

A Management Plan for  
Fred C. Babcock-Cecil M. Webb  
Wildlife Management Area  
2014 - 2024



Charlotte and Lee counties, Florida

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

**Volume I of II**





**FLORIDA DEPARTMENT OF  
ENVIRONMENTAL PROTECTION**

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3900 COMMONWEALTH BOULEVARD  
TALLAHASSEE, FLORIDA 32399-3000

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SECRETARY

February 16, 2015

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

**RE: Babcock-Webb Wildlife Management Area Management Plan - Lease No. 4095**

Dear Mr. Cochran:

The Division of State Lands, Office of Environmental Services, acting as agent for the Board of Trustees of the Internal Improvement Trust Fund, hereby approves the Babcock-Webb Wildlife Management Area management plan. The next management plan update is due February 16, 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,

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

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**A Management Plan  
for  
Fred C. Babcock-Cecil M. Webb Wildlife Management Area**

Charlotte and Lee counties, Florida

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



November 2014

Approved

Handwritten signature of Thomas H. Eason in blue ink.

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: Babcock-Webb Wildlife Management Area

Location: Charlotte and Lee counties, Florida

Acreage Total: 80,772 acres

Acreage Breakdown:

<u>Land Cover Classification</u>	<u>Acres</u>	<u>Percent of Total Area</u>
Abandoned field/abandoned pasture	1,407.2	1.7
Artificial pond	139.4	0.2
Basin swamp	547.4	0.7
Baygall	7.4	<0.1
Canal/ditch	39.4	0.1
Clearing/regeneration	953.6	1.2
Depression marsh	15,852.0	19.4
Developed	140.7	0.2
Dome swamp	50.2	0.1
Dry prairie	10,194.5	12.5
Hydric hammock	7.3	<0.1
Impoundment	637.7	0.8
Invasive exotic monoculture	6.3	<0.1
Mesic flatwoods	30,489.5	37.4
Mesic hammock	143.3	0.2
Pasture - improved	30.9	<0.1
Pasture - semi-improved	30.7	<0.1
Pine plantation	108.6	0.1
Road	24.6	<0.1
Scrubby flatwoods	62.2	0.1
Utility corridor	380.6	0.5
Wet flatwoods	15,160.0	18.6
Wet prairie	5,215.8	6.4

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

Lease/Management Agreement No.: 4095 (Appendix 1)

Use: Single       

Multiple   X  

Management Responsibilities:

Agency FWC

Responsibilities

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

Designated Land Use: Wildlife Management Area

Sublease (s): FWC has subleased portions of BWWMA to the Boy Scouts of America, City of Punta Gorda, and Department of Management Services (Appendix 2).

Encumbrances: Utility easements, subleases (Appendix 2), and outstanding fractionalized mineral rights (Section 1.6)

Type Acquisition: Federal Aid in Wildlife Restoration Act, Conservation and Recreation Lands, Preservation 2000, Florida Forever

Unique Features: Natural: Landscape-scale area of a large and pristine South Florida slash pine flatwoods ecosystem providing habitat for extensive concentrations of imperiled and more common wildlife.

Archaeological/Historical: Six resource groups and one archaeological site (Oil Well Road prehistoric campsite, CH00066)

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

Acquisition Needs/Acreage: 16,813 acres FWC Additions and Inholdings list; 8,520 acres remaining in the Hall Ranch Florida Forever Project and 4,545 acres remaining in of the Charlotte Harbor Flatwoods Florida Forever Project (Figure 3).

Surplus Lands/Acreage: None

Public Involvement: Management Advisory Group consensus building meeting and Public Hearing (Appendix 3)

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

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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, 6-7
3	Degree of title interest held by the Board, including reservations and encumbrances such as leases.	18-2.021	7
4	The legal description and acreage of the property.	18-2.018 & 18-2.021	1, Appendix 1
5	A map showing the approximate location and boundaries of the property, and the location of any structures or improvements to the property.	18-2.018 & 18-2.021	4, 94-95
6	An <b>assessment</b> as to whether the property, or any portion, should be declared surplus. <i>Provide information regarding <b>assessment and analysis</b> in the plan, and provide <b>corresponding map</b>.</i>	18-2.021	62
7	Identification of other parcels of land within or immediately adjacent to the property that should be purchased because they are essential to management of the property. <i>Please clearly indicate parcels on a map.</i>	18-2.021	96-98
8	Identification of adjacent land uses that conflict with the planned use of the property, if any.	18-2.021	12, 14-15
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, 7
10	Proximity of property to other significant State, local or federal land or water resources.	18-2.021	8-14

### Section B: Use Items

Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
11	The designated single use or multiple use management for the property, including use by other managing entities.	18-2.018 & 18-2.021	60-61
12	A description of past and existing uses, including any unauthorized uses of the property.	18-2.018 & 18-2.021	58-59
13	A description of alternative or multiple uses of the property considered by the lessee and a statement detailing why such uses were not adopted.	18-2.018	61
14	A description of the management responsibilities of each entity involved in the property's management and how such responsibilities will be coordinated.	18-2.018	97-99
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	91, 97, 99, Appendix 12

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	149
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)	85-89
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	150
19	Letter of compliance from the local government stating that the LMP is in compliance with the Local Government Comprehensive Plan.	BOT requirement	Appendix 17
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	61, 71-145
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	60-61
22	If the lead managing agency determines that timber resource management is not in conflict with the primary management objectives of the managed area, a component or section, prepared by a qualified professional forester, that assesses the feasibility of managing timber resources pursuant to section 253.036, F.S.	18-021	Appendix 8
23	A statement regarding incompatible use in reference to Ch. 253.034(10).	253.034(10)	61-62

\*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, Appendix 3
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)	Appendix 3
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)	16, Appendix 3
27	Summary of comments and concerns expressed by the advisory group for parcels over 160 acres	18-2.021	Appendix 3
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)	16, Appendix 3
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	71, Appendix 4
30	Summary of comments and concerns expressed by the management review team, if required by Section 259.036, F.S.	18-2.021	Appendix 4
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	Appendix 4

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	17-19, Appendix 5
33	Insert FNAI based natural community maps when available.	ARC consensus	24
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	21-56
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	21-58

36	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding beaches and dunes.	18-2.021	57
37	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding mineral resources, such as oil, gas and phosphate, etc.	18-2.018 & 18-2.021	57
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	21-58
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	42-47
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	21-56, Appendix 6
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)	71-148
42	<b>Habitat Restoration and Improvement</b>	259.032(10) & 253.034(5)	
42-A.	Describe management needs, problems and a desired outcome and the key management activities necessary to achieve the enhancement, protection and preservation of restored habitats and enhance the natural, historical and archeological resources and their values for which the lands were acquired.	↓	71-145
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.		71-143
42-C.	The associated measurable objectives to achieve the goals.		104-119
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>		Appendices: 7, 8, 9, 10, 12, 13
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.		145-148, Appendix 14
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)	21-58
44	<b>Sustainable Forest Management, including implementation of prescribed fire management</b>		
44-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).		71-145
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) ↓	90-91
44-C.	Measurable objectives (see requirement for #42-C).		114
44-D.	Related activities (see requirement for #42-D).		Appendices: 7, 8, 9, 10, 12, 13

44-E.	Budgets (see requirement for #42-E).		145-148, Appendix 14
45	Imperiled species, habitat maintenance, enhancement, restoration or population restoration	259.032(10) & 253.034(5)	
45-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	71-145
45-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		80-83
45-C.	Measurable objectives (see requirement for #42-C).		105-109
45-D.	Related activities (see requirement for #42-D).		Appendices: 7, 8, 9, 10, 12, 13
45-E.	Budgets (see requirement for #42-E).		145-148, Appendix 14
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)	83-84
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	Appendix 16
48	Exotic and invasive species maintenance and control	259.032(10) & 253.034(5)	
48-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	83-84
48-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		83-84
48-C.	Measurable objectives (see requirement for #42-C).		110-111
48-D.	Related activities (see requirement for #42-D).		Appendices: 7, 8, 9, 10, 12, 13
48-E.	Budgets (see requirement for #42-E).		145-148, Appendix 14

### 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	3, 57
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	56

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	21-41
52	***Quantitative description of the land regarding an inventory of hydrological features and associated acreage. <i>See footnote.</i>	253.034(5)	39-40, 56
53	<b>Hydrological Preservation and Restoration</b>	259.032(10) & 253.034(5)	
53-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	89-90
53-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		89-90
53-C.	Measurable objectives (see requirement for #42-C).		113-114
53-D.	Related activities (see requirement for #42-D).		Appendices: 7, 8, 9, 10, 12, 13
53-E.	Budgets (see requirement for #42-E).		145-148, Appendix 14

### 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	57, Appendix 12
55	***Quantitative data description of the land regarding an inventory of significant land, cultural or historical features and associated acreage.	253.034(5)	57, Appendix 12
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	91, Appendix 12
57	<b>Cultural and Historical Resources</b>	259.032(10) & 253.034(5)	
57-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	91
57-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		91
57-C.	Measurable objectives (see requirement for #42-C).		114-115
57-D.	Related activities (see requirement for #42-D).		Appendices: 7, 8, 9, 10, 12, 13
57-E.	Budgets (see requirement for #42-E).		145-148, Appendix 14

\*\*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)	91-92

59	Capital Facilities and Infrastructure	259.032(10) & 253.034(5)	
59-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	91-92
59-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		91-92
59-C.	Measurable objectives (see requirement for #42-C).		115-116
59-D.	Related activities (see requirement for #42-D).		Appendices: 7, 8, 9, 10, 12, 13
59-E.	Budgets (see requirement for #42-E).		145-148, Appendix 14
60	*** Quantitative data description of the land regarding an inventory of recreational facilities and associated acreage.	253.034(5)	92
61	Public Access and Recreational Opportunities	259.032(10) & 253.034(5)	
61-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	85-88
61-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		85-88
61-C.	Measurable objectives (see requirement for #42-C).		111-113
61-D.	Related activities (see requirement for #42-D).		Appendices: 7, 8, 9, 10, 12, 13
61-E.	Budgets (see requirement for #42-E).		145-148, Appendix 14

### Section H: Other/ Managing Agency Tools

Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
62	Place this LMP Compliance Checklist at the front of the plan.	ARC and managing agency consensus	iii
63	Place the Executive Summary at the front of the LMP. Include a physical description of the land.	ARC and 253.034(5)	i
64	If this LMP is a 10-year update, note the accomplishments since the drafting of the last LMP set forth in an organized (categories or bullets) format.	ARC consensus	62-71
65	Key management activities necessary to achieve the desired outcomes regarding other appropriate resource management.	259.032(10)	71-143
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)	145-148, Appendix 14

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)	145-148, Appendix 14
68	A statement of gross income generated, net income and expenses.	18-2.018	60, 145-148, Appendix 14

\*\*\* = 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**

Encompassing a landscape-scale area of conservation lands over 125 square miles in size that spans a natural area stretching from Charlotte Harbor to central Charlotte and Lee counties, the Fred C. Babcock-Cecil M. Webb Wildlife Management Area (BWWMA), along with the adjacent Babcock Ranch Preserve (BRP), conserves the largest and highest quality native slash pine forest remaining in south Florida. The BWWMA is one of Florida's oldest and largest publicly owned Wildlife Management Areas. Although the BWWMA's vast forest of virgin South Florida slash pine timber was cut prior to the Florida Fish and Wildlife Conservation Commission (FWC) predecessor agency, the Game and Fresh Water Fish Commission, acquiring the area in 1941, much of the underlying habitat remained essentially intact.

Set within an extensive network of conservation lands, the BWWMA provides an important nucleus within a complex of conservation lands and serves as an integral part of a larger system of parks, conservation easements, and other conservation lands within the southwest region of Florida. The BWWMA, along with other conservation lands located in the vicinity, provides important water quality protection, conserve vital wildlife habitat and corridors, and enhances the quality of life in the region and the State with exceptional public fish and wildlife based outdoor recreation opportunities.

Located near the densely populated cities of Punta Gorda, Cape Coral and Fort Myers, the BWWMA's forests and associated seasonal ponds, marshes and wetland depressions, provides essential habitat for an extensive array of imperiled, rare and common wildlife species including red-cockaded woodpeckers, Florida sandhill cranes, roseate spoonbills, Florida bonneted bats, as well as white-tailed deer and northern bobwhites. The BWWMA consists of the Webb tract, 65,758 acres northeast of US 41, and the Yucca Pens Unit, 15,014 acres southwest of US 41.

The BWWMA 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-based public outdoor recreational opportunities. Hunting, fishing, target shooting, wildlife viewing, camping, horseback-riding, scenic driving, bicycling, and hiking are included among the outstanding recreational opportunities offered on BWWMA. Additionally, BWWMA has one of the only field trial grounds facilities on public land in southwest Florida. The field trial grounds cover over 6,000 acres and are managed for northern bobwhite habitat, to provide hunting opportunities, and as a site for bird dog training and competition.

## **1.1 Management Plan Purpose**

This Management Plan serves as the basic statement of policy and direction for the management of BWWMA. It provides information including the past usage, conservation

acquisition history, and descriptions of the natural and cultural resources found on BWWMA. Furthermore, it identifies the FWC’s future management intent, goals and associated short and long-term objectives, as well as identifying challenges and solutions. This Management Plan has been developed to guide each aspect of BWWMA’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 (DEP-DSL), in compliance with paragraph seven of Lease No. 4095 (Appendix 1) and pursuant to Chapters 253 and 259, Florida Statutes (FS), and Chapters 18-2 and 18-4, Florida Administrative Code (FAC). Format and content were drafted in accordance with ARC requirements for management plans and the model plan outline provided by the staff of the DSL. Terms (Appendix 14) used in this Management Plan describing management activities and associated measurable goals and objectives conform to those developed for the Land Management Uniform Accounting Council Biennial Land Management Operational Report.

### **1.1.1 FWC Planning Philosophy**

The FWC’s planning philosophy includes emphasizing management recommendation consensus-building among stakeholders and input from user groups and the general public at the beginning of the planning process. The FWC engages stakeholders by convening a Management Advisory Group (MAG) and solicits additional input from user groups and the general public at a public hearing (Appendix 3). The FWC also engages area, district, and regional agency staff, as well as other FWC staff expertise, in developing this Management Plan, thereby facilitating area biologist and manager “ownership” of the Management Plan, and thus the development of meaningful management intent language, goals with associated measurable objectives, timelines for completion, and the identification of challenges and solution strategies for inclusion in the BWWMA 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 BWWMA. The LMR report (Section 5.1, Appendix 4) provides FWC staff with important information and guidance provided by a diverse team of land management auditors, and communicates the recommendations of the LMR team to the FWC so they may be adequately addressed in this Management Plan, and thus guides the implementation of the LMR team recommendations on BWWMA.

Furthermore, the FWC maintains transparency and accountability throughout the development and implementation of this Management Plan. A “living document” concept, linking this updated Management Plan to the previous one, is accomplished by reporting on the objectives, management activities, and projects accomplished over the last planning

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

## **1.2 Location**

The Webb tract of BWWMA is located in southwest Florida in central Charlotte County and the Yucca Pens Unit is located in southern Charlotte County and northwest Lee County (Figure 1). The area is approximately five miles southeast of Punta Gorda, 10 miles north of Fort Myers, 15 miles northeast of Cape Coral, and 20 miles south of Arcadia. The BWWMA extends approximately nine miles from north to south and 13 miles from east to west.

State Road (SR) 31 borders the east side of BWWMA, with the 73,000-acre BRP directly across SR 31. County Road 74 (CR; Bermont Road) marks the BWWMA's northern border. Interstate-75 (I-75) crosses the southwest portion of the Webb tract and US 41 divides the Webb tract and the Yucca Pens Unit. No portion of BWWMA is located within an Area of Critical State Concern.

The Webb tract lies in Townships 41 and 42 South and Ranges 23, 24, and 25 East. The Yucca Pens Unit is located in Townships 42 and 43 South, Ranges 23 and 24 East (Figure 2). The designated entrance to the Webb tract is located on Tucker Grade near I-75. There are two designated entrances to the Yucca Pens Unit along Zemel Road.

## **1.3 Acquisition**

### **1.3.1 Purpose for Acquisition of the Property**

The oldest and largest block of BWWMA was acquired through the Federal Aid in Wildlife Restoration Act (Pittman-Robertson) for the purposes of restoration, conservation and management of fish and wildlife habitat and associated natural resources, and to provide public fish and wildlife based recreational opportunities. Subsequent acquisition occurred under the State's Conservation and Recreation Lands (CARL), Preservation-2000 (P-2000), and Florida Forever land acquisition programs. The purpose of these later acquisitions was to protect the native natural communities and associated wildlife habitat, including the largest slash pine flatwoods left in southwest Florida. The area was also acquired to establish a corridor of interconnected conservation lands connecting the BWWMA with the Charlotte Harbor State Buffer Preserve, and to aid in the protection of the watershed of Gasparilla Sound-Charlotte Harbor Aquatic Preserve, designated as Outstanding Florida Waters.

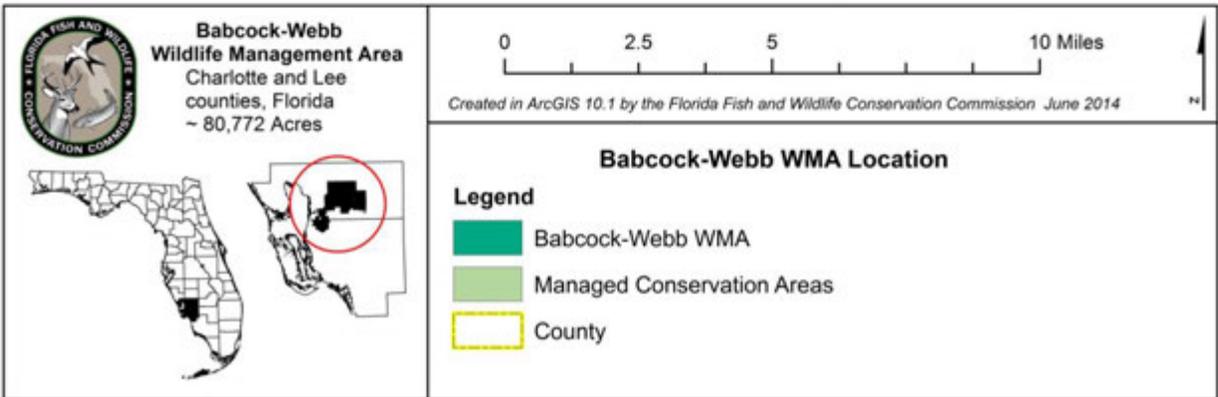
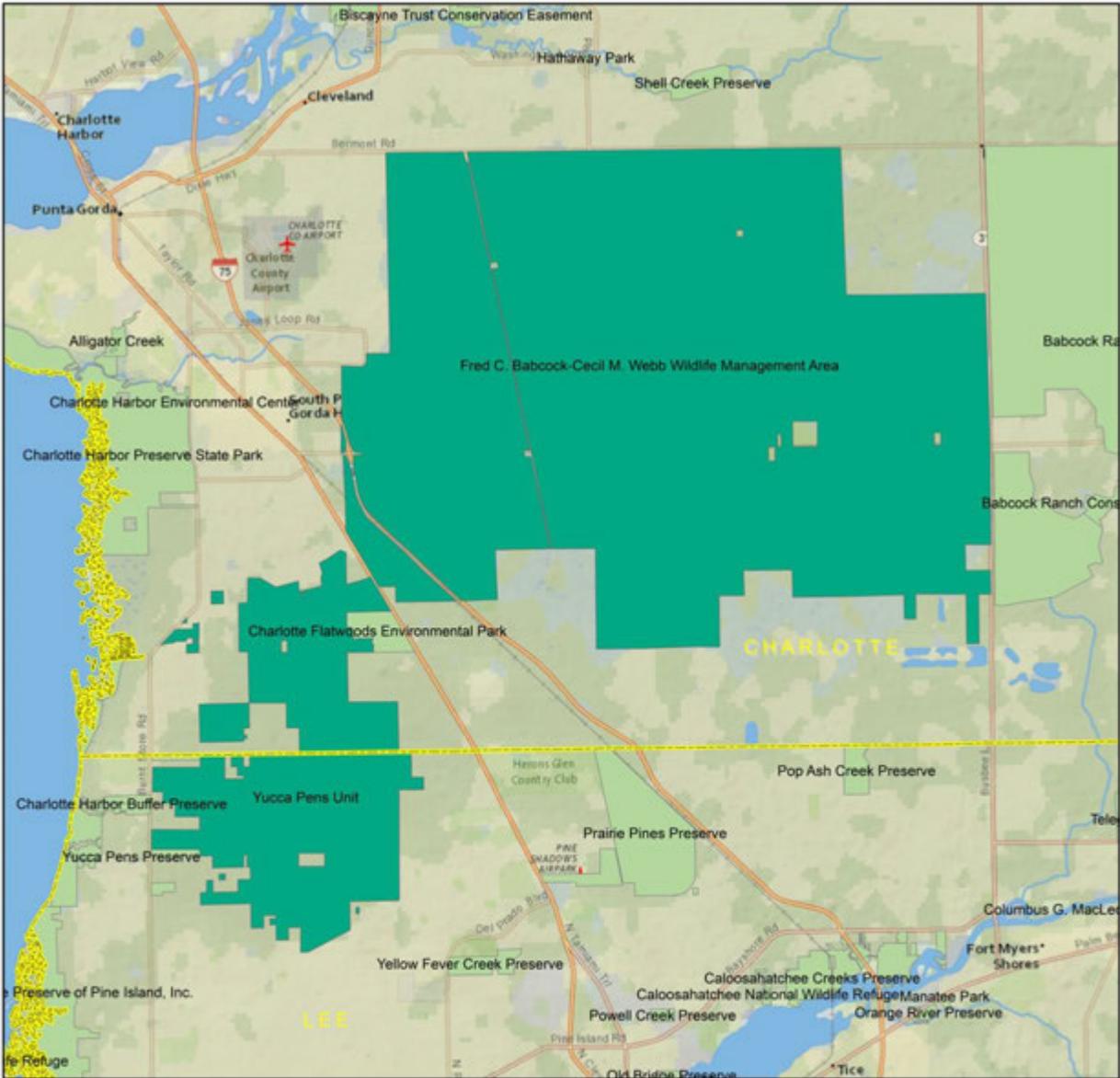


Figure 1. Babcock-Webb WMA Location

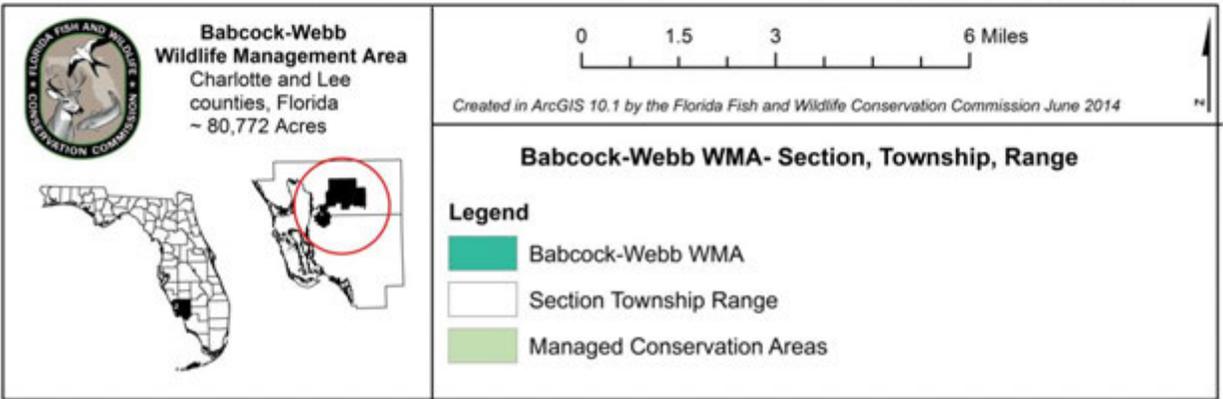
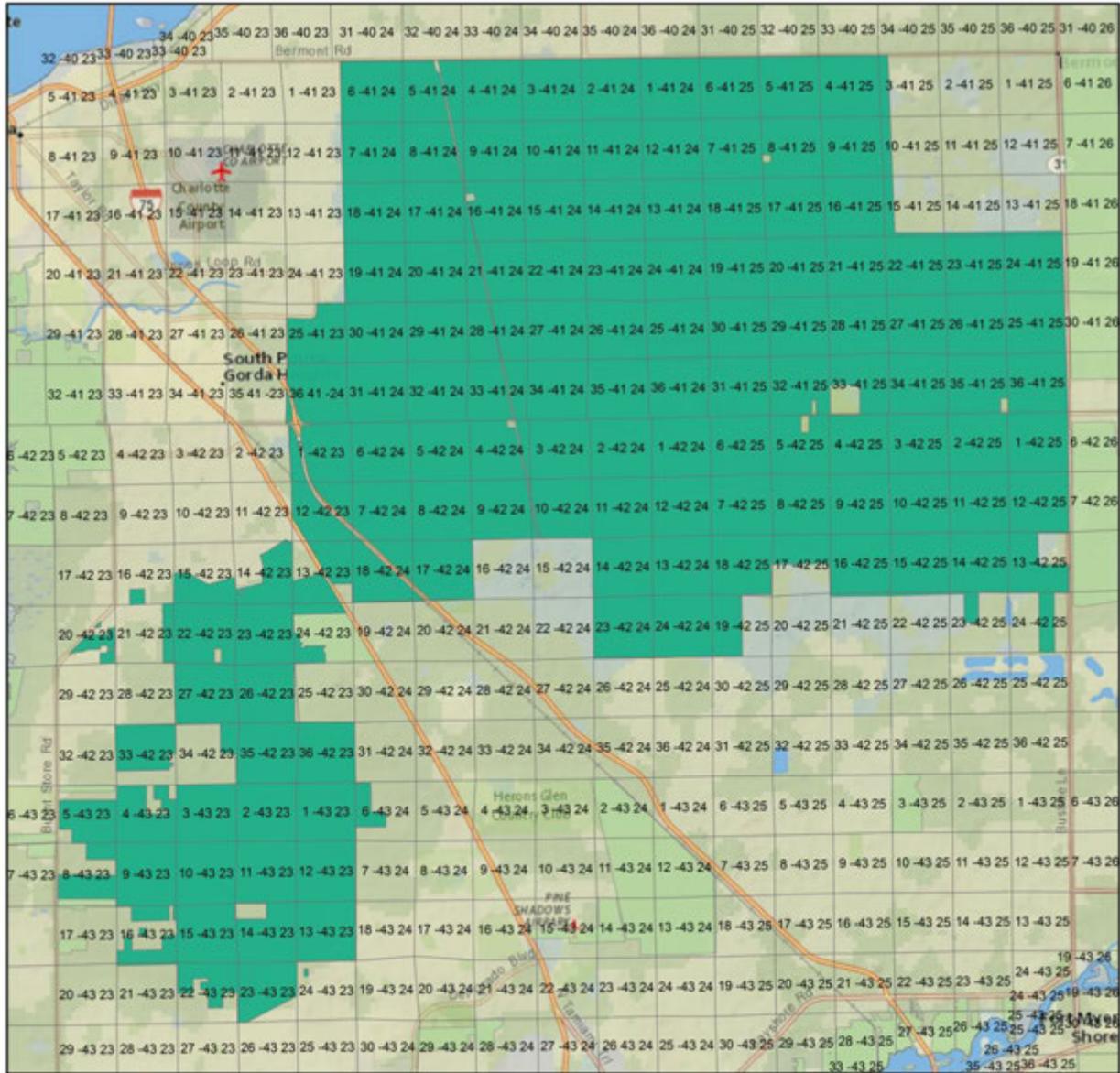


Figure 2. Babcock-Webb WMA- Section, Township, Range

### 1.3.2 Acquisition History

During the late 1930s, the Florida Game and Fresh Water Fish Commission (GFC), the predecessor agency of the FWC, became interested in the purchase of land for wildlife conservation purposes. Following several years of evaluation of wildlife habitat needs, on July 29, 1941 the GFC took official action approving the purchase of lands in Charlotte County. As noted above, these lands were acquired using funds made available by Pittman-Robertson funding for wildlife conservation and outdoor public recreation. The Pittman-Roberson funds are derived from the excise tax on hunting and fishing equipment. With the exception of 20 acres later purchased under the CARL program, all of the lands within the Webb tract were acquired using federal Pittman-Robertson funds.

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



BWWMA, FWC

When originally acquired, the area was originally named the Charlotte County Preserve. The BWWMA was later renamed in honor of Cecil M. Webb, a GFC Commissioner from 1948 to 1953 who was committed to managing wildlife resources for the citizens of Florida and had undertaken quail population research in Marion County. In 1995, the management area's name was changed to the Fred C. Babcock-Cecil M. Webb Wildlife Management Area to recognize Fred C. Babcock for the initial sale of 19,200 acres of the Webb tract to the GFC. Subsequent purchases by the GFC with federal Pittman-Robertson funds added approximately 46,538 acres to the Webb tract.

In July of 1991, the Land Acquisition Advisory Council voted to include 9,900 acres of flatwood forest and wetlands straddling the Charlotte-Lee County line in the list of environmentally sensitive tracts under the CARL program as the Charlotte Harbor Flatwoods Project. Beginning in 1995, the initial 3,600 acres of the Yucca Pens Unit were acquired using CARL program funds as part of the Charlotte Harbor Flatwoods Florida Forever Project. When initial acquisition efforts were completed, five and three-quarter sections were acquired from Ronald and Edward Ansin of Charlotte County. Utilizing both CARL and P- 2000 Program resources, the State authorized additional land acquisitions within the Charlotte Harbor Flatwoods Project which contributed to the creation of the

Yucca Pens Unit.

In April of 1996, the Charlotte Harbor Flatwoods Project was leased to the FWC, leading to the creation of the Yucca Pens Unit of BWWMA. Additional acquisition of lands within the Florida Forever Charlotte Harbor Flatwoods Project under the Florida Forever Program continued to add to the lands within the Yucca Pens Unit. In 1997, two amendments to Lease No. 4095 (Amendments #1 and #2) added an additional 396 and 60 acres. In 1998 the third lease amendment added 41 acres to the Yucca Pens Unit. Three amendments (Amendments #4-6) in 1999 added an additional 3,637 acres. Three amendments in 2000 added 3,801 acres to the Yucca Pens Unit (Amendments #7-9). Amendments #10 and #11 added 1,904 acres in 2001. In 2002, Amendments #12 and #13 added 1,332 acres to the Yucca Pens Unit. From 2004 to 2014, Amendments #14-22 increased the size of the Yucca Pens Unit of BWWMA to its current size of 15,014 acres.

#### **1.4 Management Authority**

The FWC is the designated lead managing agency for BWWMA under the authority granted by Lease Number 4095 from the Board of Trustees agent, the DSL. Further management authority derives from Article IV, Section 9 of the Florida Constitution as well as the guidance and directives of Chapters 253, 259, 327, 370, 372, 373, 375, 378, 403, 487, 870, and 597 and of the FS. These constitutional provisions and laws provide the 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 4095 with the FWC directs the FWC to "manage the leased premises only for the conservation and protection of natural and historical resources and resource-based, public outdoor recreation which is compatible with the conservation and protection of these public lands, as set forth in subsection 253.023(11), FS..." The lease agreement further directs the FWC to "implement applicable Best Management Practices for all activities under this lease in compliance with paragraph 18-2.018(2)(h), FAC, which have been selected, developed, or approved by lessor, lessee, or other land managing agencies for the protection and enhancement of the leased premises."

#### **1.6 Title Interest and Encumbrances**

The FWC holds fee-simple title to the lands within BWWMA that were acquired with the federal Pittman-Robertson funds as described above. The lands acquired in the Yucca Pens Unit are owned in fee-simple title by the Board of Trustees (Governor and Cabinet). In 1996, the DSL, as staff to the Board of Trustees, entered into Lease Agreement Number 4095, a 50 year lease agreement, granting the FWC management authority for BWWMA.

There are a variety of leases and agreements in effect at BWWMA. In October 1968, the Commission leased 1,280 acres of the field trial grounds under a 50-year lease to the Boy Scouts of America (BSA) for a scout camp known as Camp Miles (Appendix 2). Since that time, the Scouts have invested over \$3 million in facilities and developments at Camp

Miles. The lease agreement between the FWC and BSA does not require the BSA to develop a management plan for the camp; therefore, the camp and natural communities within the camp are included in this Management Plan as a part of BWWMA. In 1980, the Commission granted a 45-year lease to the City of Punta Gorda for a wastewater disposal facility on an 884-acre improved pasture in the area's northwest corner (Appendix 2).

The Southwest Florida Sportsmen Association holds an access easement along 1,320 feet of dirt road which allows for their access through part of BWWMA to their adjacent shooting range (Agreement #94054, Appendix 2). An apiary lease is in effect for multiple hives on the Webb tract and the Yucca Pens Unit through October 2016 (Contract # 13154, Appendix 2). The current grazing leases for Pasture # 1 (Contract # 13004, Appendix 2) and Pasture # 2 (Contract # 13005, Appendix 2) are active through June 2018. Pasture # 3's grazing lease is effective until August 2017 (Contract # 07026, Appendix 2).

The FWC leased an area of approximately  $\frac{1}{4}$  acre on BWWMA off of US Highway 41 to the Department of Management Services for the construction of a radio tower, operated by American Tower, L.P. (Lease 01224, Appendix 2). The Florida Power and Light Company holds a 70-foot wide perpetual right-of way easement on BWWMA for the construction, operation, and maintenance of electric transmission and distribution lines and associated facilities (Appendix 2). The FWC has signed an agreement with the Seminole Electric Power Company for an easement for the construction and maintenance of an electric transmission line and related appurtenances on BWWMA. The agreement is effective through June 2053 (Agreement #02214, Appendix 2).

Outstanding oil, gas, and mineral rights on the Yucca Pens Unit were highly fractionalized at the time of state acquisition. Because of the number of fractional owners, the seller of the property was unable to reassemble the outstanding interests for conveyance to the Board of Trustees. Prior to state acquisition, a report by the DEP Bureau of Geology indicated that there was little potential for commercial development of mineral commodities or oil and gas production on the property site and those outstanding mineral interests did not negatively affect the value of the property. Additionally, the grantor of 160 acres of land acquired with Pittman-Robertson funds on the Webb tract retained  $\frac{1}{2}$  interests in oil, gas, and mineral rights. Currently, BWWMA's active leases, easements, and outstanding mineral rights do not impede the FWC's ability to manage the property in conformance with the purposes for acquisition as described federal and state covenants and requirements, lease requirements and management directives outlined above.

## **1.7 Proximity to Other Public Conservation Lands**

The BWWMA is part of a network of conservation lands and Florida Forever Projects in southwest Florida. The 73,239 acre BRP is immediately adjacent to the east of BWWMA, across SR 31. Due to their proximity and similar habitat, many species which occur on BWWMA are also present at BRP. Other conservation lands include those managed by the

DEP’s Division of Recreation and Parks (e.g., Charlotte Harbor Preserve State Park, Estero Bay Preserve State Park, and Cayo Costa State Park); lands managed by U.S. Fish and Wildlife Service (USFWS; e.g. Caloosahatchee National Wildlife Refuge [NWR], Island Bay NWR, and Pine Islands NWR); and lands managed by the South Florida Water Management District (SFWMD) and the Southwest Florida Water Management District (SWFWMD; e.g. Bright Hour Watershed and Caloosahatchee Basin Water Storage Reservoir, respectively). Charlotte and Lee counties manage a large number of conservation lands in the vicinity of BWWMA, as do several private conservation organizations. Table 1 lists the conservation lands within a 15-mile radius of the BWWMA, including lands managed by public and private entities, that conserve cultural and natural resources within this region of Florida. Additionally, there are nine Florida Forever projects located near the BWWMA (Table 2, Figure 3).

Most of the public conservation lands listed in Table 1 are owned in fee-simple by a public entity though some fall within less-than-fee simple 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. Conservation Lands in the Vicinity (15 miles) of BWWMA**

<b>Federal Government</b>	<b>Managing Agency</b>
Wetlands Reserve Program Easement #103	USDA-NRCS
Wetlands Reserve Program Easement #105	USDA-NRCS
Wetlands Reserve Program Easement #106	USDA-NRCS
Caloosahatchee National Wildlife Refuge	USFWS
Island Bay National Wildlife Refuge	USFWS
Matlacha Pass National Wildlife Refuge	USFWS
Pine Island National Wildlife Refuge	USFWS
<b>State of Florida</b>	<b>Managing Agency</b>
Babcock Ranch Preserve	Babcock Ranch Management, LLC; BOT
Babcock Ranch Conservation Easement	DEP-DSL
Cayo Costa State Park	DEP-DRP
Charlotte Harbor Preserve State Park	DEP-DRP
Estero Bay Preserve State Park	DEP-DRP
Gasparilla Island State Park	DEP-DRP
Hickey Creek Mitigation Park Wildlife & Environmental Area	FWC
Kurgis Conservation Easement	DEP-DSL
Randell Research Center	University of Florida

**Table 1. Conservation Lands in the Vicinity (15 miles) of BWWMA**

<b>Water Management District</b>	<b>Managing Agency</b>
Bright Hour Watershed	SFWMD
C-43 Basin Storage Reservoir - Part 1	SFWMD
Caloosahatchee Basin Water Storage Reservoir	SWFWMD
Lewis Longino Preserve	SWFWMD
Longino Ranch Conservation Easement	SWFWMD
Lower Peace River Corridor	SWFWMD
Prairie/Shell Creek	SWFWMD
RV Griffin Reserve	SWFWMD
<hr/>	
<b>Charlotte County</b>	<b>Managing Agency</b>
Alligator Creek	Charlotte County
Biscayne Trust Conservation Easement	Charlotte County
Charlotte Flatwoods Environmental Park	Charlotte County
Deep Creek Properties	Charlotte County
Hathaway Park	Charlotte County
Ollie's Pond Park	Charlotte County
Prairie Creek Preserve	Charlotte County
Shell Creek Preserve	Charlotte County
Sunrise Park	Charlotte County
Tippecanoe Environmental Park	Charlotte County
Tippecanoe II Florida Scrub-jay Mitigation Area	Charlotte County
<hr/>	
<b>Lee County</b>	<b>Managing Agency</b>
Alva Scrub Preserve	Lee County
Billy Creek Preserve	Lee County
Bocilla Preserve	Lee County
Buckingham Trails Preserve	Lee County
Buttonwood Preserve	Lee County
Caloosahatchee Creeks Preserve	Lee County
Caloosahatchee Regional Park	Lee County
Carver Preserve	Lee County
Cayo Costa Unit	Lee County
Cayo Pelau Preserve	Lee County
Charlie's Marsh Preserve	Lee County
Charlotte Harbor Buffer Preserve	Lee County
Columbus G. MacLeod Preserve	Lee County
Cow Slough/Deep Lagoon	Lee County
Daniels Preserve at Spanish Creek	Lee County
Deep Lagoon Preserve	Lee County
Galt Preserve	Lee County

**Table 1. Conservation Lands in the Vicinity (15 miles) of BWWMA**

Greenbriar Swamp Preserve	Lee County East County Water Control District
Harn's Marsh	Lee County East County Water Control District
Hickey's Creek Mitigation Park	Lee County
Hickey's Creek/Greenbriar Connector	Lee County
Hickory Swamp Preserve	Lee County
Lakes Regional Park	Lee County
Manatee Park	Lee County
Meadowbrook Park	Lee County East County Water Control District
Murdock Point Cayo Costa	Lee County
Old Bridge Preserve	Lee County
Orange River Parcel	Lee County
Orange River Preserve	Lee County
Persimmon Ridge Preserve	Lee County
Pine Island Flatwoods Preserve	Lee County
Pop Ash Creek Preserve	Lee County
Powell Creek Preserve	Lee County
Prairie Pines Preserve	Lee County
Six Mile Cypress Slough Preserve	Lee County
Six Mile Cypress Slough Preserve North	Lee County
Smokehouse Bay Preserve	Lee County
St. James Creek Preserve	Lee County
Telegraph Creek Preserve	Lee County
West Marsh Preserve	Lee County
Yellow Fever Creek Preserve	Lee County
Yucca Pens Preserve	Lee County
<hr/>	
<b>City</b>	<b>Managing Agency</b>
Four Mile Cove Ecological Preserve	City of Cape Coral
Rotary Park Environmental Center	City of Cape Coral
<hr/>	
<b>Private Conservation Organizations</b>	<b>Managing Agency</b>
Audubon-Pennington Nature Park	Peace River Audubon Society
Boran Ranch Mitigation Bank	EarthBalance
Calusa Land Trust and Nature Preserve of Pine Island, Inc.	Calusa Land Trust and Nature Preserve at Pine Island, Inc.
Calusa Nature Center and Planetarium	Calusa Nature Center and Planetarium
Charlotte Harbor Environmental Center	Charlotte Harbor Environmental Center

**Table 1. Conservation Lands in the Vicinity (15 miles) of BWWMA**

Moya Preserve	Floraglates Foundation
Pine Island Preserve at Matlacha Pass	Conservation Foundation of the Gulf Coast

**Table 1. Acronym Key**

BOT	Board of Trustees
DEP-DRP	Department of Environmental Protection, Division of Recreation and Parks
DEP-DSL	Department of Environmental Protection, Division of State Lands
FWC	Florida Fish and Wildlife Conservation Commission
SFWMD	South Florida Water Management District
SWFWMD	Southwest Florida Water Management District
USDA-NRCS	U.S. Dept. of Agriculture, Natural Resources Conservation Service
USFWS	U.S. Fish and Wildlife Service

**Table 2. Florida Forever Projects in the Vicinity (15 miles) of BWWMA**

<b>Project Name</b>	<b>GIS Acres</b>
Charlotte Harbor Estuary	47,184
Charlotte Harbor Flatwoods	19,558
Estero Bay	24,061
Fisheating Creek Ecosystem	177,319
Hall Ranch	8,519
Myakka Ranchlands	18,739
Peace River Refuge	3,877
Peaceful Horse Ranch	4,214
Pineland Site Complex	210

## 1.8 Adjacent Land Uses

The BWWMA is located in southwest Florida in Charlotte and Lee counties, approximately 15 miles northwest of Fort Myers. The Webb tract is bordered by SR 31 and BRP to the east, Bermont Road (SR 74) to the north, and residential development to the west. The Yucca Pens Unit is bordered by Burnt Store Road and the Burnt Store Marina gated community to the west. Residential development borders the south and southeast boundary of the Yucca Pens Unit. The Charlotte Harbor and the Charlotte Harbor State Buffer Preserve are located one-three miles west of BWWMA.

The U.S. Census 2013 population estimate for Charlotte County is 164,736 people. The Punta Gorda 2013 population was estimated to be 17,172 individuals. The 2013 population estimate for Lee County is 661,115 people.

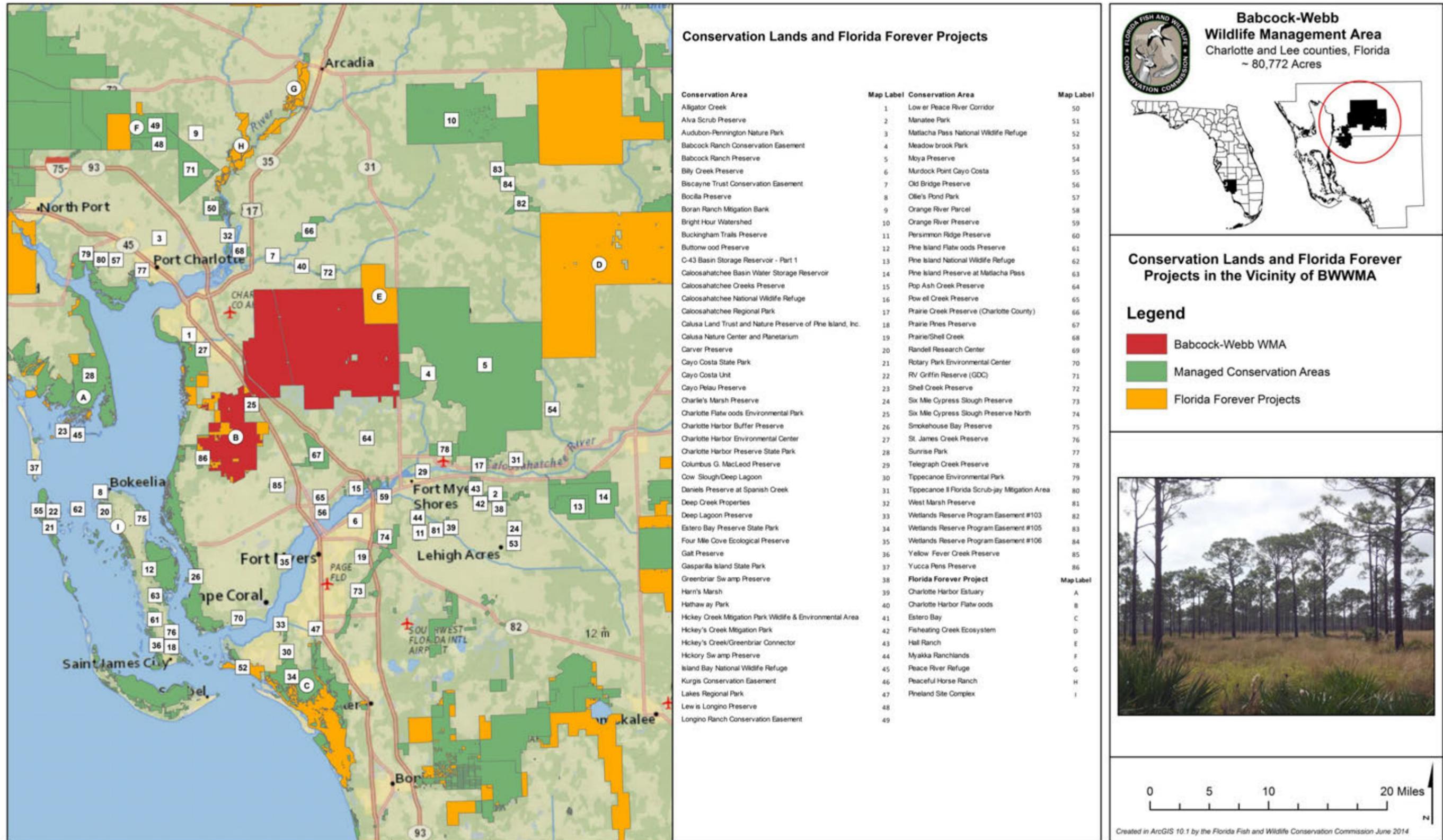


Figure 3. Conservation Lands and Florida Forever Projects near BWWMA

The Fort Myers 2013 population was estimated at 68,190 individuals. The Florida Bureau of Economic and Business Research (BEBR) produces Florida’s official state and local population estimates and projections. The BEBR’s mid-range population projection for Charlotte County in 2025 is 181,000 people. The mid-range population projection for Lee County in 2025 is 837,800 people.

In Charlotte County, BWWMA is primarily zoned as ES (Environmentally Sensitive), with some portions of the Yucca Pens Unit zoned AE (Agriculture Estate). Zoning surrounding BWWMA is generally AE, AG (Agriculture), and BZD (Babcock Zoning District), a designation for the Babcock Ranch community’s overlay district. The future land use designation for BWWMA is Resource Conservation. The surrounding future land use designations are primarily Resource Conservation, Agriculture, Public Lands and Facilities, Babcock Mixed Use, and Low Density Residential.

The Yucca Pens Unit is designated as AG-2 (Agricultural) in Lee County. Surrounding zoning include AG-2, RPD (Residential Planned Development) and RM-2 (Multi-family Residential), RM-10 Multi-family Residential), CC (Community Commercial), CM (Commercial Marine), and EC (Environmentally Critical) near the Burnt Store area and west of BWWMA. The future land use designation for the Yucca Pens Unit in Lee County is Conservation Lands-Upland and Wetland.

### **1.8.1 Babcock Ranch Preserve**

In addition to current land uses which have the potential to affect BWWMA and its management, future planned land use changes may impact the BWWMA. In 2006, the State of Florida acquired over 73,000 acres land of the adjacent 91,000-acre Crescent B Ranch within the Babcock Ranch Florida Forever Project from the Kitson and Partners, LLC for preservation. The lands were acquired as the Babcock Ranch Preserve (BRP) with Florida Forever funds. Acquisition of the BRP was authorized by the Florida Legislature through the Babcock Ranch Preserve Act to “protect and preserve the environmental, agricultural, scientific, scenic, geologic, watershed, fish, wildlife, historic, cultural, and recreational values of the Preserve, and to provide for the multiple use and sustained yield of the renewable surface resources within the Preserve” (FS 259.1053) and “with a goal of sustaining the ecological and economic integrity of the property being acquired while allowing the business of the ranch to operate and prosper” (FS 259.1052). The BRP is located along the eastern boundary of BWWMA and many species which occur on the BWWMA are also present on the BRP. The BRP provides over 55,000 acres of diverse natural habitats which helps to support wildlife populations on BWWMA (Wildlife Conservation Prioritization and Recovery Strategy; WCPR, Appendix 7).

### **1.8.2 Babcock Ranch Community**

As noted above, when the 73,000 acres of BRP were acquired, Kitson and Partners retained ownership of 17,800 acres of the former Crescent B Ranch that are now planned for a residential and mixed-use development known as the Babcock Ranch Community (BRC).

The development site is located in southeastern Charlotte County, north of CR 78, south of CR 74 and east of SR 31. The BRC will be developed to the southeast of BWWMA. The BRC is planned as a sustainable “green community” with interconnected and environmentally sensitive development types.<sup>1</sup> The Babcock Ranch Development of Regional Impact consists of several residential neighborhoods in combination with commercial centers form a Hamlet or Village. The Villages and Hamlets would support and be served by a Town Center. Town Centers would provide the main shopping, employment, and entertainment opportunities as well as an urban residential environment.<sup>2</sup>

Community plans include six million square feet of commercial, retail, and office space along with hotels and a golf course. The BRC is expected to house 40,000-50,000 people and include approximately 19,500 homes.

The development of the BRC will bring additional people, infrastructure, and facilities to the vicinity of BWWMA. Potential impacts could include increased traffic and visitation to the area as well as impacts to wildlife mobility. The FWC will continue to work with agency, private, and county partners to effectively manage the fish and wildlife resources at BWWMA and BRP as the BRC develops.

### **1.8.3 Road Expansions**

Interstate-75 crosses the southwestern corner of the Webb tract. In 1974, the Florida Department of Transportation (FDOT) acquired approximately 238 acres from the FWC for development of I-75. Its construction in 1978 has impacted water flow across the landscape and inhibited drainage on the Webb tract. The FDOT is expanding I-75 to six lanes from SR 78 (Bayshore Road) in Lee County to CR 769 (Kings Highway) in Charlotte County. In April 2013, the FDOT completed six-lane expansions from Tuckers Grade to just south of the North Jones Loop interchange. The FDOT is in the process on expanding I-75 from SR 78 to the Lee/Charlotte County line and adding stormwater retention ponds. Construction is estimated to be completed in 2014. The FWC is working cooperatively with the FDOT, the DEP, the SFWMD, and the County along with other stakeholders concerning the FDOT plans to mitigate for the expansion of I-75 both within and beyond the footprint of the project. These mitigation plans are discussed further in Section 5.7 Hydrological Resources of the plan.

Additionally, the FDOT plans to widen SR 31, which separates BWWMA from BRP, from two to four lanes. The FWC has proposed construction of two wildlife underpasses to help mitigate for increased traffic and potential wildlife-vehicle collisions between BWWMA and BRP. Although BWWMA is outside the primary ranges for the Florida black bear and Florida panther, dispersing individuals are prone to collisions with vehicles. The FWC proposes to locate one underpass approximately 4,000 feet north of the Tucker’s Grade and SR 31 crossing and the other approximately 3,000 feet south of the same crossing (WCPR, Appendix 7).

## 1.9 Public Involvement

The FWC conducted a Management Advisory Group (MAG) meeting in Lehigh Acres, Florida on November 6, 2013 to obtain input from both public and private stakeholders regarding management of BWWMA. Results of this meeting were used by the FWC to develop management goals and objectives and to identify opportunities and strategies for inclusion in this Management Plan. A summary of issues and opportunities raised by the MAG, as well as a listing of participants, is included in Appendix 3. In



Management Advisory Group Meeting, FWC

In addition, a public hearing, as required by Chapter 259.032(10), FS, was held in Punta Gorda, Florida on December 5, 2013, to obtain the input of the general public on the BWWMA Plan. The report of that hearing is also contained in Appendix 3. A website is also maintained for receipt of public input at <http://myfwc.com/conservation/terrestrial/management-plans/develop-mps/>. Further testimony and input may be received at a public hearing held by the ARC. Input received from all public involvement efforts has been considered in the development of this Management Plan.

## 2 Natural and Cultural Resources

### 2.1 Physiography and Topography

The BWWMA is located within the Gulf Coastal Lowlands and Caloosahatchee Valley physiographic provinces. The Gulf Coastal Lowlands is a gently sloping marine plain that is characterized by karst flatlands with many swamps and sloughs. Its elevations range from mean sea level (MSL) to about 35 feet above MSL at its eastward limit. The Gulf Coastal Lowlands is mainly covered with unconsolidated sand that becomes clayey with depth however; wetland areas typically have organic soils.<sup>3</sup> The Caloosahatchee Valley is an ancient river valley backfilled with sand and shell deposits of Plio-Pleistocene age. The terraced land is largely covered by wet prairie and flatwoods. BWWMA is composed of slightly rolling ridges rising from 22 to 41 feet in elevation above MSL. The highest elevation is approximately 41 feet above MSL.

#### 2.1.1 Climate

The BWWMA is located in southwest Florida's Charlotte and Lee counties in the warm, subtropical area of the state. The average annual temperature in Punta Gorda, Florida, located approximately five miles west of BWWMA, is 73.8 degrees Fahrenheit (F). Punta Gorda has a warm and humid temperate climate. The relative humidity generally ranges

from 41% to 96% during the year, with occasional days higher or lower. Summer temperatures in Punta Gorda average approximately 82 degrees F and winters average 64 degrees F. Punta Gorda receives 49.6 inches of rainfall annually on average. The majority of rain falls during the summer (24.7 inches), followed by fall (11.2 inches), spring (7.6 inches), and winter (6.1 inches). Thunderstorms occur on approximately 80 days per year in Charlotte County.<sup>4</sup>

The average annual temperature in Fort Myers, located approximately 10 miles southeast of BWWMA, is 74 degrees F. The average temperature is 82 degrees F during summer and is 65 degrees F during winter. The annual precipitation in Fort Myers averages 53.7 inches, with the majority of rainfall occurring in summer (26.8 inches). Average rainfall during fall is 13.4 inches, followed by 8.1 inches and 5.3 inches in spring and winter, respectively. Thunderstorms occur on approximately 80 days per year in Lee County, primarily during the afternoon.<sup>5</sup> The relative humidity in Fort Myers generally ranges from 43% to 96%, with occasional days higher or lower.

### **2.1.2 Soils**

The Natural Resource Conservation Service (NRCS) soils maps displaying BWWMA's soil series and depth to water table are presented as Figures 4-6. Thirty-four soil types occur on the Webb tract and 28 occur on the Yucca Pens Unit. They are acidic, poorly drained sandy soils with a clay hardpan at various depths below the surface. Below the clay hardpan is an undulating layer of marl and coral rock. In some low areas, a layer of highly organic muck has accumulated. The clay substratum has a profound influence on sub-surface drainage. Not only does this stratum tend to prevent water from seeping into the ground after the overlying sand is saturated, but it interferes with the capillary passage of water from below the stratum into the topsoil during dry periods. The result is that such soils are excessively wet during rainy periods and excessively dry during periods of drought. Soils series descriptions were developed using NRCS geographic information system (GIS) data for BWWMA (Appendix 5).

### **2.1.3 Geologic Conditions**

Charlotte County's surficial sediments are primarily composed of Pliocene/Pleistocene shelly sediments. Mollusk-bearing sediments of southern Florida contain some of the most abundant and diverse fossil faunas in the world. The origin of these accumulations of fossil mollusks is imprecisely known (Allmon, 1992).<sup>6</sup> Other sediments in the county include Holocene sediments near Charlotte Harbor, the Pliocene Tamiami Formation, and the Miocene/Pliocene Peace River Formation.<sup>7</sup> The Tamiami Formation consists of a mixture of variably sandy limestone, sands, and clays containing varying percentages of phosphate grains. Fossils, including mollusks, echinoids and corals, are commonly abundant in the Tamiami Formation.<sup>8</sup>

The geologic units in Lee County are the Tertiary Tamiami Formation, Tertiary-

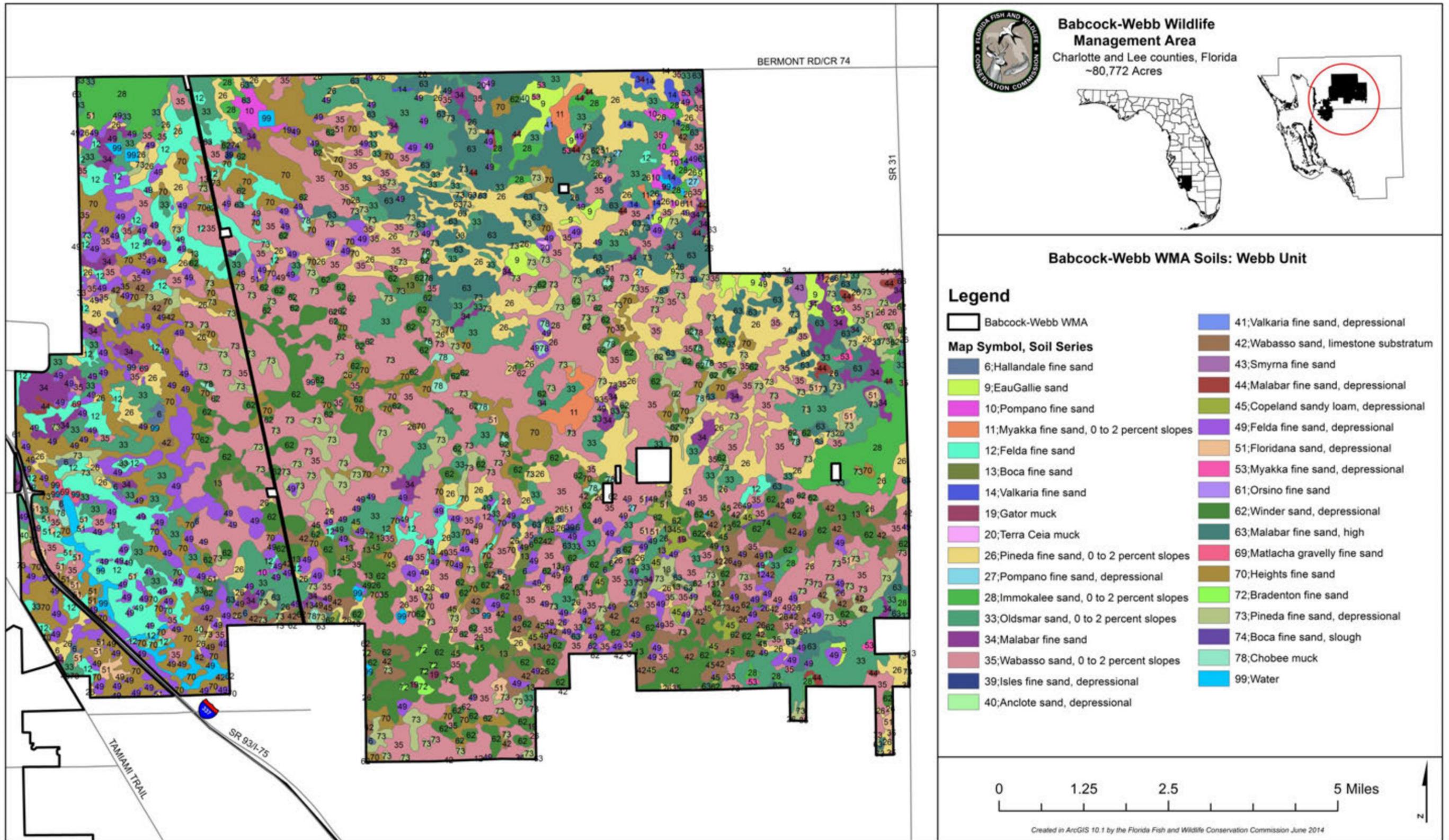


Figure 4. BWWMA Soils - Webb Tract

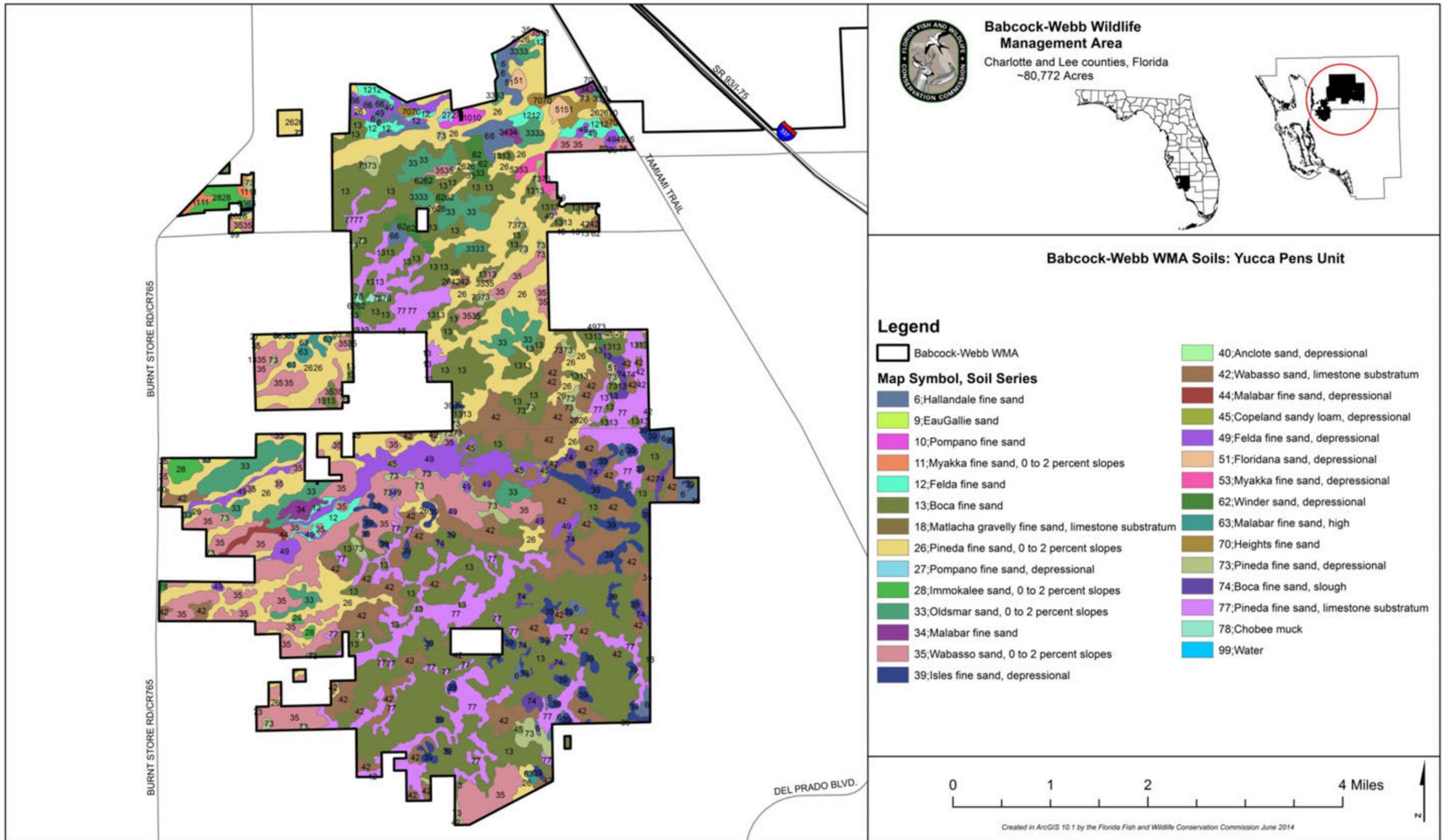


Figure 5. BWWMA Soils - Yucca Pens Unit

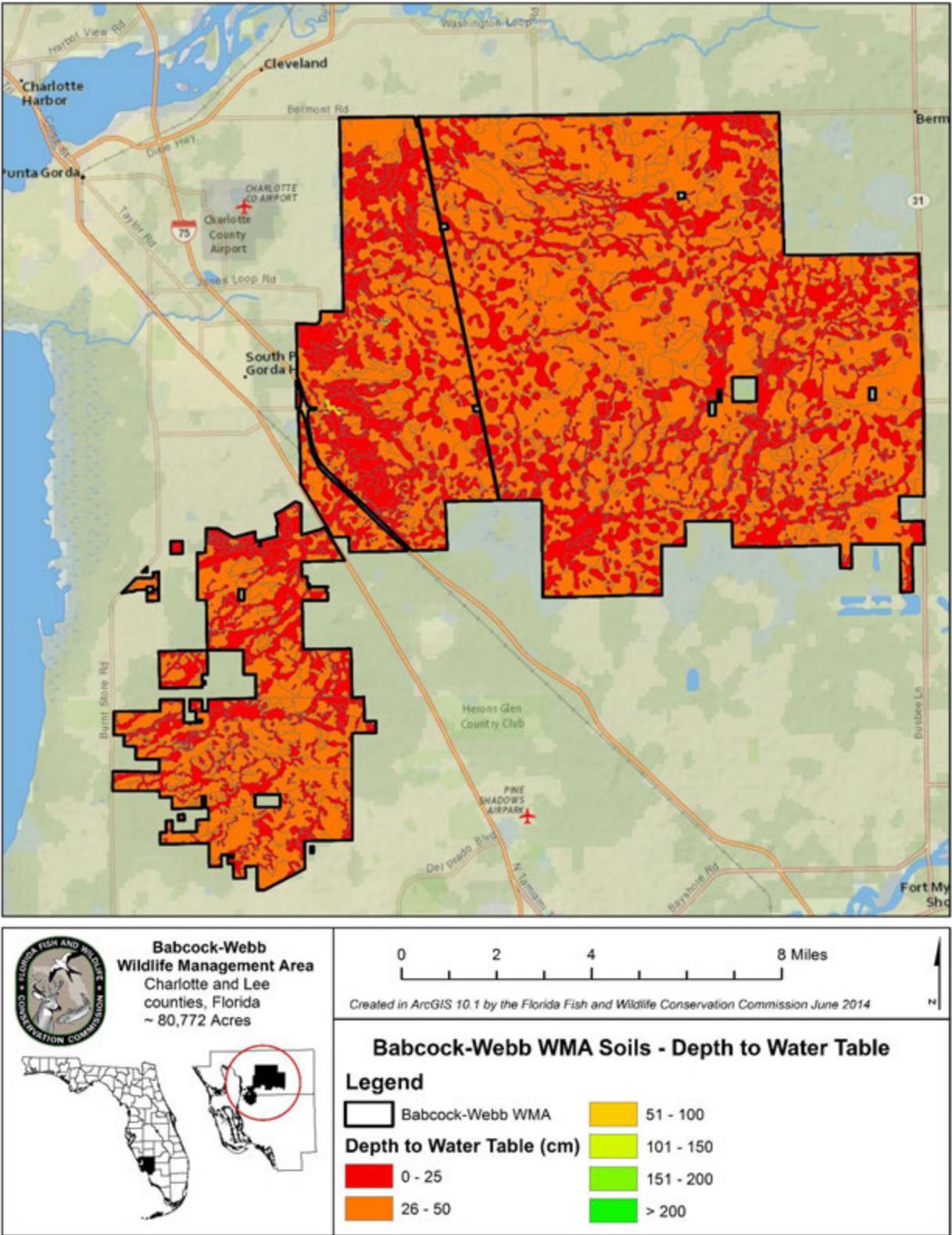


Figure 6. BWWMA Soils- Depth to Water Table

Quaternary shell units, and Quaternary (Holocene) coastal and estuarine sediments. The Tamiami Formation is a poorly defined lithostratigraphic unit containing a wide range of mixed carbonate-siliciclastic lithologies and associated faunas (Missimer, 1992).<sup>8</sup> The Peace River Formation, Hawthorn Group, underlies the Tamiami Formation throughout the County. Overlying the Tamiami Formation throughout much of Lee County are sediments mapped as undifferentiated Tertiary/Quaternary (Plio-Pleistocene) shell-bearing units. This unit consists of sand with subordinate limestone and clay. Fossils, including mollusks and corals, are common, often abundant and preservation is often excellent. A quartz sand blanket (less than 20 feet thick) overlies Tertiary Tamiami Formation and Tertiary-Quaternary shell units throughout the county. The sand is generally a fine to medium well sorted sand with no fossils.<sup>8</sup>

## 2.2 Vegetation

Vegetative community data and species lists (Figure 7, Tables 3-6) at BWWMA originated from field reviews and assessments performed for the FWC by the Florida Natural Areas Inventory (FNAI) in 2005. In 2014 the FNAI remapped and recertified BWWMA's natural communities. The FWC-schedules remapping, as feasible, of vegetative communities on conservation lands managed by the FWC on a 10 year cycle to reflect current community conditions, restoration and maintenance work, property boundary changes, and other changes which may affect the classification of natural communities. During the 2014 remapping of BWWMA, areas formerly classified as basin marsh were reclassified as depression marsh, some areas that were mistakenly classified were changed to mesic flatwoods, and natural community boundaries were updated. Natural communities comprise approximately 95% of BWWMA's total vegetative cover,



**BWWMA, David Moynahan**

over 77,000 acres. Mesic flatwoods, wet flatwoods, depression marsh, and wet and dry



**BWWMA, FWC**

prairie cover most of the area. The remainder of BWWMA is comprised of altered landcover types, including developed areas, clearings, impoundments, pasture, old fields, roads, and utility corridors.

**Table 3. Natural and Anthropogenic Community Types on BWWMA**

<b>Community Type</b>	<b>Acres</b>	<b>Percentage</b>
Abandoned field/abandoned pasture	1,407.2	1.7%
Artificial pond	139.4	0.2%
Basin swamp	547.4	0.7%
Baygall	7.4	<0.1%
Canal/ditch	39.4	0.1%
Clearing/regeneration	953.6	1.2%
Depression marsh	15,852.0	19.4%
Developed	140.7	0.2%
Dome swamp	50.2	0.1%
Dry prairie	10,194.5	12.5%
Hydric hammock	7.3	<0.1%
Impoundment	637.7	0.8%
Invasive exotic monoculture	6.3	0.0%
Mesic flatwoods	30,489.5	37.4%
Mesic hammock	143.3	0.2%
Pasture- improved	30.9	<0.1%
pasture- semi-improved	30.7	<0.1%
Pine plantation	108.6	0.1%
Road	24.6	<0.1%
Scrubby flatwoods	62.2	0.1%
Utility corridor	380.6	0.5%
Wet flatwoods	15,160.0	18.6%
Wet prairie	5,215.8	6.4%

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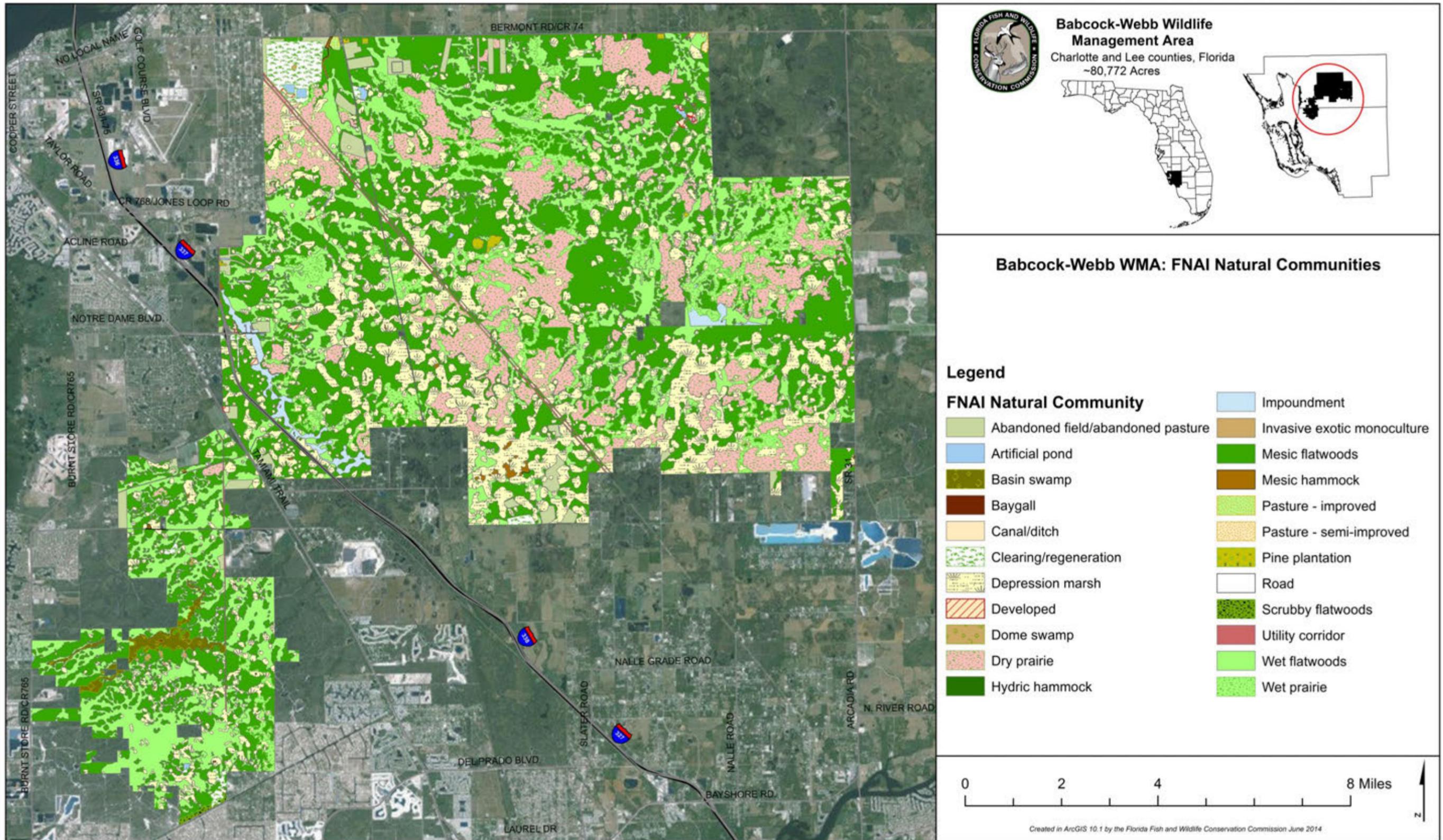


Figure 7. FNAI Natural and Altered Communities at BWWMA

**Table 4. Native Plant Species Known to Occur on the BWWMA**

<b>Common Name</b>	<b>Scientific Name</b>
American beautyberry	<i>Callicarpa americana</i>
American bluehearts	<i>Buchnera americana</i>
American burnweed	<i>Erechtites hieraciifolius</i>
Baldwin's milkwort	<i>Polygala baldwinii</i>
Baldwin's nutrush	<i>Scleria baldwinii</i>
Ballmoss	<i>Tillandsia recurvata</i>
Bartram's rose gentian	<i>Sabatia decandra</i>
Beach false foxglove	<i>Agalinis fasciculata</i>
Beautiful pawpaw	<i>Deeringothamnus pulchellus</i>
Beggarticks	<i>Bidens alba</i>
Big carpetgrass	<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>
Blueflower butterwort	<i>Pinguicula caerulea</i>
Bluejoint panicum	<i>Panicum tenerum</i>
Bog white violet	<i>Viola lanceolata</i>
Bottlebrush threeawn	<i>Aristida spiciformis</i>
Branched hedgehyssop	<i>Gratiola ramosa</i>
Bretonica peluda	<i>Melochia spicata</i>
Broomsedge bluestem	<i>Andropogon virginicus</i>
Bulltongue arrowhead	<i>Sagittaria lancifolia</i>
Bushy bluestem	<i>Andropogon glomeratus</i>
Button rattlesnake master	<i>Eryngium yuccifolium</i>
Cabbage palm	<i>Sabal palmetto</i>
Calloose grape	<i>Vitis shuttleworthii</i>
Candyroot	<i>Polygala nana</i>
Capillary hairsedge	<i>Bulbostylis ciliatifolia</i>
Cardinal airplant	<i>Tillandsia fasciculata</i>
Carolina ash	<i>Fraxinus caroliniana</i>
Carolina redroot	<i>Lachnanthes caroliniana</i>
Carolina wild petunia	<i>Ruellia caroliniensis</i>
Carolina willow	<i>Salix caroliniana</i>
Catesby's lily	<i>Lilium catesbaei</i>
Chalky bluestem	<i>Andropogon virginicus</i> var. <i>glaucus</i>
Chapman's skeletongrass	<i>Gymnopogon chapmanianus</i>

**Table 4. Native Plant Species Known to Occur on the BWWMA**

<b>Common Name</b>	<b>Scientific Name</b>
Cinnamon fern	<i>Osmunda cinnamomea</i>
Climbing hempvine	<i>Mikania scandens</i>
Clustered bushmint	<i>Hyptis alata</i>
Clustered mille graines	<i>Oldenlandia uniflora</i>
Coastalplain chaffhead	<i>Carphephorus corymbosus</i>
Coastalplain milkwort	<i>Polygala setacea</i>
Coastalplain St. John's-wort	<i>Hypericum brachyphyllum</i>
Coastalplain staggerbush	<i>Lyonia fruticosa</i>
Combleaf mermaidweed	<i>Proserpinaca pectinata</i>
Common bamboo	<i>Bambusa vulgaris</i>
Common buttonbush	<i>Cephalanthus occidentalis</i>
Common persimmon	<i>Diospyros virginiana</i>
Common reed	<i>Phragmites australis</i>
Coontie	<i>Zamia pumila</i>
Creeping primrosewillow	<i>Ludwigia repens</i>
Crowngrass	<i>Paspalum</i> sp.
Dahoon	<i>Ilex cassine</i>
Danglepod	<i>Sesbania herbacea</i>
Darrow's blueberry	<i>Vaccinium darrowii</i>
Dense gayfeather	<i>Liatris spicata</i>
Dog fennel	<i>Eupatorium capillifolium</i>
Downy lobelia	<i>Lobelia puberula</i>
Drumheads	<i>Polygala cruciata</i>
Duckweed	<i>Lemna</i> sp.
Dwarf huckleberry	<i>Gaylussacia dumosa</i>
Dwarf live oak	<i>Quercus minima</i>
Dwarf St. John's-wort	<i>Hypericum mutilum</i>
Earleaf greenbrier	<i>Smilax auriculata</i>
Early whitetop fleabane	<i>Erigeron vernus</i>
Eastern false dragonhead	<i>Physostegia purpurea</i>
Eastern poison ivy	<i>Toxicodendron radicans</i>
Eastern purple bladderwort	<i>Utricularia purpurea</i>
Eastern silver aster	<i>Symphotrichum concolor</i>
Elliott's lovegrass	<i>Eragrostis elliotii</i>
Elliott's milkpea	<i>Galactia elliotii</i>
Fairy beaksedge	<i>Rhynchospora pusilla</i>
Fall panicgrass	<i>Panicum dichotomiflorum</i>
False daisy	<i>Eclipta prostrata</i>
False nettle	<i>Boehmeria cylindrica</i>
Falsefennel	<i>Eupatorium leptophyllum</i>

**Table 4. Native Plant Species Known to Occur on the BWWMA**

<b>Common Name</b>	<b>Scientific Name</b>
Fascicled beaksedge	<i>Rhynchospora fascicularis</i>
Fetterbush	<i>Lyonia lucida</i>
Fewflower milkweed	<i>Asclepias lanceolata</i>
Field paspalum	<i>Paspalum laeve</i>
Fingergrass	<i>Eustachys glauca</i>
Fireflag	<i>Thalia geniculata</i>
Flatsedge	<i>Cyperus</i> sp.
Flattened pipewort	<i>Eriocaulon compressum</i>
Florida beargrass	<i>Nolina atopocarpa</i>
Florida bully	<i>Sideroxylon reclinatum</i>
Florida ironweed	<i>Vernonia blodgettii</i>
Florida tickseed	<i>Coreopsis floridana</i>
Florida yellow flax	<i>Linum floridanum</i>
Fourpetal St. John's-wort	<i>Hypericum tetrapetalum</i>
Fringed bladderwort	<i>Utricularia simulans</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 airplant	<i>Tillandsia utriculata</i>
Giant whitetop	<i>Rhynchospora latifolia</i>
Glade lobelia	<i>Lobelia glandulosa</i>
Golden polypody	<i>Phlebodium aureum</i>
Gopher apple	<i>Licania michauxii</i>
Groundsel tree	<i>Baccharis halimifolia</i>
Gulf Coast swallowwort	<i>Cynanchum angustifolium</i>
Gulfdune paspalum	<i>Paspalum monostachyum</i>
Hairawn muhly	<i>Muhlenbergia capillaris</i>
Hairy chaffhead	<i>Carphephorus paniculatus</i>
Hairy fimbry	<i>Fimbristylis puberula</i>
Harper's false foxglove	<i>Agalinis harperi</i>
Hemlock witchgrass	<i>Dichantherium portoricense</i>
Herb-of-grace	<i>Bacopa monnieri</i>
Hillsboro threeawn	<i>Aristida purpurascens</i>
Humped bladderwort	<i>Utricularia gibba</i>
Jamaica swamp sawgrass	<i>Cladium jamaicense</i>
Lacy bracken	<i>Pteridium aquilinum</i>
Largeflower milkweed	<i>Asclepias connivens</i>
Largeflower rose gentian	<i>Sabatia grandiflora</i>
Laurel greenbrier	<i>Smilax laurifolia</i>

**Table 4. Native Plant Species Known to Occur on the BWWMA**

<b>Common Name</b>	<b>Scientific Name</b>
Laurel oak	<i>Quercus laurifolia</i>
Lax hornpod	<i>Mitreola petiolata</i>
Leafy bladderwort	<i>Utricularia foliosa</i>
Little bluestem	<i>Schizachyrium scoparium</i>
Live oak	<i>Quercus virginiana</i>
Longleaf milkweed	<i>Asclepias longifolia</i>
Longleaf pine	<i>Pinus palustris</i>
Longleaf threeawn	<i>Aristida palustris</i>
Long-lip ladiestresses	<i>Spiranthes longilabris</i>
Lopsided indiagrass	<i>Sorghastrum secundum</i>
Love vine	<i>Cassytha filiformis</i>
Lovegrass	<i>Eragrostis</i> sp.
Low nutrush	<i>Scleria verticillata</i>
Low pinebarren milkwort	<i>Polygala ramosa</i>
Maiden fern	<i>Thelypteris</i> sp.
Maidencane	<i>Panicum hemitomon</i>
Manatee mudflower	<i>Micranthemum glomeratum</i>
Many-flowered grass-pink	<i>Calopogon multiflorus</i>
Marsh pennywort	<i>Hydrocotyle</i> sp.
Mid-sorus fern	<i>Blechnum serrulatum</i>
Mild waterpepper	<i>Polygonum hydropiperoides</i>
Mohr's thoroughwort	<i>Eupatorium mohrii</i>
Muscadine	<i>Vitis rotundifolia</i>
Myrsine	<i>Myrsine cubana</i>
Myrtleleaf St. John's-wort	<i>Hypericum myrtifolium</i>
Narrowfruit horned beaksedge	<i>Rhynchospora inundata</i>
Narrowleaf blue-eyed grass	<i>Sisyrinchium angustifolium</i>
Narrowleaf silkgrass	<i>Pityopsis graminifolia</i>
Narrowleaf yellowtops	<i>Flaveria linearis</i>
Needleleaf witchgrass	<i>Dichanthelium aciculare</i>
Netted nutrush	<i>Scleria reticularis</i>
Netted pawpaw	<i>Asimina reticulata</i>
Nodding club-moss	<i>Lycopodiella cernua</i>
Norfolk Island pine	<i>Araucaria heterophylla</i>
Northern needleleaf	<i>Tillandsia balbisiana</i>
Nutrush	<i>Scleria</i> sp.
Nuttall's meadowbeauty	<i>Rhexia nuttallii</i>
Nuttall's thistle	<i>Cirsium nuttallii</i>
Oblongleaf twinflower	<i>Dyschoriste oblongifolia</i>
Orange milkwort	<i>Polygala lutea</i>

**Table 4. Native Plant Species Known to Occur on the BWWMA**

<b>Common Name</b>	<b>Scientific Name</b>
Pale grasspink	<i>Calopogon pallidus</i>
Pale meadowbeauty	<i>Rhexia mariana</i>
Panicgrass	<i>Panicum</i> sp.
Peppervine	<i>Ampelopsis arborea</i>
Peruvian primrosewillow	<i>Ludwigia peruviana</i>
Pickerelweed	<i>Pontederia cordata</i>
Piedmont marshelder	<i>Iva microcephala</i>
Piedmont pinweed	<i>Lechea torreyi</i>
Pinebarren goldenrod	<i>Solidago fistulosa</i>
Pine-hyacinth	<i>Clematis baldwinii</i>
Pineland chaffhead	<i>Carphephorus carnosus</i>
Pineland heliotrope	<i>Heliotropium polyphyllum</i>
Pineland purple	<i>Carphephorus odoratissimus</i>
Pineland rayless goldenrod	<i>Bigelovia nudata</i>
Pineland spurge	<i>Euphorbia inundata</i> var. <i>garrettii</i>
Pineweeds	<i>Hypericum gentianoides</i>
Pineywoods dropseed	<i>Sporobolus junceus</i>
Pink sundew	<i>Drosera capillaris</i>
Pitted stripeseed	<i>Piriqueta cistoides</i>
Plumed beaksedge	<i>Rhynchospora plumosa</i>
Pond cypress	<i>Taxodium ascendens</i>
Poor joe	<i>Diodia teres</i>
Procession flower	<i>Polygala incarnata</i>
Purple thistle	<i>Cirsium horridulum</i>
Queensdelight	<i>Stillingia sylvatica</i>
Rabbitbells	<i>Crotalaria rotundifolia</i>
Red maple	<i>Acer rubrum</i>
Resurrection fern	<i>Pleopeltis polypodioides</i>
Rice button aster	<i>Symphotrichum dumosum</i>
Riverswamp nutrush	<i>Scleria distans</i>
Rose-of-plymouth	<i>Sabatia stellaris</i>
Rose-rush	<i>Lygodesmia aphylla</i>
Rosy camphorweed	<i>Pluchea baccharis</i>
Rough hedgehyssop	<i>Gratiola hispida</i>
Roundpod St. John's-wort	<i>Hypericum cistifolium</i>
Royal fern	<i>Osmunda regalis</i>
Saltmarsh umbrellasedge	<i>Fuirena breviseta</i>
Sand cordgrass	<i>Spartina bakeri</i>
Sandweed	<i>Hypericum fasciculatum</i>
Savannah milkweed	<i>Asclepias pedicellata</i>

**Table 4. Native Plant Species Known to Occur on the BWWMA**

<b>Common Name</b>	<b>Scientific Name</b>
Saw palmetto	<i>Serenoa repens</i>
Saw tooth greenbrier	<i>Smilax bona-nox</i>
Scaleleaf aster	<i>Symphotrichum adnatum</i>
Seminole false foxglove	<i>Agalinis filifolia</i>
Sensitive brier	<i>Mimosa quadrivalvis</i>
Shiny blueberry	<i>Vaccinium myrsinites</i>
Shoestring fern	<i>Vittaria lineata</i>
Shore rush	<i>Juncus marginatus</i>
Shortbeak beaksedge	<i>Rhynchospora nitens</i>
Shortleaf gayfeather	<i>Liatris tenuifolia</i>
Shortleaf rose gentian	<i>Sabatia brevifolia</i>
Silver dwarf morning-glory	<i>Evolvulus sericeus</i>
Slender flattop goldenrod	<i>Euthamia caroliniana</i>
Slenderfruit nutrush	<i>Scleria georgiana</i>
Small butterwort	<i>Pinguicula pumila</i>
Smallcup spiderlily	<i>Hymenocallis puntagordensis</i>
Smallhead doll's daisy	<i>Boltonia diffusa</i>
Snow squarestem	<i>Melanthera nivea</i>
South Florida slash pine	<i>Pinus elliottii</i> var. <i>densa</i>
Southeastern sneezeweed	<i>Helenium pinnatifidum</i>
Southern beaksedge	<i>Rhynchospora microcarpa</i>
Southern cattail	<i>Typha domingensis</i>
Southern needleleaf	<i>Tillandsia setacea</i>
Southern umbrellasedge	<i>Fuirena scirpoidea</i>
Spanish moss	<i>Tillandsia usneoides</i>
Spikerush	<i>Eleocharis</i> sp.
Spreading beaksedge	<i>Rhynchospora divergens</i>
St. Andrew's-cross	<i>Hypericum hypericoides</i>
Starrush whitetop	<i>Rhynchospora colorata</i>
Strangler fig	<i>Ficus aurea</i>
Sugarcane plumegrass	<i>Saccharum giganteum</i>
Swamp bay	<i>Persea palustris</i>
Sweet goldenrod	<i>Solidago odora</i>
Sweet shaggytuft	<i>Stenandrium dulce</i>
Sweetbroom	<i>Scoparia dulcis</i>
Sword fern	<i>Nephrolepis exaltata</i>
Tall elephantsfoot	<i>Elephantopus elatus</i>
Tall pinebarren milkwort	<i>Polygala cymosa</i>
Tarflower	<i>Bejaria racemosa</i>
Tenangle pipewort	<i>Eriocaulon decangulare</i>

**Table 4. Native Plant Species Known to Occur on the BWWMA**

<b>Common Name</b>	<b>Scientific Name</b>
Threadleaf arrowhead	<i>Sagittaria filiformis</i>
Toothpetal false reinorchid	<i>Habenaria floribunda</i>
Tracy's beaksedge	<i>Rhynchospora tracyi</i>
Turkey tangle fogfruit	<i>Phyla nodiflora</i>
Virginia chain fern	<i>Woodwardia virginica</i>
Virginia creeper	<i>Parthenocissus quinquefolia</i>
Wand goldenrod	<i>Solidago stricta</i>
Water cowbane	<i>Oxypolis filiformis</i>
Water pimpernel	<i>Samolus ebracteatus</i>
Water toothleaf	<i>Stillingia aquatica</i>
Wax myrtle	<i>Myrica cerifera</i>
Whisk fern	<i>Psilotum nudum</i>
White sunnybell	<i>Schoenolirion albiflorum</i>
White twine vine	<i>Sarcostemma clausum</i>
Whitehead bogbutton	<i>Lachnocaulon anceps</i>
Whitetassels	<i>Dalea carnea</i>
Wild pennyroyal	<i>Piloblephis rigida</i>
Wiregrass	<i>Aristida stricta</i>
Witchgrass	<i>Dichanthelium</i> sp.
Woodsorrel	<i>Oxalis</i> sp.
Woolly sunbonnets	<i>Chaptalia tomentosa</i>
Wrinkled jointtailgrass	<i>Coelorachis rugosa</i>
Yellow bristlegrass	<i>Setaria parviflora</i>
Yellow butterwort	<i>Pinguicula lutea</i>
Yellow colicroot	<i>Aletris lutea</i>
Yellow hatpins	<i>Syngonanthus flavidulus</i>
Yellow milkwort	<i>Polygala rugelii</i>
Yellow-eyed grasses	<i>Xyris</i> spp.
Yellowseed false pimpernel	<i>Lindernia dubia</i>
Zigzag bladderwort	<i>Utricularia subulata</i>

**Table 5. Threatened and Endangered Plant Species of BWWMA**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Status</b>
Beautiful pawpaw	<i>Deeringothamnus rugelli</i>	SE, FE
Blueflower butterwort	<i>Pinguicula caerulea</i>	ST
Cardinal airplant	<i>Tillandsia fasciculata</i>	SE
Catesby's lily	<i>Lilium catesbaei</i>	ST
Florida beargrass	<i>Nolina atopocarpa</i>	ST

**Table 5. Threatened and Endangered Plant Species of BWWMA**

Common Name	Scientific Name	Status
Giant airplant	<i>Tillandsia utriculata</i>	SE
Long-lip ladiestresses	<i>Spiranthes longilabris</i>	ST
Many-flowered grass-pink	<i>Calopogon multiflorus</i>	ST
Northern needleleaf	<i>Tillandsia balbisiana</i>	ST
Yellow butterwort	<i>Pinguicula lutea</i>	ST

Acronym Key	
FE	Federally-designated Endangered
SE	State-designated Endangered
ST	State-designated Threatened

**Table 6. Exotic Plant Species Known to Occur on the BWWMA**

Common Name	Scientific Name
Asian sword fern	<i>Nephrolepis brownii</i>
Australian pine	<i>Casuarina equisetifolia</i>
Bahia grass	<i>Paspalum notatum</i>
Balsam apple	<i>Momordica charantia</i>
Bermudagrass	<i>Cynodon dactylon</i>
Brazilian pepper	<i>Schinus terebinthifolius</i>
Britton's wild petunia	<i>Ruellia simplex</i>
Caesar weed	<i>Urena lobata</i>
Carrotwood	<i>Cupaniopsis anacardioides</i>
Cogongrass	<i>Imperata cylindrica</i>
Creeping oxeye	<i>Sphagneticola trilobata</i>
Ditch fimbry	<i>Fimbristylis schoenoides</i>
Earleaf acacia	<i>Acacia auriculiformis</i>
Grand eucalyptus	<i>Eucalyptus grandis</i>
Gray sheoak	<i>Casuarina glauca</i>
Guava	<i>Psidium guajava</i>
Guineagrass	<i>Panicum maximum</i>
Hairy indigo	<i>Indigofera hirsuta</i>
Japanese climbing fern	<i>Lygodium japonicum</i>
Java plum	<i>Syzygium cumini</i>
Lantana	<i>Lantana camara</i>
Lead tree	<i>Leucaena leucocephala</i>
Malaysian false pimpernel	<i>Lindernia crustacea</i>
Mango	<i>Mangifera indica</i>
Monk orchid	<i>Oeceoclades maculata</i>

**Table 6. Exotic Plant Species Known to Occur on the BWWMA**

<b>Common Name</b>	<b>Scientific Name</b>
Natalgrass	<i>Rhynchelytrum repens</i>
Old world climbing fern	<i>Lygodium microphyllum</i>
Paragrass	<i>Urochloa mutica</i>
Punktree	<i>Melaleuca quinquenervia</i>
Rattlebox	<i>Sesbania punicea</i>
River sheoak	<i>Casuarina cunninghamiana</i>
Rosary pea	<i>Abrus precatorius</i>
Rose myrtle	<i>Rhodomyrtus tomentosa</i>
Rose natalgrass	<i>Melinis repens</i>
Sea hibiscus	<i>Talipariti tiliaceum</i>
Silk-reed	<i>Neyraudia reynaudiana</i>
Smutgrass	<i>Sporobolus indicus</i>
Spadeleaf	<i>Centella asiatica</i>
Strawberry guava	<i>Psidium cattleianum</i>
Torpedograss	<i>Panicum repens</i>
Tropical soda apple	<i>Solanum viarum</i>
Water lettuce	<i>Pistia stratiotes</i>
West Indian marshgrass	<i>Hymenachne amplexicaulis</i>

### 2.2.1 FNAI Natural Community Descriptions

The FNAI describes a diverse landscape of natural communities at BWWMA. The landscape is dominated by mesic and wet flatwoods as well as depression marsh, dry prairie, and wet prairie. The following natural community descriptions were developed by the FNAI for BWWMA, and have been modified by the FWC for the purposes of this Management Plan. They also include generic natural community description excerpts from the FNAI Guide to the Natural Communities of Florida 2010 Edition.<sup>9</sup>

#### **Basin swamp** (547.4 acres)

Basin swamps are large, irregularly shaped, forested wetlands. Fires are infrequent, and can occur in a range from every 5-150 years, though basin swamps are not actively managed through prescribed fire.

The only occurrences of basin swamp on BWWMA are in the Yucca Pens Unit where they form the headwaters to Yucca Pen Creek, and are found as segments within a large wet flatwoods complex. These basin swamps likely developed in deeper areas within the wet flatwoods complex where longer hydroperiods favored pond cypress over South Florida slash pine. The basin swamps typically have a closed canopy of pond cypress. Occasionally, South Florida slash pine is also found in the canopy. The subcanopy is sparse and consists of younger canopy tree species, as well as dahoon and swamp bay. Shrub cover can vary from dense to sparse and species found include wax myrtle, swamp bay, dahoon, myrsine,

and water toothleaf. Herbs also vary in their density; this is likely due to the amount of light penetrating the canopy. The herb layer is dominated by mid-sorus fern and Virginia chain fern, as well as numerous grasses and sedges. Epiphytes and vines are common. Epiphytic species include northern needleleaf, cardinal airplant, southern needleleaf, ballmoss, and Spanish moss. Laurel greenbrier is the only vine species found.

### **Baygall (7.4 acres)**

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

All of the documented baygall at BWWMA are categorized as the South Florida bayhead variant of baygall. This community occurs within a larger matrix of marsh and wet prairie and is relatively isolated from fire events. South Florida bayhead forms on small isolated islands that share some similarities to wet flatwoods and/or mesic flatwoods habitats. The South Florida bayhead variant of baygall consists of dense stands of broadleaved evergreen shrubs, vines, and occasionally contains a thin and emergent canopy.

South Florida bayhead at BWWMA consists of a generally sparse canopy of slash pine. In many instances a canopy is completely lacking. Shrub cover is commonly dense and tall, with shrubs generally 15 to 30 feet in height. Characteristic shrub species include swamp bay, fetterbush, wax myrtle, and saw palmetto. The vines, laurel greenbrier and muscadine are common and are often entangled within the surrounding vegetation.

The majority of the herbaceous ground cover in these habitats is composed of mid-sorus fern. Other marsh herbs can be found on the perimeter of these islands where the community interfaces with surrounding marsh vegetation.

### **Depression marsh (15,852.0 acres)**

Depression marshes are typically small, rounded wetlands, dominated by herbaceous species, and are maintained by frequent fires every one-ten years. Depression marshes often dry out during periods of low rainfall, and as a result, burn more frequently than basin marshes.

Depression marshes on the BWWMA usually have a deeper center of pickerelweed, bull tongue arrowhead, and maidencane. Occasionally, there may be a deeper area of Carolina willow and fireflag amongst the pickerelweed. Species surrounding these deeper areas include Tracy's beaksedge, longleaf threeawn, bluejoint panicum, sandweed, water toothleaf, piedmont marshelder, water cowbane, rose-gentians, yellow-eyed grasses,

tenangle pipewort, branched hedgehyssop, and pink sundew. Disturbances to depression marshes on BWWMA include invasion by exotic species, mainly punk tree and torpedograss. Depression marshes on the Yucca Pens Unit are more heavily disturbed by punk tree and torpedograss. Woody encroachment, mainly from wax myrtle, is another common disturbance, especially in the Yucca Pens Unit.

**Dome swamp** (50.2 acres)

Dome swamps are typically small, rounded, forested wetlands. Fire occurs frequently along the outer edges, spreading into the dome swamp from the surrounding uplands, but is infrequent in the center of the dome swamp. Dome swamps usually have a dome like appearance due to older, taller trees growing in deeper water, where fires are less frequent, and younger, shorter trees growing in the shallower water along the edge, where fires are more frequent.

The only occurrences of dome swamps on BWWMA are in the Yucca Pens Unit. Dome swamps on BWWMA generally have a closed canopy of pond cypress. South Florida slash pine can be found infrequently. The subcanopy is sparse and consists of younger canopy species, as well as dahoon. Shrubs can be dense or sparse, and include wax myrtle, myrsine, cabbage palm, and Brazilian pepper. Herbaceous cover also varies from dense to sparse, and species include mid-sorus fern, sword fern, royal fern, pickerelweed, maidencane, false nettle, tenangle pipewort, and leafy bladderwort. Epiphytes and vines are occasional. Epiphytic species include northern needleleaf, cardinal airplant, southern needleleaf, ballmoss, and Spanish moss. Vine species include laurel greenbrier and eastern poison ivy. Disturbances to dome swamps on BWWMA include invasion by exotic species, mainly Brazilian pepper and rose myrtle.

**Dry prairie** (10,194.5 acres)

Dry prairies are nearly treeless flatlands dominated by a diverse assemblage of herbs and low shrubs. The natural fire return interval is every one-four years, which is slightly more frequent than mesic flatwoods. These fires naturally occurred during the late spring/early summer lightning season. The slightly higher fire return interval is thought to be the primary factor in limiting pine recruitment, thus creating dry prairie.

Dry prairies on BWWMA are mostly found on the Webb tract, though one small area was mapped on the Yucca Pens Unit. Dry prairies are distinguished from wet prairie by their abundance of shrubs; particularly saw palmetto, and herbaceous species composition, which is less hydrophytic. The most obvious difference between dry prairie and mesic flatwoods is canopy cover, though some species are more abundant in dry prairie, and the shrubs are often dwarfed. The dry prairies rarely have any canopy or subcanopy. Infrequently, saplings of south Florida slash pine can be found. Shrubs and herbs are typically co-dominant in the understory, though areas where wet prairie is intermingled, herbs become the more dominant component. Shrubs are typically less than three feet tall and are dominated by saw palmetto, dwarf live oak, and wax myrtle. Occasional shrubs include

coastalplain staggerbush, coastalplain St. John's-wort, and netted pawpaw. The federally and state endangered pretty false pawpaw (beautiful pawpaw) is an uncommon element of the shrub layer. Herbs are abundant, and dominated by wiregrass. Other herbaceous species include fascicled beaksedge, bottlebrush threeawn, lopsided indiagrass, lovegrass, needleleaf witchgrass, narrowleaf silkgrass, pineland rayless goldenrod, gayfeathers, chaffheads, rose-rush, shortleaf rose gentian, milkworts, and yellow-eyed grasses. Dry prairie often grades into wet prairie and in these areas a mix of dry prairie and wet prairie species is found. Invasive exotic species found in dry prairie on BWWMA include punk tree, Brazilian pepper, and torpedograss.

### **Hydric hammock (7.3 acres)**

Hydric hammocks are forested wetlands dominated by hardwood species, usually situated where limestone is close to the surface. Fires are rare in hydric hammocks due to the saturated soils.

Only one hydric hammock was mapped on BWWMA and this occurs at the headwaters of a tributary to Shell Creek on the Webb tract. Canopy cover in this hammock is dense and consists of red maple. The subcanopy is also dense and consists of laurel oak and red maple. Many tree saplings are found in the understory and include cabbage palm, dahoon, red maple, and laurel oak. Shrubs are sparse and consist of wax myrtle, myrsine, and Peruvian primrosewillow. Herbaceous cover is high and consists of maiden fern, marsh pennywort, royal fern and false nettle. Epiphytes are occasional and include cardinal airplant, southern needleleaf, and Spanish moss. Vines are occasional and include eastern poison ivy and earleaf greenbrier. Historically, this area was likely an herb-dominated wetland, but due to hydrological alteration caused by the construction of State Road 74 and the ditch that flows from the Boy Scout camp to the hammock, hardwoods have become well established.

### **Mesic flatwoods (30,489.5 acres)**

Mesic flatwoods are open, pine canopy forests with a diverse understory of shrubs and herbs occurring on low, flat terrain. Fire is an important factor in maintaining high plant diversity and naturally occurs every two-five years during the late spring/early summer lightning season. The BWWMA contains the largest parcel of natural pine flatwoods in southwest Florida.

On BWWMA, mesic flatwoods are the dominant upland community type and can occur intermingled with wet flatwoods, wet prairie, and dry prairie or as islands within basin marshes. Mesic flatwoods are distinguished from wet flatwoods by their abundance of shrubs; particularly saw palmetto, and herb species composition, which is less hydrophytic. The mesic flatwoods at BWWMA have an open canopy of South Florida slash pine. In areas bordering wetlands the canopy may become denser. Longleaf pine is infrequent. Occasionally, there is a subcanopy of younger aged south Florida slash pine. Areas bordering wetlands and islands within wetlands typically have a dense subcanopy of

cabbage palm, live oak, dahoon, swamp bay, and common persimmon. Pine saplings occur relatively infrequently. Shrubs and herbs are typically co-dominant in the understory except in areas bordering wetlands and islands where shrubs become dominant. Shrub species are usually three to six feet tall and include saw palmetto, wax myrtle, dwarf live oak, coastalplain staggerbush, netted pawpaw, coastalplain St. John's-wort, wild pennyroyal, and shiny blueberry. The federally and state listed endangered species pretty false pawpaw is an uncommon shrub. Herb species include wiregrass, fascicled beaksedge, bottlebrush threeawn, lopsided indiagrass, lovegrass, needleleaf witchgrass, narrowleaf silkgrass, pineland rayless goldenrod, gayfeathers, chaffheads, rose-rush, milkworts, and yellow-eyed grasses. Epiphytes and vines are rare. Epiphytes include ballmoss and Spanish moss. Vines include ear leaf greenbrier and muscadine. Invasive exotic species found in the mesic flatwoods on BWWMA include punk tree, Brazilian pepper, downy rose myrtle, Caesar weed, guava, cogongrass, small-leaf climbing fern, and torpedograss.

### **Mesic hammock** (143.3 acres)

Mesic hammocks are closed-canopy forests of temperate hardwood species occurring along wetlands or as islands within wetlands where they are sheltered from fire. Fire is rare, and when mesic hammocks burn they may convert to the community they border.

Mesic hammocks occur throughout BWWMA, usually bordering basin marshes or as islands within basin marshes. Two occurrences of mesic hammock are found along small blackwater streams. The canopy is dense and usually dominated by live oak and cabbage palm. Occasionally, south Florida slash pine and strangler fig are found in the canopy as well. The subcanopy is dense and consists of younger canopy tree species as well as swamp bay and dahoon. Saplings of canopy and subcanopy species are common in the understory. Shrubs are the dominant component of the understory while herbs are sparse. Saw palmetto dominates the shrub layer and other species found include wax myrtle, myrsine, and American beautyberry. The invasive exotics Brazilian pepper and Caesar weed can be found in many of the mesic hammocks. In the mesic hammocks that occur along blackwater streams, buttonbush and Carolina willow are occasionally found in the understory. Herbs present include mid-sorus fern, Virginia chain fern, royal fern, witchgrasses, and herb-of-grace. Epiphytes are common and include cardinal airplant, ballmoss, Spanish moss, golden polypody, and shoestring fern. Vines are common and include muscadine, poison ivy, Virginia creeper, pepper vine, and earleaf greenbrier.

### **Scrubby flatwoods** (62.2 acres)

Scrubby flatwoods have an open canopy of widely spaced pine trees and a low, shrubby understory dominated by scrub oaks and saw palmetto, often interspersed with areas of barren white sand. Principal canopy species are longleaf pine and slash pine in northern and Central Florida. The shrub layer consists of oak species and shrubs typical of mesic flatwoods, as well as grasses and dwarf varieties of other shrubs. Scrubby flatwoods occur on slight rises within mesic flatwoods and in transitional areas between scrub and mesic

flatwoods. Soils of scrubby flatwoods are moderately well-drained sands with or without an organic layer (spodic horizon). Scrubby flatwoods have elements characteristic of both mesic flatwoods and scrub communities.

At BWWMA, scrubby flatwoods has an open canopy of widely scattered South Florida slash pine and supports a sparse, shrubby understory. The shrub layer includes staggerbush, dwarf live oak, saw palmetto, and shiny blueberry. Herbaceous plants are represented by wiregrass and capillary hairsedge. The only vine encountered in this community is muscadine. Invasive exotic species found in scrubby flatwoods on BWWMA include cogongrass.

**Wet flatwoods** (15,160.0 acres)

Wet flatwoods are open, pine canopy forests with an understory of hydrophytic herbs and shrubs. Fire is an important factor in maintaining species richness and composition, and typically occurs every two-five years during the late spring/early summer lightning season.

Wet flatwoods on BWWMA are often intermingled with mesic flatwoods, wet prairie, basin marsh, and depression marsh. Wet flatwoods are distinguished from mesic flatwoods by their abundance of hydrophytic herbaceous species, and scarcity or absence of shrubs, particularly saw palmetto. Wet flatwoods differ from wet prairie based on canopy cover. The canopy and subcanopy is open and consists of south Florida slash pine. Shrubs are typically sparse and include myrtleleaf St. John's-wort, sandweed, wax myrtle, queensdelight, and Florida bully. Shrubs are infrequent in wet flatwoods, usually occurring in areas where mesic flatwoods is intermingled, and include saw palmetto, netted pawpaw, and coastalplain staggerbush. Herbs, specifically grasses, are typically the dominant component of the understory with the most common being wiregrass. Other herbaceous species include spreading beaksedge, fairy beaksedge, giant whitetop, hemlock witchgrass, gaping panicum, field paspalum, white sunnybell, pineland heliotrope, pitted stripeeed, tenangle pipewort, and yellow-eyed grasses. Epiphytes are infrequent and include Spanish moss and northern needleleaf. Vines are infrequent and include earleaf greenbrier, saw tooth greenbrier, muscadine, and eastern poison ivy.

A few areas that were delineated as wet flatwoods supported an unusually high amount of south Florida slash pine. These areas, which can be seen along Webb Lake, may have been depression marshes that were drained and then invaded by the pines. Species composition of some of the small wet flatwoods ecotones found along depression or basin marsh edges indicate limestone is near the surface. These areas contain an abundance of black bogrush, water pimpernel, and Florida yellow flax.

**Wet prairie** (5,215.8 acres)

Wet prairies are nearly treeless flatlands dominated by a diverse assemblage of hydrophytic herbs with few shrubs. Fire is an important factor in maintaining species diversity and composition, and typically occurs every two-five years during the late

spring/early summer lightning season.

Wet prairies at BWWMA can be found intermingled with dry prairie, mesic flatwoods, wet flatwoods, basin marsh, and depression marsh. Wet prairies are distinguished from dry prairie by their abundance of hydrophytic herbs, and scarcity or absence of shrubs, particularly saw palmetto. Wet prairies differ from wet flatwoods based on canopy cover, and from shallow depression marsh based on the presence of wiregrass. Small wet prairie ecotones can be found along the edges of most depression and basin marshes, but many of these were not delineated due to their small size. A canopy and subcanopy is absent, though a few south Florida slash pines may be found scattered throughout the area. Shrubs are sparse and include myrtleleaf St. John's-wort, sandweed, wax myrtle, queensdelight, and dwarf live oak. Saw palmetto is typically infrequent. In wet prairies that intermingle with mesic flatwoods, shrubs such as saw palmetto and wax myrtle can become more abundant. Herbs are the dominant component of the understory, and wiregrass is usually the most common herb. Other herbs found in wet prairie include spreading beaksedge, fairy beaksedge, giant whitetop, hemlock witchgrass, gaping panicum, field paspalum, white sunnybell, pineland heliotrope, pitted stripeseed, tenangle pipewort, and yellow-eyed grasses. Occasionally, species more commonly found in depression marshes can be seen in wet prairies. These include Tracy's beaksedge, bluejoint panicum, and longleaf threeawn. Species composition of some of the small wet prairies found along depression or basin marsh edges indicate limestone is near the surface. These areas contain an abundance of black bogrush, water pimpernel, and Florida yellow flax. Epiphytes and vines are absent. Invasive exotic species found in wet prairies include punk tree and torpedograss.

### **Anthropogenically Altered Communities**

#### *Abandoned field/abandoned pasture*

Abandoned fields/abandoned pastures are old fields, fallow pastures, early successional areas formerly grazed or in agriculture without recent activity to maintain the area as pasture or planted field. These areas are often dominated by weedy native and non-native species. Old pastures are generally designated when weedy cover from woody species is greater than 20 percent. On BWWMA 1,407.2 acres are classified as abandoned field.

#### *Canal/ditch*

Canal/ditch ruderal areas are areas where the historic natural community has been altered by an artificial drainage way. Approximately 39.4 acres of the BWWMA are categorized as canals and ditches.

#### *Clearing/regeneration*

The 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

953.6 acres that are classified as clearing/regeneration on the BWWMA.

*Developed*

The FNAI classifies land as developed if it contains check stations, off-road vehicle (ORV) use areas, parking lots, buildings, maintained lawns (as part of recreational, business, or residential areas), botanical or ornamental gardens, campgrounds, recreational, industrial, and residential areas. There are approximately 140.7 acres of developed land on BWWMA which is primarily due to the presence of offices and associated facilities, check stations, and camp facilities.

*Impoundment/artificial pond*

Impoundments/artificial ponds are stream or watershed impoundments or water retention ponds, cattle ponds, etc. There are 777 acres of impoundments/artificial ponds on BWWMA composed of six artificial ponds and the 395-acre Webb Lake.

*Invasive exotic monoculture*

The FNAI classifies an exotic monoculture as a stand of invasive exotic plant species that have eliminated the native vegetation, or nearly so. There are approximately 6.3 acres of exotic monoculture at BWWMA, with Brazilian pepper and melaleuca as common exotic monoculture species.

*Pasture - improved*

Improved pasture is an anthropogenic community dominated by grasses that are suitable for cattle grazing.

Only one occurrence, approximately 30.9 acres of improved pasture was delineated on BWWMA and is found in the northwest section of the property near the water treatment plant. This pasture is dominated by the exotic species Bahia grass, with smutgrass, another exotic species, also present. Native species are scattered throughout and include saw palmetto and cabbage palm.

*Pasture - semi-improved*

Semi-improved pasture is an anthropogenic community that has been prepared for cattle grazing, yet still resembles a natural community.

There 30.7 acres of semi-improved pasture at BWWMA. On BWWMA, most of the semi-improved pasture occurs in areas that are historically mesic flatwoods, and share some attributes with mesic flatwoods. Canopy and subcanopy cover is sparse, if any, and consists of south Florida slash pine. Shrubs are dense to sparse and consist of saw palmetto, wax myrtle, and sandweed. Herbs make up the bulk of the understory and are dominated by weedy species such as broomsedge bluestem, slender flattop goldenrod, and spadeleaf. Other species include spreading beaksedge, little blue maidencane, yellow-eyed grasses,

netted nutrush, fascicled beaksedge, love grass, and rosy camphorweed. Wiregrass is rare. Epiphytes and vines are absent.

### *Pine plantation*

Pine plantations are silvicultural operations supporting a typically dense, monospecific stand of pine trees. Pine plantations may retain some characteristics of the original natural communities although site preparation activities usually disturb the soil to such a degree that many of the herbaceous species are not able to revegetate the area once pines are harvested.

Pine plantations are uncommon on BWWMA and occur in different aged stands. There are 108.6 acres pine plantations at BWWMA and most occur in areas that are historically mesic flatwoods. Canopy cover in older age stands is dense while in younger stands it is more open. Canopy species consist of south Florida slash pine. A subcanopy is usually absent. Shrub cover in the older age stands is dense and consists of saw palmetto, wax myrtle, coastalplain staggerbush, dwarf live oak, and netted pawpaw. Site preparation techniques used in the younger age stands had less of an impact on groundcover species and in these areas shrub cover is less dense but consists of the same species. Herb cover in the older stands is sparse and consists of needleleaf witchgrass, broomsedge bluestem, and fascicled beaksedge. Wiregrass is generally sparse. The younger age stands contain a much greater abundance and diversity of herbs, including wiregrass, yellow-eyed grasses, fascicled beaksedge, blackroot, Nuttall's meadowbeauty, Mohr's thoroughwort, coastalplain milkwort, gaping panicum, and field paspalum. Epiphytes are absent in the pine plantations. Vines are absent in younger age stands and infrequent in older stands. Vines include earleaf greenbrier, saw tooth greenbrier, and eastern poison ivy. Disturbances to pine plantations include historical forestry operations, usually bedded rows, and exotic species, mostly Brazilian pepper and Caesar weed.

### *Road*

The BWWMA contains approximately 24.6 acres that are classified as road, due to the presence of paved or unpaved roads or trails.

### *Utility corridor*

The FNAI classifies land as a utility corridor if it contains electric, gas, or telephone right-of-ways. The BWWMA contains 380.6 acres classified as utility corridor.

## **2.2.2 Forest Resources**

BWWMA contains expansive flatwoods dominated by south Florida slash pine. Mesic and wet flatwoods cover over 50 percent of the area, or 45,649 acres. Additional forest resources include scrubby flatwoods and pine plantations. Forested wetland communities include dome swamp and hydric hammock.

Prior to state acquisition, several timber companies clear-cut pine trees on the area, leaving small pines and cull trees. Most of the pines at BWMMA are descendants of the cull trees left behind. This natural reforestation process has left large areas with few pine trees. Beginning in 1985, area staff initiated pine plantings in minimally-stocked areas that met the historic conditions for pines. As of 2013, approximately 1,200 acres of planted pines have been established on BWMMA (WCPR, Appendix 7). Additionally, the FWC has included an objective to plant pine tubelings and promote natural regeneration on 170 acres per year to improve wildlife habitat on the area in Section 6.5.1. For further information on pine plantings see Appendix 8.



Slash pine at BWMMA, FWC

Section 253.036, FS requires that plans for natural areas 1,000 acres or greater in size include a professional forester’s assessment of the resource conservation and revenue-producing potentials of the tract’s forests. A Timber Assessment for BWMMA was completed by the FFS in 2002 and updated in 2014 (Appendix 8).

## 2.3 Fish and Wildlife Resources

### 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 (Figure 8). 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 BWMMA has a very high mean wildlife value of 8.2.

### 2.3.2 Imperiled Species

For the purposes of this Management Plan, the term “Imperiled Species” refers to plant and animal species that are designated as Endangered, Threatened, or a Species of Special

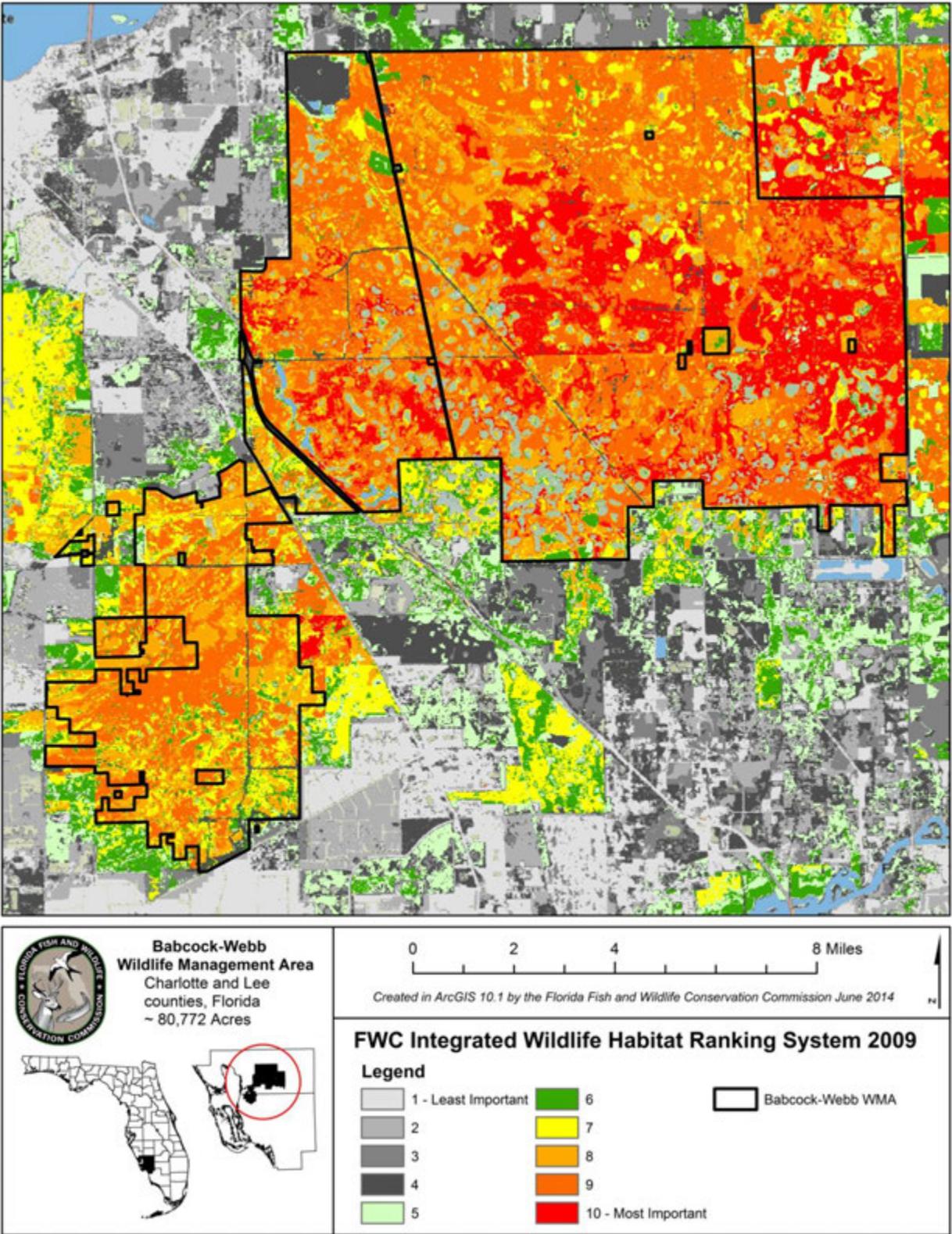


Figure 8. BWWMA Integrated Wildlife Habitat Ranking System 2009

Concern by FWC, or that are designated as Endangered or Threatened by the USFWS. This designation is also commonly known as “listed species” (Table 7).

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 have undergone 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. The FWC has developed Species Action Plans (SAPs) for imperiled species which describe individual species threats and conservation needs. The SAPs will not be submitted for approval to the FWC’s Commissioners until 2015 and are considered to be final drafts prior to Commission approval. Development of the SAPs is a critical part of moving toward FWC’s final goal of developing a single, comprehensive Imperiled Species Management Plan. For more information about the SAPs and individual plans see <http://myfwc.com/wildlifehabitats/imperiled/species-action-plans/>.

**Table 7. Rare and Imperiled Wildlife Species Occurring on or near BWWMA**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Status</b>
<b>Birds</b>		
Burrowing owl	<i>Athene cunicularia</i>	SSC
Crested caracara	<i>Caracara cheriway</i>	FT
Florida sandhill crane	<i>Grus canadensis pratensis</i>	ST
Florida scrub-jay	<i>Aphelocoma coerulescens</i>	FT
Limpkin	<i>Aramus guaranauna</i>	SSC
Little blue heron	<i>Egretta caerulea</i>	SSC
Red-cockaded woodpecker	<i>Picoides borealis</i>	FE
Reddish egret	<i>Egretta rufescens</i>	SSC
Roseate spoonbill	<i>Platalea ajaja</i>	SSC
Southeastern American kestrel	<i>Falco sparverius paulus</i>	ST
Snowy egret	<i>Egretta thula</i>	SSC
Tricolored heron	<i>Egretta tricolor</i>	SSC
White ibis	<i>Eudocimus albus</i>	SSC
Wood stork	<i>Mycteria americana</i>	FE
<b>Mammals</b>		
Florida bonneted bat	<i>Eumops glaucinus floridanus</i>	FE
Florida panther	<i>Puma concolor coryi</i>	FE
Sherman's fox squirrel	<i>Sciurus niger shermani</i>	SSC

**Table 7. Rare and Imperiled Wildlife Species Occurring on or near BWWMA**

Common Name	Scientific Name	Status
<b>Reptiles</b>		
American alligator	<i>Alligator mississippiensis</i>	FT (S/A)
Eastern indigo snake	<i>Drymarchon couperi</i>	FT
Gopher tortoise	<i>Gopherus polyphemus</i>	ST

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

**2.3.2.1 BWWMA Notable Imperiled Wildlife Species**

The FWC manages BWWMA’s natural communities for a variety of imperiled wildlife. The area is home to one of four red-cockaded woodpecker populations on public lands entirely within the slash pine flatwoods ecosystem. The red-cockaded woodpecker population on BWWMA is part of the USFWS South/Central Florida Recovery Unit, which also includes the Avon Park Air Force Range, J.W. Corbett Wildlife Management Area, Dupuis Wildlife and Environmental Area, and Three Lakes Wildlife Management Area.<sup>10</sup> Red-cockaded woodpeckers also occur at BRP, primarily in the longleaf pine flatwoods on the northeast corner of the property. The FWC takes red-cockaded woodpecker movement between properties into consideration during management for the species.

Red-cockaded woodpeckers have an advanced social system which one or more adults assist a breeding pair in the rearing of young. During fiscal year 2012-2013, annual roost checks on BWWMA identified 38 active red-cockaded woodpecker clusters; confirming 28 potential breeding groups and 10 clusters occupied by a solitary bird. A red-cockaded woodpecker cluster is an aggregation of cavity trees currently or previously used by a group of woodpeckers. A potential breeding group is made up of an adult male and female that occupy the same cluster. A total of 73 adult red-cockaded woodpeckers were observed during nesting season from 38 clusters, with an average group size of 1.92 birds. All 28 potential breeding groups attempted nesting and a total of 96 eggs were found. A



Red-cockaded woodpecker, *John Cassady*

in

total of 18 breeding groups produced 30 nestlings; 22 of which were banded. Two new recruitment cluster sites were installed in fiscal year 2012-2013, with three artificial cavities and two drilled starts in each cluster, to improve connectivity between groups. A total of 150 acres of South Florida slash pine were planted in 2012-2013 in four sites to create future connectivity between pine stands. Management of red-cockaded woodpeckers at BWWMA is guided by the USFWS Recovery Plan, FWC's Red-Cockaded Woodpecker Management Plan, and the BWWMA's WCPR Strategy (Appendix 7). The goal of red-cockaded woodpecker management on the area is to provide suitable habitat on BWWMA to support a stable or growing population of red-cockaded woodpeckers that interacts with the larger regional metapopulation. To achieve this goal, the FWC will continue to address pine recruitment and distribution, apply prescribed fire, and maintain suitable habitat conditions for red-cockaded woodpeckers (WCPR, Appendix 7).

The BWWMA is north of the primary, secondary, and dispersal zones for Florida panthers but they have been documented on the area. Though Florida panthers are rare on BWWMA, the area plays a role in their persistence as a link in a network of conservation lands that may be utilized for their expansion north of the Caloosahatchee River<sup>11</sup>, an objective identified in the USFWS Panther Recovery



**Florida panther, FWC**

Plan. Additionally, BWWMA and BRP lie along a potential corridor for panthers moving between the Big Cypress region to the south and the Myakka conservation complex to the northwest. Florida panthers use a variety of habitats that generally consist of forested uplands and wetlands, interspersed with open habitats such as marshes, wet and dry prairies, old fields, pastures, and agricultural land. Several studies found a proportionally higher use of forested habitat types by Florida panthers, although non-forested habitats are important for hunting prey species and serve as travel corridors between resting sites. Land management activities for panthers should focus on creating a mosaic of habitats that include patches of dense vegetation for resting and denning, interspersed with open areas for stalking prey (WCPR, Appendix 7). The BWWMA does not provide enough habitat to sustain an independent population of panthers, but the area has a high potential to provide suitable habitat for dispersing panthers and to help support the regional panther population if it expands north of the Caloosahatchee River (WCPR, Appendix 7). FWC staff will continue to assess the extent and condition of panther habitat on BWWMA.



**Florida bonneted bat, FWC**

The BWWMA contains the only known occupied Florida bonneted bat houses on public lands. FWC installed bat houses on BWWMA in 2007, and Florida bonneted bats were documented in the houses in 2008. To date, Florida bonneted bats have been documented using six of the 12 bat house roosts on the area. Ongoing species management activities on BWWMA consist of maintaining a suite of bat houses for use by Florida bonneted bats and other bat species. Florida bonneted bats are monitored on the area during evening emergence counts, conducted at least four times each year. In 2012, the FWC developed a Bat House Occupancy Assessment protocol and began implementing it on FWC-managed areas across the state. The purpose of this protocol is to estimate the number of bats using houses and to track changes in bat house occupancy between seasons. The FWC implemented this protocol on BWWMA in 2014 (See WCPR, Appendix 7 for additional information).

### 2.3.3 FWC Wildlife Observations and FNAI Element Occurrences

Geographic information system data maintained by the FWC (Wildlife Observations) and the FNAI (Element Occurrences) indicate that BWWMA has numerous documented occurrences of wildlife and a diverse assemblage of animal species. An FNAI Element Occurrence data usage letter is included as Appendix 6. The wildlife observations and element occurrences shown in Figure 9 represent a sampling of the variety of wildlife species documented on BWWMA and displayed in Tables 8- 13.

**Table 8. Avian Species of BWWMA**

<b>Common Name</b>	<b>Scientific Name</b>
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 woodcock	<i>Scolopax minor</i>
Anhinga	<i>Anhinga anhinga</i>
Bachman's sparrow	<i>Aimophila aestivalis</i>
Barn owl	<i>Tyto alba</i>
Barn swallow	<i>Hirundo rustica</i>
Barred owl	<i>Strix varia</i>
Belted kingfisher	<i>Megaceryle alcyon</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>
Blackpoll warbler	<i>Setophaga striata</i>
Black-throated blue warbler	<i>Setophaga caerulescens</i>

**Table 8. Avian Species of BWWMA**

<b>Common Name</b>	<b>Scientific Name</b>
Black-throated green warbler	<i>Setophaga virens</i>
Blue jay	<i>Cyanocitta cristata</i>
Blue-gray gnatcatcher	<i>Poliophtila caerulea</i>
Blue-headed vireo	<i>Vireo solitarius</i>
Blue-winged teal	<i>Anas discors</i>
Blue-winged warbler	<i>Vermivora pinus</i>
Boat-tailed grackle	<i>Quiscalus major</i>
Bobolink	<i>Dolichonyx oryzivorus</i>
Broad-winged hawk	<i>Buteo platypterus</i>
Brown thrasher	<i>Toxostoma rufum</i>
Brown-headed cowbird	<i>Molothrus ater</i>
Brown-headed nuthatch	<i>Sitta pusilla</i>
Burrowing owl	<i>Athene cunicularia</i>
Cape May warbler	<i>Setophaga tigrina</i>
Carolina wren	<i>Thryothorus ludovicianus</i>
Caspian tern	<i>Hydroprogne caspia</i>
Cattle egret	<i>Bubulcus ibis</i>
Cedar waxwing	<i>Bombycilla cedrorum</i>
Chestnut-sided warbler	<i>Setophaga pensylvanica</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>
Eastern phoebe	<i>Sayornis phoebe</i>
Eastern screech owl	<i>Megascops asio</i>
Eastern towhee	<i>Pipilo erythrophthalmus</i>
Fish crow	<i>Corvus ossifragus</i>
Florida sandhill crane	<i>Grus canadensis pratensis</i>

**Table 8. Avian Species of BWWMA**

<b>Common Name</b>	<b>Scientific Name</b>
Florida scrub-jay	<i>Aphelocoma coerulescens</i>
Glossy ibis	<i>Plegadis falcinellus</i>
Grasshopper sparrow	<i>Ammodramus savannarum</i>
Gray catbird	<i>Dumetella carolinensis</i>
Great blue heron	<i>Ardea herodias</i>
Great crested flycatcher	<i>Myiarchus crinitus</i>
Great egret	<i>Ardea alba</i>
Great horned owl	<i>Bubo virginianus</i>
Greater yellowlegs	<i>Tringa melanoleuca</i>
Green heron	<i>Butorides virescens</i>
Hairy woodpecker	<i>Picoides villosus</i>
Hooded merganser	<i>Lophodytes cucullatus</i>
House wren	<i>Troglodytes aedon</i>
Kentucky warbler	<i>Geothlypis formosa</i>
Killdeer	<i>Charadrius vociferus</i>
King rail	<i>Rallus elegans</i>
Lark sparrow	<i>Chondestes grammacus</i>
Laughing gull	<i>Leucophaeus atricilla</i>
Least bittern	<i>Ixobrychus exilis</i>
Least flycatcher	<i>Empidonax minimus</i>
Least sandpiper	<i>Calidris minutilla</i>
Least tern	<i>Sternula antillarum</i>
Lesser scaup	<i>Aythya affinis</i>
Lesser yellowlegs	<i>Tringa flavipes</i>
Limpkin	<i>Aramus guarauna</i>
Little blue heron	<i>Egretta caerulea</i>
Loggerhead shrike	<i>Lanius ludovicianus</i>
Mallard	<i>Anas platyrhynchos</i>
Mottled duck	<i>Anas fulvigula</i>
Mourning dove	<i>Zenaida macroura</i>
Northern bobwhite	<i>Colinus virginianus</i>
Northern cardinal	<i>Cardinalis cardinalis</i>
Northern flicker	<i>Colaptes auratus</i>
Northern harrier	<i>Circus cyaneus</i>
Northern mockingbird	<i>Mimus polyglottos</i>
Northern parula	<i>Setophaga americana</i>
Northern pintail	<i>Anas acuta</i>
Northern shoveler	<i>Anas clypeata</i>
Northern waterthrush	<i>Seiurus noveboracensis</i>
Orange-crowned warbler	<i>Oreothlypis celata</i>

**Table 8. Avian Species of BWWMA**

<b>Common Name</b>	<b>Scientific Name</b>
Osprey	<i>Pandion haliaetus</i>
Ovenbird	<i>Seiurus aurocapilla</i>
Painted bunting	<i>Passerina ciris</i>
Palm warbler	<i>Setophaga palmarum</i>
Pied-billed grebe	<i>Podilymbus podiceps</i>
Pileated woodpecker	<i>Dryocopus pileatus</i>
Pine warbler	<i>Setophaga pinus</i>
Prairie warbler	<i>Setophaga discolor</i>
Purple gallinule	<i>Porphyrio martinicus</i>
Purple martin	<i>Progne subis</i>
Red-bellied woodpecker	<i>Melanerpes carolinus</i>
Red-breasted merganser	<i>Mergus serrator</i>
Red-cockaded woodpecker	<i>Picoides borealis</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>
Roseate spoonbill	<i>Platalea ajaja</i>
Royal tern	<i>Thalasseus maximus</i>
Ruby-throated hummingbird	<i>Archilochus colubris</i>
Rufous-sided towhee	<i>Pipilo erythrophthalmus</i>
Rusty blackbird	<i>Euphagus carolinus</i>
Savannah sparrow	<i>Passerculus sandwichensis</i>
Sharp-shinned hawk	<i>Accipiter striatus</i>
Short-billed dowitcher	<i>Limnodromus griseus</i>
Short-tailed hawk	<i>Buteo brachyurus</i>
Smooth-billed ani	<i>Crotophaga ani</i>
Snow goose	<i>Chen carolinensis</i>
Snowy egret	<i>Egretta thula</i>
Solitary sandpiper	<i>Tringa solitaria</i>
Song sparrow	<i>Melospiza melodia</i>
Sora	<i>Porzana carolina</i>
Southeastern American kestrel	<i>Falco sparverius paulus</i>
Southern bald eagle	<i>Haliaeetus leucocephalus</i>
Spotted sandpiper	<i>Actitis macularius</i>
Summer tanager	<i>Piranga rubra</i>
Swainson's thrush	<i>Catharus guttatus</i>
Swainson's warbler	<i>Limnothlypis swainsonii</i>

**Table 8. Avian Species of BWWMA**

<b>Common Name</b>	<b>Scientific Name</b>
Swallow-tailed kite	<i>Elanoides forficatus</i>
Tricolored heron	<i>Egretta tricolor</i>
Tree swallow	<i>Tachycineta bicolor</i>
Tufted titmouse	<i>Baeolophus bicolor</i>
Turkey vulture	<i>Cathartes aura</i>
Vesper sparrow	<i>Pooecetes gramineus</i>
Virginia rail	<i>Rallus limicola</i>
White ibis	<i>Eudocimus albus</i>
White-eyed vireo	<i>Vireo griseus</i>
Wild turkey	<i>Meleagris gallopavo</i>
Wood duck	<i>Aix sponsa</i>
Wood stork	<i>Mycteria americana</i>
Worm-eating warbler	<i>Helmitheros vermivorum</i>
Yellow-crowned night heron	<i>Nyctanassa violacea</i>
Yellow warbler	<i>Setophaga petechia</i>
Yellow-bellied sapsucker	<i>Sphyrapicus varius</i>
Yellow-billed cuckoo	<i>Coccyzus americanus</i>
Yellow-breasted chat	<i>Icteria virens</i>
Yellow-rumped warbler	<i>Setophaga coronata</i>
Yellow-throated warbler	<i>Setophaga dominica</i>

**Table 9. Mammal Species Occurring on or near BWWMA**

<b>Common Name</b>	<b>Scientific Name</b>
Big brown bat	<i>Eptesicus fuscus</i>
Bobcat	<i>Lynx rufus</i>
Brazilian free-tailed bat	<i>Tadarida brasiliensis</i>
Eastern cottontail	<i>Sylvilagus floridanus</i>
Eastern woodrat	<i>Neotoma floridana</i>
Evening bat	<i>Nycticeius humeralis</i>
Florida black bear	<i>Ursus americanus floridanus</i>
Florida bonneted bat	<i>Eumops glaucinus floridanu</i>
Florida cotton mouse	<i>Peromyscus gossypinus palmarius</i>
Florida panther	<i>Puma concolor coryi</i>
Gray fox	<i>Urocyon cinereoargenteus</i>
Gray squirrel	<i>Sciurus carolinensis</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>

**Table 9. Mammal Species Occurring on or near BWWMA**

<b>Common Name</b>	<b>Scientific Name</b>
Marsh rice rat	<i>Oryzomys palustris</i>
Northern yellow bat	<i>Lasiurus intermedius</i>
Raccoon	<i>Procyon lotor</i>
Red fox	<i>Vulpes vulpes</i>
River otter	<i>Lontra canadensis</i>
Seminole bat	<i>Lasiurus seminolus</i>
Sherman's fox squirrel	<i>Sciurus niger shermani</i>
Southern short-tailed shrew	<i>Blarina carolinensis</i>
Spotted skunk	<i>Spilogale putorius</i>
Striped skunk	<i>Mephitis mephitis</i>
Virginia opossum	<i>Didelphis virginiana</i>
White-tailed deer	<i>Odocoileus virginianus</i>

**Table 10. Amphibian Species Occurring on or near BWWMA**

<b>Common Name</b>	<b>Scientific Name</b>
Barking treefrog	<i>Hyla gratiosa</i>
Eastern narrow-mouthed toad	<i>Gastrophryne carolinensis</i>
Green tree frog	<i>Hyla cinerea</i>
Little grass frog	<i>Pseudacris ocularis</i>
Oak toad	<i>Anaxyrus quercicus</i>
Peninsular newt	<i>Notophthalmus viridescens piaropicola</i>
Pig frog	<i>Lithobates grylio</i>
Pine woods treefrog	<i>Hyla femoralis</i>
Southern chorus frog	<i>Pseudacris nigrita</i>
Southern cricket frog	<i>Acris gryllus dorsalis</i>
Southern leopard frog	<i>Lithobates sphenoccephalus utricularius</i>
Southern toad	<i>Anaxyrus terrestris</i>
Squirrel treefrog	<i>Hyla squirella</i>
Two-toed amphiuma	<i>Amphiuma means</i>

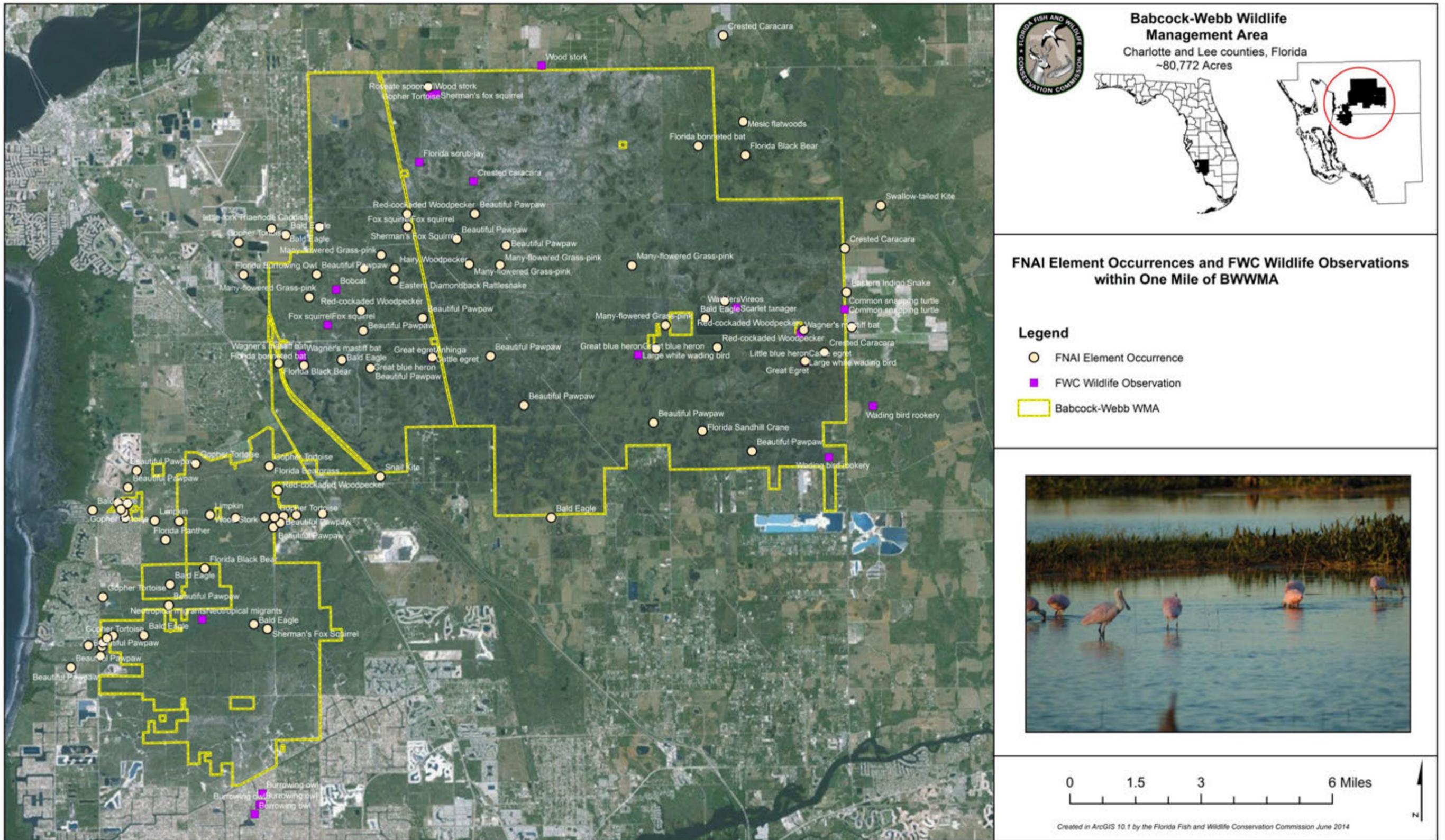


Figure 9. FNAI Element Occurrences and FWC Wildlife Observations

**Table 11. Reptilian Species Occurring on or near BWWMA**

<b>Common Name</b>	<b>Scientific Name</b>
American alligator	<i>Alligator mississippiensis</i>
Black swamp snake	<i>Seminatrix pygaea</i>
Brown snake	<i>Storeria dekayi</i>
Common garter snake	<i>Thamnophis sirtalis sirtalis</i>
Common musk turtle	<i>Sternotherus odoratus</i>
Corn snake	<i>Pantherophis guttatus</i>
Dusky pygmy rattlesnake	<i>Sistrurus miliarius barbouri</i>
Eastern coachwhip snake	<i>Masticophis flagellum flagellum</i>
Eastern coral snake	<i>Micrurus fulvius</i>
Eastern diamondback rattlesnake	<i>Crotalus adamanteus</i>
Eastern glass lizard	<i>Ophisaurus ventralis</i>
Eastern hognose snake	<i>Heterodon platirhinos</i>
Eastern indigo snake	<i>Drymarchon couperi</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 red-bellied turtle	<i>Pseudemys nelsoni</i>
Florida snapping turtle	<i>Chelydra serpentina osceola</i>
Florida softshell turtle	<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>
Peninsula ribbon snake	<i>Thamnophis sauritus sackenii</i>
Rough green snake	<i>Opheodrys aestivus</i>
Scarlet snake	<i>Cemophora coccinea</i>
Six-lined racerunner	<i>Cnemidophorus sexlineatus</i>
Southeastern five-lined skink	<i>Eumeces inexpectatus</i>
Southern black racer	<i>Coluber constrictor priapus</i>
Southern ringneck snake	<i>Diadophis punctatus punctatus</i>
Striped mud turtle	<i>Kinosternon baurii</i>

**Table 12. Fish Species Occurring on or near BWWMA**

<b>Common Name</b>	<b>Scientific Name</b>
Bluegill	<i>Lepomis macrochirus</i>
Bluespotted sunfish	<i>Enneacanthus gloriosus</i>
Brook silverside	<i>Labidesthes sicculus</i>
Brown bullhead	<i>Ameiurus nebulosus</i>
Common snook	<i>Centropomus undecimalis</i>
Dollar sunfish	<i>Lepomis marginatus</i>
Fat sleeper	<i>Dormitator maculatus</i>
Flagfish	<i>Jordanella floridae</i>
Florida gar	<i>Lepisosteus platyrhincus</i>
Golden shiner	<i>Notemigonus crysoleucas</i>
Golden topminnow	<i>Fundulus chrysotus</i>
Largemouth bass	<i>Micropterus salmoides</i>
Least killifish	<i>Heterandria formosa</i>
Marsh killifish	<i>Fundulus confluentus</i>
Mosquitofish	<i>Gambusia affinis</i>
Redear sunfish	<i>Lepomis microlophus</i>
Sailfin molly	<i>Poecilia latipinna</i>
Spotted sunfish	<i>Lepomis punctatus</i>
Swamp darter	<i>Etheostoma fusiforme</i>
Taillight shiner	<i>Notropis maculatus</i>
Warmouth	<i>Lepomis gulosus</i>
Yellow bullhead	<i>Ameiurus natalis</i>

**Table 13. Exotic Fauna Occurring on or near BWWMA**

<b>Common Name</b>	<b>Scientific Name</b>
<b>Mammals</b>	
Feral hog	<i>Sus scrofa</i>
Nine-banded armadillo	<i>Dasypus novemcinctus</i>
<b>Birds</b>	
European starling	<i>Sturnus vulgaris</i>
House sparrow	<i>Passer domesticus</i>
Muscovy duck	<i>Cairina moschata</i>
Rock dove	<i>Columba livia</i>
<b>Reptiles</b>	
Brown anole	<i>Norops sagrei</i>
Common boa	<i>Boa constrictor</i>

**Table 13. Exotic Fauna Occurring on or near BWWMA**

<b>Common Name</b>	<b>Scientific Name</b>
Green iguana	<i>Iguana iguana</i>
Knight anole	<i>Anolis equestris</i>
Veiled chameleon	<i>Chamaeleo calyptratus</i>
<b>Amphibians</b>	
Cuban treefrog	<i>Osteopilus septentrionalis</i>
Marine toad	<i>Rhinella marina</i>

## 2.4 Native Landscapes

As described earlier, the BWWMA contains the largest tract of native South Florida slash pine flatwoods remaining in southwestern Florida. The pine flatwoods of BWWMA are home to the largest known population of the rare beautiful or pretty false pawpaw. Listed as endangered by the FDACS, the beautiful pawpaw is endemic to Charlotte and Lee counties. Additional native landscapes found on BWWMA include depression marsh, dry prairie, and wet flatwoods. Complete descriptions of the natural communities found on BWWMA may be found in Section 2.2.1 of this Management Plan.

## 2.5 Water Resources

Water resources on the area consist primarily of seasonal ponds, marshes and depressions. In addition to these natural bodies of water there are six ponds totaling 13 acres, and a 395-acre lake, Webb Lake, which were artificially constructed. There are several springs located in the northern part of Webb Lake. Another spring is located east of Seaboard Grade and north of Tuckers Grade next to a set of water tower pilings. The tower was used to fill steam engines during the timber harvest in the 1920s and 1930s.



**Fishing at Webb Lake, FWC**

The DEP considers all waters on the BWWMA Class III waters (fresh waters), which meet water quality criteria established to protect fish consumption, recreation and the propagation and maintenance of a healthy, well-balanced population of fish and wildlife (62-302.400, FAC). No water resources within BWWMA are classified as Outstanding Florida Waters, or as an aquatic preserve, and are not under study for such designation. BWWMA lies within the drainage basins for Alligator Creek, Bear Branch, Cleveland Cemetery ditch, Charlotte Harbor, Daughtrey Creek, Myrtle Slough, Telegraph Swamp, Shell Creek, Pirate Canal, and Winegourd Creek.

## 2.6 Beaches and Dunes

There are no beaches or dunes located within BWWMA.

## 2.7 Mineral Resources

There are several mining operations throughout Charlotte County but there are few known commercially valuable mineral deposits.<sup>3</sup> Sand, shell, and marl deposits occur in the northeastern portion of the county and several commercial lime rock quarries are located on Cook Brown Road, south of BWWMA. Mineral resources in Lee County are primarily undifferentiated resources, which are surface and near surface sediments comprised on clayey, shelly sand, marl and organic muck. These undifferentiated resources occur in the northeastern and western portions of Lee County and are locally valuable as fill materials. Limestone is mined from the near surface of Lee County. Quartz sand occurs on the surface and near surface and has been mined in the county. Additionally, oil fields have been discovered in Lee County.<sup>12</sup> There are no active mineral mines located on BWWMA.

Outstanding oil, gas, and mineral rights were on the Yucca Pens Unit were highly fractionalized at the time of state acquisition. Due to the number of fractional owners, the seller was unwilling to attempt to reassemble the outstanding interests for conveyance to the BOT. A report by the DEP Bureau of Geology indicates that there is little potential for commercial development of mineral commodities or oil and gas production at BWWMA.

## 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. Records from the DHR indicate that 17 archaeological surveys have been completed within or partly within the BWWMA

boundary. Six resource groups (linear resources associated with roads and railways) and one archaeological site (Oil Well Road prehistoric campsite, CH00066) fall totally or partially within BWWMA. The DHR noted that most of the property appears to have a fairly low probability of holding any potentially significant archaeological or historical sites. However, the FWC will continue to follow procedures outlined by the DHR to preserve any cultural and historical resources that



*BWWMA landscape; David Moynahan*

are discovered. The FWC will continue to consult with the DHR in an attempt to locate and preserve any features on the area. As appropriate and necessary, the FWC will contact

professionals from the DHR for assistance prior to any ground-disturbing activity on the area.

## **2.9 Scenic Resources**

Scenic resources at BWWMA include an extensive example of a relatively large and pristine South Florida slash pine flatwoods ecosystem. This ecosystem comprises a pine flatwoods and wetlands complex, including wet prairie and marsh areas, as well as cypress sloughs and domes. A scenic driving tour around Webb Lake offers visitors an introduction to the natural resources of the area. Additionally, BWWMA is part of a network of sites along the Great Florida Birding & Wildlife Trail, which includes areas across the state selected for their excellent bird watching, wildlife viewing, or educational opportunities. Two of the biggest birding draws for this area are Bachman's sparrows and red-cockaded woodpeckers.

## **3 Uses of the Property**

### **3.1 Previous Use and Development**

Prior to European settlement, the landscape of Florida, including this area, was settled and used by a variety of aboriginal peoples whose culture relied mainly on hunting, fishing, and subsistence agriculture. Though some land alteration occurred, only minor alteration of the landscape is thought to have taken place until the advent of European settlement beginning with the Spanish occupation of Florida in the sixteenth century.

Along with more advanced agricultural practices, the Spanish and other settlers brought livestock, primarily cattle and hogs, as well as horses to Florida. This began an era of broad use of the landscape for agriculture. Rangeland cattle grazing and other agricultural practices began to be utilized in a more systematic way and occurred throughout much of the central Florida peninsula through most of the European settlement era from the 16<sup>th</sup> through the 20<sup>th</sup> centuries. Use of these agricultural practices began an era of increased alteration of the natural landscape. However, it wasn't until the 19<sup>th</sup> and 20<sup>th</sup> 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 its purchase by the state, BWWMA was used primarily for its cattle range and timber resources. During the 1920s and 30s, several timber companies clear-cut pine trees on the area, leaving cull trees and a few small pines. Most of the trees present on the area today are descendents of the cull trees that were not harvested. Pine resources were also used for turpentine production, and in the early 1970s, the Commission issued a 10-year lighter pine stumpage contract. Also prior to purchase by the Commission, the U.S. Army used 16,000 acres as a bombing and strafing range. Bomb craters and machine gun targets are still in evidence.

In 1957, the field trial grounds were set up in conjunction with field trial clubs that donated materials and supplies to build a clubhouse, stables, kennels, and picnic area to provide

training grounds for hunters and their bird dogs. Since 1969, the grounds have been open for limited quail hunting. Establishment of the field trial grounds is in keeping with the purposes of acquisition under the Pittman-Robertson purchase to provide quail habitat and support quail hunting. In 1968, the FWC leased 1,280 acres of the field trial grounds to the Boy Scouts for a camp, which has been developed over the years to include many recreation facilities.

Cattle production has occurred on BWWMA both before and after state acquisition. Historically, the cattlemen utilized frequent fire to reduce fuels and increase productivity for cattle. The first cattle leases on BWWMA were allocated by the acre and the cattlemen determined the stocking rates. In 1977, the FWC decided to officially cap stocking rates at 50% of the recommended rates determined by the NRCS (Appendix 7, WCPR). The 2012 NRCS Prescribed Grazing Plan for BWWMA states that the area currently provides approximately 43,727 acres of potential grazing land and can support up to 1,220 animal units (Appendix 15). Since its inception, BWWMA has been open to multiple uses, including hunting, fishing, camping, bird dog field trials, cattle grazing, apiary leases, target shooting at the range, timber harvest, horseback riding, bird watching, and bicycling.

### **3.2 Current Use of the Property**

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

Current and anticipated resource uses of the property are diverse. Hunting continues to be a popular recreational activity on BWWMA. The FWC administers hunts in the fall and spring for various game species including small game, deer, quail, and feral hogs. Hunting opportunities on BWWMA include an archery, general gun, small game, field trial quail, raccoon and opossum, and migratory bird season as well as year round fishing and frogging. Additionally, the Yucca Pens unit is open for a muzzleloading gun season. The BWWMA contains a public shooting range with 200-yard rifle, 100-yard rifle, and 50-yard pistol ranges and two shotgun pads.

As noted above, the BWWMA also offers excellent opportunities for bird watching, especially for Bachman's sparrow and red-cockaded woodpeckers. The diversity of vegetation not only harbors a variety of bird species but also provides good opportunities for

mammalian wildlife viewing. Other uses include hiking, photography, biking, sightseeing, and horseback riding. Cattle grazing and apiary operations also occur at BWWMA. Due to the proximity of population centers in Charlotte and Lee counties, public use can be expected to increase as public awareness of opportunities increase.

### **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 BWWMA, and contribute to the overall economy for region of Florida. In Fiscal Year 2012-13, an estimated 321,361 people visited BWWMA. Primarily as a result of this visitation and use of the area, FWC economic analysis estimates indicate that BWWMA generated an estimated annual economic impact of \$62,790,802 for the State and the southwest Florida region. This estimated annual economic impact has aided in the support or creation of an estimated 640 jobs.

Further revenue generating potential of BWWMA will depend upon future uses described in this Management Plan. Additional revenue from environmental lands such as BWWMA might include sales of various permits and recreational user fees and ecotourism activities, if such projects could be feasibly developed. The annual area regulations can be consulted to clarify the necessary and required permits, fees, and regulations. Additionally, the long-term values of ecosystem services, 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 BWWMA will be managed under the multiple-use concept as a Wildlife Management Area. The BWWMA 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 BWWMA will be managed under the guidance of the ARC, the Conceptual State Lands Management Plan, and as outlined in the original purposes for acquisition.

### **3.3.1 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 BWWMA. 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). 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 range	✓		
Soil and water conservation	✓		
Timber harvest	✓		
Wildlife observation	✓		

\* All-terrain vehicles are engine powered vehicles with wheels of less than a 60-inch wheelbase (measured from the center of the forward wheel or hub to the center of the rearmost wheel or hub) and are prohibited at BWWMA.

### 3.3.2 Assessment of Impact of Planned Uses of the Property

To communicate the FWC’s planned uses and activities, specific management intentions, long- and short-term goals and with associated objectives, identified challenges, and solution strategies have been developed for BWWMA (Sections 5 -8). A detailed assessment of the benefits and potential impacts of planned uses and activities on natural and cultural resources was an integral part of the development of the management activities and intent, goals, objectives, challenges, and strategies sections of this Management Plan.

### 3.3.3 Incompatible Uses and Linear Facilities

Consideration of incompatible uses and linear facilities on BWWMA are made in accordance with the requirements of Section 253.034(10) FS, 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 approval to the DEP-DSL, the ARC and the BOT prior to any incompatible use or linear facility being authorized on the BWWMA.

### **3.4 Acreage That Should Be Declared Surplus**

On conservation lands where the FWC is the lead manager, the FWC evaluates and identifies recommended areas for a potential surplus designation by the DSL, the ARC, and the Board of Trustees. This evaluation consists of GIS modeling and analysis, aerial photography interpretation, analysis of fish and wildlife resources, a review of resource and operational management needs, and a review of public access and recreational use of the area. Also, the FWC considers recommendations for surplus lands as they relate to Florida's "No Net Loss of Hunting Lands" legislation (Ch. 379.3001 F.S.), as well as surplus restrictions for lands acquired through the Federal Aid in Wildlife Restoration Act (Pittman-Robertson) or through other federal grant programs.

Webb tract lands were purchased under the auspices of the Pittman-Robertson Act to restore, enhance, and manage wildlife resources, and they continue to serve the public purposes for which they were acquired. FWC management of BWWMA continues to protect and preserve the largest and highest-quality slash pine in southwest Florida as well as connecting conservation lands to the Charlotte Harbor State Buffer Preserve and aiding in protection of the Charlotte Harbor Aquatic Preserve.

The evaluation of BWWMA by the FWC has determined that all portions of the area are being managed and operated for the original purposes of acquisition, and remain integral to the continued conservation of important fish and wildlife resources, and continue to provide high quality fish and wildlife resource based public outdoor recreational opportunities. Therefore, no portion of the BWWMA should be considered or declared surplus.

## **4 Accomplished Objectives from the BWWMA Management Plan 2003 – 2013**

This section is dedicated to reporting the extent to which the Objectives described in the BWWMA Management Plan 2003 - 2013 (pages 38-43) were successfully completed. Planned activities for BWWMA during this period were detailed in the Objectives listed below. Accomplishments for BWWMA 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 BWWMA Management Plan described the planned activities for BWWMA during this period. The degree to which the FWC was able to accomplish the planned activities during this period is reflected as **Percent Accomplished** with each associated **Objective**. **Comments** provide additional details and explanations of the accomplished objectives.

<b>Goals and Objectives</b>	<b>Percent Accomplished</b>	<b>Comments</b>
<b>Goal 1: Manage for healthy and productive wildlife and plant communities.</b>		
Objective 1: Continue to collect wildlife species data during periodic surveys (ongoing)	100%	Deer populations have remained stable with a slight decrease in recent years. Quail population indices indicate a slight decrease to stable at low levels; regulation changes and research projects are ongoing to determine possible causes. Harvest rates of dove, snipe, rabbit and squirrels have been stable to slightly increasing during the reporting period.
Objective 2: Using GPS and GIS technologies, locate and map red-cockaded woodpecker clusters; collect baseline data and monitor population productivity and distribution (ongoing).	100%	All known trees have been documented with GPS and entered into ArcGIS. A biologist is on staff to monitor the population's productivity and distribution. Artificial cavities and drill starts are being used to enhance clusters as well as create recruitment clusters.
Objective 3: Using management techniques including prescribed fire, cattle grazing, mechanical and chemical treatments, continue to maintain natural plant communities and the associated wildlife species (ongoing).	100%	All techniques are being utilized to maintain natural plant communities and associated wildlife species. Each year approximately 23,000 acres are burned, 1,300 acres are roller chopped, and 5,000 acres are surveyed and chemically treated for exotic plants. Three cattle leases are established and cattle currently graze about 52,000 acres.
Objective 4: Continue to monitor annual eagle nest productivity (ongoing).	100%	All known eagle nests are being monitored consistent with the WCPR strategy.

Goals and Objectives	Percent Accomplished	Comments
Objective 5: To improve wildlife habitat, conduct selective thinning operations in high-density pine stands (ongoing).	50%	Conducted a comprehensive evaluation of pine forest thinning needs on the area to improve red-cockaded woodpecker recruitment and habitat. Timber harvesting contract is in place and area will be thinned by 2015.
Objective 6: Contract to annually plant 240 acres of bare root pine seedlings on previously disturbed areas (ongoing).	25%	Three years during the last period have had approximately 140 - 200 acres of South Florida slash pine tubelings planted annually. Due to the lack of funding and suitable planting weather, only 600 acres were successfully planted during the planning period.
Objective 7: Continue to utilize prescribe fire, mechanical and chemical treatments to improve the food and cover components of habitat for northern bobwhite quail (ongoing).	100%	All techniques are being utilized to maintain natural plant communities and associated wildlife species. Each year approximately 23,000 acres are burned, 1,300 acres are roller chopped, and 5,000 acres are surveyed and chemically treated for exotic plants.
Objective 8: Continue vegetative monitoring activities begun in 1972, by sampling existing vegetation transects, photo plots, and point-step locations once over the next five years (ongoing).	100%	Sampling was conducted with no vegetative differences occurring. Grazing evaluations have been conducted by NRCS on the 3 pastures on Webb and the Yucca Pens.
Objective 9: By 2003, develop a species management plan for red-cockaded woodpeckers.	100%	The Red-Cockaded Woodpecker Plan was developed in 2003 and will be revised by the end of 2016.
Objective 10: Contract with FNAI to complete mapping the natural communities and survey rare and endangered plants by 2004.	100%	Current natural community mapping was completed in 2004-05 and was updated in 2014.
Objective 11: Using the results of plant community survey and mapping efforts develop quantifiable vegetation management objectives by 2005.	100%	Objective Based Vegetation Management was completed in 2008-09. DFCs continue to be incorporated into area management.

Goals and Objectives	Percent Accomplished	Comments
Objective 12: Contract to complete a herpetological inventory by 2006.	100%	The herpetological inventory was completed in 2006-07.
<b>Goal 2: Monitor and control exotic and invasive plant species.</b>		
Objective 1: Using aerial and ground applications, chemically treat 1,800 acres of exotic plants including melaleuca, Brazilian pepper, tropical soda apple, cogongrass and downy rose myrtle, and continue to annually monitor, and treat, any new occurrences (ongoing).	100%	Exotic treatment has been ongoing with an average 5,000 acres treated each year. Additional exotics treated are West Indian grass, old and new world Japanese climbing fern and rosary pea. Exotic plant locations were mapped in 2004-2005.
<b>Goal 3: Where feasible, restore and maintain the hydrology to natural conditions.</b>		
Objective 1: Continue to work with the county and state government agencies to restore historical sheet flow to the area (ongoing).	100%	The Charlotte Flatwoods Initiative Project has been created to design a regional solution to the problems on Webb and Yucca Pens. The Project has members from FWC, South and Southwest Florida Water Management Districts, FDOT, FDEP, USCOE, CSX Railroad, Charlotte and Lee Counties and Charlotte Harbor NEP.
Objective 2: Continue to monitor water levels at restoration areas (ongoing).	100%	Water levels continue to be recorded on a weekly basis. New staff gauges were installed in 2011.
Objective 3: In cooperation with SFWMD and USGS, continue to monitor water quality at five monitoring stations on the area (ongoing).	100%	Wells are monitored on a quarterly basis.
Objective 4: Continue to collect rainfall data from Lee County's Babcock-Webb weather station (ongoing).	100%	Rainfall data continues to be gathered from the original rain gauge and 2 additional gauges installed by Lee County on the Webb tract.

<b>Goals and Objectives</b>	<b>Percent Accomplished</b>	<b>Comments</b>
Objective 5: Repair or replace nine water control structures by 2006.	100%	All structures were replaced between 2008-2012.
Objective 6: Contract to complete a hydrology study of the Yucca Pens Unit by 2008.	100%	Hydrological flow way modeling was completed in 2011. Recommendations were implemented in 2013 and scheduled for improvement in 2015.
<b>Goal 4: Monitor and maintain game species populations harvested by hunters and anglers on an optimum sustainable yield basis.</b>		
Objective 1: Continue to conduct annual spotlight surveys of white-tailed deer (ongoing).	100%	Spotlight counts at BWWMA continue to be conducted in June and July.
Objective 2: Continue to collect and analyze biological data from harvested animals (ongoing).	100%	Data continues to be collected from hunter harvested game at the Webb check station.
Objective 3: Continue to conduct annual breeding season call counts for northern bobwhite (ongoing).	100%	Northern bobwhite call counts continue to be conducted, however, the counts are currently done in the fall to estimate the fall population in cooperation with Tall Timbers Research Station.
Objective 4: Continue to conduct coyote and bobcat scent station surveys annually (ongoing).	50%	Ongoing wildlife analysis of the area determined coyote and bobcat surveys were no longer warranted, and therefore were discontinued in 2007.
Objective 5: Continue to intensively manage game fisheries in Ponds 1 - 3 and Webb Lake using aerators, fish feeders, stocking and limited harvests (ongoing).	80%	Fisheries discontinued using the aerators, fish feeders, and stocking in 2006-07. The limited harvest regulations continue to be in effect.
Objective 6: Conduct a northern bobwhite quail population and productivity study (ongoing).	100%	The original study was completed in 2009. A second study started in 2011 to look at effects of size of burn and to develop an equation to determine the fall population based on fall whistle counts.
<b>Goal 5: Provide diverse outdoor recreational opportunities compatible with the management of the natural and cultural resources.</b>		

<b>Goals and Objectives</b>	<b>Percent Accomplished</b>	<b>Comments</b>
Objective 1: In the Babcock-Webb tract, continue to provide archery, general gun and small game hunting seasons (ongoing).	100%	The area continues to provide archery, general gun and small game hunting.
Objective 2: In the Yucca Pens Unit, continue to provide general gun, small game and muzzle loading gun game hunting seasons (ongoing).	100%	The area continues to provide archery, general gun and small game hunting.
Objective 3: Continue to provide wildlife viewing opportunities by maintaining at least 390 acres of wildlife openings/food plots (ongoing).	100%	All food plots are maintained annually through disking, fertilization and planting.
Objective 4: Continue to provide angling opportunities on various ponds and lakes existing throughout the area (ongoing).	100%	Angling opportunities continue to be provided throughout the area.
Objective 5: Continue to provide and maintain at least five picnic shelters along the shore of Webb Lake (ongoing).	100%	Picnic shelters along Webb Lake continue to be maintained.
Objective 6: Continue to maintain the 102-acre dove field (ongoing).	100%	The dove field continues to be maintained by Charlotte County Public Works. The field was not planted in 2013 due to pumping permit changes.
Objective 7: Continue to maintain the field trial clubhouse (ongoing).	100%	The field trial clubhouse and compound continue to be maintained.
Objective 8: Continue to maintain three boat ramps on Webb Lake and one fishing pier/boat ramp on Pond 2 (ongoing).	100%	In cooperation with DFFM, the three boat ramps on Webb Lake and the pier/fishing ramp on Pond 2 continue to be maintained. A fishing dock was added in 2011 on Webb Lake.
Objective 9: Continue to administer a lease to the Boy Scouts of America, Inc. for their use in environmental education, firearms instruction and safety, archery, canoeing, survival skills and swimming (ongoing).	100%	The lease continues to be administered with annual meetings and random checks.

<b>Goals and Objectives</b>	<b>Percent Accomplished</b>	<b>Comments</b>
Objective 10: Continue to maintain 41 elevated primitive campsites at Webb Lake (ongoing).	100%	The elevated campsites continue to be maintained.
Objective 11: To facilitate access to BWWMA, continue to maintain existing designated roads in all-weather travel condition (ongoing).	100%	All roads continue to be maintained.
Objective 12: To increase public access in the Yucca Pens Unit during the hunting seasons, designate a limited number of existing roads for approved hunting vehicle use by 2003.	100%	Roads within the Yucca Pens have been repaired to allow public access to most areas.
Objective 13: Build a new 100-yard, ten position target shooting range to the existing facility location by 2004.	100%	The 100 yard range was added in 2006-07.
Objective 14: Expand and improve the existing range facility to continue to provide a safe target shooting environment by 2004.	100%	The range was expanded and facilities improvement was completed in 2006-07.
Objective 15: Investigate the need and feasibility of contracting the operation of the target shooting range to a concessionaire by 2005.	100%	A concessionaire operation was investigated twice during the period but was not implemented due to the inability to attract a suitable vendor.
Objective 16: Develop and publish interpretive brochures by 2006.	100%	Interpretive brochures were developed in 2004-05.
Objective 17: Develop a self-guided driving tour by 2006.	100%	Webb Lake driving tour has been established.
Objective 18: To enhance equestrian recreational opportunities, renovate the existing 40-horse stall stable located at the field trial facility by 2007.	100%	The 40-horse stall stable was replaced in 2005-2006.

Goals and Objectives	Percent Accomplished	Comments
Objective 19: Develop 90 new campsites adjacent to the current campground by 2007.	100%	An additional campground loop was added as well as expansion of the overflow campground to the south and west which added more than 90 campground sites.
Objective 20: Develop 15 miles of all-purpose trails by 2007.	90%	13 miles of trails have been developed since 2006-07.
Objective 21: Provide two vaulted toilets at the campground and one vaulted toilet at the target shooting range by 2007.	100%	Six vaulted toilets were added to the campground, one at the range and one in the Yucca Pens by 2005-06. There are a total of 8 vaulted toilets on the area.
Objective 22: Renovate and expand existing field trial clubhouse restroom facilities to be ADA compliant by 2008.	100%	The clubhouse and ADA compliance was completed by 2008.
<b>Goal 6: Assure an optimum boundary for BWWMA by continuing to identify and pursue acquisition needs.</b>		
Objective 1: To minimize fragmentation of the area, continue to identify strategic parcels for acquisition (ongoing).	100%	Parcels continue to be identified.
Objective 2: Maintain a GIS shapefile, acreage, and other necessary data to facilitate nominations for the FWC Inholdings and Additions Program (ongoing).	100%	Parcels continue to be nominated.
Objective 3: Continue to encourage the Boy Scouts of America, Inc. to acquire adjacent, comparable land to mitigate for the loss of BWWMA land due to their lease agreement with FWC (ongoing).	100%	The Boy Scouts are encouraged regularly to look for and investigate outside alternatives.
<b>Goal 7: Manage and protect cultural resources of the BWWMA.</b>		

<b>Goals and Objectives</b>	<b>Percent Accomplished</b>	<b>Comments</b>
Objective 1: Post signage advising the public of protection provided to cultural resources by Chapter 267, F. S. by 2003.	100%	Signage was posted in 2003-04.
Objective 2: Contact DHR to arrange for a survey to identify cultural resources on the area by 2004.	100%	DHR determined in 2004 that an archaeological and cultural survey was not necessary.
<b>Goal 8: Develop facilities and infrastructure to facilitate the management of the area.</b>		
Objective 1: To facilitate access to BWWMA, continue to maintain existing designated roads in all-weather travel condition (ongoing).	100%	All main roads have been upgraded to make all-weather travel better and secondary roads are being improved to provide limited all-weather travel.
Objective 2: Renovate the current check station by 2005.	100%	The check station was renovated in 2005-06.
Objective 3: Build a new check station at the entrance of the Yucca Pens Unit by 2008.	100%	A new check station was placed at the Yucca Pens entrance in 2008-09.
Objective 4: Build a new 9,000 sq. ft shop/office facility west of the current shop/office on Tucker Grade by 2008.	100%	The new shop/office process began on 2006 and was completed in 2009.
<b>Goal 9: Provide for revenue-generating activities other than hunting and fishing.</b>		
Objective 1: Continue to collect a day-use fee for area utilization (ongoing).	100%	Day-use fees continue to be collected.
Objective 2: Continue to contract for cattle grazing on BWWMA (ongoing).	100%	Babcock-Webb tract cattle grazing contracts are continuing and consideration is being given to the Yucca Pens.

<b>Goals and Objectives</b>	<b>Percent Accomplished</b>	<b>Comments</b>
Objective 3: Continue to provide apiary contracts on BWWMA (ongoing).	100%	Apiary contracts are continuing on both BWWMA Units.
Objective 4: To improve wildlife habitat, conduct selective thinning operations in high density pine stands (ongoing).	50%	A comprehensive evaluation of pine forest thinning needs was conducted on the area to improve red-cockaded woodpecker recruitment and habitat. Timber harvesting contract is in place and area will be thinned by 2015.
Objective 5: Continue to administer a palmetto berry harvest contract through 2005.	30%	The palmetto berry contract was discontinued in 2005-06 due to low contract income and lack of outside interest.

## **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 BWWMA is to restore and maintain natural communities in a condition that sustains ecological processes and conserves biological diversity, especially fish and wildlife resources. In conjunction with this primary emphasis, it is the FWC's intent to provide quality fish and wildlife resource based public outdoor recreational opportunities on BWWMA. 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 previously noted, the management activities described in this section are in compliance with those of the Conceptual State Lands Management Plan.

### **5.1 Land Management Review**

The Land Management Review (LMR) of BWWMA's Yucca Pens Unit, to which the BOT holds title, was completed in February 2013 (Appendix 4). The LMR team found that the FWC was managing the area in accordance with the purposes of acquisition. The recommendations from the LMR team were considered and addressed in the development of this Management Plan, including development of management intent language, goals and objectives, and identification of management challenges and development of solution strategies (Sections 5 - 8).

### **5.2 Adaptive Management**

Adaptive management is "learning by doing,"<sup>13</sup> 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.<sup>13, 14</sup> 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 components of experimental design (i.e., controls, replication, and randomization) are included in the monitoring process.<sup>13, 14</sup> 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.<sup>14, 15</sup>

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

### **5.2.1 Monitoring**

A well-developed monitoring protocol is also one of the principal, required criteria for the management of BWWMA. 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.<sup>14</sup>

For natural communities, monitoring protocols are established through FWC's Objective-Based Vegetation Management (OBVM, Section 5.3.1) program, which monitors how specific vegetative attributes are responding to FWC management. For imperiled and focal wildlife species, monitoring protocols are established through FWC's Wildlife Conservation Prioritization and Recovery (WCPR, Section 5.4.2) program. The FWC monitors game species during fall northern bobwhite counts and annual white-tailed deer spotlight surveys. To obtain population trend information, FWC staff has conducted white-tailed deer spotlight counts on the Webb tract since 1982 and on the Yucca Pens Unit since 2002. Across BWWMA, staff record opportunistic wildlife observations and maintain a species list (WCPR, Appendix 7).

Bird species at BWWMA are monitored in cooperation with the Peace River Audubon Society during the annual Christmas Bird Count, as well as an annual Breeding Bird Survey and National Migratory Bird Survey conducted by Lee County staff. Additional

survey efforts include monitoring of mourning dove and red-cockaded woodpeckers. Red-cockaded woodpecker monitoring includes cluster and cavity status checks, nest checks and chick banding, fledge checks, monitoring of banded birds.

The FWC monitors Florida bonneted bats four times per year by counting bats emerging from bat houses during the evening. Previous monitoring efforts have included herpetological drift fence surveys in 2004, small mammal trappings in 2006 and 2007, and a 2008 bat species inventory by the Florida Bat Conservancy. FWC staff may monitor additional fish and wildlife species when deemed appropriate.

Exotic and invasive plant and animal species (Section 5.5) are also monitored as needed and appropriate. Recreational uses are monitored through FWC's Public Access and Wildlife Viewing program, and work in conjunction with the establishment and adjustment of public access carrying capacities (Section 5.6.3). Cultural and historical resources (Section 5.9) are monitored with guidance from the DHR.

### **5.2.2 Performance Measures**

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

### **5.2.3 Implementation**

The BWWMA 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 BWWMA, 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 BWWMA, FWC will focus on managing for native habitat diversity, emphasizing maintenance of high-quality natural communities, and restoration of disturbed areas. Restoration may be achieved on disturbed areas by the introduction of fire, restoring historic hydrological conditions and/or the use of mechanical or chemical vegetation management techniques as appropriate. The BWWMA has high-quality native

communities including mesic flatwoods, wet flatwoods, depression marsh, and wet and dry prairie that the FWC will continue to manage and protect. On disturbed upland sites, FWC continues to evaluate and initiate ground cover and natural community restoration.

As described earlier, the FNAI has conducted surveys and mapped the current vegetative communities on BWWMA. This information will be used to guide and prioritize management and restoration efforts on the area. As a result of FNAI's surveys, ORV disturbance was documented in basin swamps, scrubby flatwoods, and other wetlands communities. To address this issue, the FWC has included an objective in Section 6.1 of this Management Plan to conduct a study to determine the amount of damage, if any, that is caused by ORVs and consider possible ways to ameliorate any documented disturbances.

### **5.3.1 Objective-Based Vegetation Management**

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

The first step in implementing OBVM is to map the current, and in most cases the historic natural communities, on the managed area using the FNAI Natural Community Classification. The FWC contracts with the 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 the 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 were mapped, management units were delineated. Delineating management units takes into account the distribution and extent of the current and/or historic mapped natural communities, existing and proposed infrastructure, and other management considerations. FWC land managers then identify the predominant current or historic natural community within each management unit that guides the type and frequency of management activities that should be applied.

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

Vegetation monitoring samples the selected attributes with the results being compared to the established DFCs. All monitoring performed under OBVM is completed using the program's Standard Operating Procedures.

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

### **5.3.2 Prescribed Fire and Fire Management**

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

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

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

On some areas, prescribed burning is limited by the buildup of mid-story brush and a lack of pyrogenic groundcover fuels. This condition creates unsuitable habitat for many wildlife

species. Mechanical control of brush on upland sites by roller chopping, logging, shredding, or incidentally by equipment during commercial thinning operations, can reduce shading and encourage the grasses and forbs that are necessary to sustain prescribed fire.

Single drum (with standard, not offset blades), one-pass roller chopping can be a valuable management tool, enabling the use of prescribed fires in areas heavily invaded by dense woody vegetation. Whenever possible, existing firebreaks such as roads and trails, as well as natural breaks such as creeks and wetlands, will be used to define burning compartments. Disk harrows, mowing, and foam lines will be used as necessary to minimize disturbance and damage created by fire plows.

The transitional areas between two adjacent but different vegetative cover types, such as forests and wetlands, are known as ecotones. With the possible exception of wildfire suppression, mechanical soil disturbance in ecotones will be avoided in order to protect habitats for important rare species that often occur between flatwoods and riparian drainages. Silvicultural site preparation and creation of firebreaks are avoided when possible in these zones. Additionally, fires are allowed to burn into the edges of marshes, swamps and other wetlands in order to maintain these habitats.

Prescribed fire is the primary land management activity on BWWMA. During the early years of FWC management, staff ignited fires and allowed them to burn across the landscape without suppression, which is similar to how wildfires historically occurred in Florida. Increasing development around BWWMA necessitated fire lines and increased smoke management monitoring. Fire line development began in the 1980s, with approximately 540 miles of fire lines on the Webb tract at present. This system provides the ability to manage both fire and smoke on a smaller scale compared to historic methods. Cattle lessees disk 75% of the fire lines (402 miles) on the Webb tract and the remaining 138 miles and 105 miles in the Yucca Pens Unit are maintained by FWC staff.

Fire management on BWWMA has gone through several stages since the fire lines were established. The original fire cycle on the Webb tract consisted of alternating blocks on a two-year cycle. This time intensive rotation caused a majority of the blocks to exceed the two-year cycle with only winter burning. A high intensity quail management area on the Webb tract, known as the field trial area, was put into an annual prescribed burn cycle.



**Prescribed burn at BWWMA, FWC**

In 1996, staff changed the fire cycle on the rest of BWWMA to an annual winter burn

rotation. This fire cycle kept a majority of the area within the cycle interval. Due to low fuel levels, some unburned areas remained in the blocks and provided wildlife cover. A quail research project was initiated in 2003 to determine what was limiting the area quail population. However, the results were not specific as to the effect that burn size was exerting on the population. In conjunction with a second bobwhite quail project with Tall Timbers Research Station (TTRS) in early 2010, three burn treatments were established. The purpose is to evaluate the response of the quail population to different burn approaches. These approaches consist of large burn blocks (> 1,000 acres), smaller strips, and even smaller alternating blocks. The research blocks followed the quail harvest zones developed to evenly distribute quail hunting pressure across the area.

The theory behind the project is that large burns may be detrimental to quail since their home range is approximately 300 acres in south Florida. Two zones were established for burning alternating blocks one year and the second year, switching to the adjacent blocks. A second zonal pair contains strip burns which involve burning one strip, skipping a strip and burning the next strip and treating adjacent strips the following year. A third zonal pair was set up as a big burn area in which one-half of the area is burned one year and the adjacent half is burned the following year. The remaining two zones and other areas not included in the zones were established as strip burns due to the restrictive time requirements of alternating blocks. Once the research project results are analyzed and the conclusions are provided, the fire program will be adjusted accordingly to match the recommendations.

By 1998, the FWC had established fire lines and a fire management program was initiated on the Yucca Pens Unit of BWWMA. This included mostly dormant season burns to reduce fuel loads. In 2003, summer burns were initiated and by 2006, about 4,000 acres were burned during the growing season. Due to weather issues from 2006-2009, prescribed fires were rarely conducted on the Yucca Pens Unit. The time requirements to follow the new prescribed fire plan on the Webb have created a situation in which all of the Yucca Pens Unit is currently out of rotation due to lack of staff time.

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

### **5.3.3 Habitat Restoration**

As previously described in Section 5.3.2, habitat restoration and maintenance at BWWMA is frequently achieved through prescribed fire. Fires are conducted to promote new herbaceous growth and burn off old dead plant material and prevent hardwood encroachment. Approximately 65-70% of the area is burned annually in winter, though fires do not burn all of the target area, which leaves cover and forage for wildlife.

Habitat restoration through mechanical roller chopping treatments to reduce palmetto density and height has been used intensively to create greater herbaceous coverage and promote earlier succession plants utilized by wildlife. In the absence of summer burns, saw palmetto tends to increase in abundance over time in flatwoods communities. Once they dominate the plant composition in an area, the suitability of that area for most plant and animal species has significantly deteriorated. Reducing the palmetto abundance to less than 25% of the plant composition restores habitat conditions for most extant plant and animal species. During the 2012-13 and 2013-14 period, roller chopping was used on 22,771 acres and 15,140 acres, respectively. Small irregular strips and patches, comprising 10-20% of the treatment area, are typically left unchopped to provide cover and structural diversity. Palmetto roller chopping has also been used to prepare sites for slash pine plantings.



**Two years after roller chopping at BWWMA, FWC**

Also noted above, clear-cuts on the area prior to state acquisition, natural pine regeneration at BWWMA has left areas under stocked. Pine plantings in areas that met historic conditions for pines have occurred at BWWMA since 1985. As of 2013, approximately 1,200 acres of planted pines have been established at BWWMA. Several areas have been planted to increase suitability for red-cockaded woodpeckers. Some of these areas are also roller chopped and mowed to reduce palmetto coverage. Oaks have also been planted at BWWMA to help establish hammocks in the future and provide habitat diversity and potential turkey roost sites.

FWC staff intensively manages exotic plant species at BWWMA to control and stop their spread. During the period 2012-2014, over 14,000 acres of the Webb tract and Yucca Pens Unit were surveyed and treated for Japanese climbing fern, cogongrass, melaleuca, Brazilian pepper, silk reed, downy rose myrtle, and others. Since state acquisition, melaleuca, Brazilian pepper, and downy rose myrtle have been reduced by 70%-80% as a result of management and aerial treatments on the Yucca Pens Unit.

Prior hydrological alterations on and adjacent to BWWMA have necessitated restoration needs on the area. In 2009-2010 the SFWMD funded and executed a hydrological study and flow-way model for the Yucca Pens Unit. This study determined that free flowing culvert pipes were draining the water from the Yucca Pens Unit through the Gator Slough Canal and that additional water from the Webb tract was needed to hydrate the Yucca Pens Unit. The FWC began implementing recommendations of the SFWMD study in 2013 to include installing a series of ditch blocks to correct the free-flowing culverts. Additional improvements to the ditch blocks were initiated in 2014 and final improvements scheduled

for 2015. Additional information regarding hydrological conditions and restoration work is described in Section 5.7.

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

### **5.4.1 Fish and Wildlife**

Due to the variety of natural communities, a diversity of associated wildlife, including rare, imperiled, common game, and non-game species, can be found on BWWMA. 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 mesic and wet flatwoods, depression marsh, dry prairie, and wet prairie. Natural communities that are less represented on BWWMA include basin swamp, baygall, dome swamp, hydric hammock, mesic hammock, and scrubby flatwoods.

The size and natural community diversity of BWWMA creates a habitat mosaic for a wide variety of wildlife species. Resident wildlife will be managed for optimum richness, and diversity. In addition to resident wildlife, BWWMA provides resources critical to many migratory birds including waterfowl, passerines, raptors, and others. Habitats important to migratory species will be protected, maintained or enhanced.

The FWC intends to manage game populations on a sustained-yield basis to assure healthy game populations and a high-quality recreational experience. In general, game wildlife populations will be managed to provide continued recreational sport hunting and wildlife viewing opportunities. However, some of the hunting opportunities may be regulated through a limited entry hunt program to ensure the persistence of viable game species populations, as well as hunter safety and satisfaction. The potential for conflicts among recreational activities and user groups will also be considered and continually monitored.



**Bat house at BWWMA, FWC**

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

Concurrent with ongoing species inventory and monitoring activities, 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, timber stand improvements, and mechanical vegetation treatments will address rare and imperiled species requirements and habitat needs.

In addition to these larger scale habitat maintenance activities for imperiled and non-imperiled wildlife, the FWC has installed 40 blue bird nest boxes and 22 bat houses comprising 13 roosts on the area. In 2010, the FWC constructed a large community bat house near the office to provide roosting habitat for Brazilian free-tailed bats. Artificial cavities for red-cockaded woodpeckers are used by the FWC to create recruitment clusters and to enhance habitat for existing clusters without suitable cavities. Additionally, the FWC maintains 425 acres of food plots for northern bobwhites. 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 program to ensure management is having the desired effect on wildlife.

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

The WCPR program helps FWC take a proactive, science-based approach to species management on FWC-managed lands. This approach assesses information from statewide potential habitat models and Population Viability Analysis, and in conjunction with input from species experts and people with knowledge of the area, creates site-specific wildlife assessments for imperiled wildlife species and a select suite of focal species. Staff combines these assessments with area-specific management considerations to develop a 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](http://myfwc.com/media/1515251/Threatened_Endangered_Species.pdf)), as well as select focal species found on the area.

The FWC hosted a WCPR workshop in February 2013 for the BWWMA and subsequently developed a draft WCPR Species Management Strategy (WCPR Strategy) based on input received at the workshop. After incorporating input from a review by experts, the WCPR Strategy was finalized in March 2014 and many of the management actions described therein were initiated immediately. The information developed for the BWWMA WCPR Strategy has been incorporated throughout the development of this Management Plan.

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

#### **5.4.3 Focal Species Selection and Management**

The following are excerpts from FWC's WCPR Strategy for BWWMA (Appendix 7):

The FWC's land management is based on restoring the natural form and function of natural communities. However, in some instances it is important to consider the needs of specific species, and necessary to monitor the impacts of natural communities' management on select wildlife. In an effort to ensure a focused, science based approach to species management, the FWC is using the focal species approach, incorporating a variety of concepts and considerations that, if applied correctly, allow FWC to identify the needs of wildlife collectively by strategically selecting a subset of wildlife species. The group of focal species includes umbrella species, keystone species, habitat specialists, and indicator species.

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

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

Using statewide landcover based habitat maps, 20 of the 60 focal species were modeled to have potential habitat on BWWMA (Table 14). Two species, the gopher tortoise and Cooper’s hawk, were not identified by the PLCP to have potential habitat on BWWMA, but were added to the list because they have been documented on BWWMA by FWC staff and species’ experts. The Florida bonneted bat is not a focal species but was added to the list for BWWMA because it is a federally endangered species that occurs on the area. For all focal species modeled to have potential habitat on BWWMA, FWC staff created area-specific potential habitat maps by replacing the statewide landcover data with BWWMA natural community data.

**Table 14. WCPR Focal Species of BWWMA**

<b>Common Name</b>	<b>Scientific Name</b>
Bachman’s sparrow	<i>Peucaea aestivalis</i>
Brown-headed nuthatch	<i>Sitta pusilla</i>
Burrowing owl	<i>Athene cunicularia</i>
Cooper’s hawk	<i>Accipiter cooperii</i>
Crested caracara	<i>Caracara cheriway</i>
Florida black bear	<i>Ursus americanus floridanus</i>
Florida bonneted bat	<i>Eumops glaucinus floridanus</i>
Florida grasshopper sparrow	<i>Ammodramus savannarum floridanus</i>
Florida mottled duck	<i>Anas fulvigula</i>
Florida panther	<i>Puma concolor coryi</i>
Florida pine snake	<i>Pituophis melanoleucus mugitus</i>
Florida sandhill crane	<i>Grus canadensis pratensis</i>
Florida scrub-jay	<i>Aphelocoma coerulescens</i>
Gopher frog	<i>Lithobates capito</i>
Gopher tortoise	<i>Gopherus polyphemus</i>
Limpkin	<i>Aramus guarauna</i>
Northern bobwhite	<i>Colinus virginianus</i>
Red-cockaded woodpecker	<i>Picoides borealis</i>
Sherman’s fox squirrel	<i>Sciurus niger shermani</i>
Southeastern American kestrel	<i>Falco sparverius paulus</i>
Southern bald eagle	<i>Haliaeetus leucocephalus</i>
Swallow-tailed kite	<i>Elanoides forficatus</i>
Wading birds	

**Table 14. WCPR Focal Species of BWWMA**

<b>Common Name</b>	<b>Scientific Name</b>
Great egret	<i>Ardea alba</i>
Little blue heron	<i>Egretta caerulea</i>
Reddish egret	<i>Egretta rufescens</i>
Roseate spoonbill	<i>Platalea ajaja</i>
Snowy egret	<i>Egretta thula</i>
Tricolored heron	<i>Egretta tricolor</i>
White ibis	<i>Eudocimus albus</i>
Wood stork	<i>Mycteria americana</i>

The WCPR identified objectives for the Florida bonneted bat, Florida panther, and red-cockaded woodpecker. The WCPR Strategy recommends monitoring and species management of the Florida bonneted bat, northern bobwhite, and red-cockaded woodpecker. For comprehensive information regarding monitoring and specific management actions for the focal species of BWWMA, please refer to the WCPR Strategy for BWWMA (Appendix 7). Also, measurable objectives contained within the BWWMA WCPR Strategy are included in Section 6.2 of this Management Plan.

### **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 BWWMA including melaleuca, torpedograss, tropical soda apple, rose myrtle, Brazilian pepper, rosary pea, cogongrass, lantana, old world climbing fern, Japanese climbing fern, guava, Caesar weed, earleaf acacia, sheoaks, natalgrass, java plum, Australian pine, carrotwood, lead tree, Asian sword fern, Guinea grass, water lettuce, Britton’s wild petunia, rattlebox, paragrass, and creeping oxeye. 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.



**FWC staff treating exotic plants at BWWMA, FWC**

From 2012-2014, FWC staff treated 5,180 acres of exotic plants and contracted for surveying and treatment of an additional 9,251 acres of Japanese climbing fern, cogongrass, melaleuca, Brazilian pepper, silk reed, downy rose myrtle, etc. Currently, the FWC estimates there are approximately 15,000 infested acres that require treatment. The infested acreage changes each year due to treatments and recurrence of exotics but treatment is always a

priority on the area. 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.

FWC staff and contractors follow the exotic plant protocol outlined below. Each unit is surveyed by a qualified FWC employee or contractor. While conducting the survey the employee or contractor will have all the supplies necessary to treat any of the known exotic plants. Some habitat types are quite low and can be surveyed rapidly by making parallel passes within each unit using an ATV. In areas of dense vegetation, the survey will be conducted on foot to provide a more thorough search. Once an exotic plant is located, it will be treated and depending on the level of infestation the location may be entered into a GPS and the number of plants or area of infestation is estimated. The documented plant(s) are treated and scheduled for a retreatment within one year or earlier depending on the species and location.

Additionally, the FWC will continue efforts to control the introduction of exotic and invasive species, as well as pests and pathogens, on BWWMA 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, the FWC implements a proactive approach to controlling the introduction of exotic pests and pathogens to the area.

An exotic animal species of concern on the BWWMA 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



**Feral hog, FWC**

private landowners to coordinate feral hog control measures as necessary. Hog populations are controlled by hunts during the archery and general gun seasons on the Webb tract and the muzzleloading gun and general gun seasons on the Yucca Pens Unit. Trapping is another measure that may be implemented to augment ongoing feral hog control efforts and to further reduce the natural community damage and degradation caused by this species.

## **5.6 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 ADA<sup>16</sup> 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 BWWMA. In 2000, the FWC developed a Nature Based Recreation Master Plan (RMP) for the area. This plan will be updated during early 2015. To accomplish this, the FWC will work with recreational stakeholders and the general public to develop a RMP for BWWMA that will be used to further design and develop appropriate infrastructure that will support the recreational use of the area by the general public. The RMP will include planning for parking, trail design, and area resource interpretation. When complete, the RMP will be included as Appendix 10.

### **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, the FWC has determined that BWWMA can currently support 2,060 visitors per day. However, objectives to add or improve public access facilities and infrastructure resulting in an increase of the public access carrying capacity to 2,490 visitors per day have been proposed in Section 6.5 of this Management Plan.

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 BWWMA 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 BWWMA is part of the Great Florida Birding & Wildlife Trail, which includes areas across the state selected for their excellent bird watching, wildlife viewing, or educational opportunities. The area is a birding hot spot in southwest Florida and is home to numerous resident as well as migrating birds. Two of the biggest birding draws for this area are Bachman's sparrows and red-cockaded woodpeckers. Northern bobwhite, eastern cottontail rabbits, gray squirrels, raccoons, white-tailed deer, and feral hogs are common inhabitants of the flatwoods.



*White ibises at BWWMA, David Moynahan*

#### **5.6.5 Hunting**

Hunting seasons on the Webb tract include archery, general gun, small game, field trial area quail, raccoon and opossum, and migratory bird. Hunting seasons on the Yucca Pens Unit are muzzleloading gun, general gun, small game, raccoon and opossum, and migratory bird. Fishing and frogging are allowed year round at BWWMA. Popular game species on the area include northern bobwhite, white-tailed deer, dove, and feral hogs. The FWC maintains approximately 425 acres of northern bobwhite food plots that are annually treated with herbicide, disked, fertilized, and planted. Additionally, a 102-acre dove field is planted annually on the Punta Gorda Water Treatment Facility grounds, located in the northeast corner of BWWMA. The FWC periodically evaluates hunting opportunities offered on BWWMA.

#### **5.6.6 Field Trial Grounds**

The field trials grounds are managed for quail hunting during field trial bird dog competitions. The field trial season begins in mid-September and ends in mid-February.

Within the time frame there are training weekends and field trial weekends. On average, there are approximately 13-14 trials held during that period. Two clubs holds trials on the grounds, The Associated Field Trial Clubs of Florida and Quail Forever. The field trial grounds encompass over 6,000 acres and include a club house facility, a horse stable, dog kennels, and a picnic area.

### **5.6.7 Fishing**

Fishing opportunities within BWWMA are found primarily on six artificial ponds and the 395-acre Webb Lake. Webb Lake is managed as a trophy pan fish area. Common catches include bluegill and redear sunfish. Three boat ramps at Webb Lake provide access for non gasoline-powered boats. Marl ponds 1, 2, and 3 are located in either side of Tucker Grade Road. They are each about two acres in size and provide excellent opportunities for bank fishing. Forty-acre pond is located south of Bermont Road off of 40-Acre Pond Road.

### **5.6.8 Boating**

Non-gasoline powered boats are permitted at Webb Lake.

### **5.6.9 Trails - Hiking, Bicycling, and Equestrian**

There are currently over 12 miles of trails on BWWMA; 7.6 miles are designated recreational trails including a driving tour on Webb Lake Road and the other five miles are non-motorized hunting trails. A short-term objective (2014-2016) included in Section 6.5 of this Management Plan includes designation of up to 20 miles of new trails. All trails are open to hiking, bicycling and equestrian use. Horses are allowed year round throughout the area unless otherwise specified.



*Bicycling at BWWMA, David Moynahan*

Horses are allowed year round throughout the area unless otherwise specified. During hunting days, horses are prohibited on the Yucca Pens Unit. As part of the BWWMA RMP update scheduled for 2014, the 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.

### **5.6.10 Camping**

Camping on the Webb tract is allowed only at designated campgrounds. Camping is allowed one day prior to the beginning of archery season until one day after archery season ends. Camping is allowed eight days prior to general gun season through the last day of small game season. During the remainder of the year, camping is allowed each weekend from 5 p.m. Friday until 9 p.m. Sunday, and on Memorial Day, Independence Day, Martin Luther King Jr. Day and Labor Day. Camping equipment is allowed on the area only when camping is allowed. Camping is prohibited on the Yucca Pens Unit. Additional camping opportunities will be contemplated as part of the BWWMA RMP development process.

### 5.6.11 Shooting Range

BWWMA's shooting range is located on Tucker Grade at Rifle Range Road. The funds for the shooting range were provided through the Pittman-Robertson Act. This range was built with public funds through the FWC's Hunter Safety Program. It is intended for training students enrolled in the Hunter Safety Program and for the public's use. The 10-pad shooting range has 200-yard rifle, 150-yard rifle, and 15, 25, and 50-yard pistol ranges and two shotgun pads. In 2012 and 2013 the range accommodated 71,788 and 63,120 shooters, respectively.



The BWWMA shooting range, *David Moynahan*

### 5.6.12 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).

### 5.6.13 Interpretation and Environmental Education

There are 12 interpretive signs and four kiosks at BWWMA which include maps of the area, fishing information about Webb Lake and Marl Pond, information about wildlife and natural communities, and the history of the area. A BWWMA recreation guide and bird list is available on site as well as online. The FWC will continue to assess the need for conservation education and continue to identify partnerships that could provide for additional conservation



Sign at Webb Lake, *FWC*

education programs and outreach opportunities.

## **5.7 Hydrological Preservation and Restoration**

Water levels, flow, and their effects on both habitat and the various wildlife species are a major issue on BWWMA. Summer rains typically result in the inundation of much of the WMA during the June-October wet season. This can reduce habitat suitability for burrowing species such as the gopher tortoise or burrowing owl. Rain and associated seasonal flooding can also have an effect on land management activities.

BWWMA experiences serious hydrological issues. These concerns have been compounded over the years and most result from interruptions in the natural flow of the Gator Slough watershed. The Gator Slough watershed originates on the Webb tract and historically flowed southwest through the Yucca Pens Unit and into Matlacha Pass and Charlotte Harbor. Gator Slough Canal was created in the 1960s during development of the city of Cape Coral. This canal causes excess water drainage on the Yucca Pens. Interstate-75 was constructed in the early 1980s and created an impediment to water drainage on the Webb tract, causing water to back-up on the area. Combined with modifications on small private tracts nearby, these hydrologic changes contribute to disrupted water flow on and surrounding BWWMA.

In 1982, one of the first WMA hydrological studies was completed for the Webb tract. The study documented the water flow issues, including the serious nature of the over-drainage and excessive flooding, and recommended installation of a combination of low water fords and riser structures to help manage the problem. The premise behind construction of these water control structures was that they would slow the flow and hold water so as to reduce flooding downstream. Unfortunately, further land modifications and development around the Webb tract overwhelmed the original structures and prevented this plan from working. In 2011 and 2012, these structures were replaced.

In 2010 a group called the Charlotte Harbor Flatwoods Initiative (CHFI) was formed to take a regional approach in addressing the ever-increasing watershed problems. This group includes several representatives from federal and state agencies, county and city governments, and private interests. The primary factor leading to the group formation was the future I-75 lane expansion project scheduled to begin in late 2014 or early 2015. This expansion presents a chance for the modification of the I-75 drainage and flow ways, as well as opportunities to look at the current water flow issues to the southwest of BWWMA and other water flow alternatives to move water from the Webb tract back across the Yucca Pens Unit. The improvement in water flows across historic watersheds will benefit not only the Yucca Pens but the Charlotte Harbor estuaries. The resulting benefit to the estuaries is estimated to increase the fisheries benefit by over 3 million dollars. To assist in the decision-making process, the SFWMD funded and executed a flow-way model hydrological study for the Yucca Pens Unit, which resulted in the 2010 Yucca Pens Hydrologic

Restoration Plan. The FWC has entered into an interagency agreement with the SFWMD to implement recommendations from this Restoration Plan. Currently, the CHFI is optimistic there will be at least some hydrological improvement.

In August 2014, the ARC approved an amendment to the Charlotte Harbor Flatwoods Florida Forever project to add over 650 acres of Bond Ranch, LLC to the project boundary. The Bond Ranch parcel is integral to the success of the CHFI and restoring sheet flow to its more natural condition. Bond Ranch is located northeast of I-75, which it borders for approximately 1.1 mile. The tract shares a common boundary on its northeast corner for approximately 0.5 mile with BWWMA. The FDOT will work with the FDEP-DSL to acquire Bond Ranch to mitigate for stormwater and flood control during the I-75 widening project in the area. Rather than steep-sided storm water ponds in the median of I-75 that are hazards even to wildlife and must eventually be replaced, state ownership and management in coordination with FDOT will allow the creation of storm water drainage designed with nature. It will also offer significant water quality protection to Charlotte Harbor.

Currently, the Bond Ranch's operation is dependent on pumping off water that enters its boundaries into the receiving areas adjacent to the I-75 bridge. From there, water flows into Prairie Pines Preserve and southeastward. There have been significant flooding events in the Fort Myers area due to the current trajectory of water flow. Acquisition of Bond Ranch and conversion of the parcel to a storage area for excess water from the Webb tract would allow for more natural water flows from the Webb tract to wetlands in the Yucca Pens Unit. The Yucca Pens Unit will receive the waters and sheet flow will continue westward to Charlotte Harbor in a much more natural and historic manner. This project will reduce peak flow discharges to tidal waters and enhance base flows.

### **5.7.1 Hydrological Assessment**

Building on the results and recommendations of aforementioned studies, the FWC will conduct or obtain a site-specific comprehensive hydrological assessment and restoration plan to identify potential hydrology restoration needs and solutions. Pursuant to the recommendations of this hydrological assessment, the FWC will implement hydrological restoration as feasible and appropriate.

## **5.8 Forest Resource Management**

A Timber Assessment of the timber resources of BWWMA was completed by the FFS in 2002 and updated in 2014 (Appendix 8). The management of timber resources will be considered in the context of the Timber Assessment and the overall land management goals and activities. The primary timber management objective for BWWMA is to restore where necessary and maintain a healthy south Florida flatwoods ecosystem. Stands should be managed with an eye toward becoming red-cockaded woodpecker foraging zones and future cluster sites. Raising stocking levels of pine trees in the thousands of acres of severely

under-stocked stands will increase future options for FWC staff as well as red-cockaded woodpeckers (Appendix 8).

Timber resources include some pine plantations in need of thinning for habitat improvement. Thinning of the forest over-story, hydrological restoration and reintroduction of prescribed burning are the most important factors in re-establishment of natural communities and the enhancement of wildlife habitats in these areas. Upland pine forest planted with off-site pines will be reforested with south Florida slash pine or other on-site species as appropriate.

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

## **5.9 Cultural and Historical Resources**

Six resource groups (linear resources associated with roads and railways) and one archaeological site (Oil Well Road prehistoric campsite, CH00066) fall totally or partially within BWWMA (Appendix 12). The FWC will continue to monitor, protect, and preserve as necessary the six resource groups and archaeological site. The FWC will refer to and follow the DHR's Management Procedures for Archaeological and Historical Sites and Properties on State-Owned or Controlled Properties for management of these resources, and prior to any facility development, ground disturbing activities. The FWC will continue to consult with the DHR in an attempt to locate other features on the area. In addition, the FWC will ensure management staff has DHR Archaeological Resources Management Training.

## **5.10 Capital Facilities and Infrastructure**

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

Current capital facilities and infrastructure on BWWMA include (Figures 10 and 11):

- Two field offices

- Eight storage buildings
- A shop (9,000 square feet for office, equipment storage, etc.)
- Two pole barns
- Three staff residences
- A check station and mobile check station
- A field trial clubhouse
- Two horse stables
- Three shooting range buildings
- A quail research trailer and associated equipment sheds
- 14 groundwater wells
- 14 picnic shelters
- Three boat launches at Webb Lake
- Four entrance signs
- 12 interpretive signs
- Four kiosks
- 166 miles of road
- 12.6 miles of trails
- BSA campground and facilities

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.

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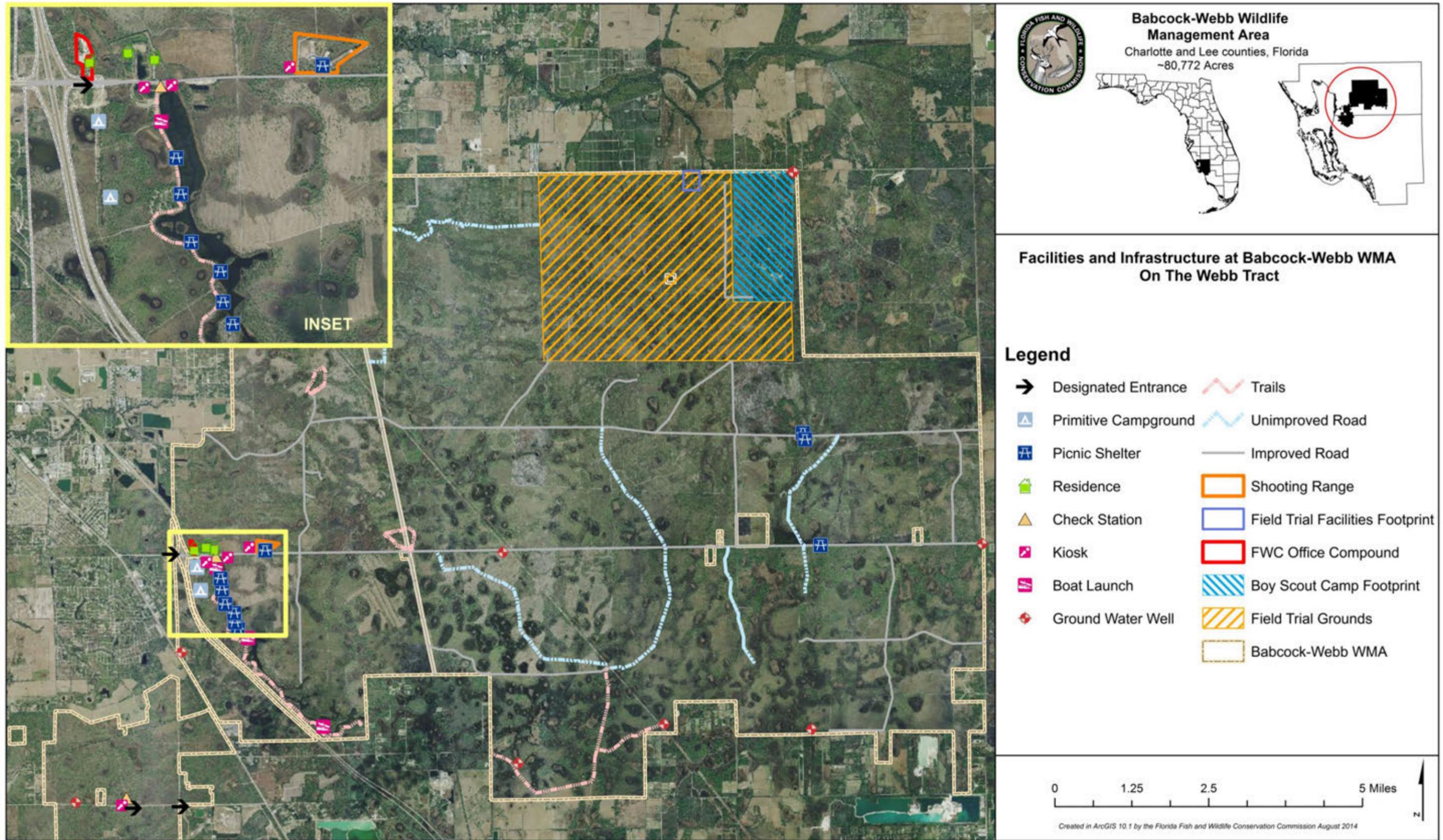


Figure 10. BWWMA Facilities and Infrastructure: Webb Tract

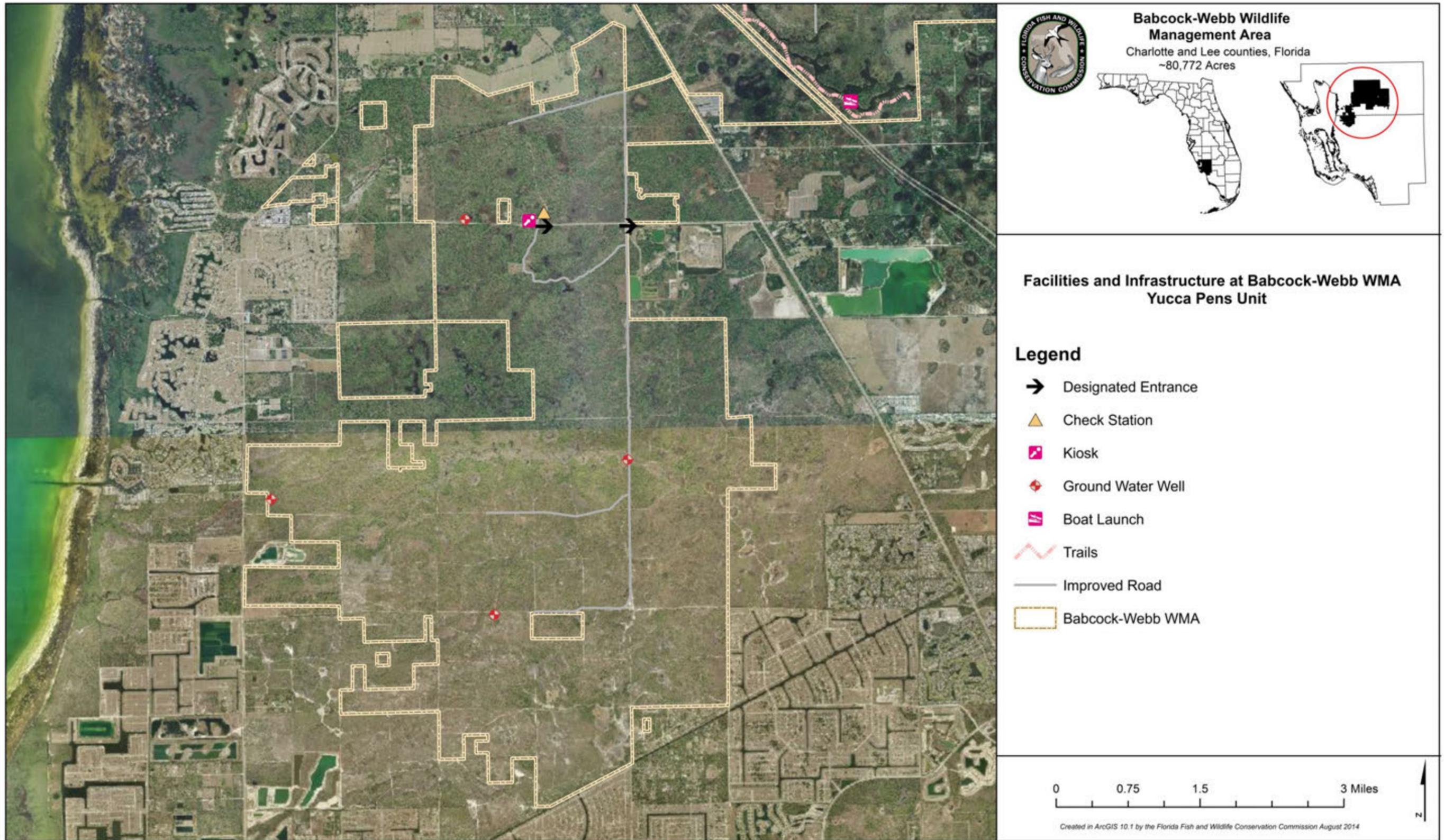


Figure 11. BWWMA Facilities and Infrastructure: Yucca Pens Unit

### **5.11.2 Optimal Conservation Planning Boundary**

The second tier is known as the OCPB (Figure 12). 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 BWWMA. Although the OCPB provides the basis for potential future voluntary, willing-seller conservation acquisitions, it is designed to function primarily as a conservation planning boundary. The OCPB identifies surrounding lands and natural resources that may be important to the continued viability of fish and wildlife populations in the region. As they are currently managed, these lands appear to contribute to regional conservation and may support conservation landscape linkages.

### **5.11.3 Conservation Action Strategy**

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

Primary components of the CAS may include:

- FWC Landowner Assistance Program
- FWC conservation planning
- FWC Additions and Inholdings Program Land Conservation Work Plan
- Forest Stewardship Program proposals
- Florida Forever 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.

At its August 2014 meeting, the ARC added 650 acres of Bond Ranch to the Charlotte Harbor Flatwoods Florida Forever Project boundary. The addition of Bond Ranch to BWWMA would provide water storage, nutrient treatment for runoff, and wetland mitigation for the I-75 widening project; restore water flow from the Webb tract; and augment water flow to the Yucca Pens Unit. The Bond Ranch is included in the OCPB for BWWMA.

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

#### **5.11.4 FWC Florida Forever Additions and Inholdings Acquisition List**

Currently, the FWC has identified approximately 16,813 acres of potential additions or privately held inholdings for BWWMA. In addition, approximately 8,520 acres of the Hall Ranch and 5,195 acres of the Charlotte Harbor Flatwoods Florida Forever projects remain to be acquired, including the Bond Ranch parcel added to boundary in August 2014. Upon completion of the CAS, additions to the FWC Florida Forever Additions and Inholdings acquisition list may be recommended.

### **5.12 Research Opportunities**

The FWC intends to cooperate with researchers, universities, and others as feasible and appropriate. The FWC will continue to contract with the TTRS regarding northern bobwhite population dynamics and management responses. For BWWMA, the FWC will continue to assess and identify research needs and pursue research partnership opportunities as appropriate. Research proposals involving the use of the area are evaluated on an individual basis. All research activities on the BWWMA must have prior approval by FWC.

### **5.13 Cooperative Management and Special Uses**

#### **5.13.1 Cooperative Management**

The FWC is responsible for the overall management and operation of BWWMA as set forth in the lease agreements with the Board of Trustees. In keeping with the lease agreements, and in order to conduct its management operations in the most effective and efficient manner, the FWC cooperates with other agencies to achieve management goals and objectives described in this management plan.

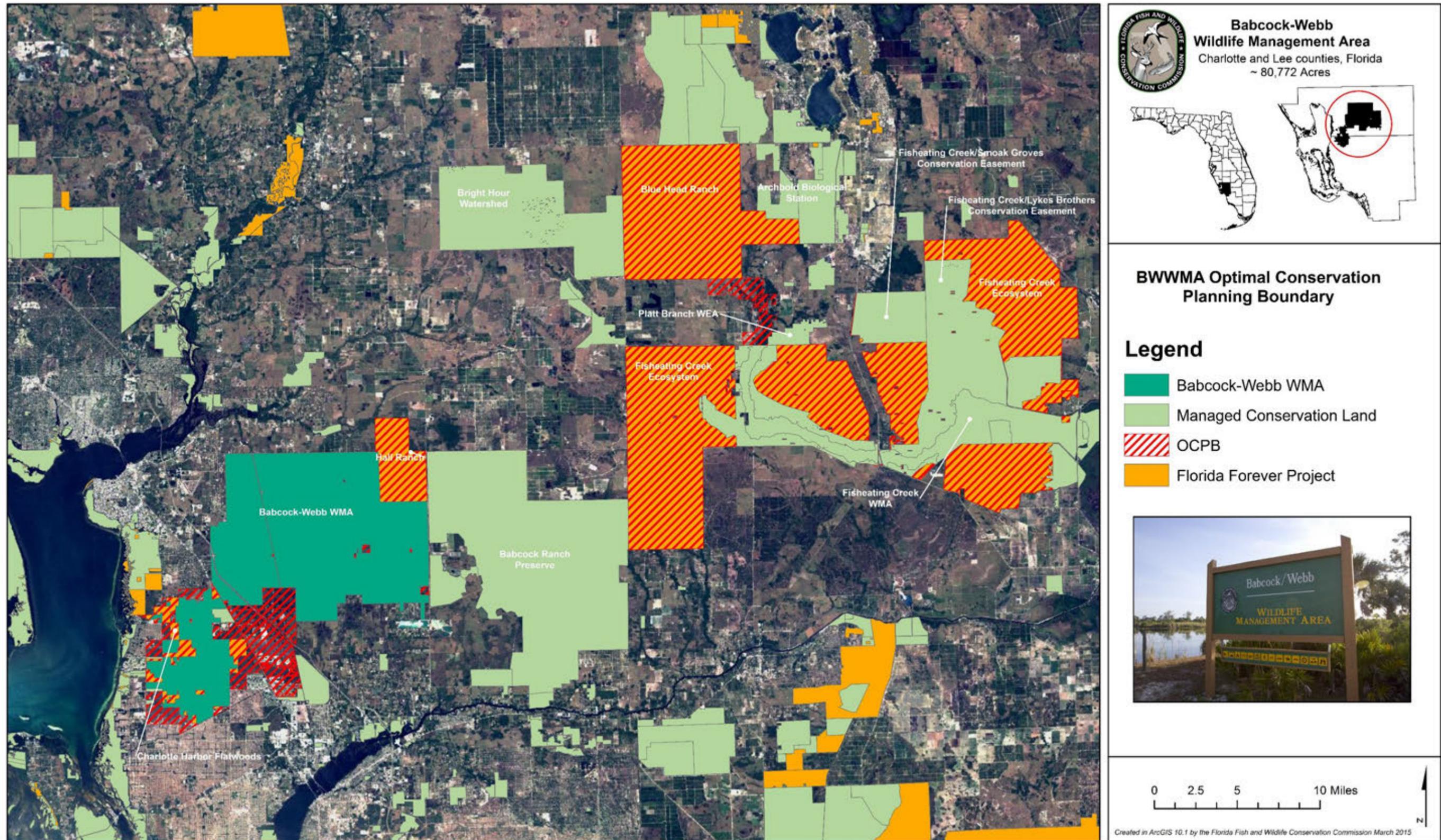


Figure 12. BWWMA Optimal Conservation Planning Boundary

These include cooperating with the DHR to ensure the requirements of the Management Procedures Guidelines - Management of Archaeological and Historical Resources document (Appendix 12) are followed with regard to any ground-disturbing activities. In addition, the FFS is a designated cooperating agency on lands for which the BOT holds title, and assists FWC by providing technical assistance on forest resource management. The FWC will continue to cooperate with the CHFI, a group formed to take a regional approach in addressing watershed problems in the area, to restore hydrological functions and mitigate for the impacts of I-75. Also, the FWC cooperates with the DEP, the SWFWMD, and the SFWMD for the monitoring and management of both ground and surface water resources of the BWWMA.

### 5.13.2 First Responder and Military Training

First-responder (public governmental police department or agency, fire and emergency medical service personnel) training and military training are conditionally allowed on BWWMA. 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 BWWMA 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 BWWMA. 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 the FWC to the DSL and the ARC for approval consideration prior to authorization.

### 5.13.3 Cattle Grazing

As noted above, cattle grazing has occurred at BWWMA since before state acquisition of the property. Currently there are three active grazing lessees on BWWMA (Section 1.6, Appendix 2). The 2012 NRCS Prescribed Grazing Plan (Appendix 15) for BWWMA states that the area provides approximately 43,727 acres of potential grazing land and can support up to 1,220 animal units.



Cattle at BWWMA, NRCS

Prescribed grazing is a controlled harvest of vegetation with grazing and browsing animals. Cattle grazing helps to maintain open areas and create a mosaic of habitats by creating edge. By maintaining open area, succession of woody plants and palmettos is dramatically decreased. This has been proven to be beneficial for deer, turkey, and northern bobwhite. The FWC has capped stocking rates at 50% of the recommended stocking rates determined by the NRCS forage assessment of BWWMA's pasture areas. The objectives of the prescribed grazing plan are

to improve and/or maintain an optimum level of the native forages and assist in the reduction of biomass. The primary forage species in the mesic and wet flatwoods of BWWMA is wiregrass (NRCS 2012, Appendix 15).

#### 5.13.4 Apiaries

Currently, there are multiple apiaries on BWWMA operating under one apiary agreement (Section 1.6, Appendix 2). The use of apiaries is approved for BWWMA 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). Location, management, and administration of apiaries on BWWMA are guided by the FWC Apiary Policy (Appendix 11).



Beehives at BWWMA, FWC

#### 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.<sup>17</sup>

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;<sup>18, 19,</sup><sup>20</sup> more frequent invasions and outbreaks of exotic invasive species;<sup>21</sup> and loss of habitat in coastal areas due to sea level rise.<sup>22</sup> 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.<sup>23</sup> 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.

Elements of climate change that may potentially affect the BWWMA include inundation and saltwater intrusion from sea level rise, more frequent and more potent storm events, alteration of vegetation reproductive cycles, changes in migratory bird patterns and changes in the fire regime. Sea-level rise potential inundation scenarios at BWWMA ranging from one to six meters are depicted in Figure 13. Under the sea level rise potential inundation scenario, the Yucca Pens Unit will be impacted with two and three meter sea level rise in Charlotte Harbor.

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.

To address the potential impacts of climate change on the BWWMA, Goals and Objectives have been developed as a component of this Management Plan (Section 6.12). 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 BWWMA Management Plan in the future.

### **5.15 Soil and Water Conservation**

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

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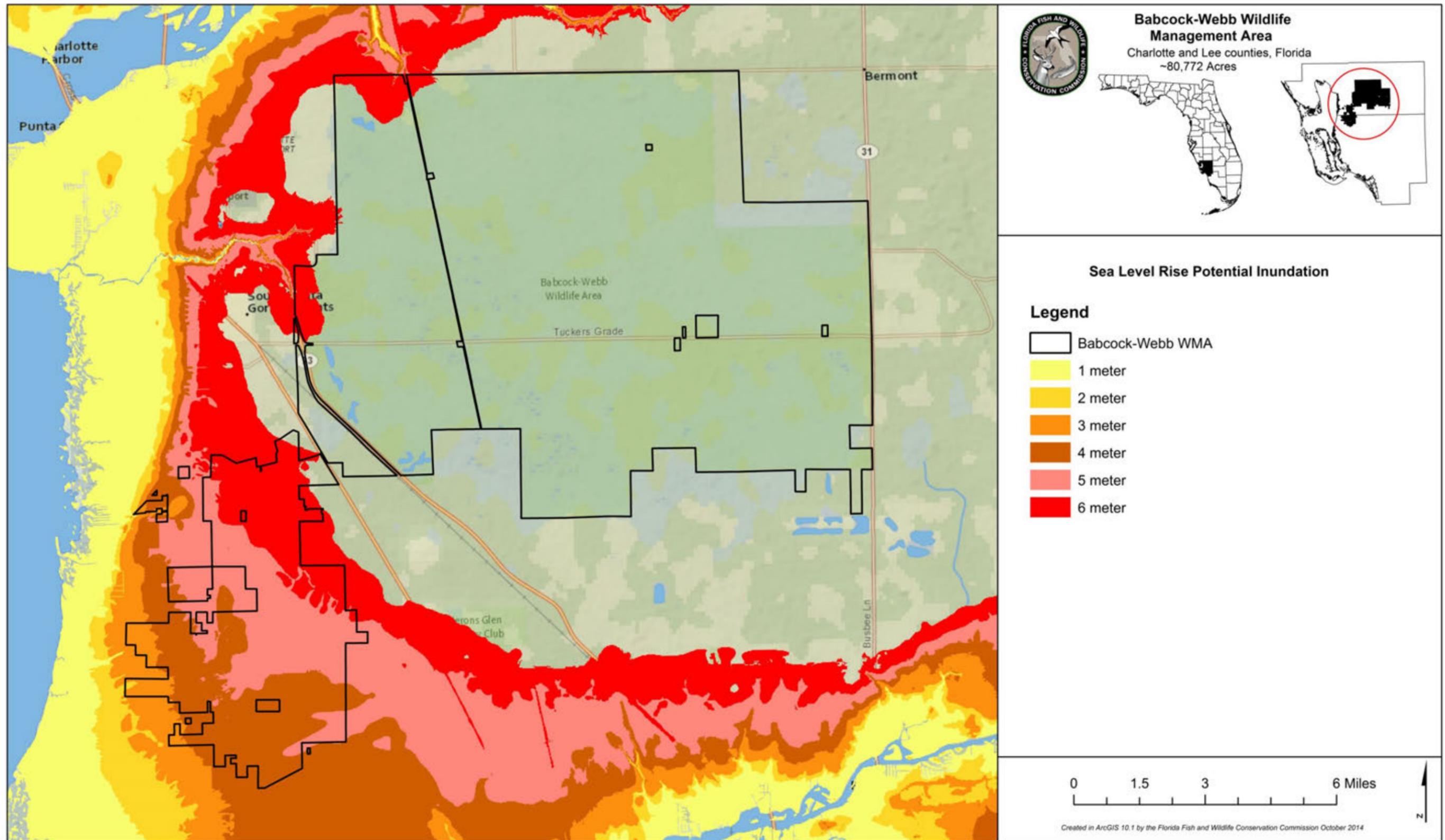


Figure 13. Sea Level Rise Potential Inundation at BWWMA

## **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 BWWMA. 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 (2015-2016) or long-term (2016-2025) timelines for completion.

### **6.1 Habitat Restoration and Improvement**

**Goal: Improve extant habitat and restore disturbed areas.**

#### **Short-term**

- 6.1.1 Conduct prescribed burning on 23,200 acres of fire adapted natural communities per year.
- 6.1.2 Maintain 60,000 acres of fire adapted communities (100%) within 2-4 year target fire return interval.
- 6.1.3 Develop and implement an updated prescribed burn plan for the area.
- 6.1.4 Conduct habitat/natural community improvement on 1,200 acres of pine flatwoods on the area per year utilizing roller chopping and mowing.
- 6.1.5 Conduct natural community restoration activities through pine tubelings plantings or promote natural regeneration on 170 acres per year to improve wildlife habitat on the area (Figure 14).
- 6.1.6 Conduct a timber thinning harvest on 2,131 acres by 2016 to improve habitat on the area (Figure 14).
- 6.1.7 Continue to implement OBVM on the area.

#### **Long-term**

- 6.1.8 Continue to conduct prescribed burning on 23,200 acres of fire adapted natural communities on the area per year.
- 6.1.9 Continue to maintain 60,000 acres of fire adapted communities (100%) on the area within a 2-4 year target fire return interval.
- 6.1.10 Continue to implement OBVM on the area.

- 6.1.11 Continue to conduct habitat/natural community improvement on 1,200 acres of pine flatwoods on the area per year utilizing roller chopping and mowing.
- 6.1.12 Continue to conduct natural community restoration activities through pine tubelings plantings or promote natural regeneration on 170 acres per year to improve wildlife habitat on the area (Figure 14).
- 6.1.13 Contract or otherwise conduct a study on the impacts of Off Road Vehicle (ORV) use by 2020 on the area as feasible.

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

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

### **Short-term**

- 6.2.1 Continue to implement the area’s WCPR Strategy.
- 6.2.2 By 2015, assess the availability of Florida panther caching and denning habitat and protect and enhance these areas as described in the area’s WCPR Strategy; establish a Florida panther Strategic Management Area (SMA) if determined to be appropriate.
- 6.2.3 As described in the area’s WCPR Strategy, monitor two imperiled species, Florida bonneted bat and red-cockaded woodpecker, and one focal species, northern bobwhite. Nineteen other focal species will be opportunistically monitored, i.e. gopher frog, eastern indigo snake, Florida pine snake, gopher tortoise, American swallow-tailed kite, Bachman’s sparrow, brown-headed nuthatch, Cooper’s hawk, crested caracara, Florida grasshopper sparrow, Florida mottled duck, Florida sandhill crane, Florida scrub-jay, limpkin, Southeastern American kestrel, Southern bald eagle, Florida black bear, Florida panther, Sherman’s fox squirrel and any other imperiled wildlife observed on the area.
- 6.2.4 As described in the area’s WCPR Strategy, continue to maintain and monitor a suite of bat houses for use by Florida bonneted bats and other species.
- 6.2.5 As described in the area’s WCPR Strategy and to meet the objectives within the BWWMA Red-Cockaded Woodpecker Management Plan, continue to conduct species management for red-cockaded woodpeckers on BWWMA including artificial cavities and translocation.
- 6.2.6 As described in the area’s WCPR Strategy and to meet the objectives within the BWWMA Red-Cockaded Woodpecker Management Plan, continue to maintain at

least 25 primary breeding groups of red-cockaded woodpeckers.

- 6.2.7 As part of an ongoing northern bobwhite research effort and as described in the area's WCPR Strategy, continue to conduct fall covey counts for northern bobwhite on the Webb tract to estimate the population size, determine appropriate harvest rates, and evaluate the effectiveness of management strategies.
- 6.2.8 As described in the area's WCPR Strategy, continue to conduct red-cockaded woodpecker monitoring on BWWMA including cluster/cavity status checks; nest checks and chick banding; fledge checks; and monitoring of banded birds.
- 6.2.9 As described in the area's WCPR Strategy, conduct at least four simultaneous Florida bonneted bat counts annually, one per season.
- 6.2.10 As described in the area's WCPR Strategy, in 2014 implement the FWC Bat House Occupancy Assessment to estimate the number of bats using bat houses and evaluate the seasonality of use of bat houses in Florida.
- 6.2.11 As described in the area's WCPR Strategy, update the BWWMA Red-Cockaded Woodpecker Management Plan by the end of 2016.
- 6.2.12 Continue to assess red-cockaded woodpecker habitat on the area and the need to plant or thin pine communities for optimal species management.

### **Long-term**

- 6.2.13 Continue to implement the area's WCPR Strategy.
- 6.2.14 As described in the area's WCPR Strategy, monitor two imperiled species, Florida bonneted bat and red-cockaded woodpecker, and one focal species, northern bobwhite. Nineteen other focal species will be opportunistically monitored, i.e. gopher frog, eastern indigo snake, Florida pine snake, gopher tortoise, American swallow-tailed kite, Bachman's sparrow, brown-headed nuthatch, Cooper's hawk, crested caracara, Florida grasshopper sparrow, Florida mottled duck, Florida sandhill crane, Florida scrub-jay, limpkin, Southeastern American kestrel, Southern bald eagle, Florida black bear, Florida panther, Sherman's fox squirrel and any other imperiled wildlife observed on the area.
- 6.2.15 As described in the area's WCPR Strategy, continue to maintain and monitor a suite of bat houses for use by Florida bonneted bats and other species.
- 6.2.16 As described in the area's WCPR Strategy and to meet the objectives within the BWWMA Red-Cockaded Woodpecker Management Plan, continue to conduct species management for red-cockaded woodpeckers on BWWMA including artificial cavities and translocation.

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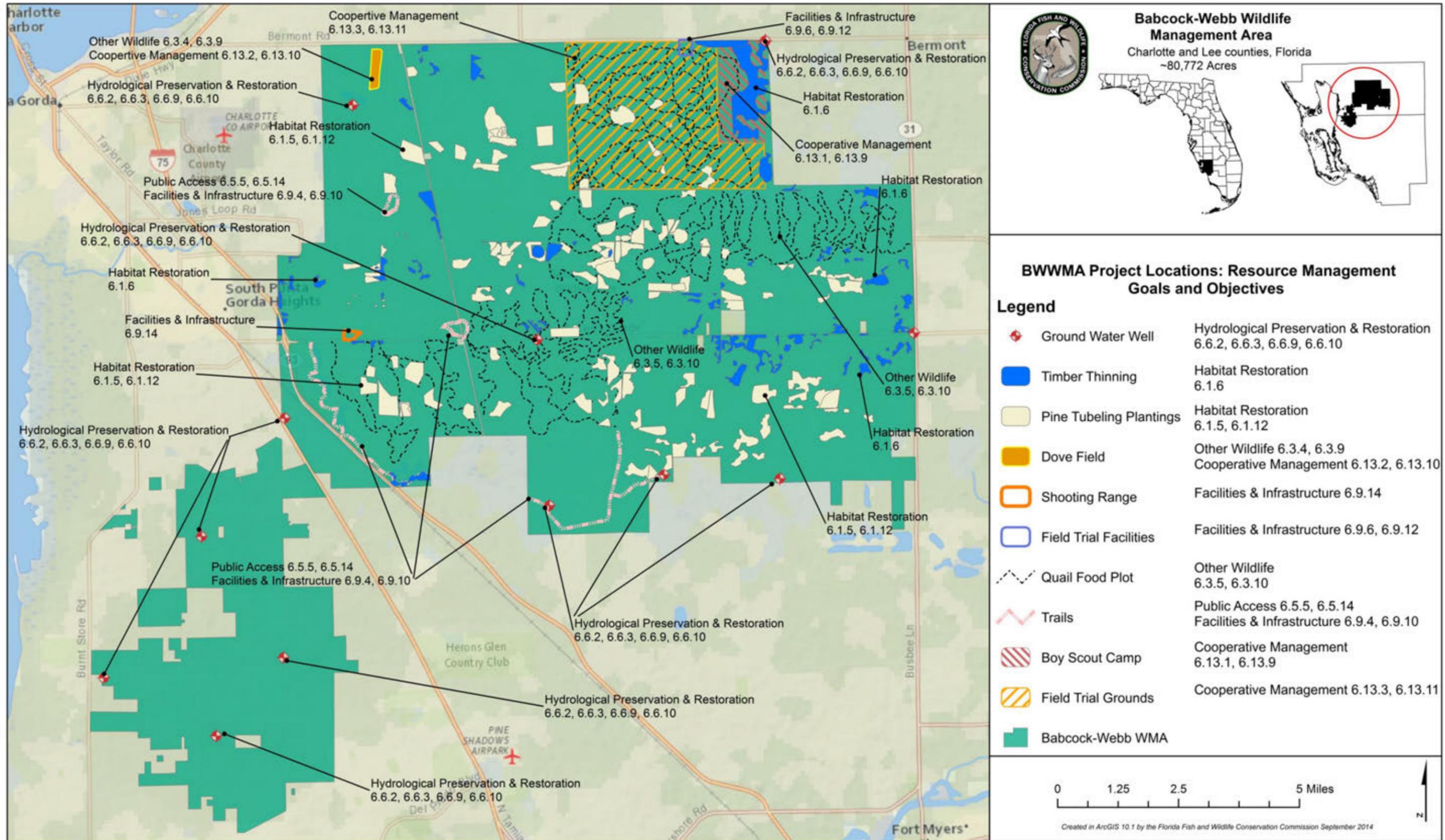


Figure 14. BWWMA Project Locations

- 6.2.17 As described in the area’s WCPR Strategy and to meet the objectives within the Babcock-Webb WMA Red-Cockaded Woodpecker Management Plan, continue to maintain at least 25 primary breeding groups of red-cockaded woodpeckers.
- 6.2.18 As part of an ongoing northern bobwhite research effort and as described in the area’s WCPR Strategy, continue to conduct fall covey counts for northern bobwhite on the Webb tract to estimate the population size, determine appropriate harvest rates, and evaluate the effectiveness of management strategies.
- 6.2.19 As described in the area’s WCPR Strategy, continue to conduct red-cockaded woodpecker monitoring on BWWMA including cluster/cavity status checks; nest checks and chick banding; fledge checks; and monitoring of banded birds.
- 6.2.20 As described in the area’s WCPR Strategy, conduct at least four simultaneous Florida bonneted bat counts annually, one per season.
- 6.2.21 As described in the area’s WCPR Strategy, continue to conduct the FWC Bat House Occupancy Assessment to estimate the number of bats using bat houses and evaluate the seasonality of use of bat houses in Florida.
- 6.2.22 Continue to assess red-cockaded woodpecker habitat on the area and the need to plant or thin pine communities for optimal species management.
- 6.2.23 By 2024, revise and update the area’s WCPR Strategy.
- 6.2.24 In coordination with USFWS, FDOT and Charlotte County, cooperate with the development of one wildlife underpass north of Tucker Grade along SR-31 and one wildlife underpass south of Tuckers Grade along SR-31.

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

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

#### **Short-term**

- 6.3.1 Continue to conduct annual spotlight monitoring surveys on the area for white-tailed deer.
- 6.3.2 Continue to collect biological harvest data at the area’s check station.
- 6.3.3 Continue to collect opportunistic wildlife occurrence data on the area.
- 6.3.4 In cooperation with the city of Punta Gorda, continue to maintain a 102-acre dove field on the area (Figure 14).

- 6.3.5 As described in the area's WCPR Strategy, annually maintain approximately 425 acres of wildlife food plots for northern bobwhite on the Webb tract (Figure 14).

### **Long-term**

- 6.3.6 Continue to conduct annual spotlight monitoring surveys on the area for white-tailed deer.
- 6.3.7 Continue to collect biological harvest data at the area's check station.
- 6.3.8 Continue to collect opportunistic wildlife occurrence data on the area.
- 6.3.9 In cooperation with the city of Punta Gorda, continue to maintain a 102-acre dove field on the area (Figure 14).
- 6.3.10 As described in the WCPR Strategy, annually maintain approximately 425 acres of wildlife food plots on the area for northern bobwhite on the Webb tract (Figure 14).

## **6.4 Exotic and Invasive Species Maintenance and Control**

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

### **Short-term**

- 6.4.1 Annually treat at least 5,000 acres of EPPC Category I and Category II invasive exotic plant species on the area, including melaleuca, torpedograss, tropical soda apple, rose myrtle, Brazilian pepper, rosary pea, cogongrass, lantana, Old World climbing fern, Japanese climbing fern, guava, Caesar weed, earleaf acacia, sheoaks, natalgrass, rattlebox, java plum, Australian pine, carrotwood, lead tree, Asian sword fern, Guinea grass, water lettuce, Britton's wild petunia, rattlebox, paragrass, and creeping oxeye.
- 6.4.2 Implement control measures that may include additional hunting as well as trapping on one nuisance animal species (wild hog).
- 6.4.3 Monitor for and control as necessary exotic animal species on the area including Burmese python, Nile monitor, tegu, Cuban tree frogs, green iguanas, knight anoles, etc.

### **Long-term**

- 6.4.4 Continue to annually treat at least 5,000 acres of EPPC Category I and Category II invasive exotic plant species on the area, including melaleuca, torpedograss, tropical soda apple, rose myrtle, Brazilian pepper, rosary pea, cogongrass, lantana, Old

World climbing fern, Japanese climbing fern, guava, Caesar weed, earleaf acacia, sheoaks, natalgrass, rattlebox, java plum, Australian pine, carrotwood, lead tree, Asian sword fern, Guinea grass, water lettuce, Britton's wild petunia, rattlebox, paragrass, and creeping oxeye.

- 6.4.5 Continue cooperating with the Integrated Pest Management (IPM) herbicide bank and Cooperative Invasive Species Management Areas (CISMA) for additional funding opportunities exotic control measures.
- 6.4.6 Continue to implement control measures that may include additional hunting as well as trapping on one nuisance animal species (wild hog).
- 6.4.7 Contract or otherwise conduct a study to determine the impacts of wild hogs on natural communities as feasible.
- 6.4.8 Continue opportunistic monitoring and control for exotic animal species occurrences on the area including Burmese python, Nile monitor, tegu, Cuban tree frogs, green iguanas, knight anoles, etc.

## **6.5 Public Access and Recreational Opportunities**

**Goal: Provide public access and recreational opportunities.**

### **Short-term**

- 6.5.1 Continue to provide hunting opportunities on the area through an archery season, general gun season, small game season, field trial area quail season, raccoon and opossum season, migratory bird seasons, and year round fishing and frogging.
- 6.5.2 Update the area's Recreation Master Plan.
- 6.5.3 Maintain public access and recreational opportunities on the area to allow for a recreational carrying capacity of 2,060 visitors per day.
- 6.5.4 Continue to provide a bird list, recreation guide, web site, four kiosks, and 13 interpretive signs for interpretation of, and education about, the area.
- 6.5.5 Maintain 12.6 miles of existing trails (Figure 14).
- 6.5.6 Monitor the area's trails annually for visitor impacts.
- 6.5.7 Continue to provide paddling opportunities on appropriate water bodies within the area.
- 6.5.8 Continue to provide fishing opportunities on designated water bodies within the area, as appropriate.

## Long-term

- 6.5.9 Develop additional public access and recreational opportunities on the area to allow for a carrying capacity of 2,490 visitors per day.
- 6.5.10 Continue to provide hunting opportunities on the area through an archery season, general gun season, small game season, field trial area quail season, raccoon and opossum season, migratory bird seasons, and year round fishing and frogging.
- 6.5.11 Implement the area's updated Recreation Master Plan.
- 6.5.12 Update the area's Recreation Guide brochure.
- 6.5.13 Designate up to 20 miles of new trails on the area.
- 6.5.14 Continue to monitor the area's trails annually for visitor impacts (Figure 14).
- 6.5.15 Continue to provide a bird list, recreation guide, web site, four kiosks, and 13 interpretive signs for interpretation of, and education about, the area.
- 6.5.16 Develop one new interpretive and educational kiosk in the Yucca Pens Unit, and one new kiosk on the eastern side of the Webb tract in proximity to SR-31.
- 6.5.17 Reassess the area's recreational opportunities every three years.
- 6.5.18 Continue to provide paddling opportunities on appropriate water bodies within the area.
- 6.5.19 Continue to provide fishing opportunities on designated water bodies within the area, as appropriate.
- 6.5.20 Cooperate with other agencies, Charlotte and Lee counties, stakeholders, and regional landowners to investigate regional recreational opportunities including linking hiking, and multi-use trail systems between adjacent public areas.
- 6.5.21 To assist with promotion and marketing of BWWMA, continue to cooperate with Charlotte and Lee Counties' Tourism Development Councils, Chamber of Commerce, and other related tourism organizations; link FWC recreation web site resources to appropriate local and regional tourism web sites.
- 6.5.22 In cooperation with the FDOT, and Charlotte and Lee counties, conduct a feasibility study for the development of recreational access and linkages to the BRP.
- 6.5.23 In cooperation with FDOT, and Charlotte and Lee counties, conduct a feasibility study for the development of additional recreational access and linkages to the Yucca Pens Unit.

- 6.5.24 Continue to identify partnerships that could provide for environmental educational programs and outreach.
- 6.5.25 Conduct a recreation user study to determine recreational use levels and patterns on the area.

## **6.6 Hydrological Preservation and Restoration**

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

### **Short-term**

- 6.6.1 To maintain and enhance natural hydrological functions on the area, install and maintain low-water crossings and culverts as appropriate.
- 6.6.2 Continue to maintain 15 water control structures and 18 staff gauges on the area (Figure 14).
- 6.6.3 Continue to cooperate with the SWFWMD to monitor five groundwater monitoring wells on the area (Figure 14).
- 6.6.4 Continue to cooperate with the SWFWMD, the SFWMD, and the DEP to monitor surface water quality and quantity on the area.
- 6.6.5 Install and maintain low-water crossings, culverts, and other hydrological improvements, as appropriate, to maintain and enhance natural hydrological functions.
- 6.6.6 Continue to cooperate with the CHFI to restore hydrological function associated with mitigating the impacts of the I-75 widening project.

### **Long-term**

- 6.6.7 Conduct or obtain a comprehensive hydrological assessment and restoration plan for the area to identify potential hydrology restoration needs.
- 6.6.8 To maintain and enhance natural hydrological functions on the area, install and maintain low-water crossings and culverts as appropriate.
- 6.6.9 Continue to maintain 15 water control structures and 18 staff gauges on the area (Figure 14).
- 6.6.10 Continue to cooperate with the SWFWMD to monitor five groundwater monitoring wells on the area (Figure 14).

- 6.6.11 Continue to cooperate with the SWFWMD, the SFWMD, and the DEP to monitor surface water quality and quantity on the area.
- 6.6.12 Continue to implement the area's hydrological restoration plan as feasible.
- 6.6.13 Continue to cooperate with the CHFI to restore hydrological function associated with mitigating the impacts of the I-75 widening project.

## **6.7 Forest Resource Management**

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

### **Short-term**

- 6.7.1 Cooperate with the FFS or a professional forestry consultant to complete a Timber Assessment by 2015.
- 6.7.2 Consult with the FFS or a professional forestry consultant regarding development of forest management activities as appropriate.

### **Long-term**

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

## **6.8 Cultural and Historical Resources**

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

### **Short-term**

- 6.8.1 Ensure all known sites are recorded in the DHR Master Site file.
- 6.8.2 Continue to monitor, protect, and preserve as necessary six resource groups and one archaeological site on the area.

### **Long-term**

- 6.8.3 Cooperate with the DHR or trained FWC staff in designing site plans for development of infrastructure on the area.
- 6.8.4 Cooperate with the DHR to manage and maintain the area's known existing cultural resources.
- 6.8.5 Continue to monitor, protect, and preserve as necessary six resource groups and one

archaeological site on the area.

6.8.6 Coordinate with the DHR for cultural resource management guideline staff training.

## **6.9 Capital Facilities and Infrastructure**

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

### **Short-term**

- 6.9.1 Monitor the area's trails and infrastructure biannually for visitor impacts.
- 6.9.2 Continue to maintain 39 facilities on the area (see Section 5.10).
- 6.9.3 Maintain 166 miles of roads on the area.
- 6.9.4 As necessary, maintain 12.6 miles of trails existing on the area (Figure 14).
- 6.9.5 Continue to provide oversight and cooperatively manage facilities associated with the City of Punta Gorda for the operation of a deep-water injection well water treatment facility on the area.
- 6.9.6 Continue to maintain six facilities at the area's Field Trail grounds (Figure 14).

### **Long-term**

- 6.9.7 Continue to monitor the area's trails and infrastructure biannually for visitor impacts.
- 6.9.8 Continue to maintain 39 facilities on the area (see Section 5.10).
- 6.9.9 Continue to maintain 166 miles of roads on the area.
- 6.9.10 As necessary, continue to maintain 12.6 miles of trails existing on the area and up to 20 miles of newly designated trails (Figure 14).
- 6.9.11 Continue to provide oversight and cooperatively manage facilities associated with the City of Punta Gorda for the operation of a deep-water injection well water treatment facility on the area.
- 6.9.12 Continue to maintain six facilities at the area's Field Trail grounds (Figure 14).
- 6.9.13 Construct two pole barns, expand the office/shop facility, install two kiosks (one on the eastern end of the Webb tract and one on the Yucca Pens Unit), coordinate the installation of two wildlife crossings, evaluate the development of one recreational

access facility (on the eastern end of the Webb tract on SR-31), develop two recreational parking areas, and designate up to 20 miles of new trails on the area.

6.9.14 Expand and improve the area's shooting range and associated facilities as needed to meet demand by 2024 (Figure 14).

## **6.10 Land Conservation and Stewardship Partnerships**

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

### **Short-term**

6.10.1 Identify potential important wildlife habitat, landscape-scale linkages, wildlife corridors, and operational/resource management needs.

6.10.2 Identify and develop conservation stewardship partnerships.

6.10.3 Identify and pursue conservation acquisition needs.

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

6.10.5 Develop a CAS for the area.

6.10.6 Contact and inform adjoining landowners about the FWC LAP to pursue non-acquisition conservation stewardship partnerships.

6.10.7 Determine which parcels, if any, should be added to the FWC acquisition list.

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

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

6.10.10 Identify potential conservation easements donations.

6.10.11 Evaluate and determine if any portions of BWWMA, if any, are no longer needed for conservation purposes.

### **Long-term**

6.10.12 To minimize fragmentation of the area, continue to identify strategic parcels to revise the completed OCPB for BWWMA as appropriate and necessary.

- 6.10.13 Continue to identify and develop conservation stewardship partnerships.
- 6.10.14 Continue to identify and pursue conservation acquisition needs.
- 6.10.15 Continue to maintain a GIS shapefile and other necessary data to facilitate nominations from the FWC OCPB and for the FWC LAP and Land Acquisition Program.
- 6.10.16 Continue to propose nominations of selected properties, if any are recommended, as additions to the FWC acquisition list.
- 6.10.17 Continue to pursue the acquisition of parcels on the FWC acquisition list as acquisition work plan priorities and funding allow.
- 6.10.18 As feasible, continue to periodically contact and meet with adjacent landowners for willingness to participate in the CAS, and coordinate landowner assistance/conservation stewardship partnership workshops as deemed appropriate.
- 6.10.19 Coordinate and conduct landowner assistance/conservation stewardship partnership workshop(s) as appropriate.
- 6.10.20 Continue to identify potential conservation easements donations.
- 6.10.21 Continue to evaluate and determine if any portions of BWWMA are no longer needed for conservation purposes that could be recommended for a potential surplus designation.

## **6.11 Research Opportunities**

**Goal: Explore and pursue cooperative research opportunities.**

### **Short-term**

- 6.11.1 Continue to contract with the TTRS to research northern bobwhite ecology, population dynamics, and response to management.
- 6.11.2 Continue to cooperate with research studies/efforts for the Florida bonneted bat.
- 6.11.3 Continue to cooperate with researchers, universities, and others as appropriate.

### **Long-term**

- 6.11.4 Explore and pursue cooperative research needs and opportunities through universities, and the FWC Fish and Wildlife Research Institute (FWRI) and others.
- 6.11.5 Continue to cooperate with research studies/efforts for the Florida bonneted bat.

- 6.11.6 Continue to cooperate with researchers, universities, and others as appropriate.
- 6.11.7 Continue to assess the need for and pursue research and environmental education partnership opportunities as appropriate.

## **6.12 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 BWWMA.**

### **Long-term**

- 6.12.1 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 BWWMA.
- 6.12.2 Incorporate appropriate climate change monitoring protocols and management strategies into the OBVM program for BWWMA.
- 6.12.3 Incorporate appropriate climate change adaptation strategies into the WCPR for BWWMA.
- 6.12.4 As appropriate, update the BWWMA Prescribed Fire Plan to incorporate new scientific information regarding projected climate change, such as increased frequency of drought, on the fire regime of BWWMA's fire-adapted habitats.
- 6.12.5 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 FWC's public education curriculum.

## **6.13 Cooperative Management and Special Uses**

**Goal: Provide access and use of BWWMA to current cooperative managers.**

### **Short-term**

- 6.13.1 Continue to provide oversight and cooperatively manage the land and associated facilities of the Boy Scouts of America's Camp Miles (Figure 14).

- 6.13.2 Continue to cooperate with the City of Punta Gorda to operate a deep-water injection well water treatment facility and a 102-acre dove field on the area (Figure 14).
- 6.13.3 Continue to manage and provide special use access to the BWWMA Field Trial grounds (Figure 14).
- 6.13.4 Continue to cooperate with the FFS, the DEP, the SFWMD and the SWFWMD for resource and water management activities at BWWMA.
- 6.13.5 Continue to provide oversight and cooperatively manage approximately 1/4 acre of BWWMA for a communications tower with American Tower, L.P.
- 6.13.6 Continue to provide oversight for grazing and administer cattle grazing leases at BWWMA.
- 6.13.7 Continue to provide oversight for apiary placement and administer apiary leases at BWWMA.
- 6.13.8 Continue to participate in the CHFI for water monitoring and hydrological restoration efforts at BWWMA.

**Long-term**

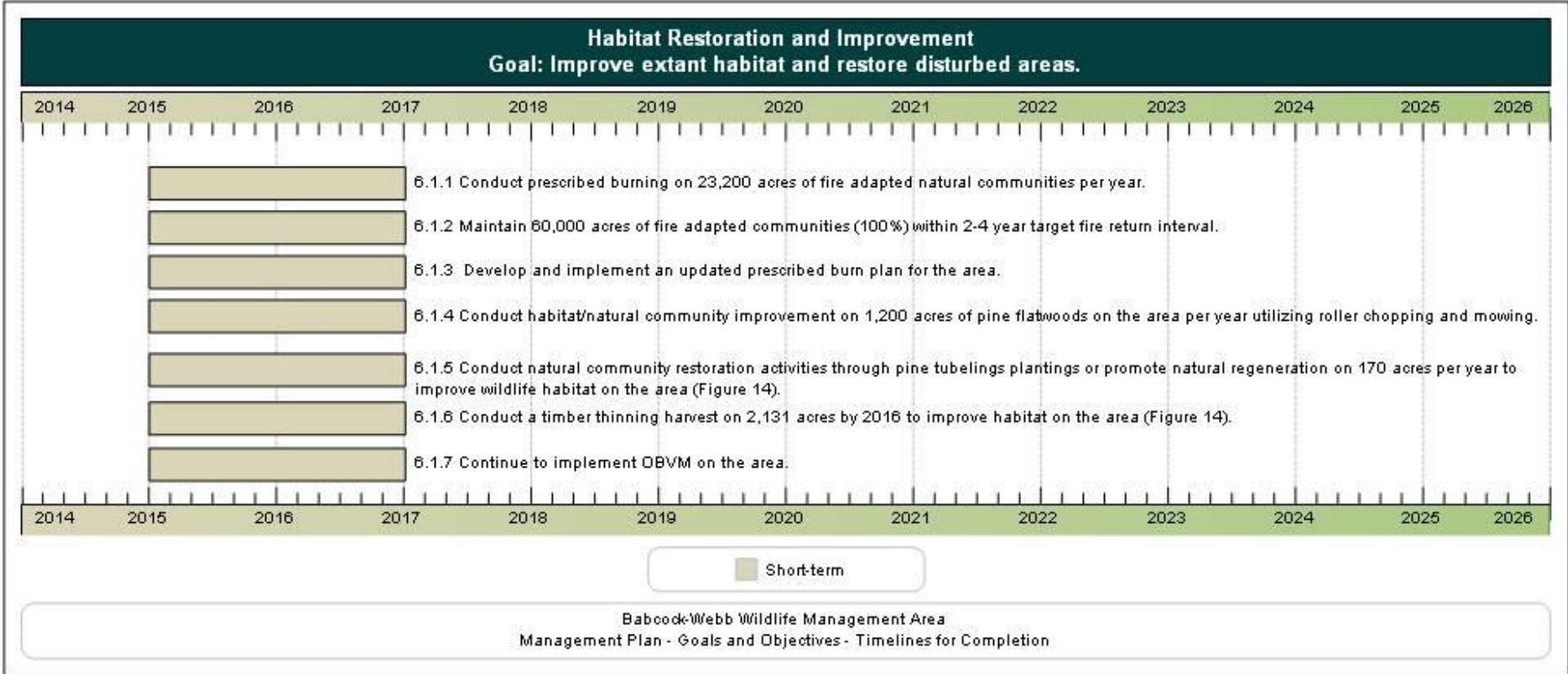
- 6.13.9 Continue to provide oversight and cooperatively manage the land and associated facilities of the Boy Scouts of America's Camp Miles (Figure 14).
- 6.13.10 Continue to cooperate with the City of Punta Gorda to operate a deep-water injection well water treatment facility and a 102-acre dove field on the area (Figure 14).
- 6.13.11 Continue to manage and provide special use access to the BWWMA Field Trial grounds (Figure 14).
- 6.13.12 Continue to cooperate with the FFS, the DEP, the SFWMD and the SWFWMD for resource and water management activities at BWWMA.
- 6.13.13 Continue to provide oversight and cooperatively manage approximately 1/4 acre of BWWMA for a communications tower with American Tower, L.P.
- 6.13.14 Continue to provide oversight for grazing and administer cattle grazing leases at BWWMA.
- 6.13.15 Continue to provide oversight for apiary placement and administer apiary leases at BWWMA.

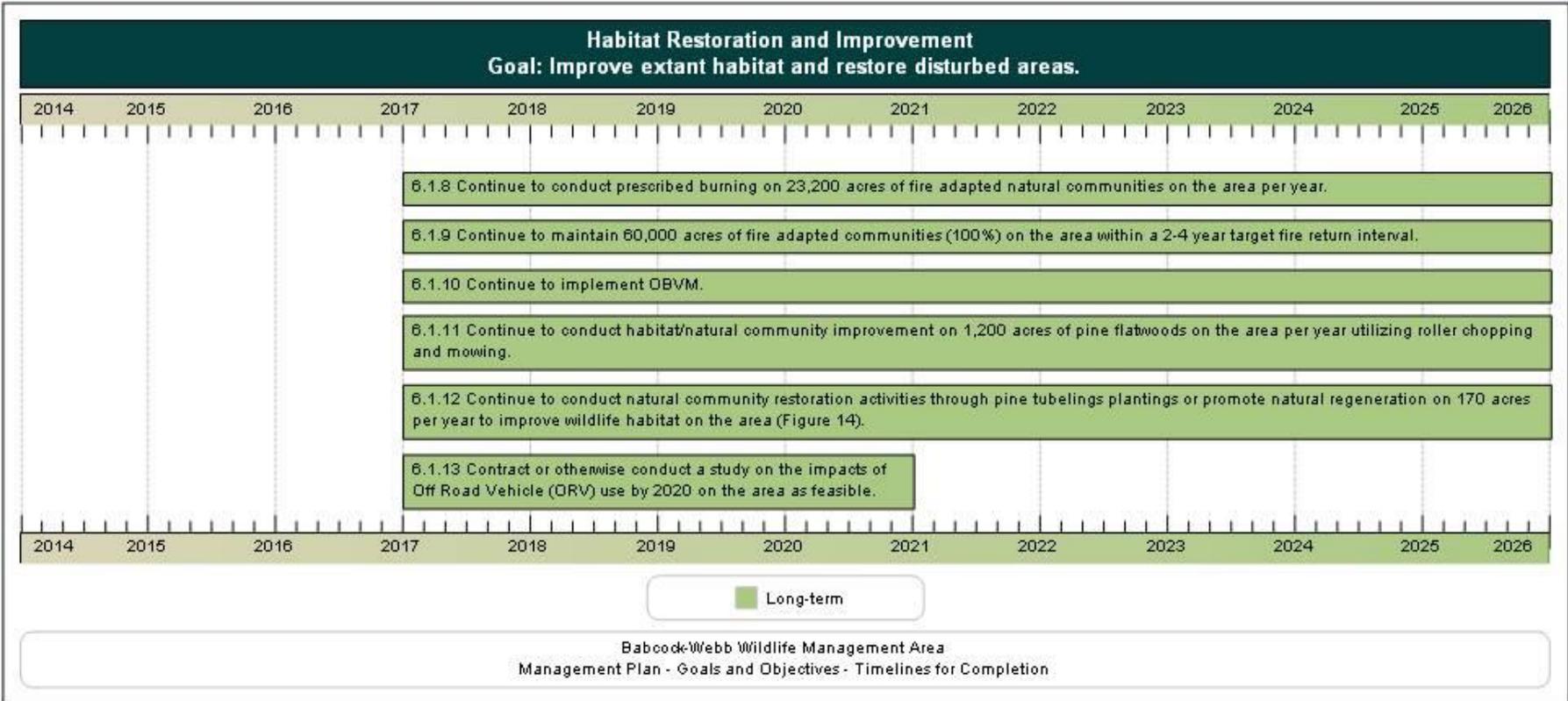
6.13.16 Continue to participate in the CHFI for water monitoring and hydrological restoration efforts at BWWMA.

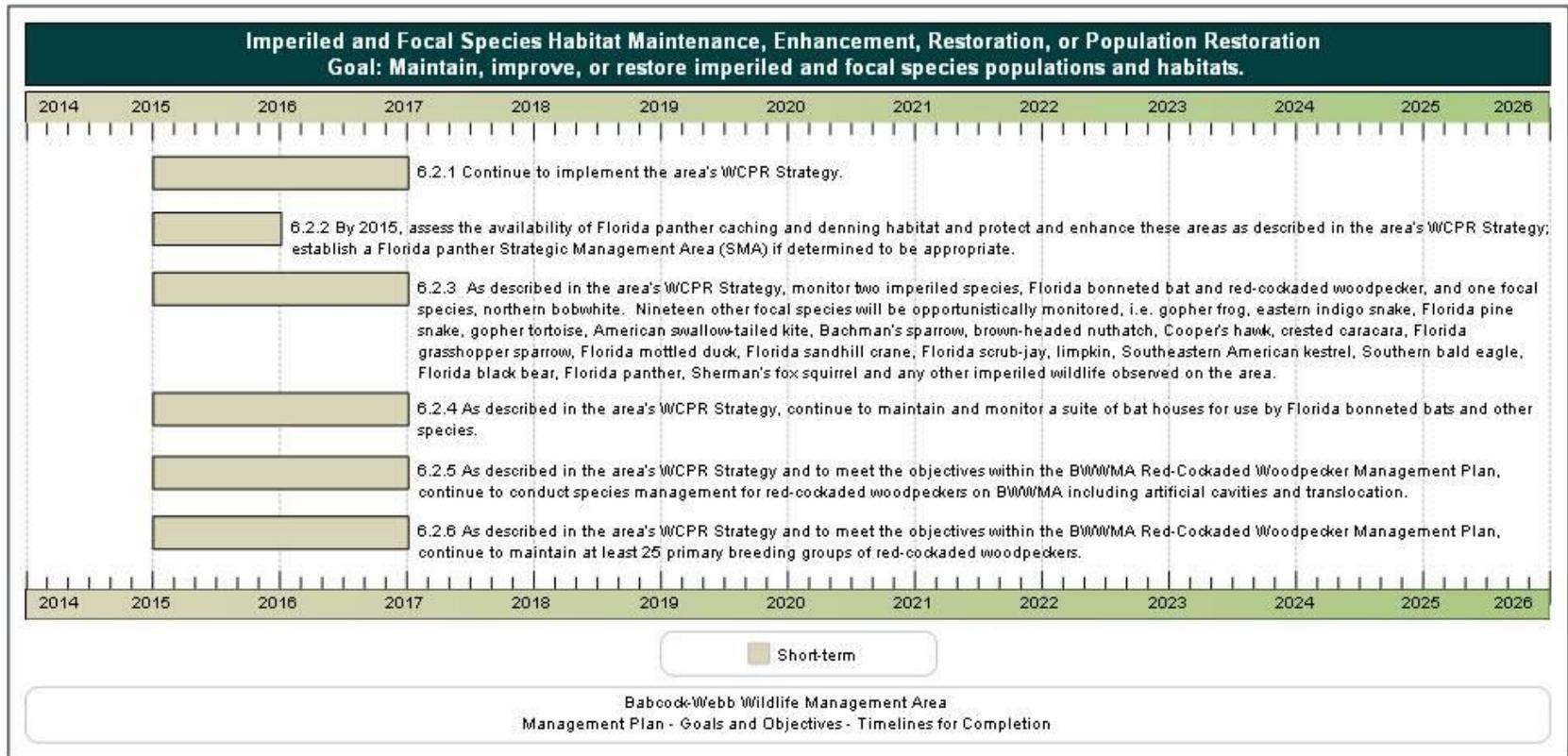
## **7 Schedule: Timelines for Completion of Resource Management Goals and Objectives**

The following section presents the short- and long-term goals and objectives for the management of BWWMA 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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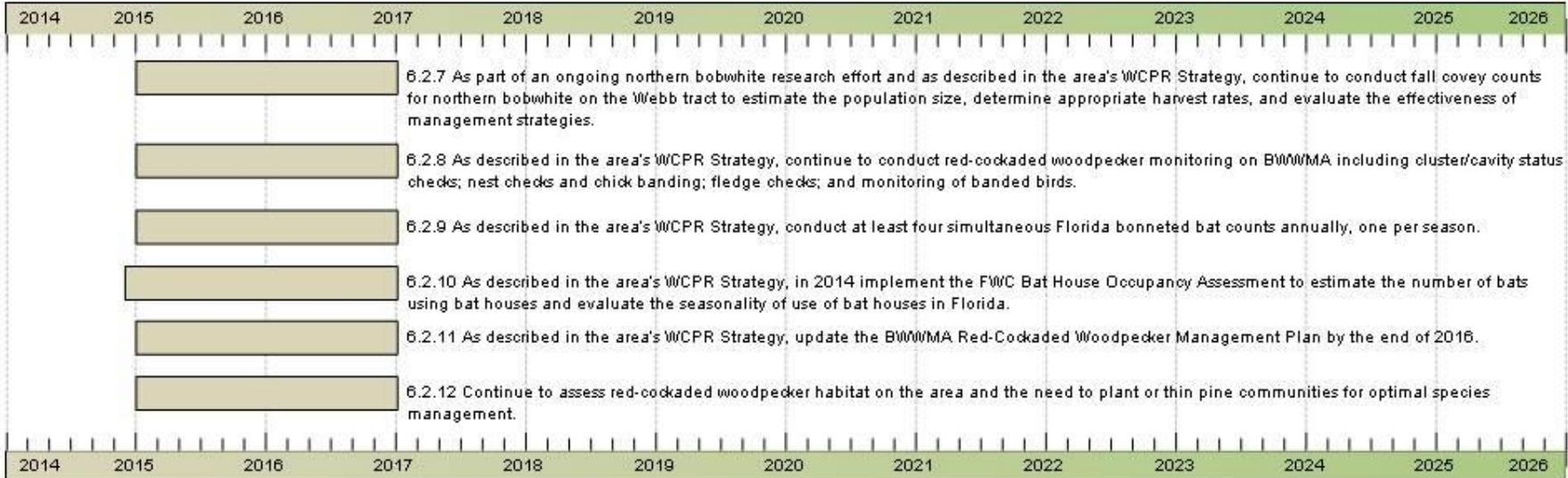






**Imperiled and Focal Species Habitat Maintenance, Enhancement, Restoration, or Population Restoration**

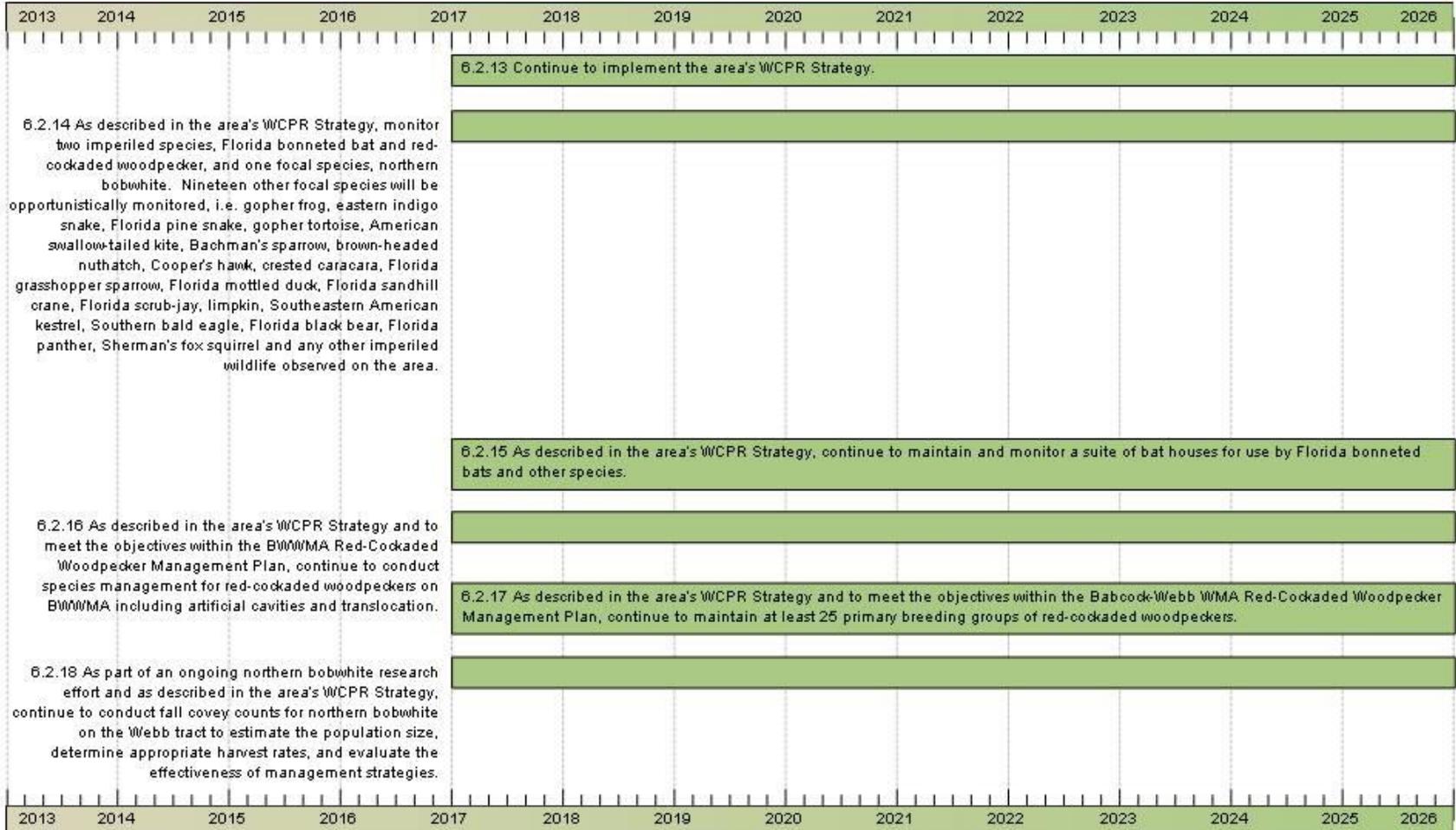
**Goal: Maintain, improve, or restore imperiled and focal species populations and habitats.**



■ Short-term

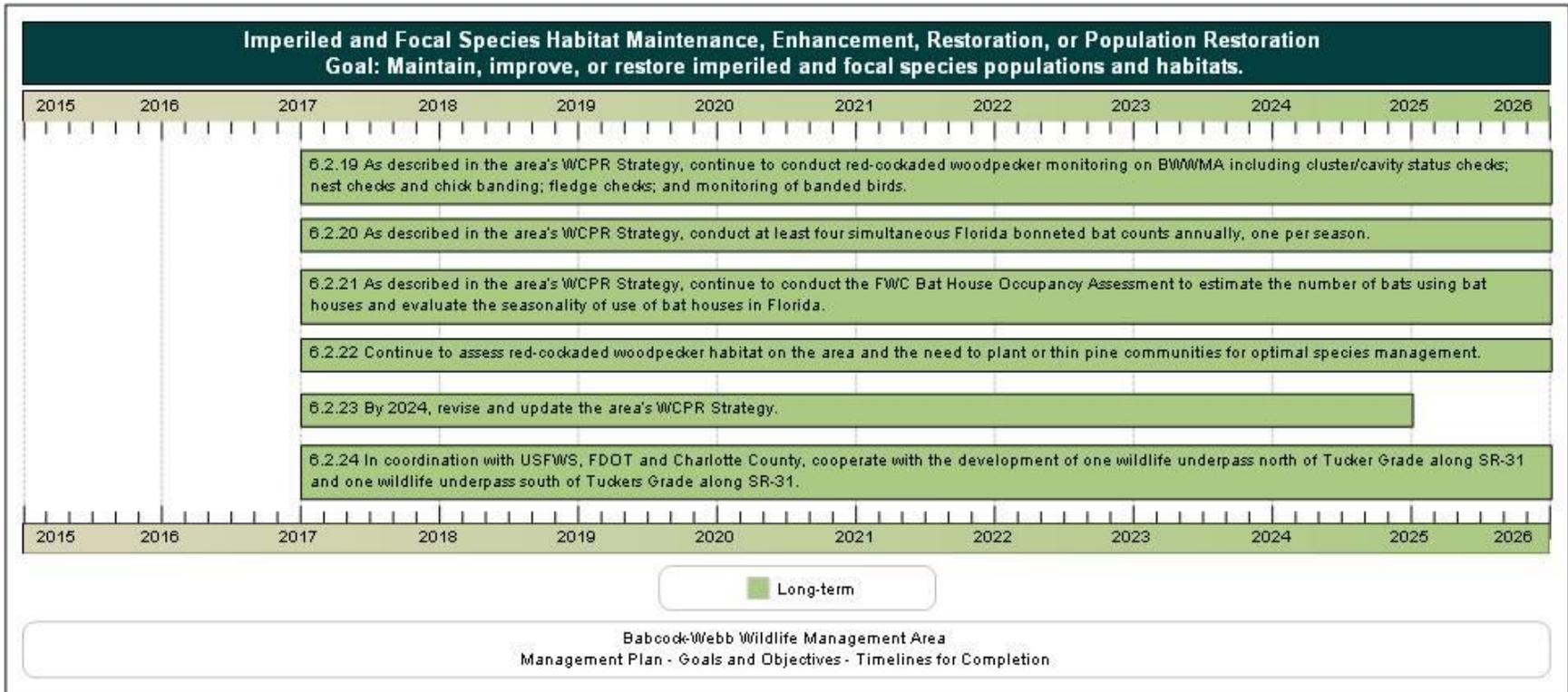
Babcock-Webb Wildlife Management Area  
Management Plan - Goals and Objectives - Timelines for Completion

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

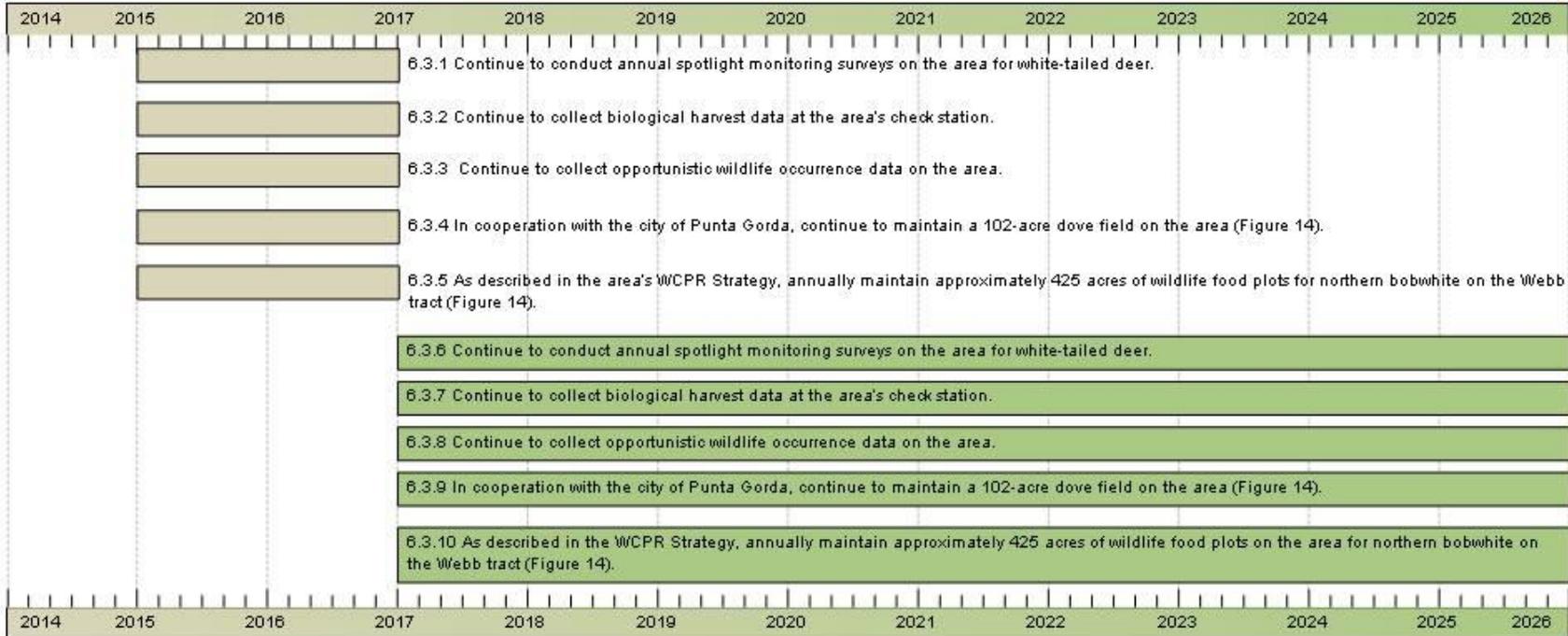


■ Long-term

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

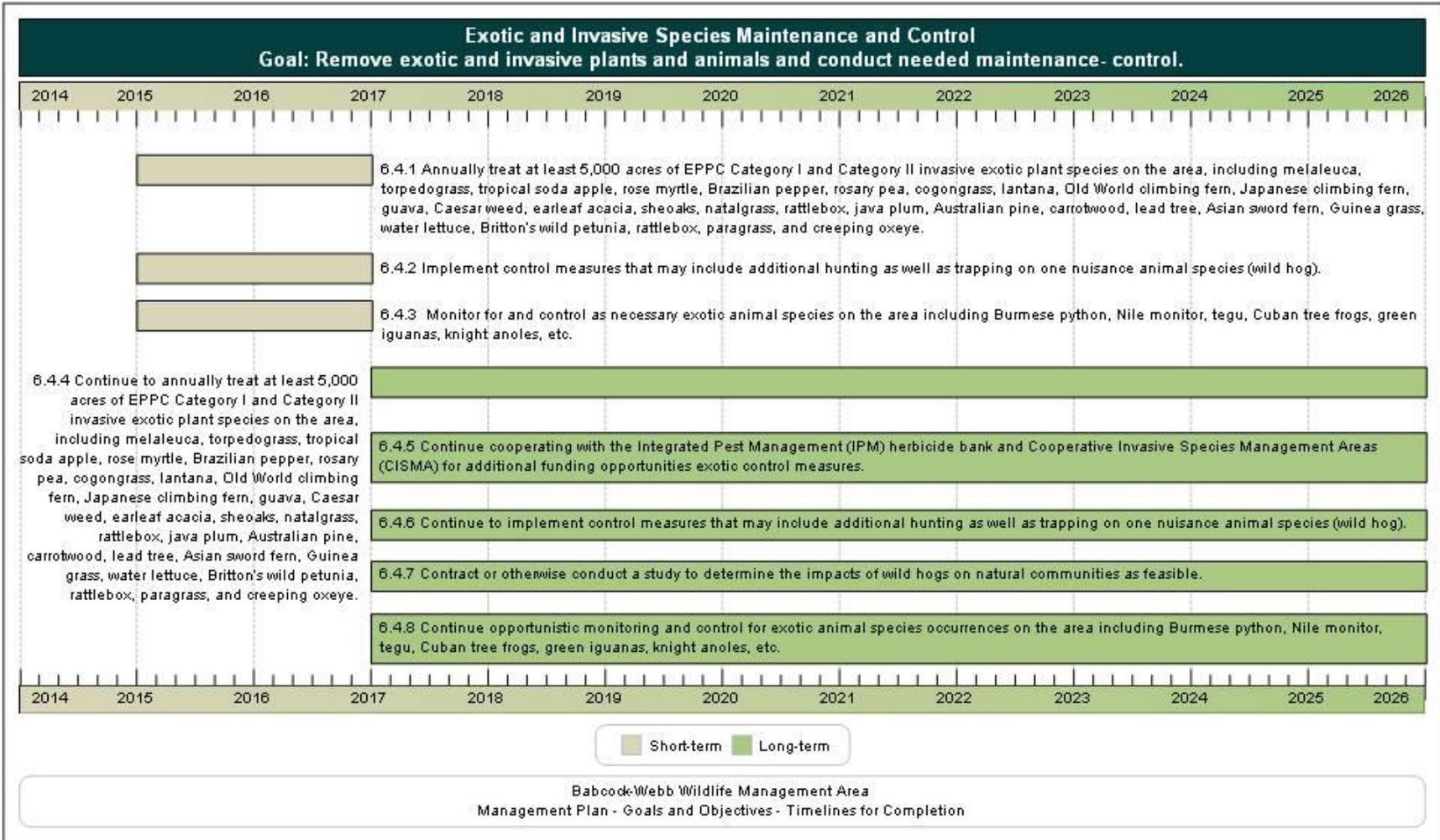


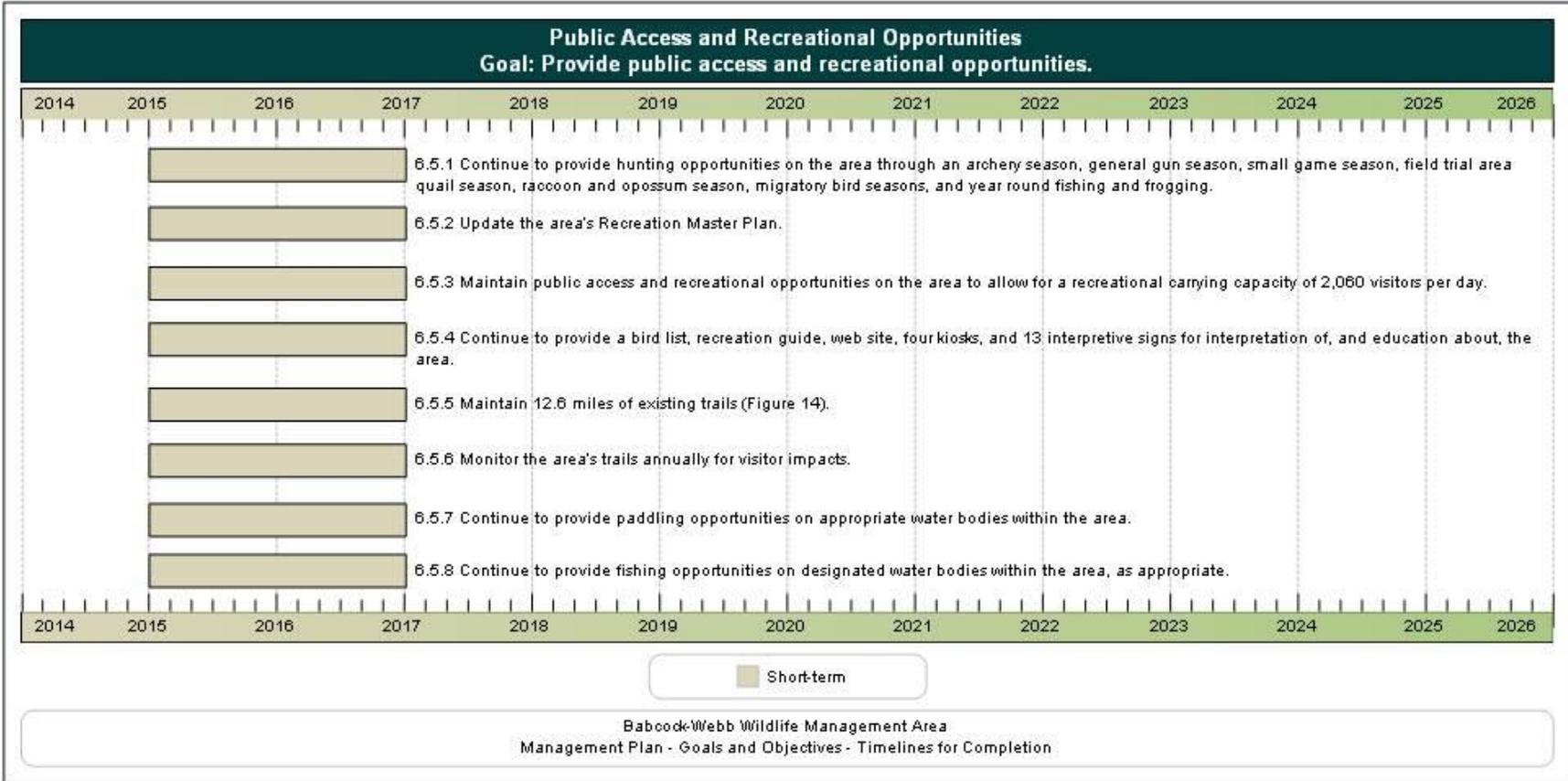
**Other Wildlife (Game and Nongame) Habitat Maintenance, Enhancement, Restoration, or Population Restoration**  
**Goal: Maintain, improve, or restore game and non-game populations and habitats.**

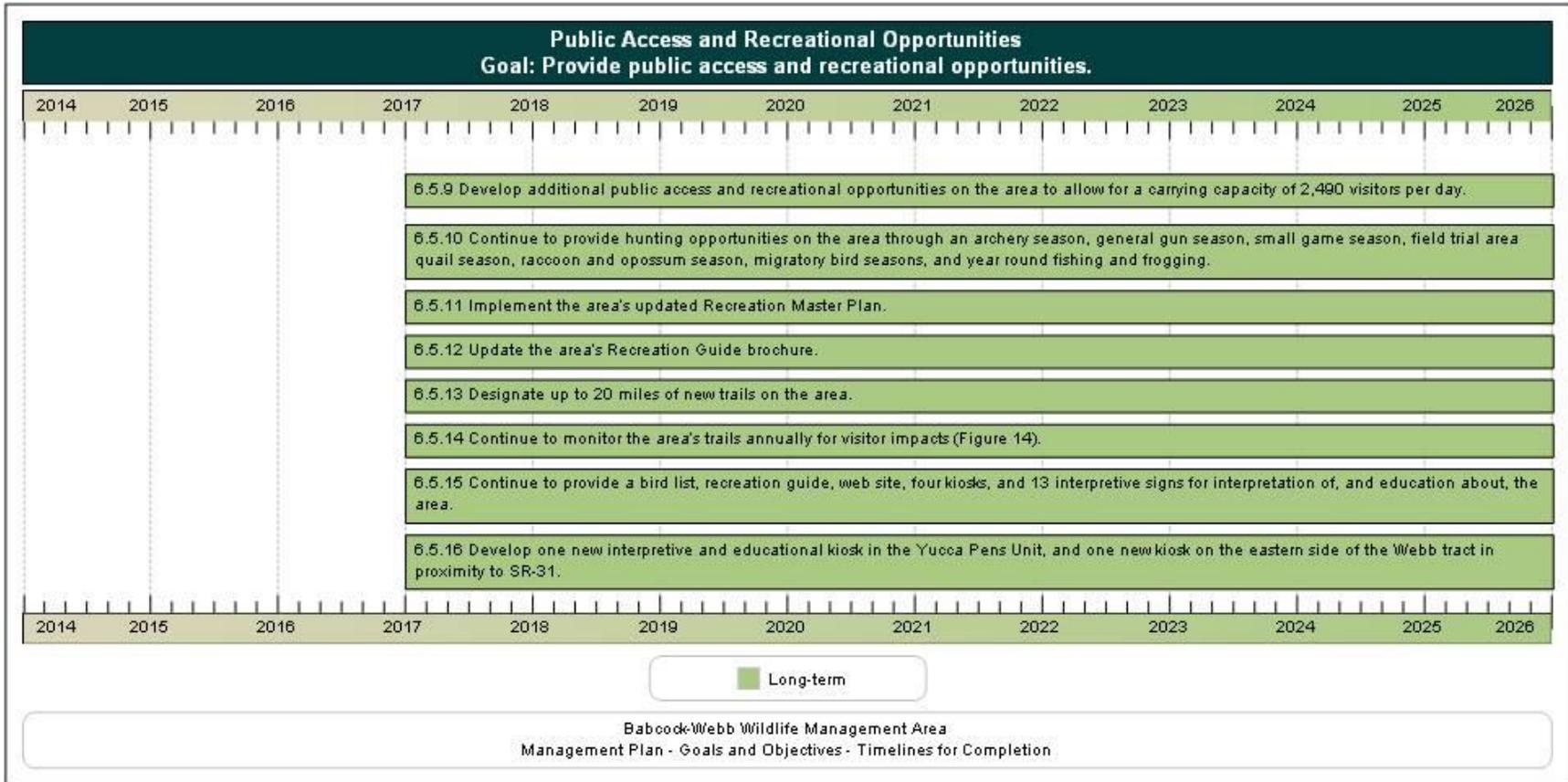


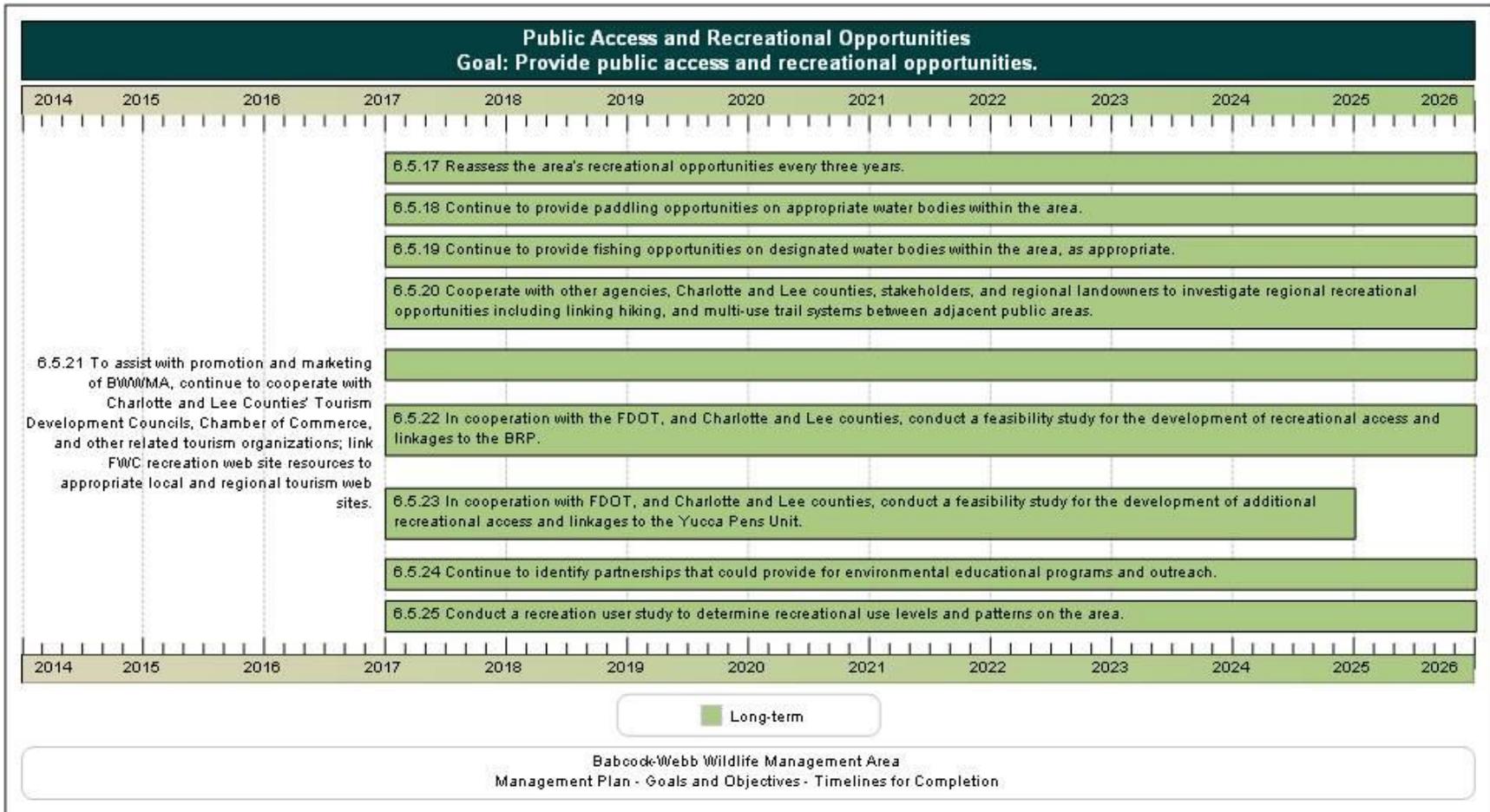
Short-term Long-term

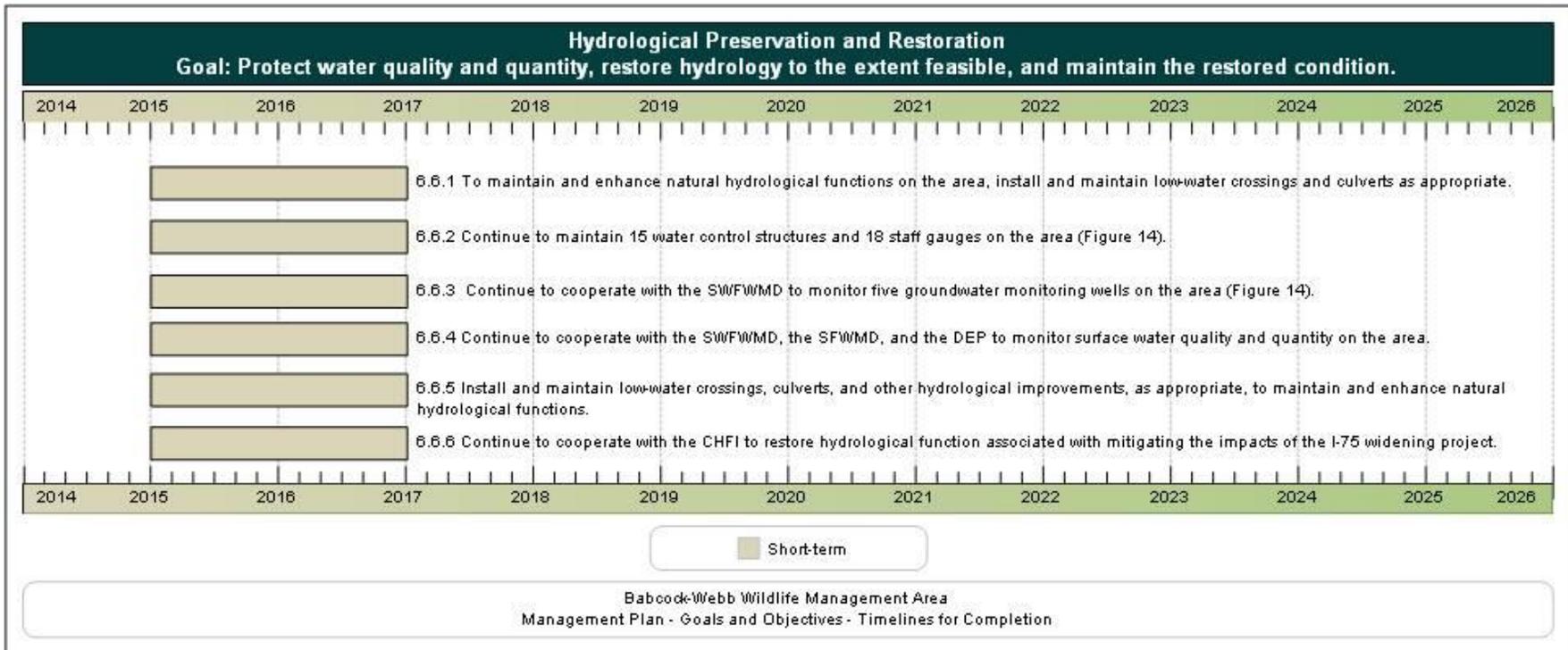
Babcock-Webb Wildlife Management Area  
 Management Plan - Goals and Objectives - Timelines for Completion

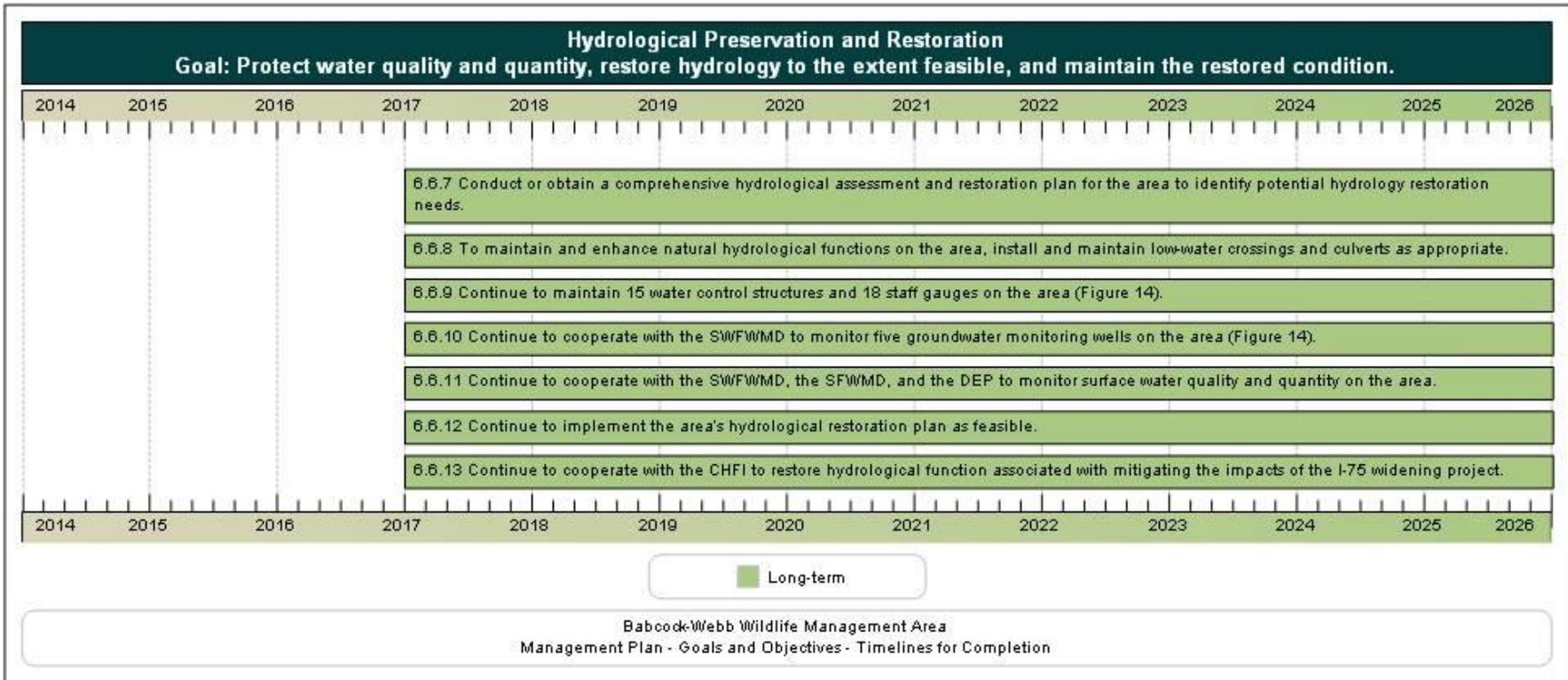


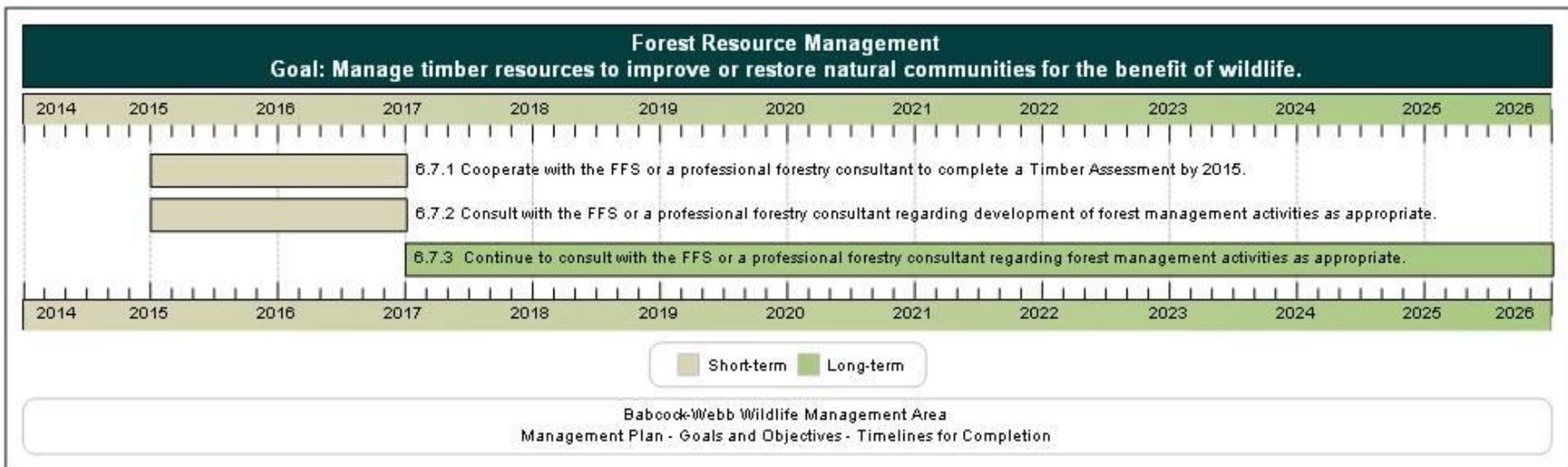


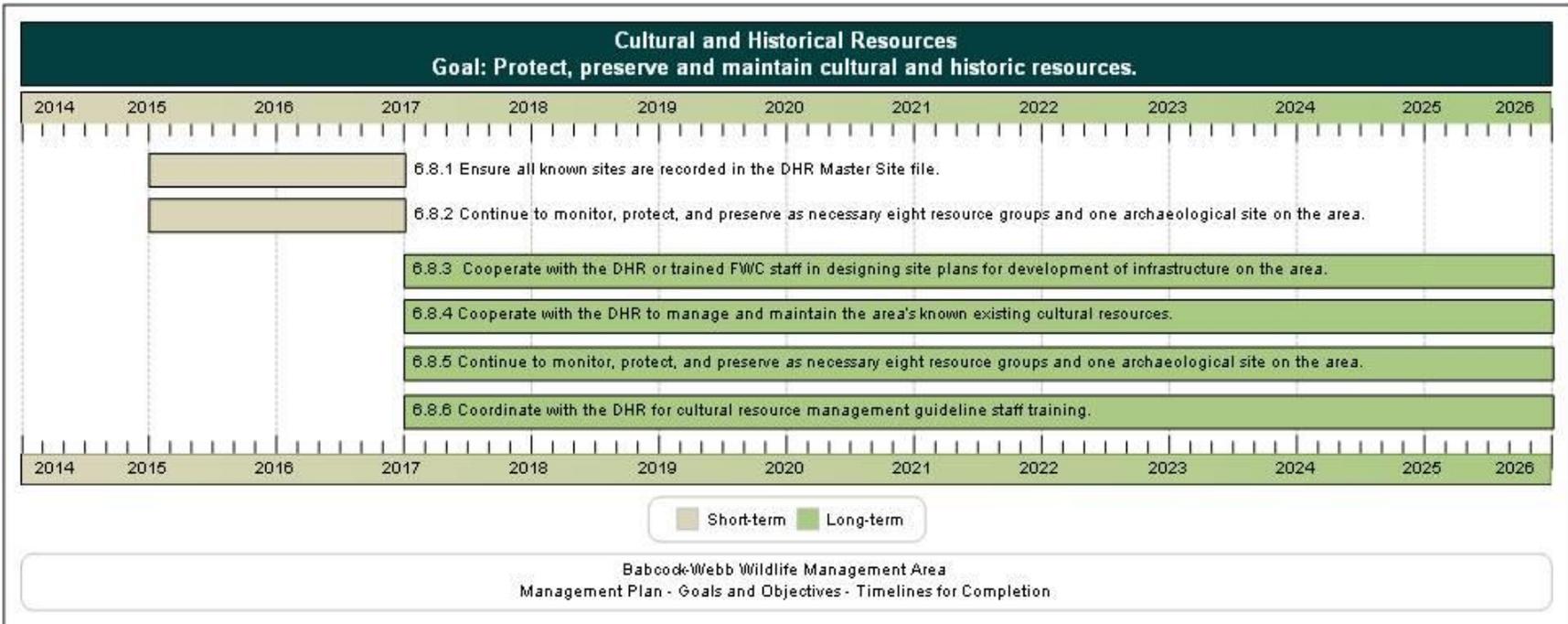


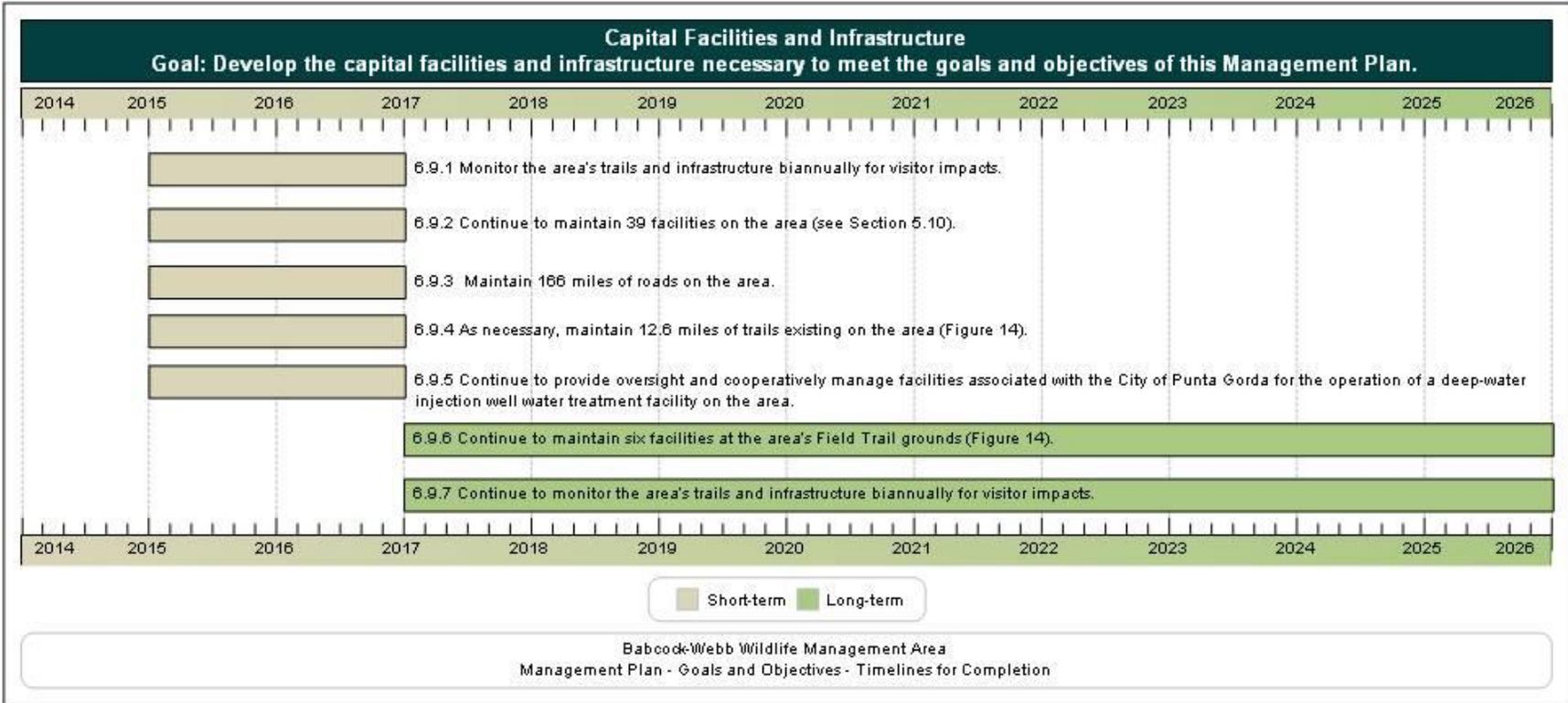


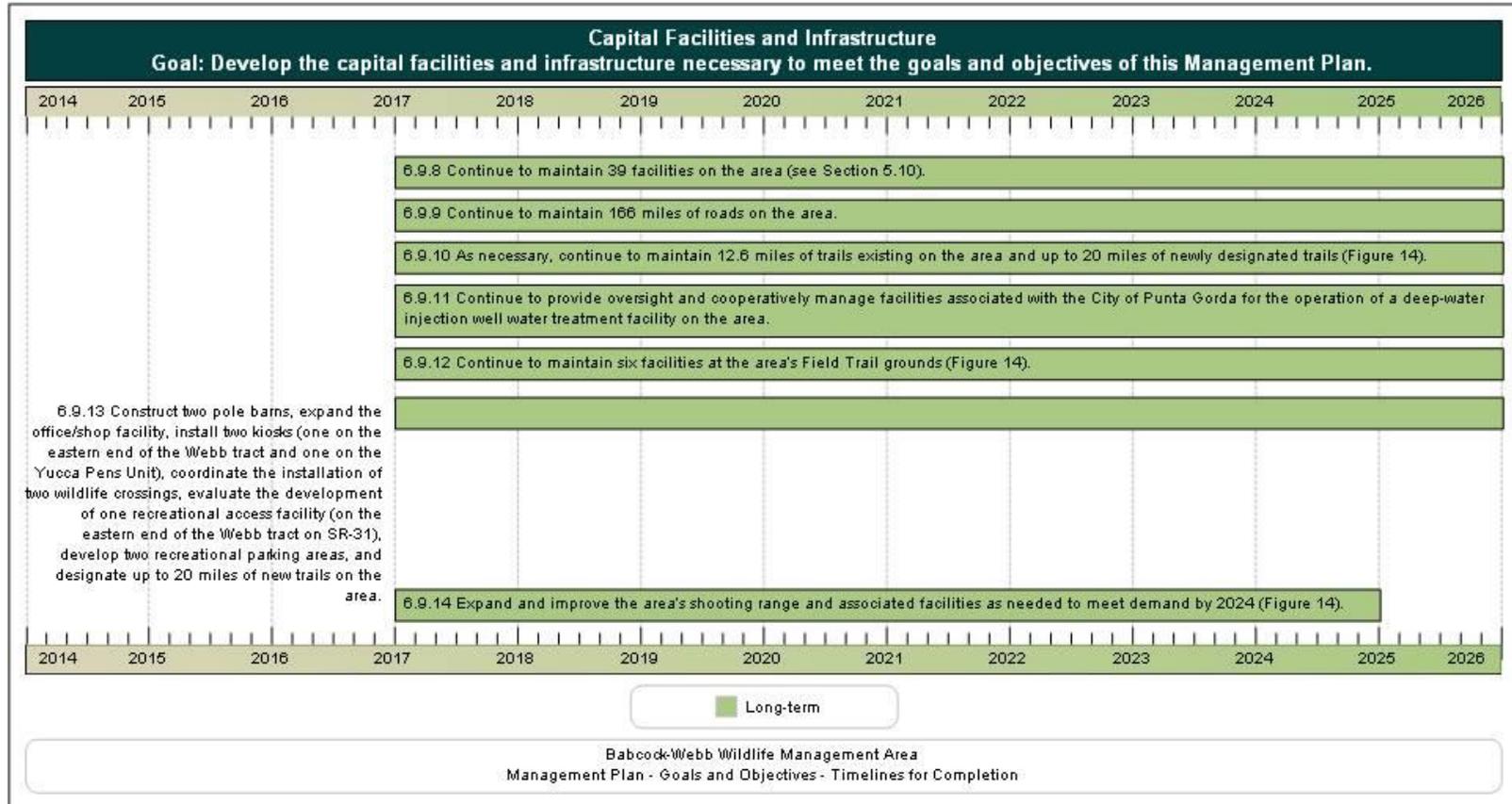


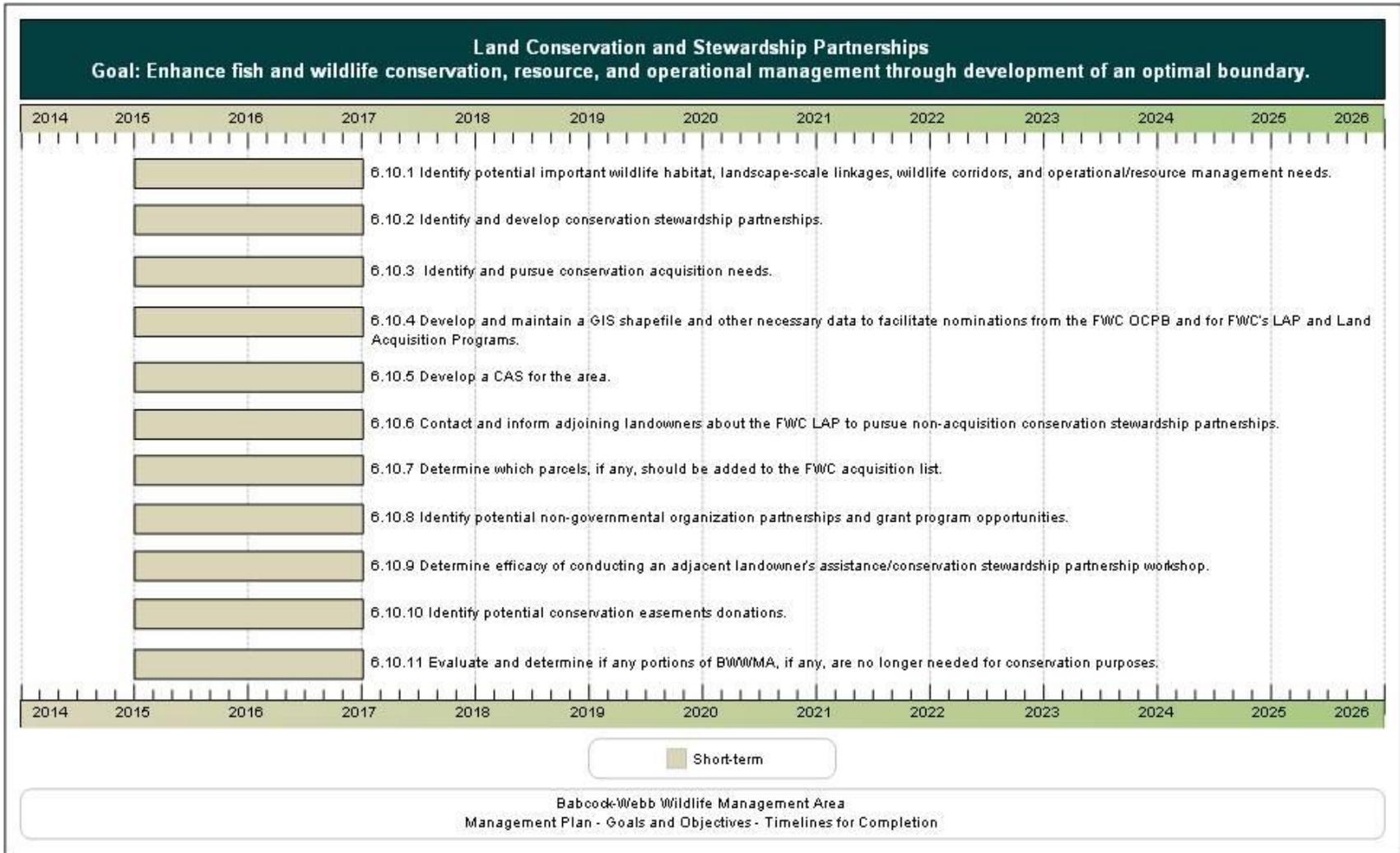


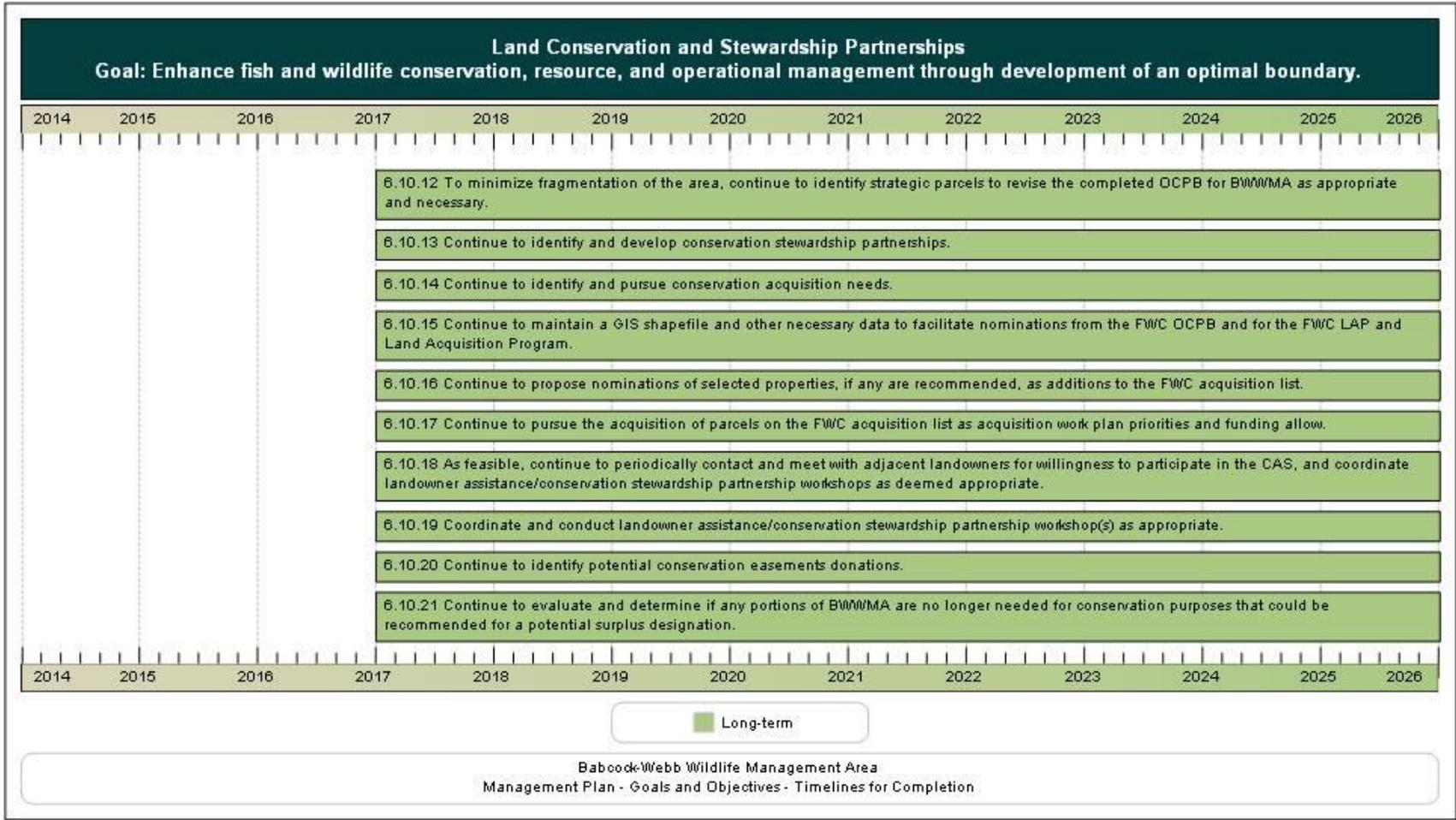


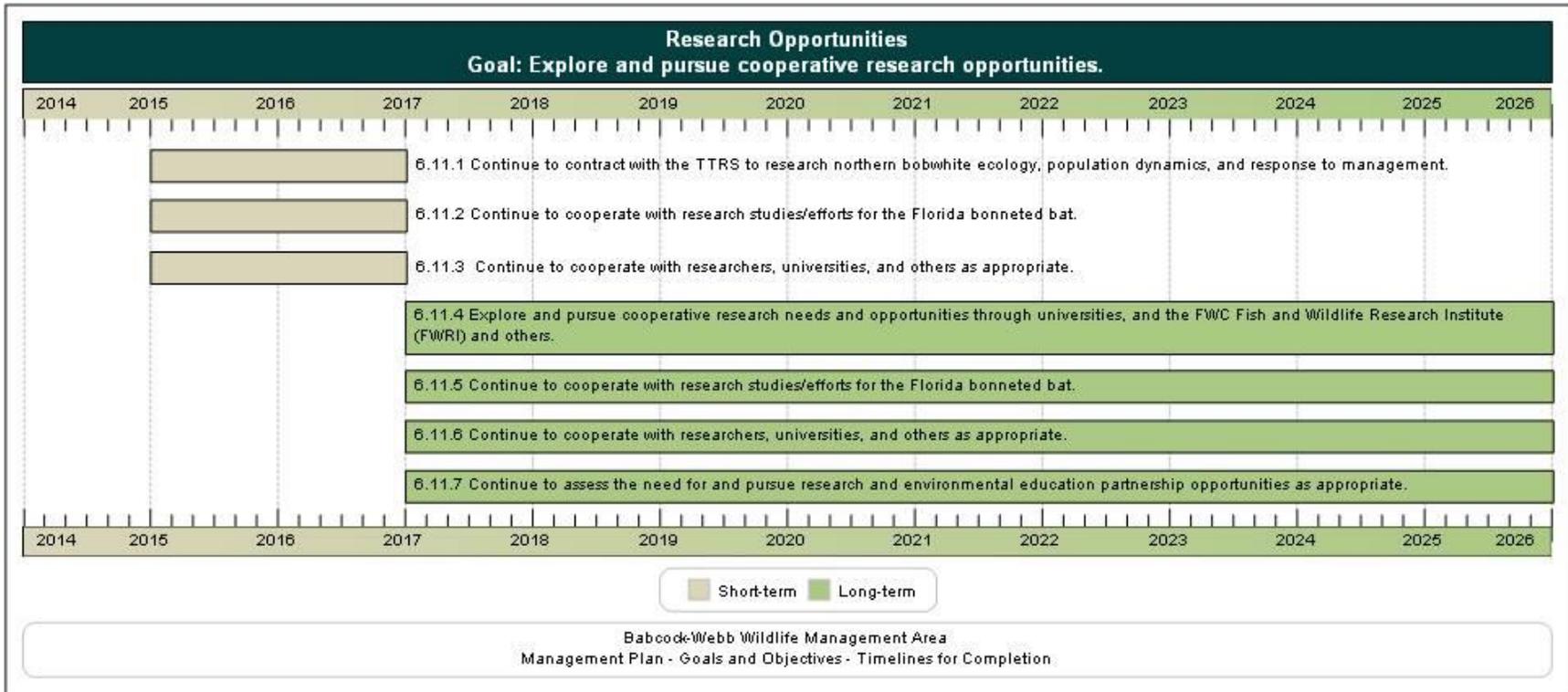


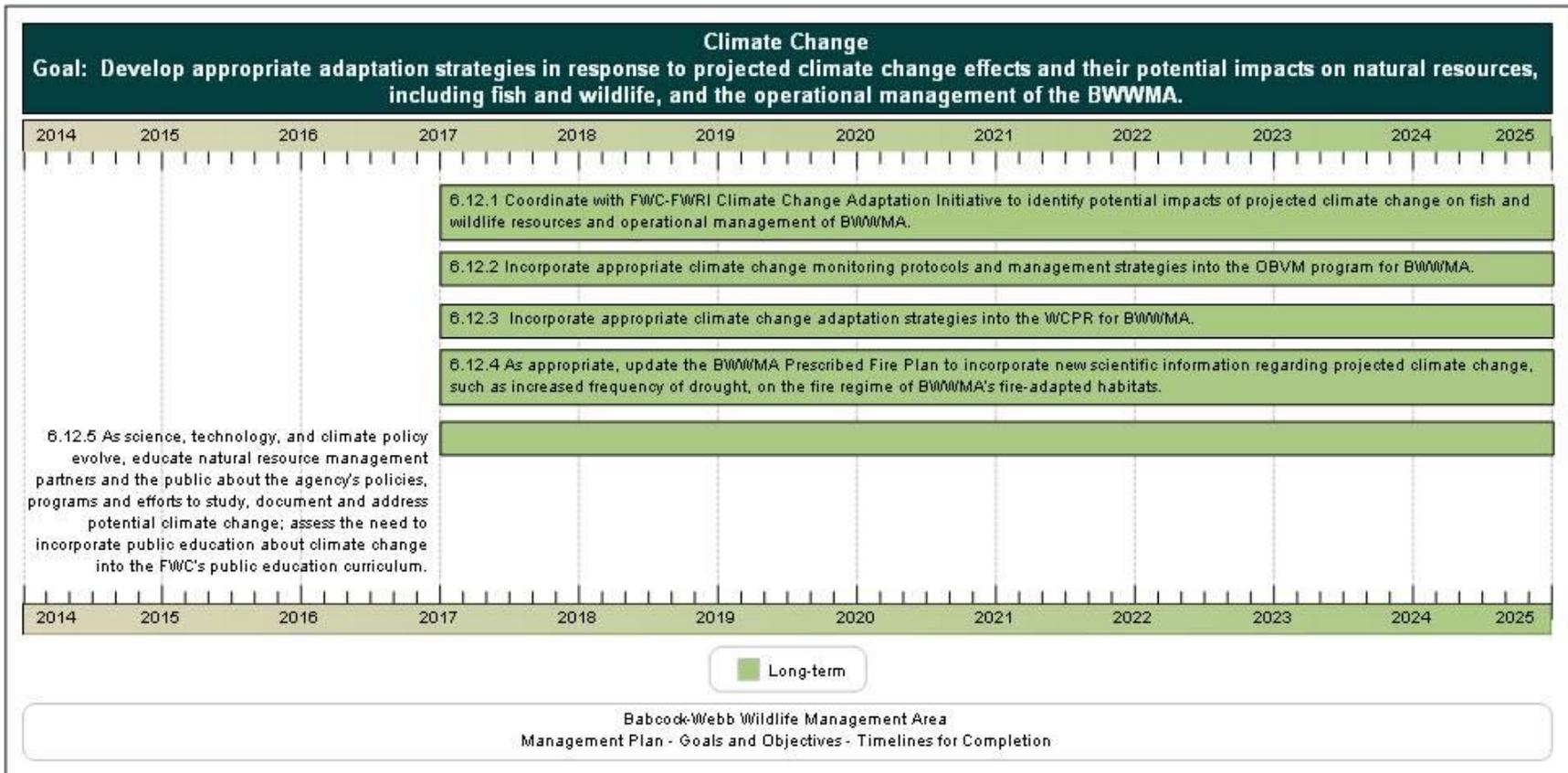


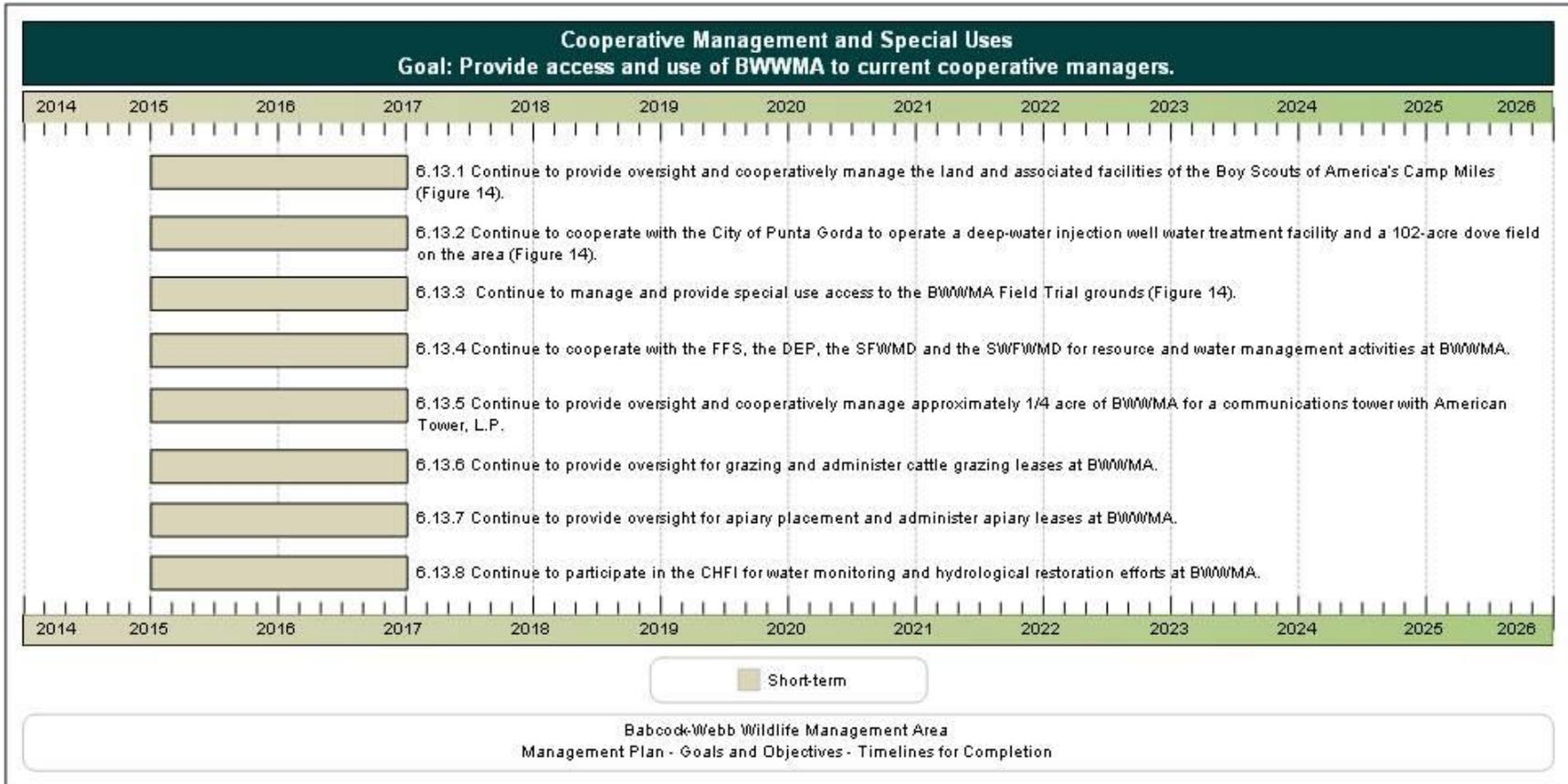


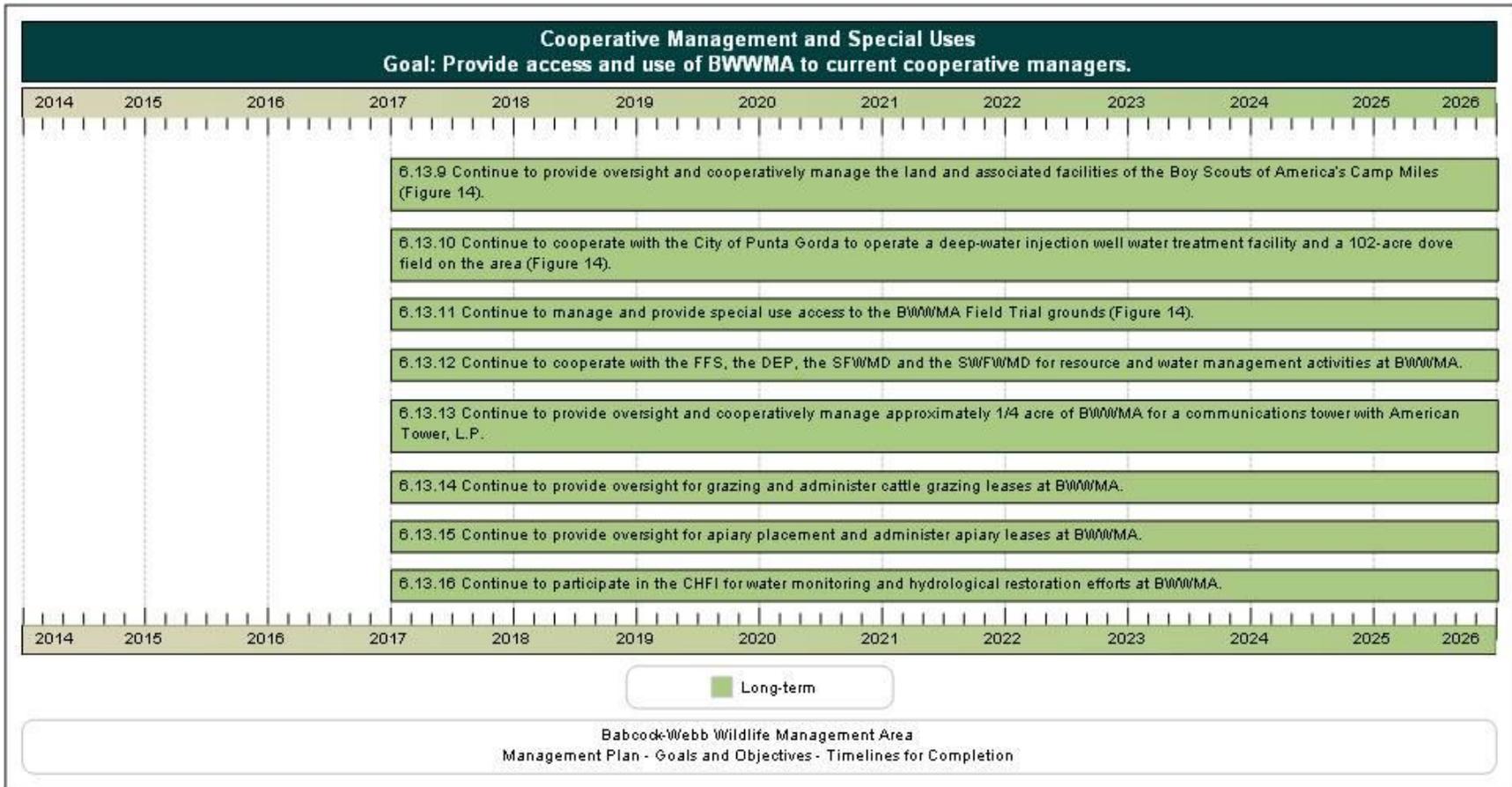












## **8 Resource Management Challenges and Strategies**

The following section identifies and describes further management needs and challenges associated with BWWMA and provides solution strategies that will address these challenges. These specific challenges may not be fully addressed in the broader goals and objectives section above, and are thereby provided here.

### **8.1 Challenge: Natural hydrological flow and function is impeded in Alligator Creek.**

8.1.1 Strategy: Continue to work with Charlotte County to restore and maintain flows.

### **8.2 Challenge: Currently, law enforcement and management staffing is at insufficient levels for optimal management of BWWMA.**

8.2.1 Strategy: Pursue funding for increased law enforcement and management staffing.

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

### **8.3 Challenge: Currently, insufficient management staffing exists to achieve prescribed fire goals.**

8.3.1 Strategy: Pursue funding for management staffing, and additional private sector contract services.

### **8.4 Challenge: There are smoke management challenges during prescribed burns due to the proximity to major roadways, airports, and residential areas.**

8.4.1 Strategy: Use available tools and resources to minimize smoke impact and increase outreach for areas of potential impacts.

8.4.2 Strategy: Cooperate with other agencies such as FWC Law Enforcement, Florida Highway Patrol, FDOT, FFS, and the Charlotte and Lee counties Sheriffs' Offices.

### **8.5 Challenge: Exotic invasive plants from adjacent private lands are spreading to BWWMA.**

8.5.1 Strategy: Coordinate with the local CISMA, FWC's Uplands Invasive Plant Management Section, and FWC's Landowner Assistance Program to work with adjacent landowners to control and manage exotic invasive plants on adjacent properties.

8.5.2 Strategy: Coordinate with other governmental and private organizations to obtain resources to control and manage exotic invasive species on adjacent properties.

**8.6 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 BWWMA.**

8.6.1 Strategy: Coordinate with FWC law enforcement to assist with control of these illegal activities on BWWMA.

**8.7 Challenge: Area staffing is insufficient for maintenance of recreational trails.**

8.7.1 Strategy: Pursue funding, maintenance agreements, and/or volunteer agreements to ensure maintenance of recreational trails.

**8.8 Challenge 8: Currently, FWC has insufficient resources to perform water monitoring, including water quality monitoring, on BWWMA, therefore it cannot be determined if water quality is diminishing over time.**

8.8.1 Strategy: Pursue funding for water quality assessment and ongoing monitoring.

**8.9 Challenge: Currently, no recent boundary survey of BWWMA has been completed.**

8.9.1 Strategy: FWC will continue to pursue funding to complete a boundary survey.

## **9 Cost Estimates and Funding Sources**

The following represents the actual and unmet budgetary needs for managing the lands and resources of BWWMA. 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

BWWMA. Cost estimate categories are those currently recognized by FWC and the Land Management Uniform Accounting Council. More information on these categories, as well as the Fiscal Year 2013-2014 operational plan showing detailed cost estimates by activity and categories of expenditures, may be found in Appendix 14.

**Babcock-Webb WMA Management Plan Cost Estimate**  
***Maximum expected one year expenditure***

<u>Resource Management</u>	<u>Expenditure</u>	<u>Priority</u>
Exotic Species Control	\$858,032	(1)
Prescribed Burning	\$239,463	(1)
Cultural Resource Management	\$7,517	(1)
Timber Management	\$34,123	(1)
Hydrological Management	\$79,625	(1)
Other (Restoration, Enhancement, Surveys, Monitoring, etc.)	\$642,743	(1)
<b>Subtotal</b>	<b>\$1,861,503</b>	
<u>Administration</u>		
General administration	\$144,378	(1)
<u>Support</u>		
Land Management Planning	\$77,976	(1)
<i>Land Management Reviews</i>	\$6,679	(3)
Training/Staff Development	\$30,067	(1)
Vehicle Purchase	\$1,429,968	(2)
Vehicle Operation and Maintenance	\$244,425	(1)
Other (Technical Reports, Data Management, etc.)	\$55,295	(1)
<b>Subtotal</b>	<b>\$1,844,410</b>	
<u>Capital Improvements</u>		
New Facility Construction	\$210,916	(2)
Facility Maintenance	\$855,579	(1)
<b>Subtotal</b>	<b>\$1,066,495</b>	
<u>Visitor Services/Recreation</u>		
Info./Education/Operations	\$128,436	(1)
<u>Law Enforcement</u>		
Resource protection	\$73,772	(1)
<b><u>Total</u></b>	<b>\$5,118,996*</b>	

**Priority schedule:**

- Bold**           **(1) Immediate (annual)**
- Normal           (2) Intermediate (3-4 years)
- Italic*           (3) *Other (5+ years)*

\* Based on the characteristics and requirements of this area, 16 FTE positions would be optimal to fully manage this area. All land management funding is dependent upon annual legislative appropriations.

## **Babcock-Webb WMA Management Plan Cost Estimate**

### ***Ten-year projection***

<b><u>Resource Management</u></b>	<b><u>Expenditure</u></b>	<b><u>Priority</u></b>
Exotic Species Control	\$7,538,762	(1)
Prescribed Burning	\$2,103,951	(1)
Cultural Resource Management	\$66,043	(1)
Timber Management	\$299,806	(1)
Hydrological Management	\$699,598	(1)
Other (Restoration, Enhancement, Surveys, Monitoring, etc.)	\$5,647,207	(1)
<b>Subtotal</b>	<b>\$16,355,366</b>	
<b><u>Administration</u></b>		
General administration	\$1,268,524	(1)
<b><u>Support</u></b>		
Land Management Planning	\$685,107	(1)
<i>Land Management Reviews</i>	\$19,118	(3)
Training/Staff Development	\$264,174	(1)
Vehicle Purchase	\$5,032,120	(2)
Vehicle Operation and Maintenance	\$2,147,543	(1)
Other (Technical Reports, Data Management, etc.)	\$485,829	(1)
<b>Subtotal</b>	<b>\$8,633,890</b>	
<b><u>Capital Improvements</u></b>		
New Facility Construction	\$609,228	(2)
Facility Maintenance	\$7,517,214	(1)
<b>Subtotal</b>	<b>\$8,126,442</b>	
<b><u>Visitor Services/Recreation</u></b>		
Info./Education/Operations	\$1,128,456	(1)
<b><u>Law Enforcement</u></b>		
Resource protection	\$648,172	(1)
<b><u>Total</u></b>	<b>\$36,160,851 *</b>	

#### **Priority schedule:**

<b>Bold</b>	<b>(1) Immediate (annual)</b>
Normal	(2) Intermediate (3-4 years)
<i>Italic</i>	(3) Other (5+ years)

\* Based on the characteristics and requirements of this area, 16 FTE positions would be optimal to fully manage this area. All land management funding is dependent upon annual legislative appropriations.

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

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

### 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 BWWMA 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). Such uses also comply with the authorities of the FWC as derived from Article IV, Section 9 of the Florida Constitution as well as the guidance and directives of Chapters 372, 253, 259, 327, 370, 403, 870, 373, 375, 378, 487, and 597 FS.

The FWC has developed and utilizes an Arthropod Control Plan for BWWMA in compliance with Chapter 388.4111 F.S. (Appendix 16). This plan was developed in cooperation with the local Charlotte and Lee counties arthropod control agencies. This plan is also in conformance with the Local Government Comprehensive Plans as approved and adopted for Charlotte and Lee counties, Florida, (Appendix 17).

## 12 Endnotes

- <sup>1</sup> Babcock Ranch. Kitson & Partners. n.d. Retrieved from <http://www.kitsonpartners.com/babcock.html>
- <sup>2</sup> Charlotte County Developments of Regional Impact: Babcock Ranch. Charlotte County. n.d. Retrieved from <http://www.charlottecountyfl.gov/services/planningzoning/Pages/DRI.aspx?DRI=Babcock%20Ranch>
- <sup>3</sup> Chapter 3, Natural Resources and Coastal Planning Element: Charlotte County Evaluation and Appraisal Report Amendments. 2007. Retrieved from [http://www.charlottecountyfl.gov/services/planningzoning/Comprehensive%20Plan/chapter\\_3.pdf](http://www.charlottecountyfl.gov/services/planningzoning/Comprehensive%20Plan/chapter_3.pdf)
- <sup>4</sup> Henderson, W.G. and the United States Department of Agriculture, Soil Conservation Service. Soil Survey of Charlotte County, Florida. 1981. Retrieved from <http://ufdc.ufl.edu/UF00026087/00001>
- <sup>5</sup> Henderson, W.G. and the United States Department of Agriculture, Soil Conservation Service. Soil Survey of Lee County, Florida. 1981. Retrieved from <http://ufdc.ufl.edu/UF00025710/00001>
- <sup>6</sup> Geologic Units in Charlotte County, Florida. United States Geological Survey. 2014. Retrieved from <http://mrdata.usgs.gov/geology/state/fips-unit.php?code=f12015>
- <sup>7</sup> Arthur, J.D., Campbell, F.R., Duncan, J.G., Green, R.C., Lloyd, J.M., Means, G.H., Missimer, T.M., Scott, T.M., and Yon, J.W. 2001. Florida Geological Survey statewide map.
- <sup>8</sup> Florida Geological Survey. 2001. Geology and Hydrology of Lee County, Florida, Tallahassee, FL.
- <sup>9</sup> Florida Natural Areas Inventory (FNAI). 2010. Guide to the natural communities of Florida: 2010 edition. Florida Natural Areas Inventory, Tallahassee, FL.
- <sup>10</sup> U.S. Fish and Wildlife Service. 2003. Recovery plan for the red-cockaded woodpecker (*Picoides borealis*): second revision. U.S. Fish and Wildlife Service, Atlanta, GA. 296 pp.
- <sup>11</sup> Florida Fish and Wildlife Conservation Commission. 2012. Florida Panther Habitat Assessment Methodology.

- <sup>12</sup> Florida Geological Survey. 1990. Mineral Resources of Lee County, Florida. Retrieved from <http://ufdc.ufl.edu/UF00015038/00001/1x?vo=3>
- <sup>13</sup> Aldridge, C. L., M. S. Boyce and R. K. Baydack. 2004. Adaptive management of prairie grouse: how do we get there? *Wildlife Society Bulletin* 32:92-103.
- <sup>14</sup> Wilhere, G. F. 2002. Adaptive management in Habitat Conservation Plans. *Conservation Biology* 16:20-29.
- <sup>15</sup> Walters, C. J. and R. Hilborn. 1978. Ecological optimization and adaptive management. *Annual Review of Ecology and Systematics* 9:157–188.
- <sup>16</sup> Regulatory Negotiation Committee on Accessibility Guidelines for Outdoor Developed Areas, Final Report (1999).
- <sup>17</sup> 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.
- <sup>18</sup> McCarty, J. P. 2001. Ecological consequences of recent climate change. *Conservation Biology* 15:320-331.
- <sup>19</sup> 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.
- <sup>20</sup> 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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- <sup>22</sup> Stevenson, J. C., M. S. Kearney, and E. W. Koch. 2002. Impacts of sea level rise on tidal wetlands and shallow water habitats: A case study from Chesapeake Bay. *American Fisheries Society Symposium* 32:23-36.
- <sup>23</sup> IPCC. 2007b. *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, Cambridge, UK.

## **13 Appendices Contained in Volume II**

1. Lease Agreement and Amendments
2. Agreements and Easements
3. Public Input
4. Land Management Review
5. Soil Series Descriptions
6. FNAI Element Occurrence Data Usage Letter
7. WCPR Strategy
8. BWWMA Timber Assessment
9. Prescribed Burn Plan
10. BWWMA Recreation Master Plan
11. FWC Apiary Policy
12. Management Procedures Guidelines - Management of Archaeological and Historical Resources and Cultural Resources Table
13. FWC Agency Strategic Plan
14. Operation Plan Fiscal Year 2013- 2014 and Land Management Uniform Cost Accounting Council Terms
15. NRCS Grazing Plan
16. Arthropod Control Plans
17. Charlotte County and Lee County Letters of Compliance with Local Government Comprehensive Plans