6.3 Prepare and implement a Forest Management Plan in association with red-cockaded woodpecker management.
- 6.6.4 Cooperate with the FFS or a professional forestry consultant to complete a Timber Assessment for the area's forested pine communities.
- 6.6.5 Consult with the FFS or a professional forestry consultant regarding forest management activities as appropriate.
- 6.6.6 Prepare and implement a Forest Management Plan in association with red-cockaded woodpecker management.

Long-term

- 6.6.7 Continue to implement a Forest Management Plan in association with red-cockaded woodpecker management.
- 6.6.8 Continue to consult with the FFS or a professional forestry consultant regarding forest management activities as appropriate.

6.7 Cultural and Historical Resources

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

Short-term

- 6.7.1 Ensure all known sites are recorded in the Florida Division of Historical Resources Master Site file.
- 6.7.2 Continue to monitor, protect, and preserve as necessary four identified sites.
- 6.7.3 Coordinate with DHR to assess the need for conducting a cultural resource survey.
- 6.7.4 Monitor all other recorded cultural sites on the area on a regular rotating basis.
- 6.7.5 The FWC will continue to consider ways to determine the feasibility of expanding the interpretation of various sites on the JWCWMA.

Long-term

- 6.7.6 Cooperate with DHR, or trained FWC staff, in designing site plans for development of infrastructure.
- 6.7.7 Cooperate with DHR to manage and maintain known existing cultural resources.
- 6.7.8 Continue to monitor, protect, and preserve as necessary four identified sites.
- 6.7.9 Coordinate with DHR for Archaeological Resources Management training for staff.

6.7.10 Continue to monitor all other recorded cultural sites on the area on a regular rotating basis.

6.7.11 The FWC will continue to consider ways to determine the feasibility of expanding the interpretation of various sites on the JWCWMA.

6.8 Capital Facilities and Infrastructure

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

Short-term

6.8.1 Continue to maintain 27 facilities (Figure 10). The structures on the area include; a floating dock, a cleaning station, two check stations, a number of campsites and informational kiosks, two roofed shooting rangers, the Hungryland Boardwalk and a picnic pavilion. Additional structures include an office, two staff residences, equipment, chemical and seed sheds and two pole barns.

6.8.2 Continue to maintain 21 miles of roads on the area.

6.8.3 Continue to maintain 112 miles of vehicular trails existing on the area.

6.8.4 As necessary, improve or repair five facilities, 21 miles of roads, and five miles of trails existing on the area.

6.8.5 Continue to maintain 17 miles of designated non-vehicular recreational trails on the area.

Long-term

6.8.6 Monitor trails and infrastructure on the area biannually for visitor impacts.

6.8.7 Continue to maintain 27 facilities (Figure 10). The structures on the area include; a floating dock, a cleaning station, two check stations, a number of campsites and informational kiosks, two roofed shooting rangers, the Hungryland Boardwalk and a picnic pavilion. Additional structures include an office, two staff residences, equipment, chemical and seed sheds and two pole barns.

6.8.8 Continue to maintain 21 miles of roads on the area.

6.8.9 Continue to maintain 112 miles of vehicular trails existing on site on the area.

6.8.10 As necessary, continue to improve or repair 27 facilities, 21 miles of roads, and 112 miles of vehicular trails on the area.

- 6.8.11 As funding allows, and in conjunction with the EYCC site improvement design study, improve, or replace all buildings and associated facilities within the current EYCC site footprint.
- 6.8.12 Continue to maintain 17 miles of designated non-vehicular recreational trail on the area.
- 6.8.13 Construct and maintain Pratt canal crossing, non-vehicular access to Dupuis WEA, interpretive information for cultural sites, and replace kiosk and three shelters at Hungryland trailhead.

6.9 Land Conservation and Stewardship Partnerships

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

Short-term

- 6.9.1 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.
- 6.9.2 Develop a Conservation Action Strategy for the area.
- 6.9.3 Contact and inform adjoining landowners about the FWC LAP to pursue non-acquisition conservation stewardship, partnerships, and potential conservation easements.
- 6.9.4 Identify and recommend parcels for addition to the FWC acquisition list.
- 6.9.5 Identify potential non-governmental organization partnerships and grant program opportunities.
- 6.9.6 Determine efficacy of conducting an adjacent landowner's assistance/conservation stewardship partnership workshop.

Long-term

- 6.9.7 To minimize fragmentation of the area, continue to identify strategic parcels to revise the completed OCPB for the JWCWMA as deemed appropriate and necessary.
- 6.9.8 Continue to identify and recommend parcels for addition to the FWC acquisition list.
- 6.9.9 Pursue acquisition of parcels added to the FWC acquisition list as acquisition work plan priorities and funding allow.

- 6.9.10 To minimize fragmentation of the area, continue to identify strategic parcels to revise the completed OCPB for the JWCWMA as deemed appropriate and necessary.
- 6.9.11 Continue to identify and recommend parcels for addition to the FWC acquisition list.
- 6.9.12 Pursue acquisition of parcels added to the FWC acquisition list as acquisition work plan priorities and funding allow.
- 6.9.13 As feasible, continue to periodically contact and meet with adjacent landowners for willingness to participate in the area's Conservation Action Strategy, and coordinate landowner assistance/conservation stewardship partnership workshops as deemed appropriate.

6.10 Climate Change

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

Short-term

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

Long-term

- 6.10.2 Continue to coordinate with FWC-FWRI Climate Change Adaptation Initiative to identify potential impacts of projected climate change on fish and wildlife resources and operational management of the JWCWMA.
- 6.10.3 Incorporate appropriate climate change adaptation strategies into the WCPR for the JWCWMA.
- 6.10.4 As appropriate, update the JWCWMA Prescribed Fire Plan to incorporate new scientific information regarding projected climate change, such as increased frequency of drought, on the fire regime of the JWCWMA's fire-adapted habitats.
- 6.10.5 As science, technology, and climate policy evolve, educate natural resource management partners and the public about the agency's policies, programs and efforts to study, document and address potential climate change; assess the need to incorporate public education about climate change into the update of the JWCWMA Recreation Plan.

6.11 Research Opportunities

Goal: Explore and pursue cooperative research opportunities.

Short-term

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

Long-term

- 6.11.4** Continue to explore and pursue cooperative research opportunities through universities, FWRI, etc.
- 6.11.5** Continue to cooperate with researchers, universities, and others as appropriate.
- 6.11.6** Continue to assess the need for and pursue research and environmental education partnership opportunities as appropriate.

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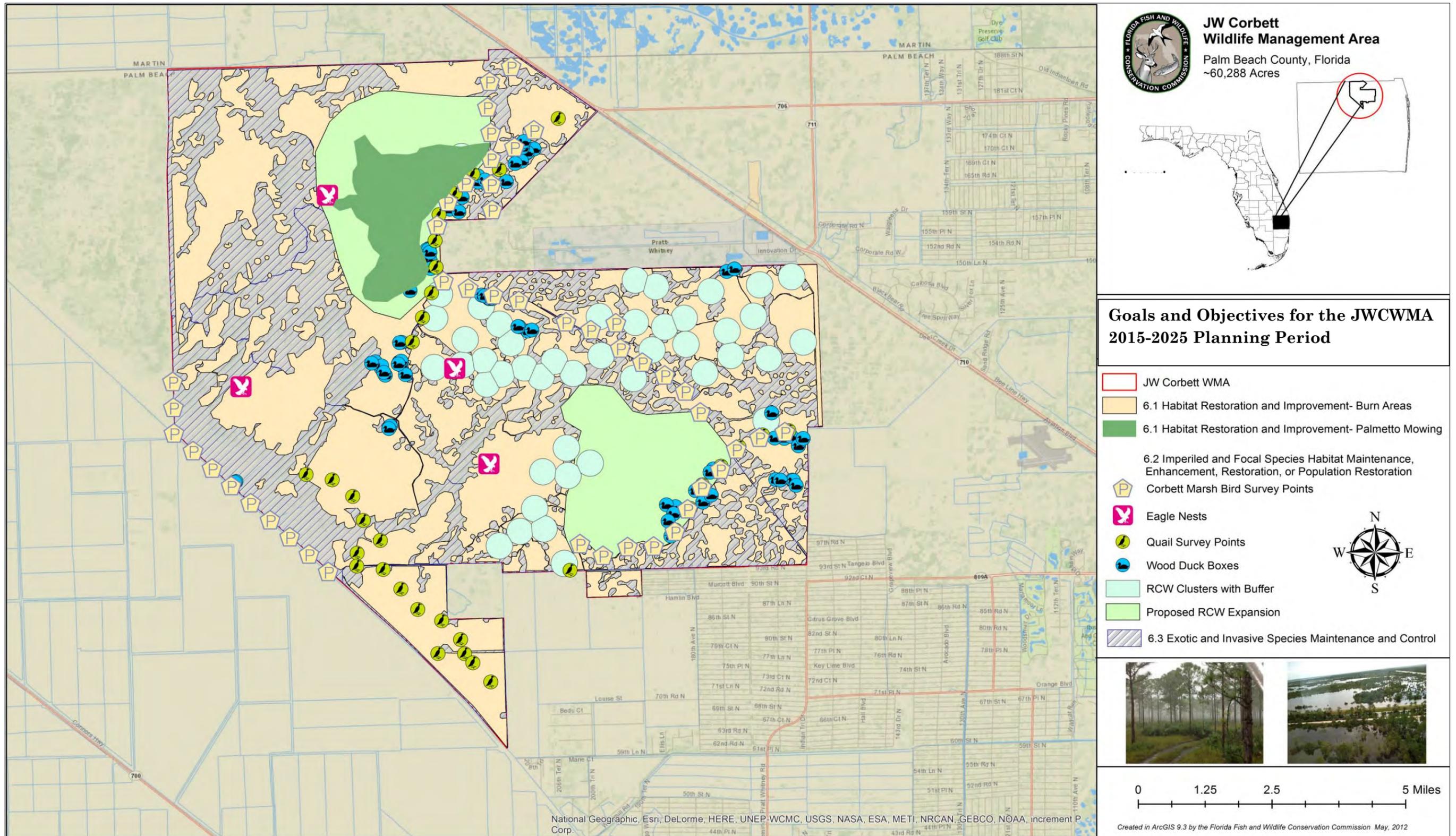


Figure 14. Goals and Objectives for the JWCWMA 2015-2025 Planning Period

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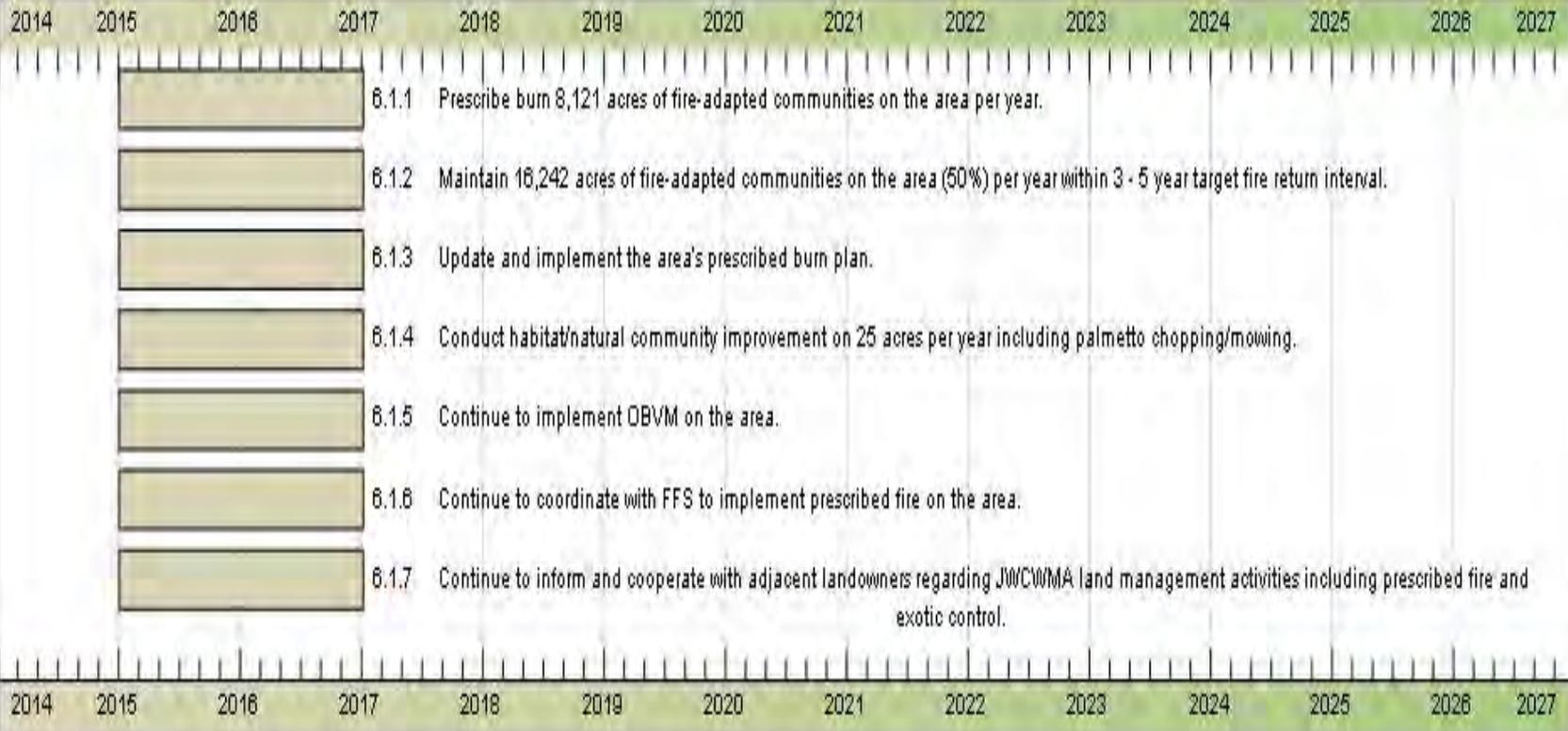
7 Schedule: Timelines for Completion of Resource Management Goals and Objectives

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

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Habitat Restoration and Improvement

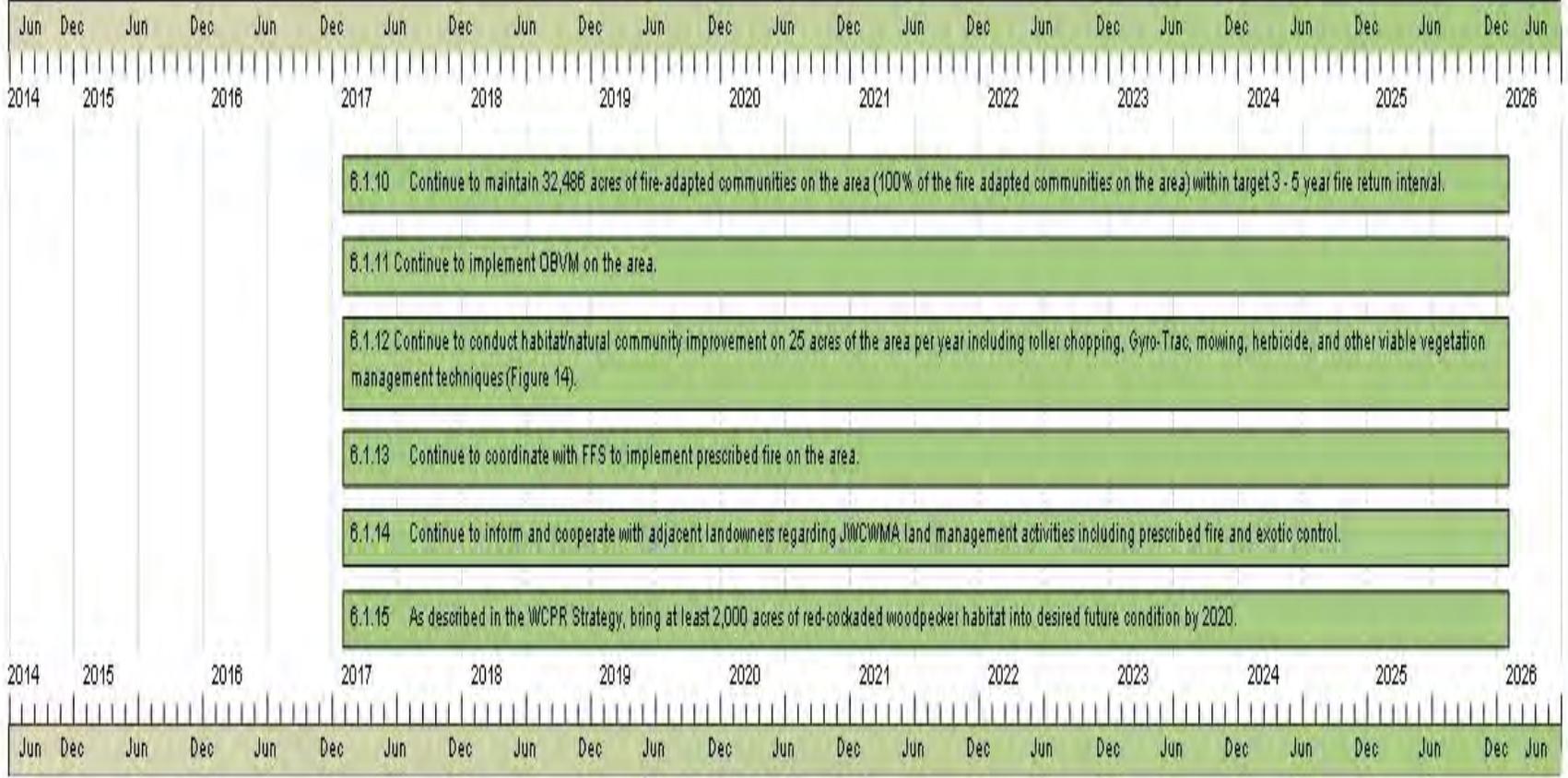
Goal: Improve extant habitat and restore disturbed areas.



Short-term

J.W. Corbett Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion

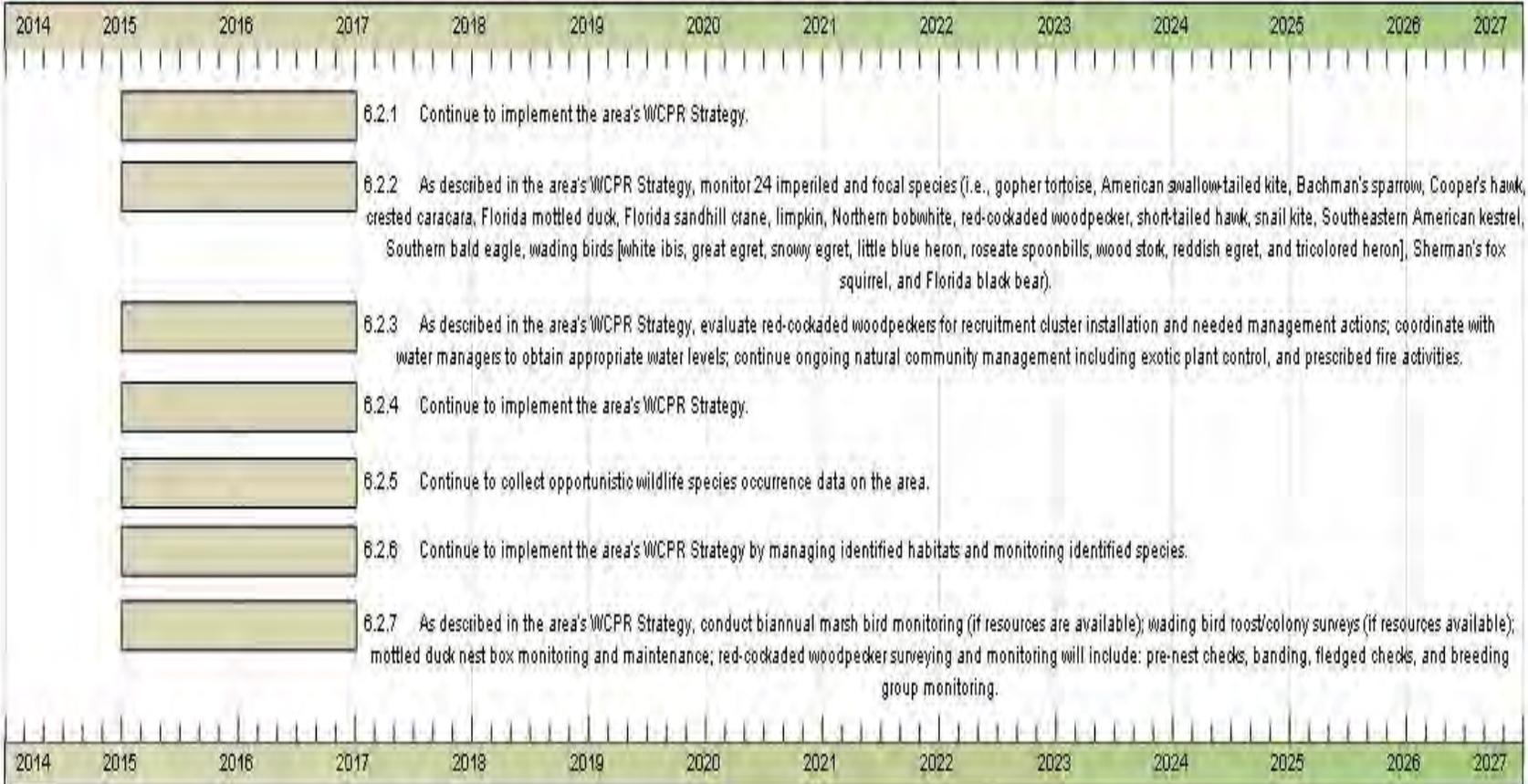
Habitat Restoration and Improvement
Goal: Improve extant habitat and restore disturbed areas.



Long-term

J.W. Corbett Wildlife Management Area
 Management Plan - Goals and Objectives - Timelines for Completion

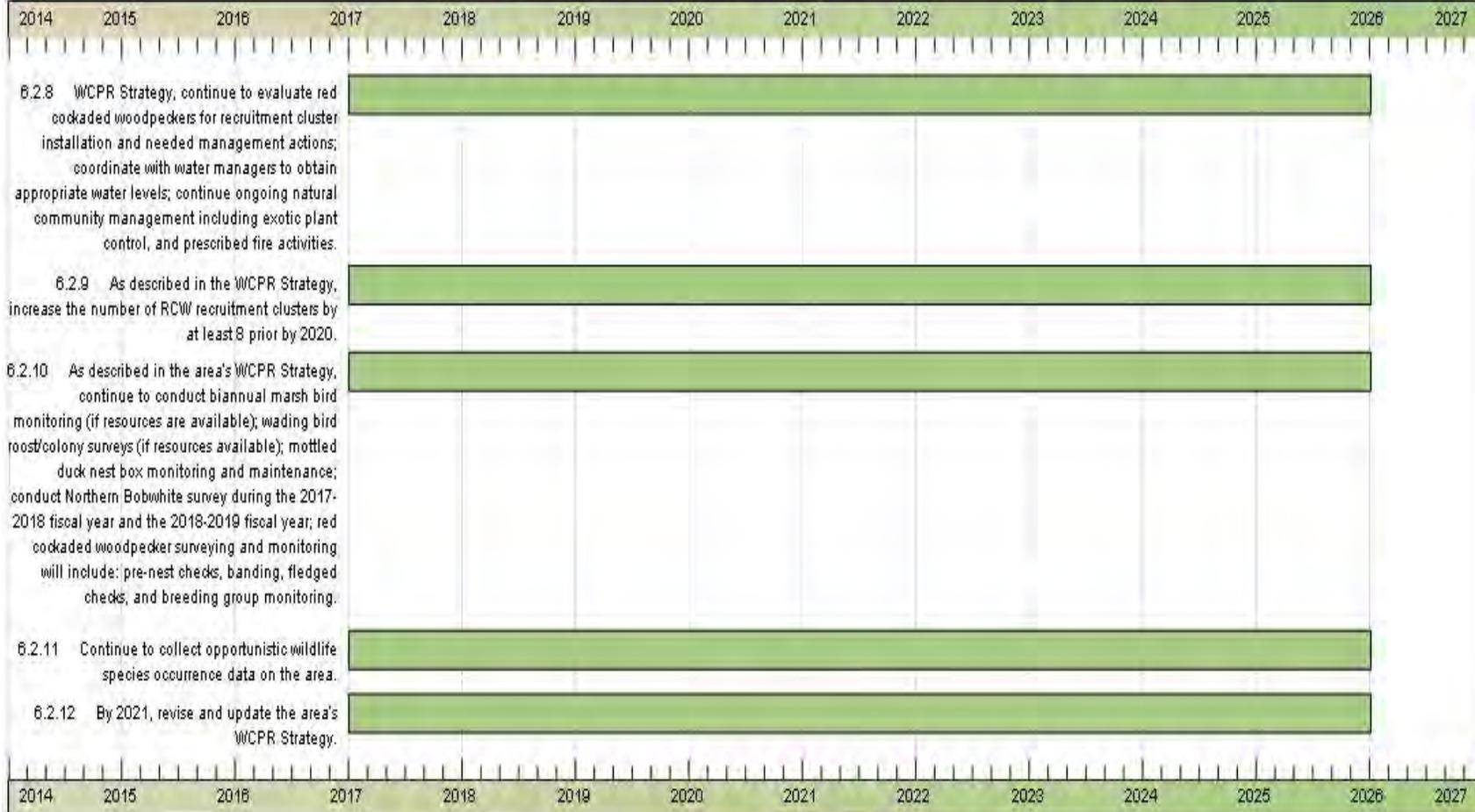
Imperiled and Focal Species Habitat Maintenance, Enhancement, Restoration, or Population Restoration
Goal: Maintain, improve, or restore imperiled and focal species populations and habitats.



Short-term

J.W. Corbett Wildlife Management Area
 Management Plan - Goals and Objectives - Timelines for Completion

Imperiled and Focal Species Habitat Maintenance, Enhancement, Restoration, or Population Restoration
Goal: Maintain, improve, or restore imperiled and focal species populations and habitats.

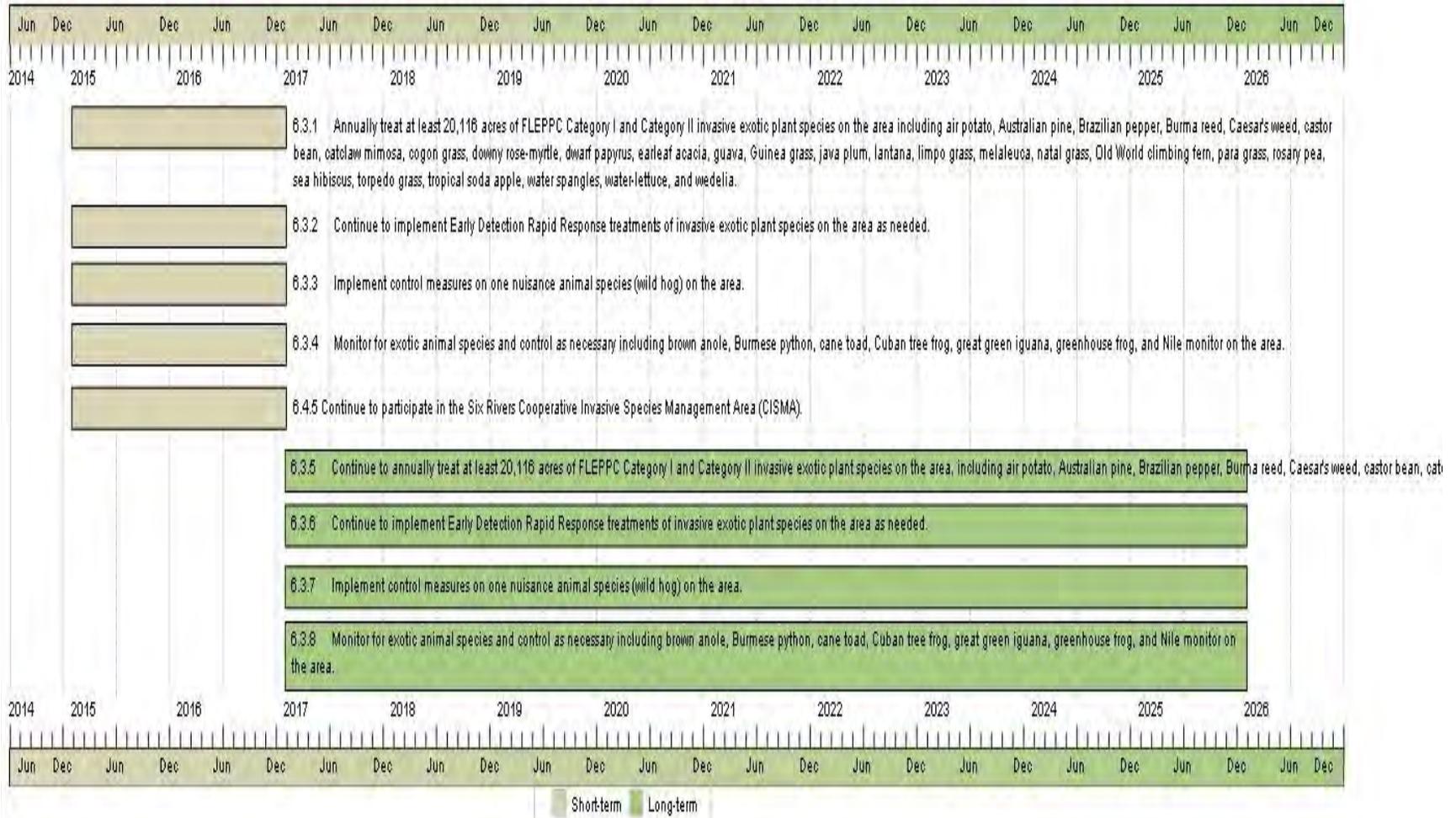


■ Long-term

J.W. Corbett Wildlife Management Area
 Management Plan - Goals and Objectives - Timelines for Completion

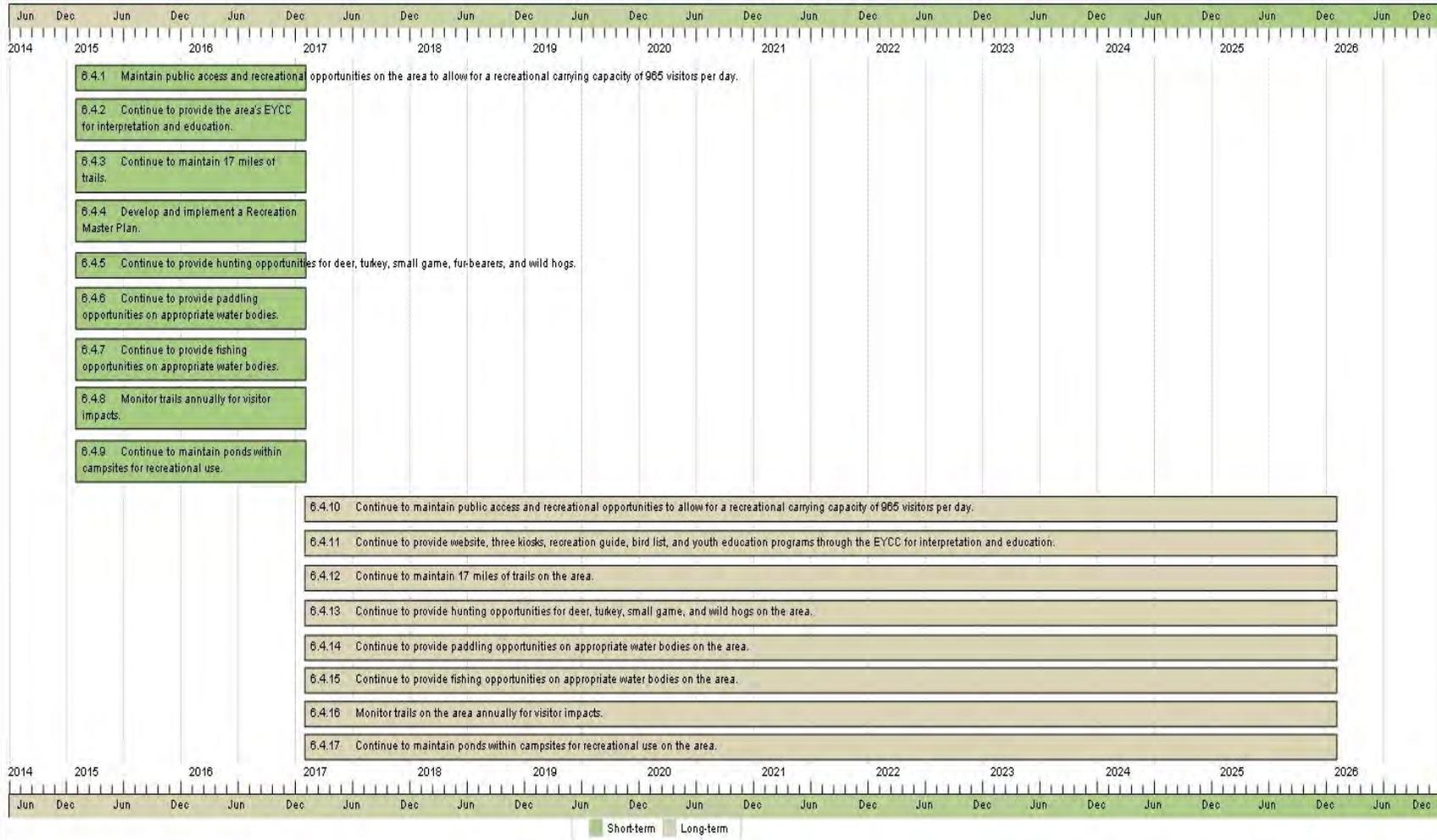
Exotic and Invasive Species Maintenance and Control

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

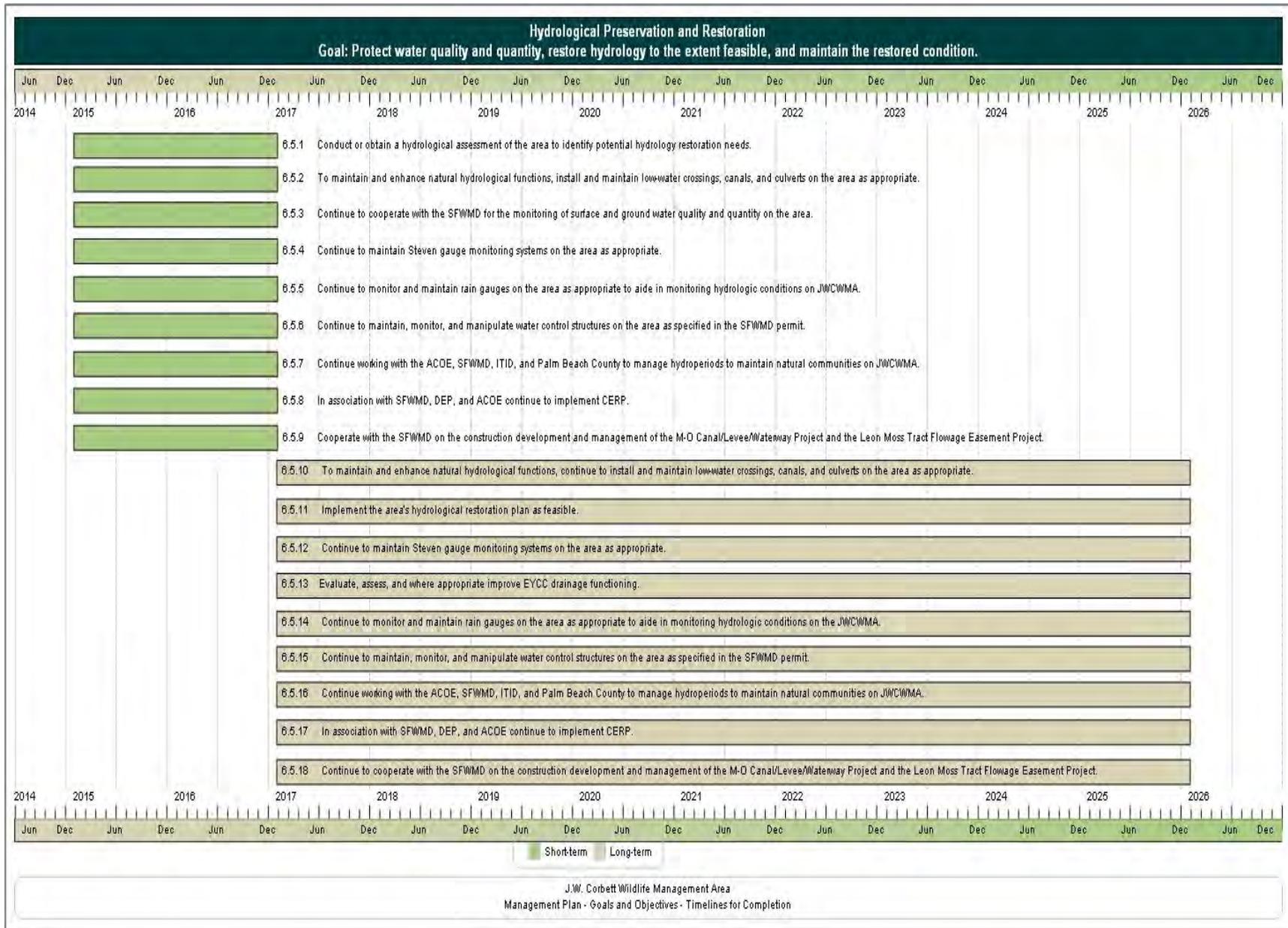


J.W. Corbett Wildlife Management Area
 Management Plan - Goals and Objectives - Timelines for Completion

Public Access and Recreational Opportunities
Goal: Provide public access and recreational opportunities.

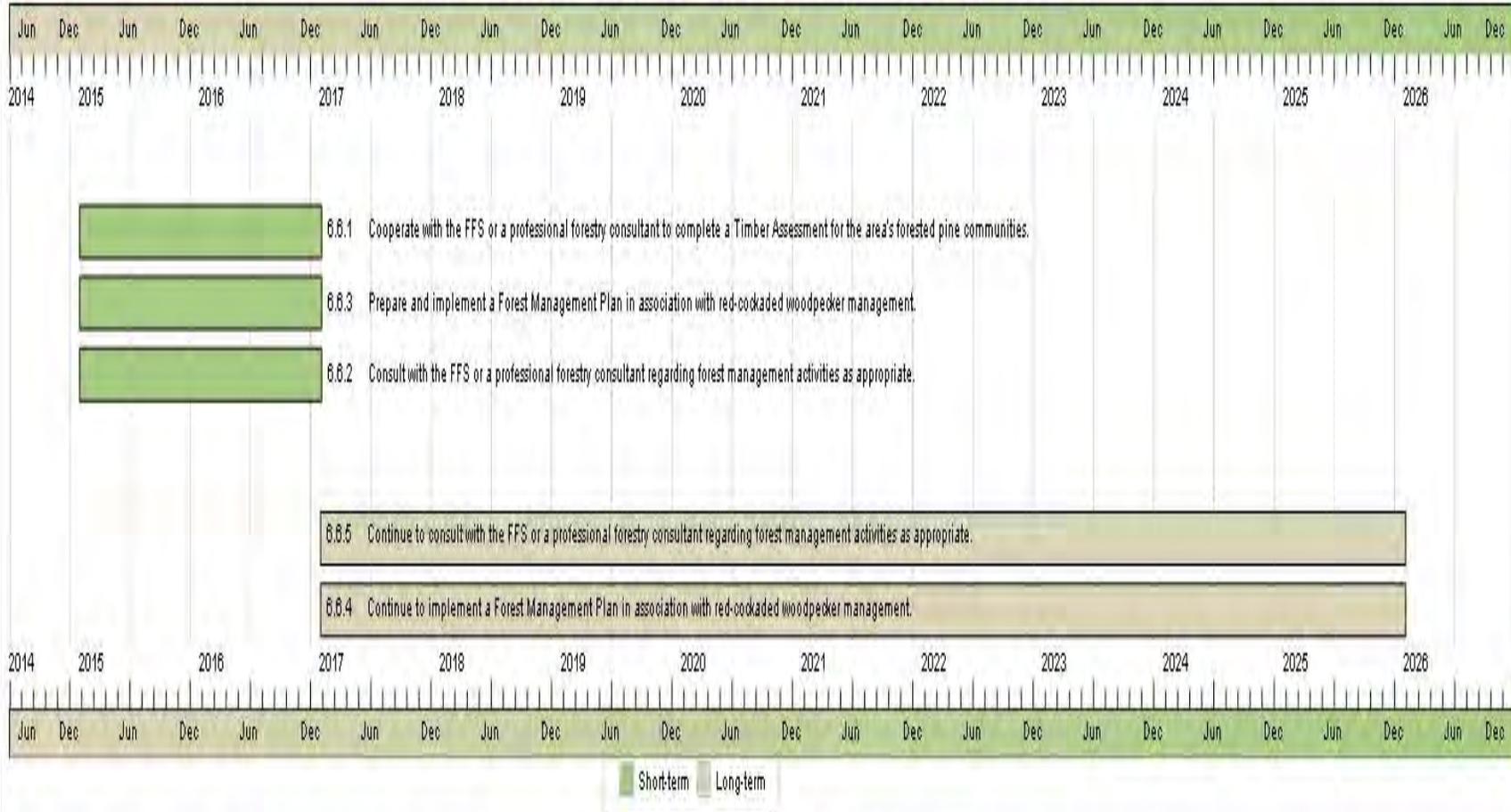


J.W. Corbett Wildlife Management Area
 Management Plan - Goals and Objectives - Timelines for Completion

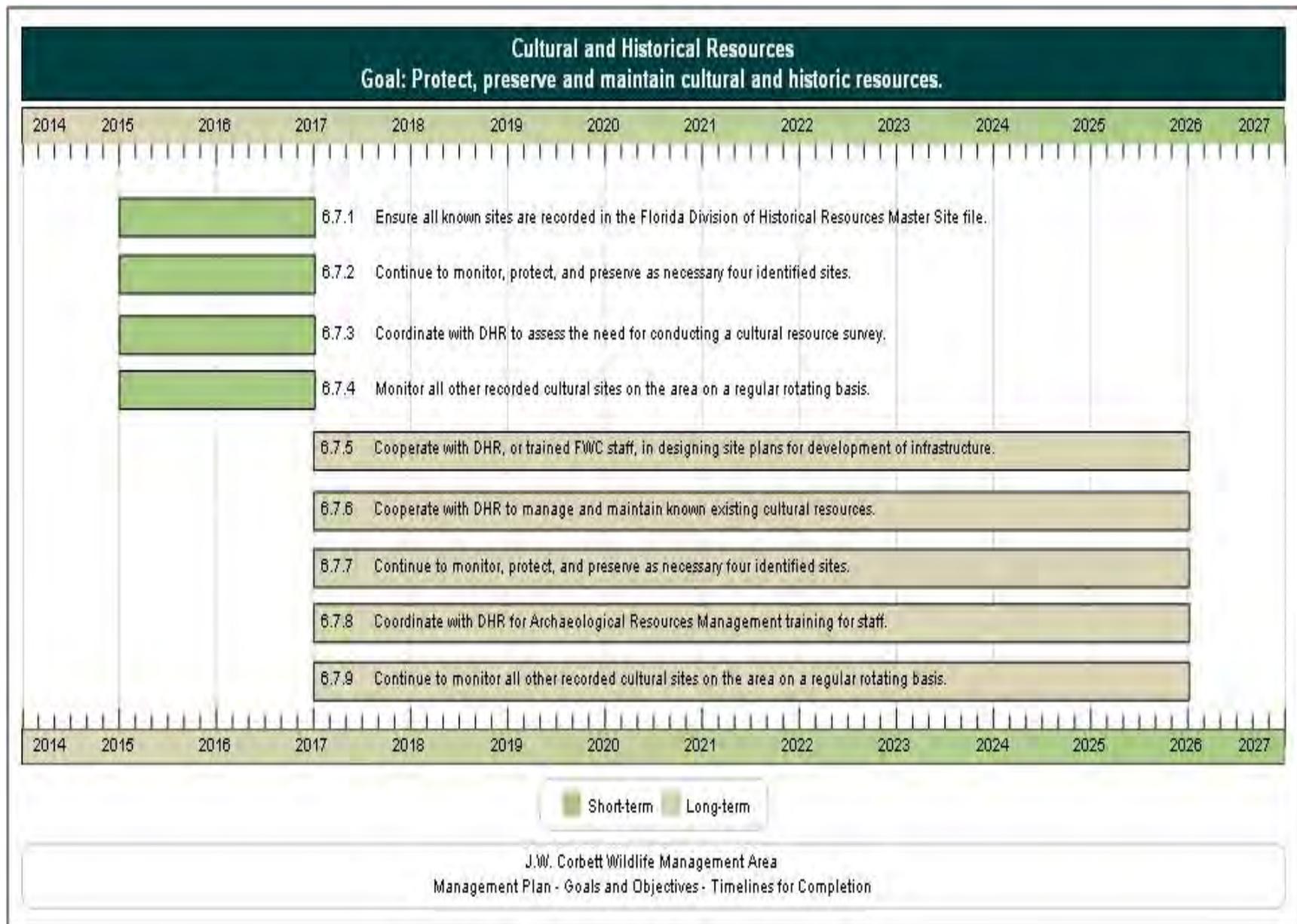


Forest Resource Management

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

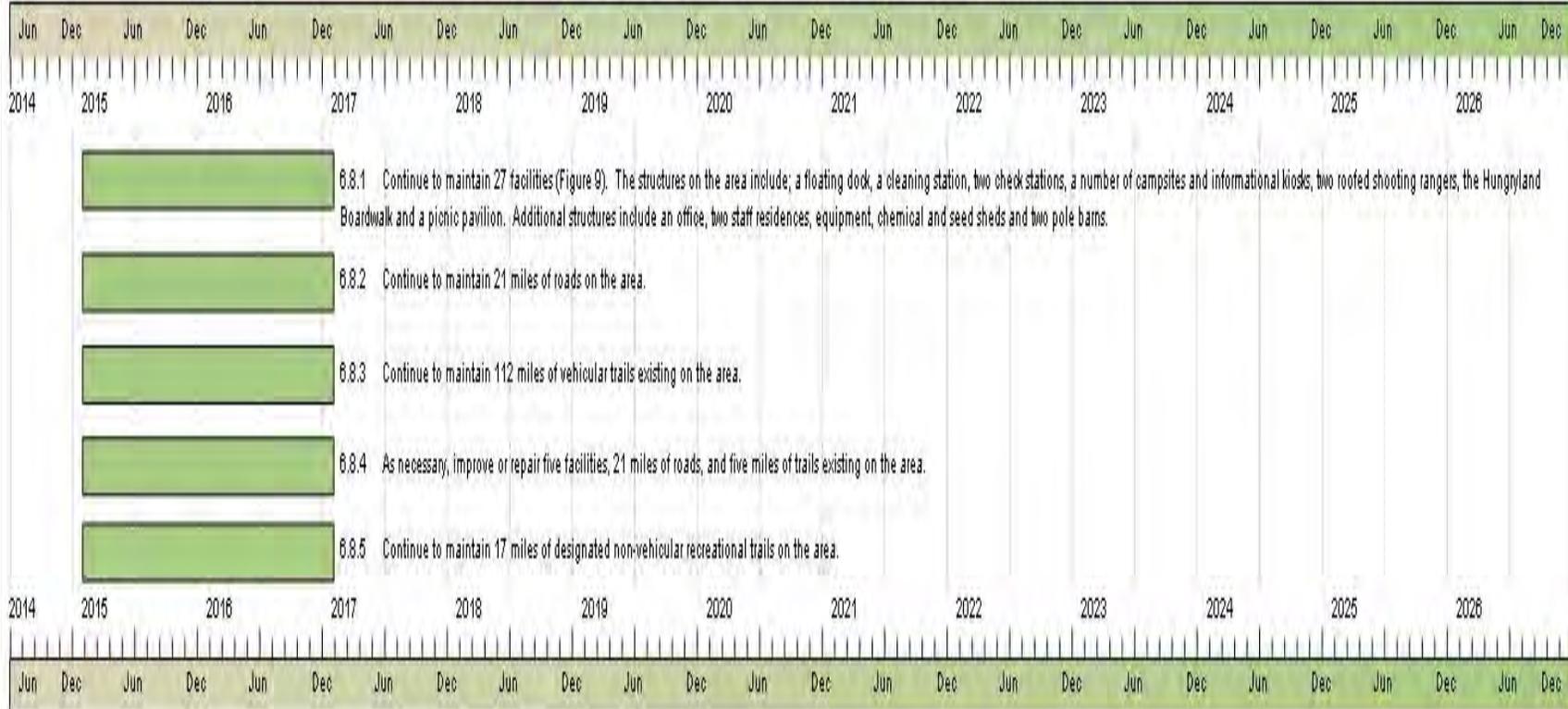


J.W. Corbett Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion



Capital Facilities and Infrastructure

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

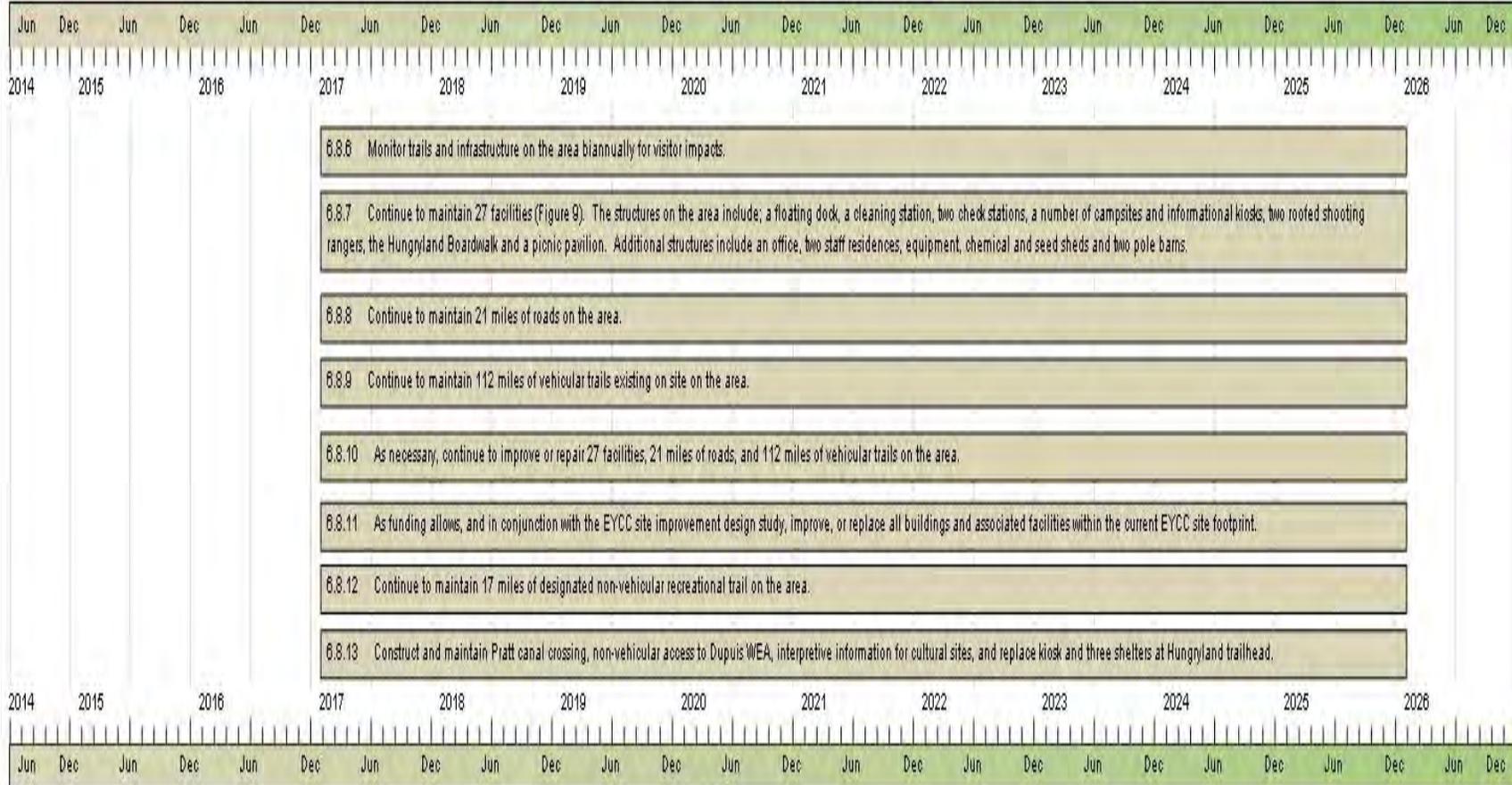


Short-term

J.W. Corbett 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.

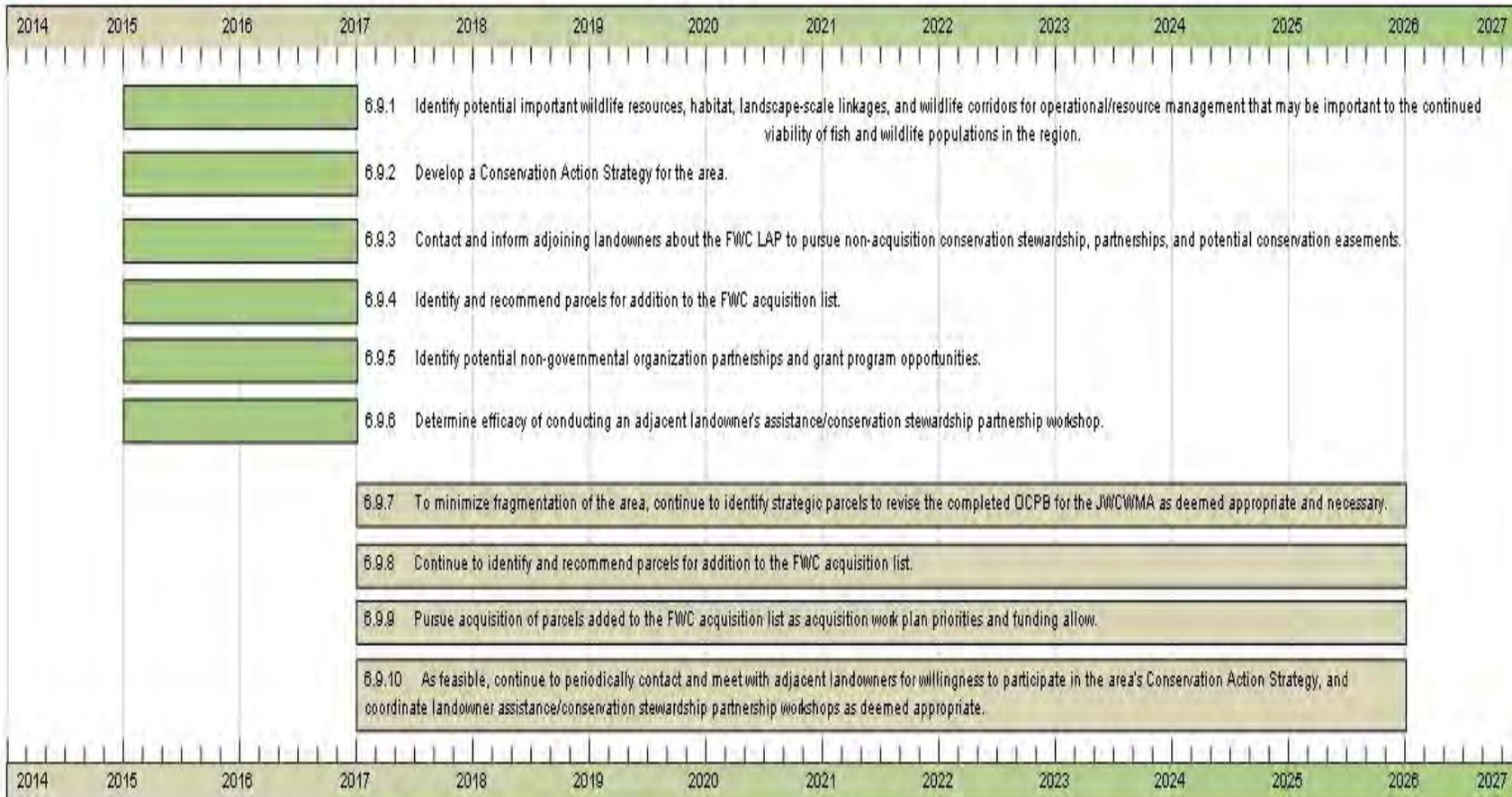


Long-term

J.W. Corbett Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion

Land Conservation and Stewardship Partnerships

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

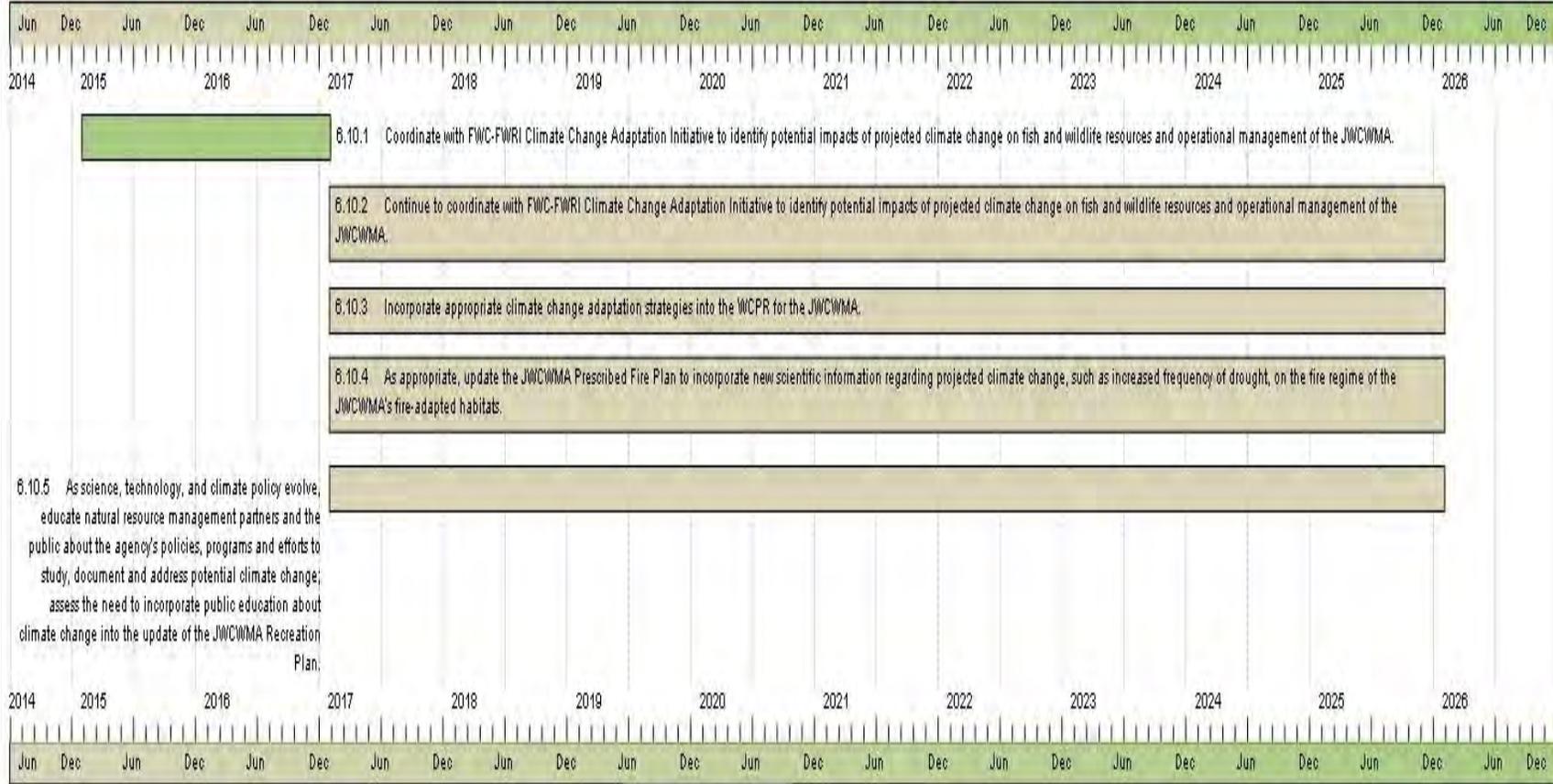


■ Short-term ■ Long-term

J.W. Corbett 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 EPWMA.



Short-term
 Long-term

J.W. Corbett Wildlife Management Area
 Management Plan - Goals and Objectives - Timelines for Completion

Research Opportunities

Goal: Explore and pursue cooperative research opportunities.



Short-term Long-term

J.W. Corbett 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 the JWCWMA 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: Currently there is a high turnover of area staff affecting the management continuity on the area partially due to the high cost of living in the southeast Florida region resulting in gaps of needed ongoing resource and operational management regimes.**
 - 8.1.1 Strategy: Evaluate the feasibility of constructing and developing onsite housing facilities that would offset the high cost of living associated in Palm Beach County to discourage employment outside of the agency.**
- 8.2 Challenge: Currently large highway dividing Hungryland and the JWCWMA impacting the hydrology and limiting wildlife connectivity.**
 - 8.2.1 Strategy: Recommend hydrological improvements to mimic or recreate natural hydroperiods.**
 - 8.2.2 Strategy: Cooperate with the Department of Transportation (DOT) and Palm Beach County to recommend and evaluate the feasibility of developing a wildlife crossing beneath the highway.**
- 8.3 Challenge: Lack of public access to the Leon Moss area within the JWCWMA is preventing recreational access and use.**
 - 8.3.1 Strategy: Coordinate with the Florida Power and Light to pursue potential public access opportunities.**
 - 8.3.2 Strategy: Explore the feasibility of developing a pedestrian bridge across the central canal.**
- 8.4 Challenge: Currently, law enforcement and management staffing is at insufficient levels for optimal management of the JWCWMA.**
 - 8.4.1 Strategy: Pursue funding for increased law enforcement and management staffing and additional private sector contract services.**
 - 8.4.2 Strategy: Explore potential volunteer resources for assisting with management.**
- 8.5 Challenge: There are smoke management challenges during prescribed burns due to proximity to major roadways, airports, and residential areas.**

- 8.5.1 **Strategy:** Use available tools and resources to minimize smoke impact and increase outreach for areas of potential impact.
- 8.5.2 **Strategy:** Cooperate with other agencies such as FWC Law Enforcement, Florida Highway Patrol, Florida Department of Transportation, Florida Forest Service, and Martin and Palm Beach counties Sheriffs' Offices.
- 8.6 **Challenge:** Exotic invasive plants from adjacent private lands are spreading to the JWCWMA.
 - 8.6.1 **Strategy:** Coordinate with the local Cooperative Invasive Species Management Area (CISMA), FWC's Uplands Invasive Plant Species Section, and FWC's LAP to work with adjacent landowners to control and manage exotic invasive plants on adjacent properties.
 - 8.6.2 **Strategy:** Coordinate with other governmental and private organizations to obtain resources to control and manage exotic invasive species on adjacent properties.
- 8.7 **Challenge:** Illegal activities (e.g., litter, dumping, vandalism, illegal off-trail vehicle use, underage drinking) continue to negatively impact the management, operations, and public use of the JWCWMA.
 - 8.7.1 **Strategy:** Coordinate with FWC law enforcement to assist with control of these illegal activities on the JWCWMA.
- 8.8 **Challenge:** Current trail designation and agreements preclude biking and equestrian use of the Ocean to Lake Trail.
 - 8.8.1 **Strategy:** Coordinate with stakeholders to determine the feasibility of compatible use on the Ocean to Lake Trail.
- 8.9 **Challenge:** Currently there is ongoing security management issues associated with the operation and management of the EYCC.
 - 8.9.1 **Strategy:** In conjunction with development of site design, studies, or plans for enhancement and improvement of EYCC, implement more effective perimeter/boundary controls and overall security management.
 - 8.9.2 **Strategy:** In conjunction with development of site design, studies, or plans for enhancement and improvement of EYCC, develop separate entrance road access and gate facility into the EYCC.
- 8.10 **Challenge:** Area staffing is insufficient for maintenance of recreational trails.

- 8.10.1 Strategy: Pursue funding, maintenance agreements, and/or volunteer agreements to ensure maintenance of recreational trails.**
- 8.11 Challenge: Currently, FWC has insufficient resources to perform water monitoring, including water quality monitoring, on the JWCWMA, therefore it cannot be determined if water quality is diminishing over time.**
- 8.11.1 Strategy: Pursue funding for water quality assessment and ongoing monitoring.**
- 8.12 Challenge: The current size, daily and annual bag limits for wild hogs does not provide sufficient control of the hog population.**
- 8.12.1 Strategy: Through rule changes, evaluate the feasibility of eliminating shoulder height regulations, as well as and daily and annual bag limits.**
- 8.12.2 Strategy: Work with stakeholders to gain support for improved hog control utilizing hunting.**
- 8.12.3 Strategy: Initiate trapping of hogs as necessary and feasible**
- 8.13 Challenge: Currently Seminole Pratt Whitney Road is in poor condition and is poorly maintained, which affects access and management.**
- 8.13.1 Strategy: Coordinate with the SFWMD, Palm Beach County and Indian Trails to improve the road.**

9 Cost Estimates and Funding Sources

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

The cost estimate below, although exceeding what FWC typically receives through the appropriations process, is estimated to be what is necessary for optimal management, and is consistent with the current and planned resource management and operation of the JWCWMA. Cost estimate categories are those currently recognized by FWC and the Land Management Uniform Accounting Council. More information on these categories, as well as the Fiscal Year 2014-2015 operational plan showing detailed cost estimates by activity and categories of expenditures, may be found in Appendix 13.10.

Table 18. Maximum Expected One Year Expenditure

J.W. Corbett WMA Management Plan Cost Estimate

Maximum expected one year expenditure

<u>Resource Management</u>		<u>Priority schedule:</u>	
Exotic Species Control	\$778,823	Bold	Immediate (annual)
Prescribed Burning	\$136,805	Normal	Intermediate (3-4 years)
Cultural Resource Management	\$32,920	<i>Italic</i>	Other (5+ years)
Hydrological Management	\$75,552		
Other	\$579,846		
Subtotal	\$1,603,947		
<u>Administration</u>			
General Administration	\$182,529		
<u>Support</u>			
Land Management Planning	\$86,457		
Training/Staff Development	\$24,054		
Vehicle Purchase	\$475,732		
Vehicle Operation and Maintenance	\$141,008		
Other	\$11,896		
Subtotal	\$739,147		
<u>Capital Improvements</u>			
Facility Maintenance	\$308,897		
Subtotal	\$308,897		
<u>Visitor Services/Recreation</u>			
Info./Education/Operations	\$629,043		
<u>Law Enforcement</u>			
Resource protection	\$55,118		
<u>Total</u>	\$3,518,682	*	

*Based on the FWC's current staffing ratio of approximately twelve full time employees (FTE) per 5,000 acres of managed area, two-tenths of one FTE position would be optimal to fully manage the area covered by this prospectus. All land management funding is dependent upon annual legislative appropriations.

Table 19. Maximum Expected Ten Year Expenditure

J.W. Corbett WMA Management Plan Cost Estimate

Ten-year projection

<u>Resource Management</u>		Priority schedule:
Exotic Species Control	\$6,842,824	Bold Immediate (annual)
Prescribed Burning	\$1,201,983	Normal Intermediate (3-4 years)
Cultural Resource Management	\$289,239	<i>Italic</i> Other (5+ years)
Hydrological Management	\$663,812	
Other	\$5,094,592	
Subtotal	\$14,092,450	
<u>Administration</u>		
General Administration	\$1,603,723	
<u>Support</u>		
Land Management Planning	\$759,622	
<i>Land Management Reviews</i>	\$9,952	
<i>Training/Staff Development</i>	\$211,339	
Vehicle Purchase	\$1,674,120	
Vehicle Operation and Maintenance	\$1,238,912	
Other	\$104,522	
Subtotal	\$3,998,466	
<u>Capital Improvements</u>		
<i>New Facility Construction</i>	\$586,132	
Facility Maintenance	\$2,714,003	
Subtotal	\$3,300,136	
<u>Visitor Services/Recreation</u>		
Info./Education/Operations	\$5,526,844	
<u>Law Enforcement</u>		
Resource protection	\$484,276	
<u>Total</u>	\$29,005,894	

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

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

Approved Conditional Rejected

- | | | |
|---|---|---|
| • Dike and levee maintenance | | ✓ |
| • Exotic species control | | ✓ |
| • Mechanical vegetation treatment | | ✓ |
| • Public contact and educational facilities development | | ✓ |
| • Prescribed burning | | ✓ |
| • Timber harvest activities | ✓ | |
| • Vegetation inventories | | ✓ |

11 Compliance with Federal, State, and Local Governmental Requirements

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

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

where the law allows reasonable exceptions (e.g., where handicap access is structurally impractical or where providing such access would change the fundamental character of the facility being provided).

Uses planned for the JWCWMA are in compliance with the Conceptual State Lands Management Plan and its requirement for “balanced public utilization,” and are in compliance with the mission of FWC as described in its Agency Strategic Plan (Appendix 13.7). Such uses also comply with the authorities of the FWC as derived from Article IV, Section 9 of the Florida Constitution as well as the guidance and directives of Chapters 372, 253, 259, 327, 370, 403, 870, 373, 375, 378, 487, and 597 F. S.

The FWC has developed and utilizes an Arthropod Control Plan for the JWCWMA in compliance with Chapter 388.4111 F.S. (Appendix 13.11). This plan was developed in cooperation with the local Palm Beach County arthropod control agency. This plan is also in conformance with the Local Government Comprehensive Plan as approved and adopted for Palm Beach County, Florida, (Appendix 13.15).

12 Endnotes

- ¹ Aldridge, C. L., M. S. Boyce and R. K. list. 2004. Adaptive management of prairie grouse: how do we get there? *Wildlife Society Bulletin* 32:92-103.
- ² Wilhere, G. F. 2002. Adaptive management in Habitat Conservation Plans. *Conservation Biology* 16:20-29.
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- ⁴ Regulatory Negotiation Committee on Accessibility Guidelines for Outdoor Developed Areas, Final Report (1999).
- ⁵ Karl, T. R., J. M. Melillo, and T. C. Peterson (Eds.). 2009. *Global Climate Change Impacts in the United States*. Cambridge University Press. New York, NY.
- ⁶ McCarty, J. P. 2001. Ecological consequences of recent climate change. *Conservation Biology* 15:320-331.
- ⁷ Walther, G. R., E. Post, P. Convey, A. Menzel, C. Parmesan, T. J. Beebee, J. M. Fromentin, O. Hoegh-Guldberg, and F. Bairlein. 2002. Ecological responses to recent climate change. *Nature* 416:389–395.
- ⁸ Parmesan, C. 2006. Ecological and evolutionary responses to recent climate change. *Annual Review of Ecology, Evolution, and Systematics* 37:637-669.
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- ¹⁴ Webster et al. 2005; Webster, P. J., et al. 2005. Changes in Tropical Cyclone Number, Duration, and Intensity, in a Warming Environment. *Science* 309: 1844–1846.
- ¹⁵ Mann, M.E. and K.A. Emanuel. 2006. Atlantic Hurricane Trends Linked to Climate Change. *Eos Trans. AGU* 87: 233-244.
- ¹⁶ Stanton, E.A. and F. Ackerman. 2007. Florida and Climate Change: The Costs of Inaction. Tufts University Global Development and Environment Institute and Stockholm Environment Institute–US Center, Tufts University, Medford, MA.
- ¹⁷ Clough, J.S. 2008. Application of the Sea-Level Affecting Marshes Model (SLAMM 5.0) to Crystal River NWR. Warren Pinnacle Consulting, Inc. for U.S. Fish and Wildlife Service. 46 pp.
- ¹⁸ Florida Fish and Wildlife Conservation Commission. 2012. Florida Black Bear Management Plan. Florida Fish and Wildlife Conservation Commission, Tallahassee, Florida, 215 p.