

A Management Plan for
Bullfrog Creek
Wildlife and Environmental Area
2017 - 2027



Hillsborough County, Florida

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

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**A Management Plan
for
Bullfrog Creek Wildlife and Environmental Area**

Hillsborough County, Florida

Owned by Hillsborough County

Managed by the Florida Fish and Wildlife Conservation Commission



June 2017

Approved _____

Thomas H. Eason, Ph.D.
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: Bullfrog Creek Wildlife and Environmental Area
 Location: Hillsborough County, Florida
 Acreage Total: 833 acres
 Acreage Breakdown:

<u>Land Cover Classification</u>	<u>Acres</u>	<u>Percent of Total Area</u>
Blackwater stream	3.60	0.44%
Bottomland forest	28.97	3.53%
Clearing/regeneration	71.30	8.69%
Depression marsh	13.24	1.61%
Dome swamp	7.15	0.87%
Floodplain swamp	6.90	0.84%
Mesic flatwoods	483.74	58.93%
Mesic hammock	91.93	11.20%
Pasture - improved	5.25	0.64%
Pine plantation	6.02	0.73%
Scrubby flatwoods	44.91	5.47%
Wet flatwoods	57.92	7.06%

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

Lease/Management Agreement No.: Memorandum of Agreement 97056 (Appendix 12.1)

Use: Single Management Responsibilities:
 Multiple X Agency Responsibilities
FWC LEAD, SUBLESSEE (Wildlife and Environmental Area, resource protection, law enforcement)
Hillsborough County Easement road maintenance

Designated Land Use: Wildlife and Environmental Area

Sublease (s): None.

Encumbrances: List: None.

Type Acquisition: Fish and Wildlife Habitat Program

Unique Features: Natural: Natural communities including blackwater stream, mesic flatwoods, mesic hammock, wet flatwoods, and scrubby flatwoods.

Archaeological/Historical: None documented within Bullfrog Creek WEA.

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: Zero acres in FWC Additions and Inholdings list and no acres yet to be acquired in a related Florida Forever project.

Surplus Lands/Acreage: None.

Public Involvement: Management Advisory Group consensus building meeting and Public Hearing (Appendix 12.3)

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

ARC Approval Date _____ BTIITF Approval Date: _____

Comments: _____

Land Management Plan Compliance Checklist

Required for State-owned conservation lands over 160 acres

Section A: Acquisition Information Items

Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
1	The common name of the property.	18-2.018 & 18-2.021	1
2	The land acquisition program, if any, under which the property was acquired.	18-2.018 & 18-2.021	7
3	Degree of title interest held by the Board, including reservations and encumbrances such as leases.	18-2.021	9
4	The legal description and acreage of the property.	18-2.018 & 18-2.021	1, 96
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
6	An assessment as to whether the property, or any portion, should be declared surplus. <i>Provide information regarding assessment and analysis in the plan, and provide corresponding map.</i>	18-2.021	N/A
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	70-72
8	Identification of adjacent land uses that conflict with the planned use of the property, if any.	18-2.021	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)	7
10	Proximity of property to other significant State, local or federal land or water resources.	18-2.021	9

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	45
12	A description of past and existing uses, including any unauthorized uses of the property.	18-2.018 & 18-2.021	43
13	A description of alternative or multiple uses of the property considered by the lessee and a statement detailing why such uses were not adopted.	18-2.018	46
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	8, 73
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	68

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	73
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)	63-66
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	94
19	Letter of compliance from the local government stating that the LMP is in compliance with the Local Government Comprehensive Plan.	BOT requirement	97
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	77
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	N/A
22	If the lead managing agency determines that timber resource management is not in conflict with the primary management objectives of the managed area, a component or section, prepared by a qualified professional forester, that assesses the feasibility of managing timber resources pursuant to section 253.036, F.S.	18-021	96
23	A statement regarding incompatible use in reference to Ch. 253.034(10).	253.034(10)	47

*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	15, Appendix
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
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)	Appendix
27	Summary of comments and concerns expressed by the advisory group for parcels over 160 acres	18-2.021	Appendix
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)	Appendix
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	N/A
30	Summary of comments and concerns expressed by the management review team, if required by Section 259.036, F.S.	18-2.021	N/A
31	If manager is not in agreement with the management review team's findings and recommendations in finalizing the required 10-year update of its management plan, the managing agency should explain why they disagree with the findings or recommendations.	259.036	N/A

Section D: Natural Resources			
Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
32	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding soil types. <i>Use brief descriptions and include USDA maps when available.</i>	18-2.021	16-18, Appendix
33	Insert FNAI based natural community maps when available.	ARC consensus	19-21

34	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding outstanding native landscapes containing relatively unaltered flora, fauna and geological conditions.	18-2.021	42
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	42-43
36	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding beaches and dunes.	18-2.021	42
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	42
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	19-41
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	39-41
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	19-33, Appendix
41	Specific description of how the managing agency plans to identify, locate, protect and preserve or otherwise use fragile, nonrenewable natural and cultural resources.	259.032(10)	52-87
42	Habitat Restoration and Improvement	259.032(10) & 253.034(5)	
42-A.	Describe management needs, problems and a desired outcome and the key management activities necessary to achieve the enhancement, protection and preservation of restored habitats and enhance the natural, historical and archeological resources and their values for which the lands were acquired.	↓	52-90
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.		77-87
42-C.	The associated measurable objectives to achieve the goals.		77-87
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>		52-90, 96
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.		90-93
43	***Quantitative data description of the land regarding an inventory of forest and other natural resources and associated acreage. See <i>footnote.</i>	253.034(5)	19-34

44	Sustainable Forest Management, including implementation of prescribed fire management		
44-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	18-2.021, 253.034(5) & 259.032(10) ↓	52-90
44-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		77-87
44-C.	Measurable objectives (see requirement for #42-C).		77-87
44-D.	Related activities (see requirement for #42-D).		52-90
44-E.	Budgets (see requirement for #42-E).		90-93
45	Imperiled species, habitat maintenance, enhancement, restoration or population restoration		259.032(10) & 253.034(5)
45-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	52-90
45-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		77-87
45-C.	Measurable objectives (see requirement for #42-C).		77-87
45-D.	Related activities (see requirement for #42-D).		52-90
45-E.	Budgets (see requirement for #42-E).		90-93
46	***Quantitative data description of the land regarding an inventory of exotic and invasive plants and associated acreage. <i>See footnote.</i>		253.034(5)
47	Place the Arthropod Control Plan in an appendix. If one does not exist, provide a statement as to what arrangement exists between the local mosquito control district and the management unit.	BOT requirement via lease language	97
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).	↓	52-90
48-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		77-87
48-C.	Measurable objectives (see requirement for #42-C).		77-87
48-D.	Related activities (see requirement for #42-D).		52-90
48-E.	Budgets (see requirement for #42-E).		90-93

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</i>		42

	<i>appropriate managing agencies that have been notified of the proposed plan.</i>	18-2.018 & 18-2.021	
50	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding water resources, including water classification for each water body and the identification of any such water body that is designated as an Outstanding Florida Water under Rule 62-302.700, F.A.C.	18-2.021	42, 66-67
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	42, 25-33
52	***Quantitative description of the land regarding an inventory of hydrological features and associated acreage. <i>See footnote.</i>	253.034(5)	42, 25-33
53	Hydrological Preservation and Restoration	259.032(10) & 253.034(5)	
53-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	52-90
53-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		77-87
53-C.	Measurable objectives (see requirement for #42-C).		77-87
53-D.	Related activities (see requirement for #42-D).		52-90
53-E.	Budgets (see requirement for #42-E).		90-93

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	42-43
55	***Quantitative data description of the land regarding an inventory of significant land, cultural or historical features and associated acreage.	253.034(5)	42-43
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	42-43, 68
57	Cultural and Historical Resources	259.032(10) & 253.034(5)	
57-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	52-90
57-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		77-87
57-C.	Measurable objectives (see requirement for #42-C).		77-87
57-D.	Related activities (see requirement for #42-D).		52-90
57-E.	Budgets (see requirement for #42-E).		90-93

**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)	68-69
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).	↓	52-90
59-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		77-87
59-C.	Measurable objectives (see requirement for #42-C).		77-87
59-D.	Related activities (see requirement for #42-D).		52-90
59-E.	Budgets (see requirement for #42-E).		90-93
60	*** Quantitative data description of the land regarding an inventory of recreational facilities and associated acreage.	253.034(5)	68-69
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).	↓	52-90
61-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		77-87
61-C.	Measurable objectives (see requirement for #42-C).		77-87
61-D.	Related activities (see requirement for #42-D).		52-90
61-E.	Budgets (see requirement for #42-E).		90-93

Section H: Other/ Managing Agency Tools			
Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
62	Place this LMP Compliance Checklist at the front of the plan.	ARC and managing agency consensus	iv
63	Place the Executive Summary at the front of the LMP. Include a physical description of the land.	ARC and 253.034(5)	iii
64	If this LMP is a 10-year update, note the accomplishments since the drafting of the last LMP set forth in an organized (categories or bullets) format.	ARC consensus	47-52
65	Key management activities necessary to achieve the desired outcomes regarding other appropriate resource management.	259.032(10)	52-90

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)	90-93
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)	90-93
68	A statement of gross income generated, net income and expenses.	18-2.018	90-93, 44-45

*** = 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.

Management Plan Compliance Checklist - Conservation Lands.xlsx

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Management Plan Acronym Key

ADA	Americans with Disabilities Act
ARC	Acquisition and Restoration Council
BCSP	Bullfrog Creek Scrub Preserve
BCWEA	Bullfrog Creek Wildlife and Environmental Area
BEBR	Bureau of Economic and Business Research
CAS	Conservation Action Strategy
CISMA	Cooperative Invasive Species Management Area
DEP	Department of Environmental Protection
DHR	Department of State - Division of Historical Resources
DSL	Division of State Lands
EDRR	Early Detection/Rapid Response invasive plant species
EPCHC	Environmental Protection Commission of Hillsborough County
FAC	Florida Administrative Code
FFS	Florida Forest Service
FLEPPC	Florida Exotic Pest Plant Council
FNAI	Florida Natural Areas Inventory
FS	Florida Statute(s)
FWC	Florida Fish and Wildlife Conservation Commission
FWRI	Fish and Wildlife Research Institute
GIS	Geographic Information Systems
GPS	Geographic Positioning System
IMPP	Internal Management Policies and Procedures
IPCC	Intergovernmental Panel on Climate Change
IWHRS	Integrated Wildlife Habitat Ranking System
LAP	Landowner Assistance Program
LATF	Land Acquisition Trust Fund
LMR	Land Management Review
MAG	Management Advisory Group
MOA	Memorandum of Agreement
OBVM	Objective-Based Vegetation Management
OCPB	Optimal Conservation Planning Boundary
OFW	Outstanding Florida Waters
ORB	Optimal Resource Boundary
RMP	Recreation Master Plan
SWFWMD	Southwest Florida Water Management District
WCPR	Wildlife Conservation Prioritization and Recovery
WEA	Wildlife and Environmental Area

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1 Introduction and General Information

Located less than five miles from Tampa Bay in the southwest corner of populous Hillsborough County, the Bullfrog Creek Wildlife and Environmental Area (BCWEA) conserves 833 acres of vital natural habitat in close proximity to a number of urban centers. The BCWEA is home to a variety of upland and wetland natural communities that support a wide variety of imperiled, rare, and more common wildlife species. These natural communities provide excellent habitat for the gopher tortoise, a keystone species that is designated as threatened by the State of Florida. Gopher tortoise burrows, which help support a large suite of commensal species, can be found throughout the upland communities of the BCWEA. Due to the mixture of habitat types present on the area, a variety of resident and migratory birds can also be found on the BCWEA throughout the year. Additionally, the area helps protect the water quality of Bullfrog Creek and its wider floodplain. The shallow, relatively swift waters of Bullfrog Creek run for approximately one mile through the northeast corner of the area.

The BCWEA lies immediately adjacent to the Hillsborough County-managed Bullfrog Creek Scrub Preserve (BCSP) and aids in maintaining wildlife connectivity within a mosaic of conservation lands in Hillsborough County and throughout southwest Florida. The 833 acres of land that comprise the BCWEA were conserved by Hillsborough County and the Florida Fish and Wildlife Conservation Commission (FWC) in 1998 through the FWC's Mitigation Park Program to protect vital habitat for the gopher tortoise. The title to the lands comprising the 833-acre BCWEA is held by Hillsborough County, while the FWC has lead management authority for all resources within the established boundary of the area. Hillsborough County conveyed lead management responsibility over the entirety of the BCWEA to the FWC through a Memorandum of Agreement (MOA 97056) executed in 1998.

The BCWEA is managed by the FWC primarily to conserve the natural communities on site that provide habitat conditions critical to sustaining the gopher tortoise and other listed upland species, as well as to provide opportunities for low-intensity, natural resource-based public recreation that are compatible with the primary purpose for management of the area. The MOA states that the primary management goal for the BCWEA shall be "the protection and enhancement of listed wildlife populations, even to the exclusion of other uses and activities."

As a result, the BCWEA is managed by the FWC primarily to protect vital habitat for the gopher tortoise. The area is further managed to conserve and restore natural habitat for the benefit of wildlife, while also providing opportunities for low-intensity wildlife-based public outdoor recreation.

1.1 Management Plan Purpose

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

This Management Plan is submitted for review as an informational item 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 (DEP) Division of State Lands (DSL), pursuant to Chapters 253 and 259, Florida Statutes (FS), and Chapters 18-2 and 18-4, Florida Administrative Code (FAC). Format and content were drafted in accordance with ARC requirements for management plans and the model plan outline provided by the staff of DSL. Terms (Appendix 12.2) used in this Management Plan describing management activities and associated measurable goals and objectives conform to those developed for the Land Management Uniform Accounting Council Biennial Land Management Operational Report.

Although the lands covered by this Management Plan are not titled to the Board of Trustees, they are being submitted to the ARC and Board of Trustees as an informational item for a variety of important reasons. Foremost among these is that the FWC has determined that it is essential for all the conservation areas it manages, including those lands titled to agencies other than the Board of Trustees, to have conservation land management plans that are in conformance with the State's statutory framework and criteria for the development of management plans for state-owned conservation lands. This ensures that each conservation area that the FWC manages has a comprehensive, consistent, and accountable land management plan that is developed under and meets the current ARC, Board of Trustees, and FWC planning framework and requirements.

Further, the FWC may also request for the BCWEA to be included on the list of FWC-managed conservation lands that receive funding through the Land Acquisition Trust Fund (LATF) conservation land management funding formula. Public conservation areas are required to have a Board of Trustees and ARC-approved management plan that meets the State's requirements in order to be eligible to receive land management funding through the LATF land management funding formula. For these reasons, this Management Plan has been developed to meet ARC and Board of Trustees criteria and is submitted for review as an informational item.

Additionally, this Management Plan will also be submitted to Hillsborough County for review and approval in keeping with the terms and requirements of the BCWEA Memorandum of Agreement between the FWC and Hillsborough County.

1.1.1 FWC Planning Philosophy

The FWC’s planning philosophy emphasizes soliciting input from stakeholders and the general public at the beginning of the planning process (Appendix 12.3). The FWC first engages stakeholders by convening a Management Advisory Group (MAG) to develop management recommendations and build consensus regarding the prioritization of those recommendations. Following this meeting, the FWC and the MAG host a public hearing to receive further input from user groups and the general public. 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 promoting 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 BCWEA Management Plan (Sections 5 – 7).

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 developed and reviewed by the FWC and Hillsborough County.

1.2 Location

As noted above, the BCWEA is located in southwestern Hillsborough County, approximately eight miles south of Riverview and one mile north of Sun City Center (Figure 1). The waters of Tampa Bay lie five miles west of the BCWEA, and downtown Tampa is approximately fifteen miles northwest of the area. Interstate 75 forms the western boundary of the BCWEA while the BCSP, managed by Hillsborough County, forms the eastern boundary of the area. An aerial image of the BCWEA can be found in Figure 2, below.

The BCWEA is located in Sections 26 and 25, Township 31 South, and Range 19 East (Figure 3). The entrance to the BCWEA is located in the northeast corner of the area. This entrance can be reached via an access road off of US 301 that runs along the northern border of the BCSP.

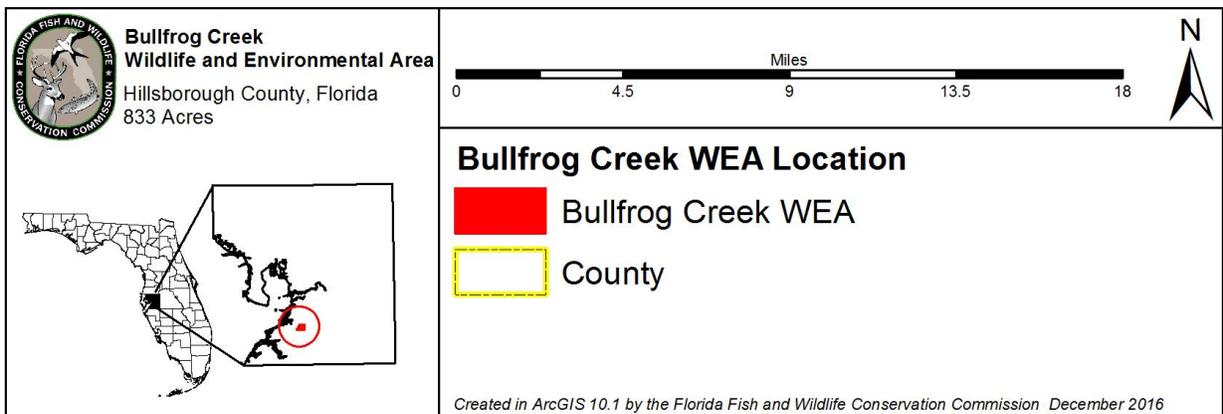
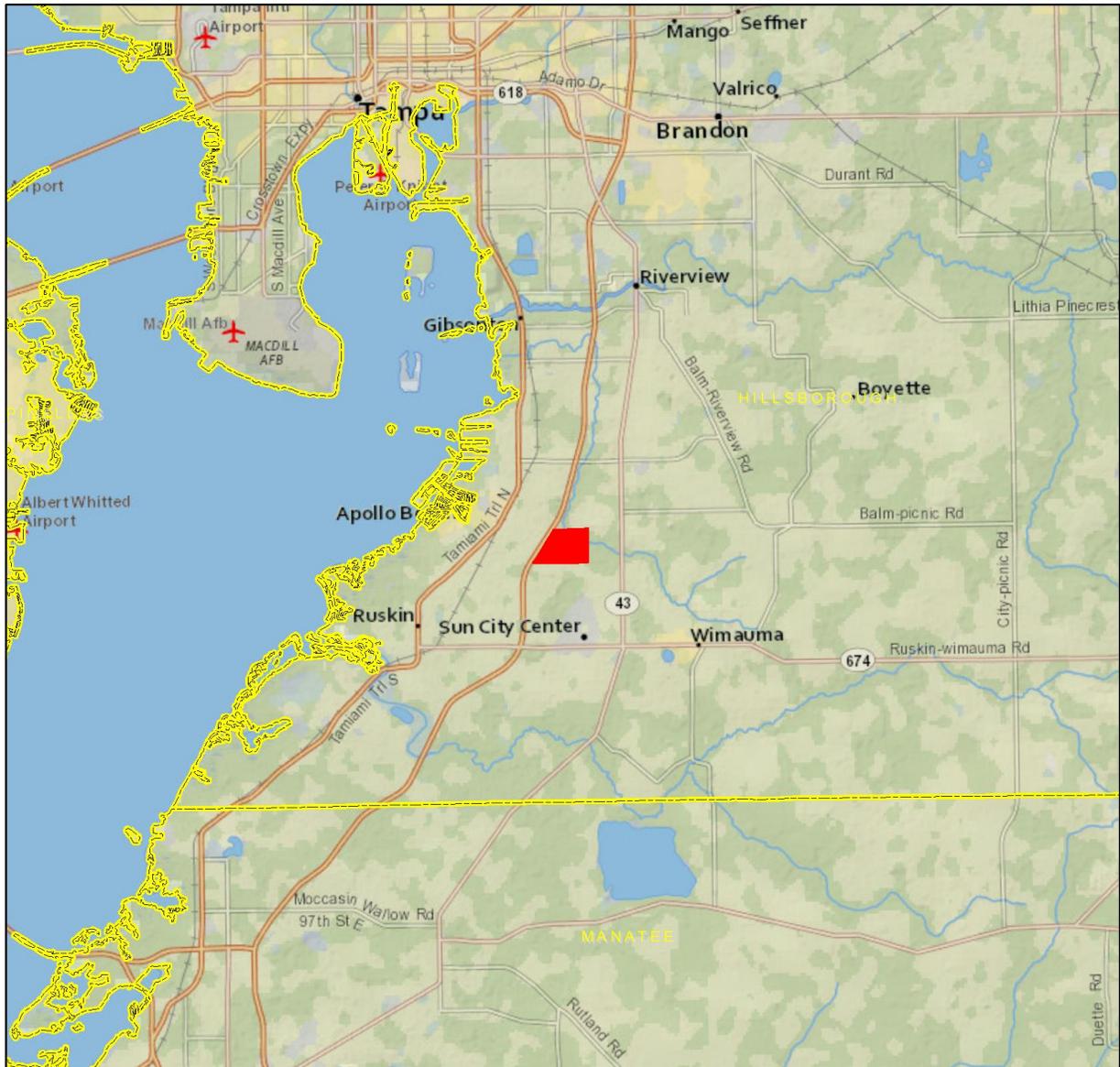


Figure 1. BCWEA Location

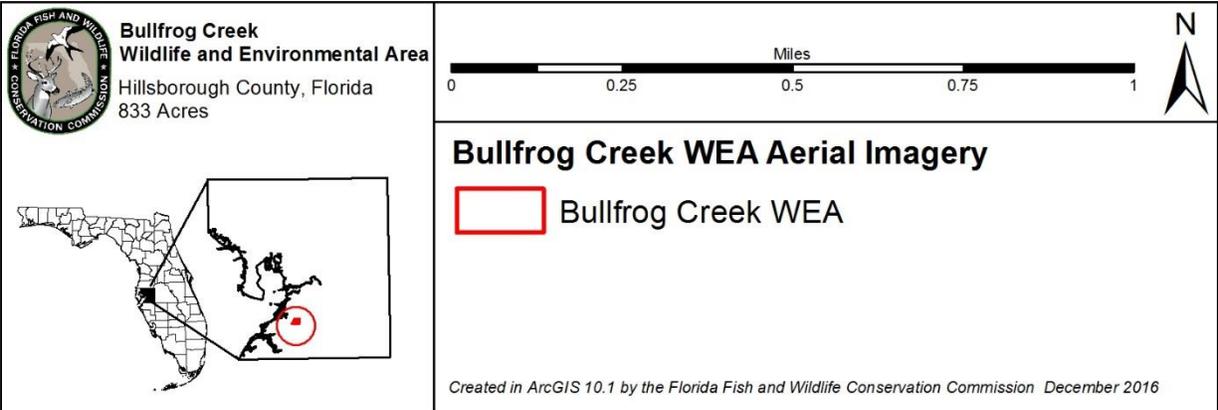


Figure 2. BCWEA Aerial Imagery

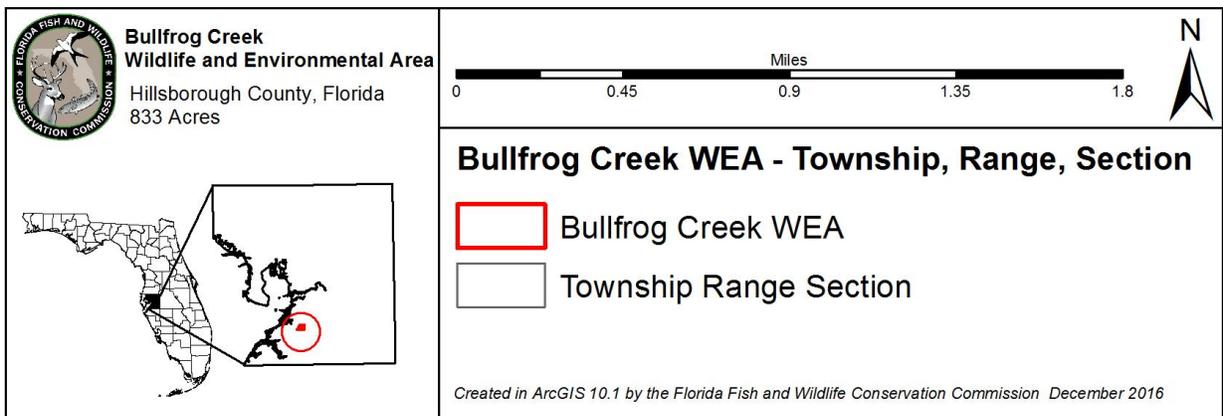
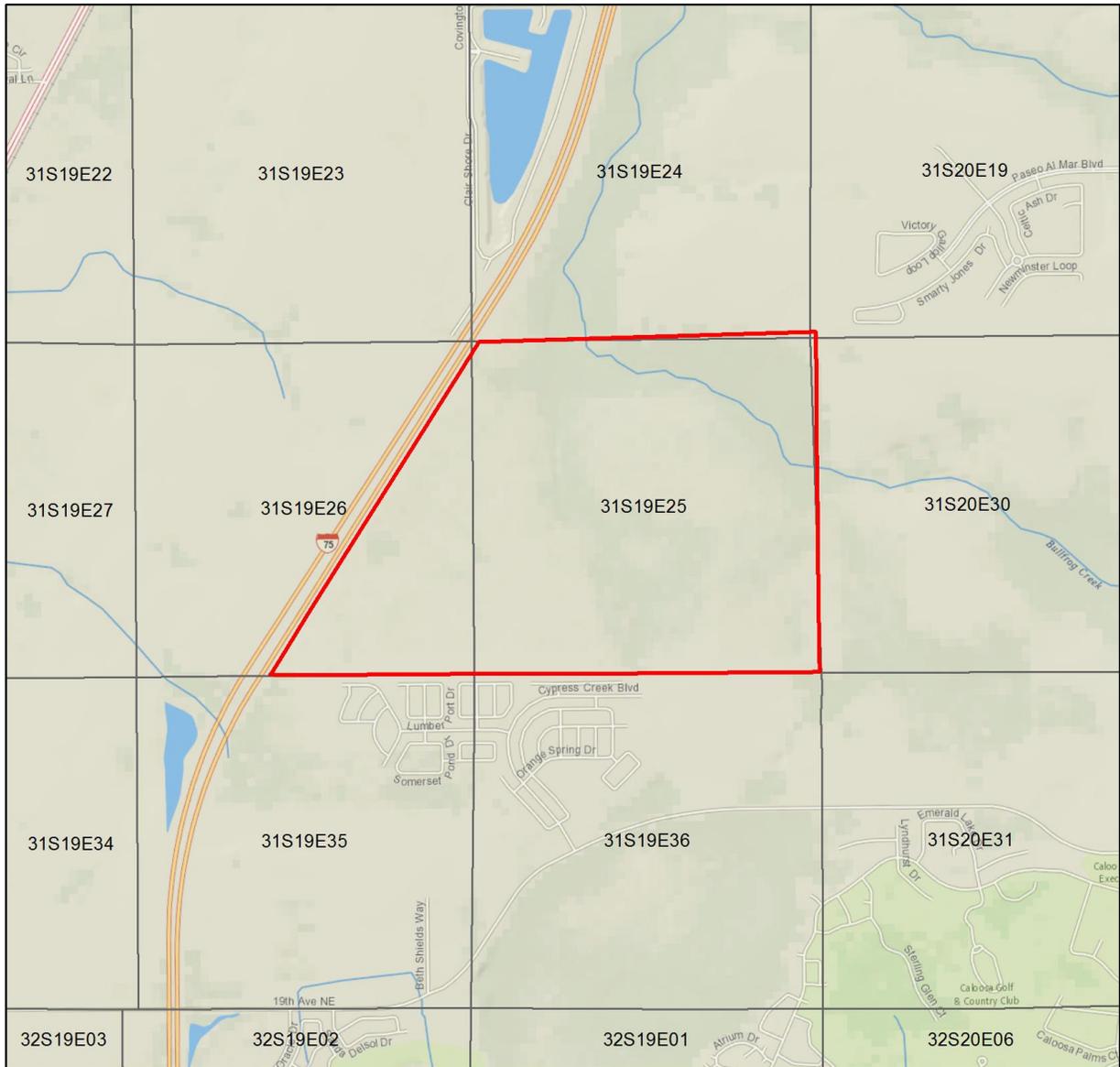


Figure 3. BCWEA Section, Township, and Range

1.3 Acquisition

1.3.1 Purpose for Acquisition of the Property

The primary purpose for acquisition of the BCWEA is to promote habitat conditions critical to meeting the life history requirements of the gopher tortoise and associated upland wildlife species. The BCWEA was acquired as a means to provide an offsite compensation alternative to state and federal listed species regulatory decisions. The following mission statement was developed and approved by the FWC to guide management activities at the BCWEA: “It shall be the primary management mission at Bullfrog Creek WEA to manage plant communities and public use in a manner that gives first consideration to the habitat needs and life history requirements of the gopher tortoise.”

1.3.2 Acquisition History

As stated above, the BCWEA was established in 1998 by Hillsborough County and the FWC under authority of the FWC Fish and Wildlife Habitat Acquisition Program with funding from and through the FWC Mitigation Park Program. The FWC implemented the now defunct Mitigation Park Program in 1988 to provide land use regulatory programs with an alternative to on-site wildlife mitigation under Section 372.074, FS (since replaced by Chapter 379, FS), which establishes the Fish and Wildlife Habitat Program for the purpose of acquiring, assisting other agencies or local governments in acquiring, and managing



lands important to the conservation of fish and wildlife. Under this authority, the FWC, or its designee, is responsible for managing these lands for the primary purpose of maintaining and enhancing their habitat value for fish and wildlife and to provide compatible fish- and wildlife-based public outdoor recreation.

The primary purpose of the Mitigation Park Program was to help protect endangered and threatened wildlife from the impacts of development by providing an offsite alternative to the previous method of on-site preservation of habitat within the boundaries of a development. Through this program, when developers proposed to develop habitat for an endangered or threatened species, they paid mitigation “taking” fees that were used to buy and manage high quality habitat elsewhere. As a result, the program provided an alternative method to preserve wildlife habitat while allowing developers to develop imperiled species habitat on their project sites. It also consolidates mitigation within a geographical region by buying larger, more manageable tracts which can be utilized by the public for low-intensity, natural resource-based recreation. All of the areas established through this program are managed primarily to protect and enhance habitat important to upland endangered or threatened wildlife, especially the gopher tortoise.

The Mitigation Park Program has since been discontinued, but the 14 mitigation tracts acquired through the program continue to be actively managed by the FWC in accordance with their original purpose for acquisition. These Gopher Tortoise Mitigation Parks, now established by the FWC as Wildlife and Environmental Areas (WEAs), provide conservation of important fish and wildlife habitat while allowing for public outdoor recreation within a management regime that is primarily focused on restoration and management of gopher tortoise habitat. For this reason, management activities emphasize the maintenance and restoration of optimum listed species habitat.



The BCWEA was established through MOA 87056 executed in January 1998 between Hillsborough County and the FWC. Through this MOA, Hillsborough County, which holds title to the land since purchasing it in 1995, established a perpetual conservation easement over the area comprising the BCWEA and granted the FWC the right to use and manage the property as a mitigation park. The BCWEA was established and granted to the FWC in exchange for up to 600 mitigation credits to accommodate mitigation efforts for the Tampa Bay Regional Planning Council through the FWC Mitigation Park Program.

1.4 Management Authority

Hillsborough County, which holds title to the land comprising the BCWEA, granted a perpetual conservation easement for all 833 acres of the BCWEA to the FWC through MOA 97056. Through this MOA, Hillsborough County conferred to the FWC management authority over the BCWEA and designated the FWC as the lead managing agency for the area. 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, 373, 375, 378, 379, 403, 487, 870, and 597 and of the Florida Statutes. These constitutional provisions and laws provide FWC the authority to protect, conserve, and manage the State’s fish and wildlife resources.

1.5 Management Directives

The MOA and Deed of Conservation Easement entered into by the FWC and Hillsborough County directs the FWC to manage the BCWEA as a mitigation park and to retain the area “forever in its natural condition pursuant to Section 704.06, FS.” The MOA further states that “public access and passive, resource-based recreation will be provided by [the FWC], but controlled to minimize disturbance and other adverse impacts to habitat quality or wildlife populations. The principal land management goal at [the BCWEA] will be the

protection and enhancement of listed wildlife populations, even to the exclusion of other uses and activities.”

1.6 Title Interest and Encumbrances

Title to the BCWEA is vested in Hillsborough County. In January 1998, the FWC and Hillsborough County entered into MOA 97056, granting the FWC management authority for the BCWEA by way of a perpetual conservation easement. There are no known encumbrances to the property.

1.7 Proximity to Other Public Conservation Lands

Located within 15 miles of the BCWEA are conservation areas managed by the Florida Department of Environmental Protection Division of Recreation and Parks (DEP-DRP), the FWC, the Southwest Florida Water Management District (SWFWMD), county and municipal governments, and private conservation organizations. As previously noted, Hillsborough County’s BCSP lies immediately adjacent to the eastern boundary of the BCWEA. The Terra Ceia Florida Forever Project, approximately 13 miles to the southwest, is the only Florida Forever Project within a 15-mile radius of the BCWEA. The network of conservation lands and Florida Forever projects in the vicinity of the BCWEA are shown in Figure 4 and Tables 1 and 2, respectively.

Florida Forever projects and conservation lands within a 15-mile radius of the BCWEA include lands managed by public and private entities and contribute to the conservation of historical and natural resources within this region of Florida. Most of the conservation lands within the vicinity of the BCWEA are owned in full-fee by a public entity. However, some of these areas fall within a less-than-fee ownership classification where the land is owned by a private landowner while a public agency or not-for-profit organization holds a conservation easement and monitoring responsibility for the land. Other areas are simply owned by the private landowner, while public agencies or not-for-profit organizations manage the land.

Table 1. Conservation Lands within a 15-mile Radius of the BCWEA

State of Florida	Managing Agency
Alafia River State Park	DEP-DRP
Cockroach Bay Preserve State Park	DEP-DRP
Four Corners Conservation Easement	DEP-DWRM-BMMR
Little Manatee River State Park	DEP-DRP
Moody Branch Wildlife and Environmental Area	FWC
South Fork State Park	DEP-DRP
Terra Ceia Preserve State Park	DEP-DRP
Ybor City Museum State Park	DEP-DRP

Table 1. Conservation Lands within a 15-mile Radius of the BCWEA

Federal	Managing Agency
MacDill Air Force Base	DOD-AF
County/City	Managing Agency
Alafia River Corridor	Hillsborough County
Alafia Scrub Preserve	Hillsborough County
Alderman's Ford Park	Hillsborough County
Alderman's Ford Preserve	Hillsborough County
Apollo Beach Nature Preserve	Hillsborough County
Bahia Beach Coastal Restoration	Hillsborough County
Balm Scrub Preserve	Hillsborough County
Balm-Boyette Scrub	Hillsborough County
Bell Creek Preserve	Hillsborough County
Bloomingtondale Park	Hillsborough County
Boy Scout	Hillsborough County
Boy Scout Conservation Easement	Hillsborough County
Bullfrog Creek Scrub Preserve	Hillsborough County
Cockroach Bay	Hillsborough County
Cockroach Creek Greenway	Hillsborough County
Curiosity Creek Preserve	Manatee County
Delaney Creek	Hillsborough County
Doyle Campbell Memorial Park	Hillsborough County
E. G. Simmons Park	Hillsborough County
Edward Medard Park and Reservoir	Hillsborough County
Ekker Preserve	Hillsborough County
Fish Hawk Creek Preserve	Hillsborough County
Fred and Ida Schultz Preserve	Hillsborough County
Golden Aster Scrub Nature Preserve	Hillsborough County
Hidden Harbor Riparian Conservation Area	Manatee County
Keene Property	City of Tampa
Kitchen Preserve	Hillsborough County
Lithia Springs Park	Hillsborough County
Little Manatee River	Hillsborough County
Little Manatee River Corridor	Hillsborough County
Little Manatee River Corridor Addition	Hillsborough County
McKay Bay	Hillsborough County
Palm River Park	City of Tampa
Picnic Island	City of Tampa

Table 1. Conservation Lands within a 15-mile Radius of the BCWEA

Rhodine Scrub	Hillsborough County
South MacDill 48	City of Tampa
Triple Creek Nature Preserve	Hillsborough County
Upper Little Manatee River	Hillsborough County
Weedon Island Preserve	Pinellas County
Wolf Branch	Hillsborough County
<hr/>	
Water Management District	Managing Agency
Edward Chance Reserve	SWFWMD
Little Manatee River (SWFWMD)	SWFWMD
Tampa Bay Estuarine Ecosystem - TECO Tract and Fulkerson Road Shell Pit	SWFWMD
Tampa Bay Estuarine Ecosystem - Terra Ceia	SWFWMD
<hr/>	
Private	Managing Entity
Florida Coastal Islands Sanctuaries	National Audubon Society, Inc.
Myron and Helen Gibbons Nature Preserve	Tampa Bay Conservancy, Inc.
Tampa Bay Mitigation Bank	Tampa Bay Mitigation, LLC
Weedon Island Preserve	Pinellas County

Acronym Key	Agency Name
DEP-DRP	Florida Department of Environmental Protection – Division of Recreation and Parks
DEP-DWRM-BMMR	Florida Department of Environmental Protection – Division of Water Management, Bureau of Mining and Minerals Regulation
DOD-AF	U.S. Department of Defense – Air Force
FWC	Florida Fish and Wildlife Conservation Commission
SWFWMD	Southwest Florida Water Management District

Table 2. Florida Forever Projects within a 15-mile Radius of the BCWEA

Project Name	GIS Acres
Terra Ceia Florida Forever Project	4,724

1.8 Adjacent Land Uses

As previously noted, the BCWEA is located in southwest Hillsborough County, adjacent to Interstate 75 and approximately 15 miles south of downtown Tampa and approximately 20 miles east of St. Petersburg.

The 2013 U.S. Census estimates that there are 1,291,578 people living in Hillsborough County. The Bureau for Economic and Business Research's (BEBR's) medium-range population projection indicates that in the year 2025 there will be 1,563,300 people living in the county. The population projections for counties surrounding Hillsborough County for the year 2025 according to the BEBR are as follows: Manatee-405,300; Pasco-595,700; Pinellas-935,200; Polk-744,600.



The current zoning ordinance for the BCWEA is agriculture.

According to Hillsborough

County's zoning codes, land zoned agriculture permits the following uses: mining, commercial agricultural uses, single-family and mobile homes residential on a minimum lot size of 2.5 acres to which encourages agriculture uses, intensive commercial activities, and manufacturing. The land comprising the BCWEA is designated natural preservation on the Hillsborough County future land use map.

The current land use designations for areas in the vicinity of the BCWEA are agriculture, planned development, and residential. According to Hillsborough County's land development code, potentially all uses are permitted on property zoned planned development. For land zoned residential, all uses related to agriculture and residential are permitted on residentially zoned land. According to Hillsborough County's future land use map, these same areas will be zoned suburban mixed-use, community mixed-use, and residential.

Hillsborough County is one of the largest counties in Florida that will likely continue to grow according to BEBR's medium-range population projections. There are currently residential communities in the vicinity of and bordering the BCWEA and, based on Hillsborough County's future land use map, there could be more development in the vicinity. The close proximity of existing development, and the high likelihood of continued future development in the area, will pose various challenges to the management of the BCWEA for the foreseeable future.

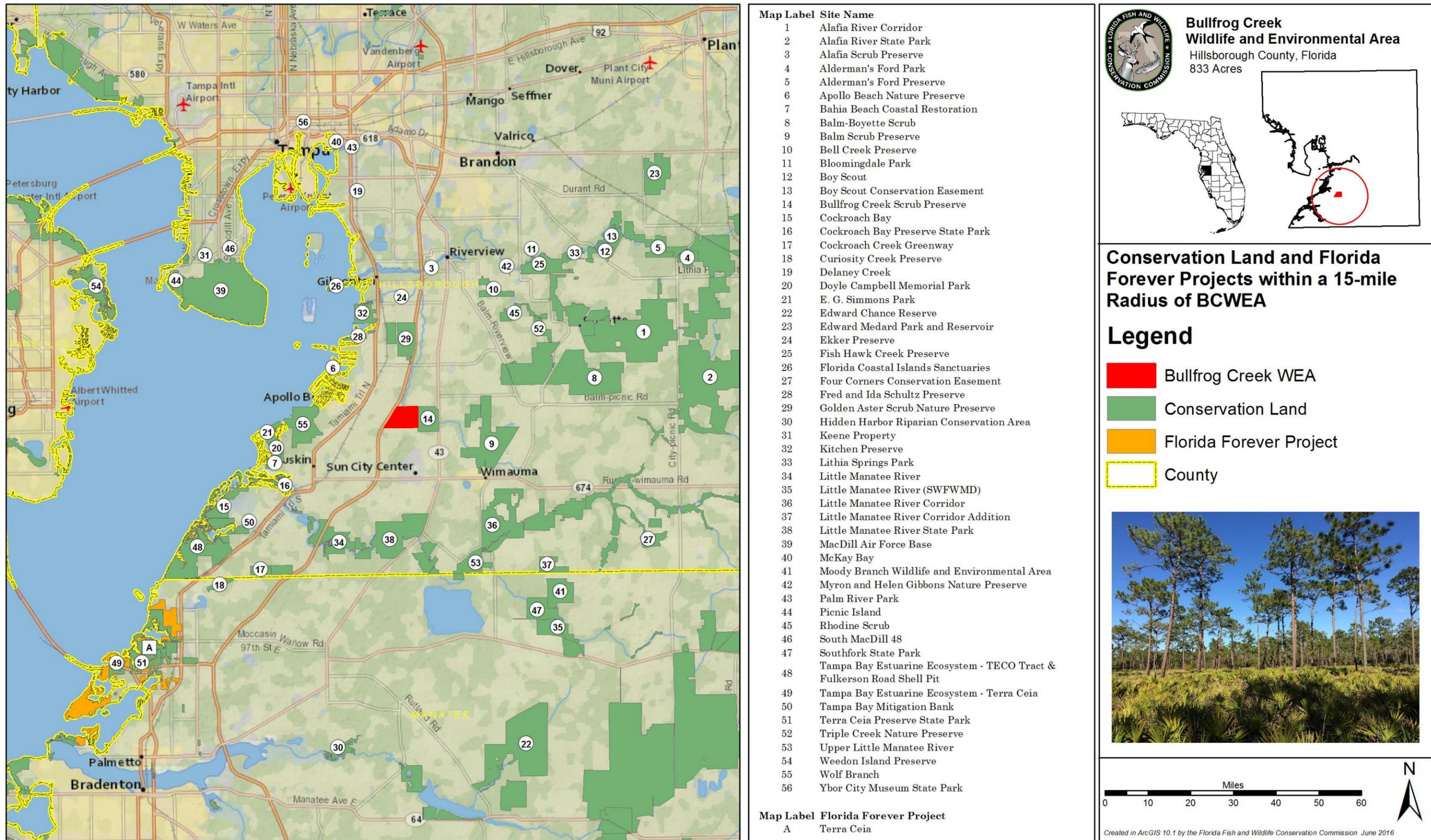


Figure 4. Conservation Lands and Florida Forever Projects within a 15-mile Radius of BCWEA

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1.9 Public Involvement

The FWC conducted a Management Advisory Group (MAG) meeting in Temple Terrace, Florida, on January 11, 2017, to obtain input from both public and private stakeholders regarding management of the BCWEA. Results of this meeting were used by the FWC to develop management goals and objectives and to identify opportunities and strategies for inclusion in this Management Plan. A summary of issues and opportunities raised by the MAG, as well as a listing of participants, is included as Appendix 12.3.1. Further, a public hearing was held in Tampa, Florida, on March 16, 2017, to solicit input and comment from the general public regarding this Management Plan. The report of that hearing is also contained in Appendix 12.3.3. A website is also maintained for receipt of public input at <http://myfwc.com/conservation/terrestrial/management-plans/develop-mps/>. Input received from all public involvement efforts has been considered in the development of this Management Plan.

2 Natural and Historical Resources

2.1 Physiography

Florida is divided into three geomorphic zones and the BCWEA is located in the Central or Midpeninsular Zone. The Midpeninsular Zone is further subdivided into physiographic



provinces and the BCWEA falls within the Southern Gulf Coastal Lowlands physiographic province. The portion of the Southern Gulf Coastal Lowlands that contains the BCWEA, between the Alafia and Little Manatee Rivers, is one of the most prominently terraced parts of peninsular Florida as the land rapidly slopes from the Polk Upland to Tampa Bay.

2.1.1 Climate

The climate of Hillsborough County, like much of peninsular Florida, is humid and subtropical. Between October and May, cold fronts regularly sweep through the state and keep conditions relatively dry. There is a defined rainy season from June through September. Easterly winds off the warm waters of the Gulf Stream running through the Gulf of Mexico and the Florida Straits keep temperatures moderate across the central peninsula year-round.

The average annual precipitation for the city of Tampa during the period from 1900 to 2012 was 47.37 inches. The average annual maximum temperature for the same period was 81.7 degrees Fahrenheit (°F) and the average annual minimum temperature was 63.7°F.

Historically, the lowest temperatures have occurred in January and the highest temperatures have occurred in July and August.

2.1.2 Topography and Geologic Conditions

As previously stated, the BCWEA is located in one of the most terraced areas of Florida, as the land slopes from Florida's central uplands down towards Tampa Bay and the Gulf of Mexico. Elevations within the BCWEA itself range from approximately 35 feet above mean sea level (MSL) within the Bullfrog Creek floodplain to greater than 50 feet above MSL in the upland flatwoods and hammocks.

The BCWEA is composed entirely of one geologic unit, undifferentiated sediments of Pleistocene and Holocene age. The lithology of these undifferentiated sediments consists of sand, peat, silt, and clay or mud.

2.1.3 Soils

The most common soil type on the BCWEA is Myakka fine sand, which covers over 75% of the area. These are nearly level, poorly drained soils that are commonly found in the broad plains of the flatwoods on the area. Other soils found on the BCWEA include frequently flooded Winder fine sand, Smyrna fine sand, St. Johns fine sand, and Archbold fine sand.



U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) data were used to identify the BCWEA's soil series and soil depth to water table. The eight soil map units described in the soil survey of the BCWEA are distributed as shown in Figure 5. Analyses of depth to water table for map units occurring within the BCWEA are also provided in Figure 6. The NRCS defines a soil map unit as: "a collection of soil areas or non-soil areas (miscellaneous areas) delineated in a soil survey." Soil map units may contain multiple soil components, which are given names that are unique identifiers. Figures 5 and 6 provide aggregation data for the BCWEA soil map units. Soil series descriptions may be found in Appendix 12.4.

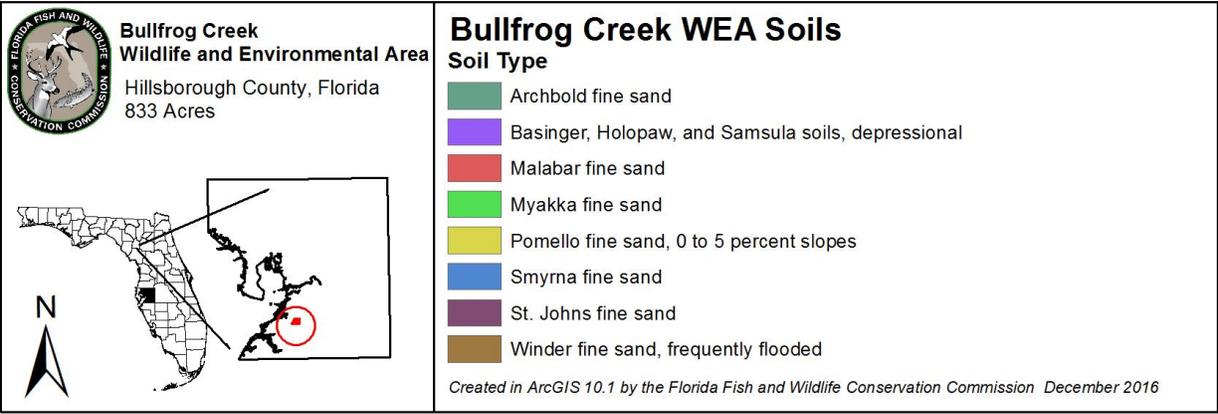
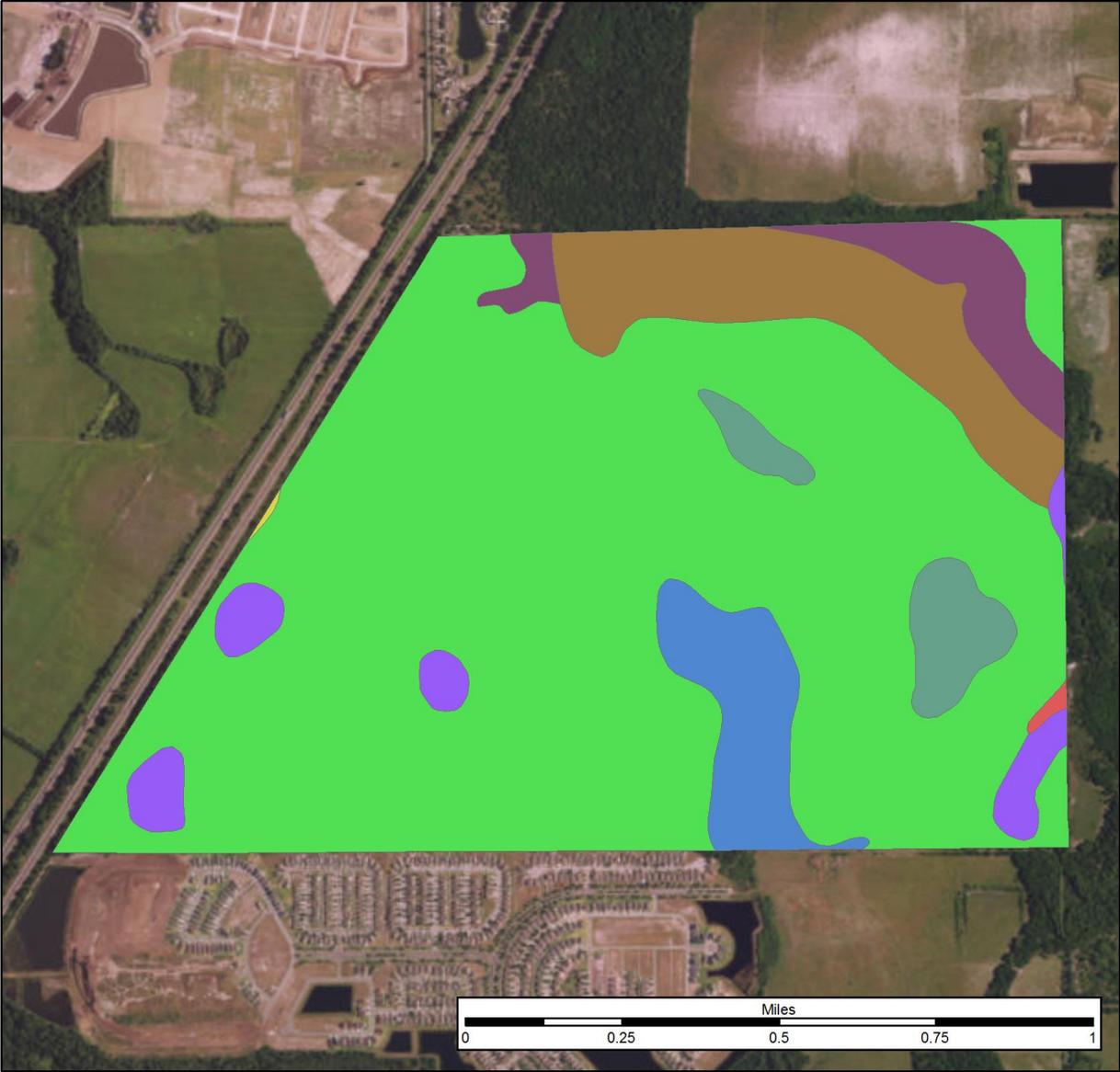


Figure 5. BCWEA Soil Type

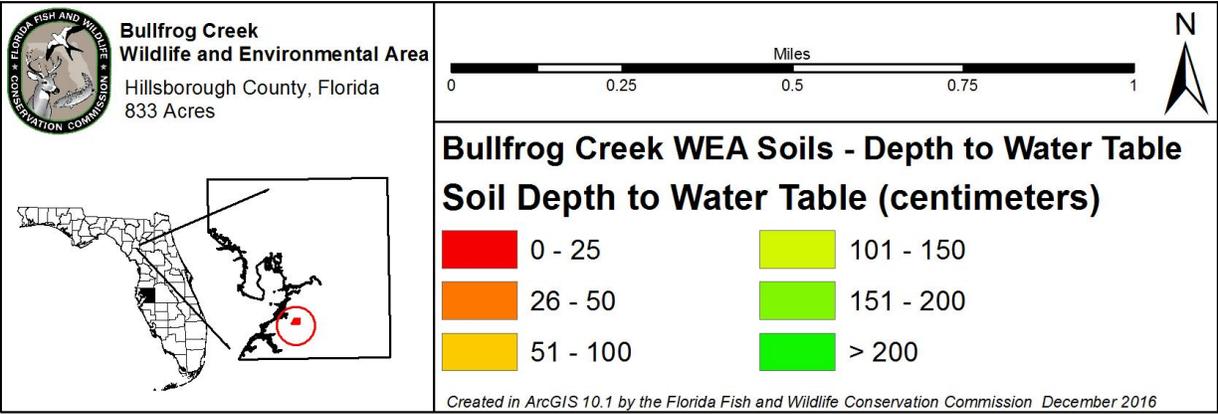
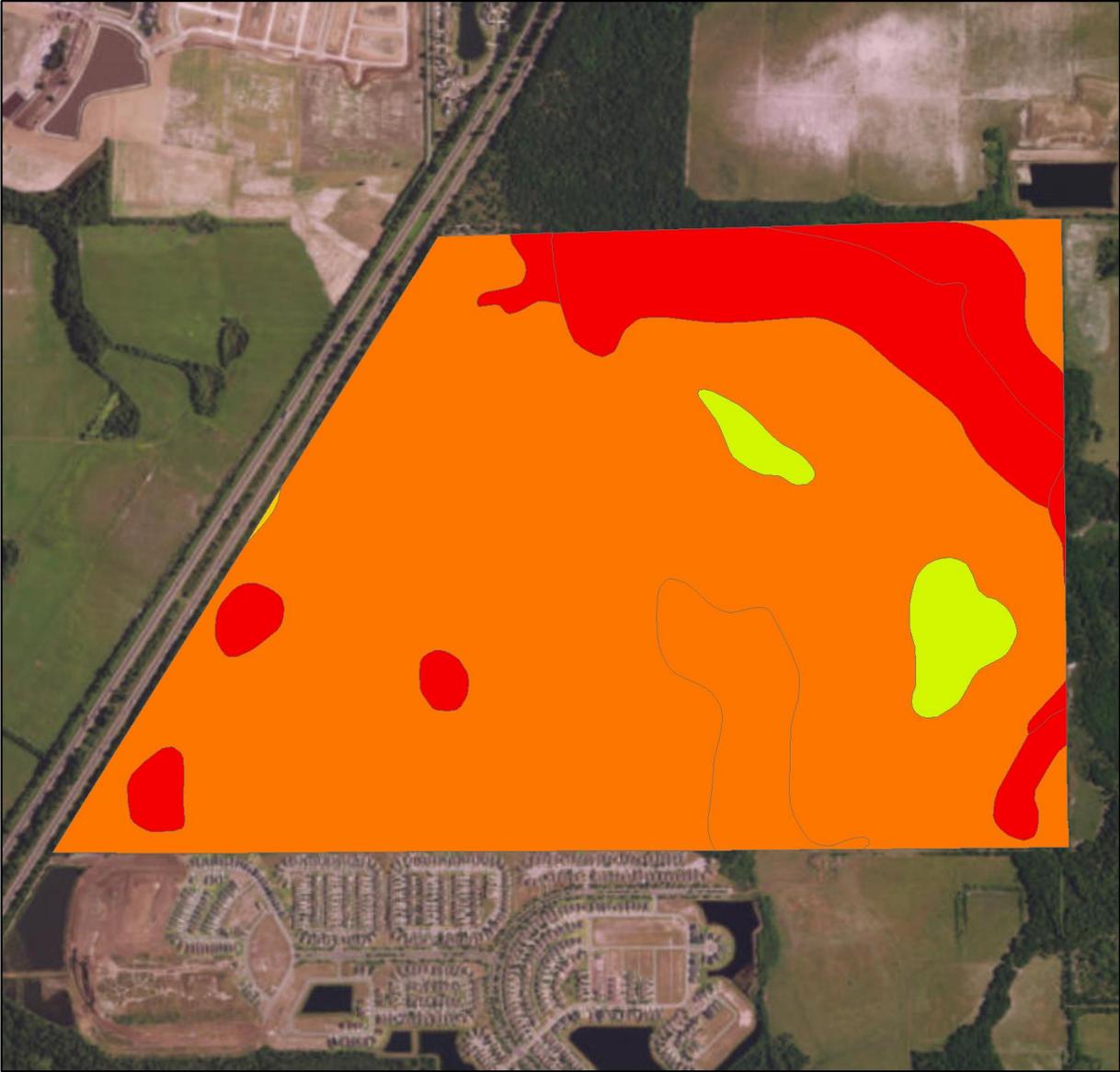


Figure 6. BCWEA Soil Depth to Water Table

2.2 Vegetation

The BCWEA is composed primarily of uplands, with bottomland forest along the creek and small marshes interspersed within the upland areas. Through the services of the Florida Natural Areas Inventory (FNAI), the FWC initially surveyed and mapped the natural and anthropogenic communities of the BCWEA in 2007. The area was re-mapped and the natural communities were recertified by the FNAI in 2014. This mapping effort identified 12 natural and anthropogenic community types existing on the BCWEA (Table 3 and Figure 7). The predominant natural communities found on the area are mesic flatwoods, mesic hammock, wet flatwoods, and scrubby flatwoods.

Additionally, utilizing historic aerial photographs and survey information of the area, the FNAI has mapped the historical natural communities on the BCWEA (Figure 8). The mapping of historical natural communities provides the FWC with knowledge of the historical conditions of the area and is used to help guide the management and restoration of the current natural communities on the BCWEA.

Surveys by FWC biologists and contracted FNAI staff have documented a variety of native plant species (Table 4) and imperiled plant species (Table 5) as occurring on the BCWEA. Table 6 displays the invasive/exotic plant species documented on the area, as well as the Florida Exotic Pest Plant Council (FLEPPC) categories for those species included in the FLEPPC list of invasive plants.

Table 3. FNAI Mapped Natural Communities of the BCWEA

Community Type	GIS Acres	Percentage
Blackwater stream	3.60	0.44%
Bottomland forest	28.97	3.53%
Clearing/regeneration	71.30	8.69%
Depression marsh	13.24	1.61%
Dome swamp	7.15	0.87%
Floodplain swamp	6.90	0.84%
Mesic flatwoods	483.74	58.93%
Mesic hammock	91.93	11.20%
Pasture - improved	5.25	0.64%
Pine plantation	6.02	0.73%
Scrubby flatwoods	44.91	5.47%
Wet flatwoods	57.92	7.06%

*GIS-calculated acreage may differ from actual acreage.

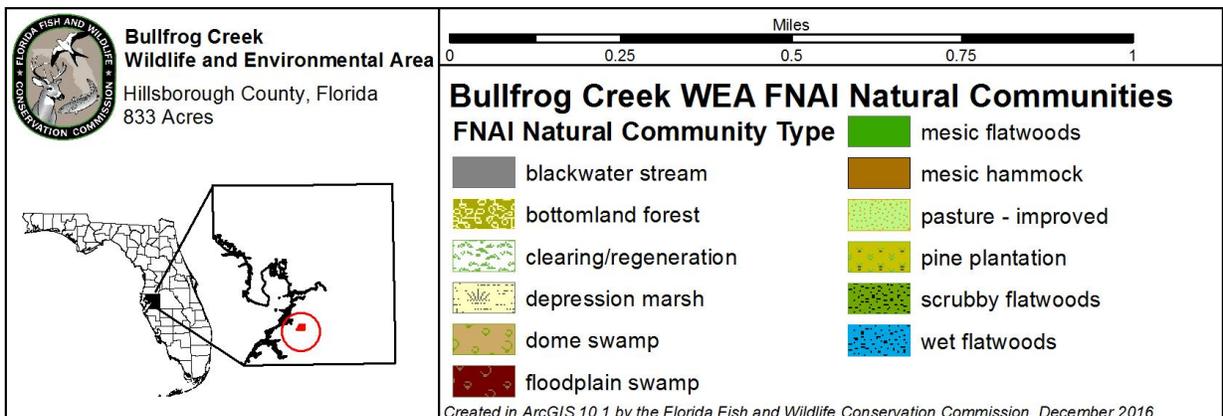
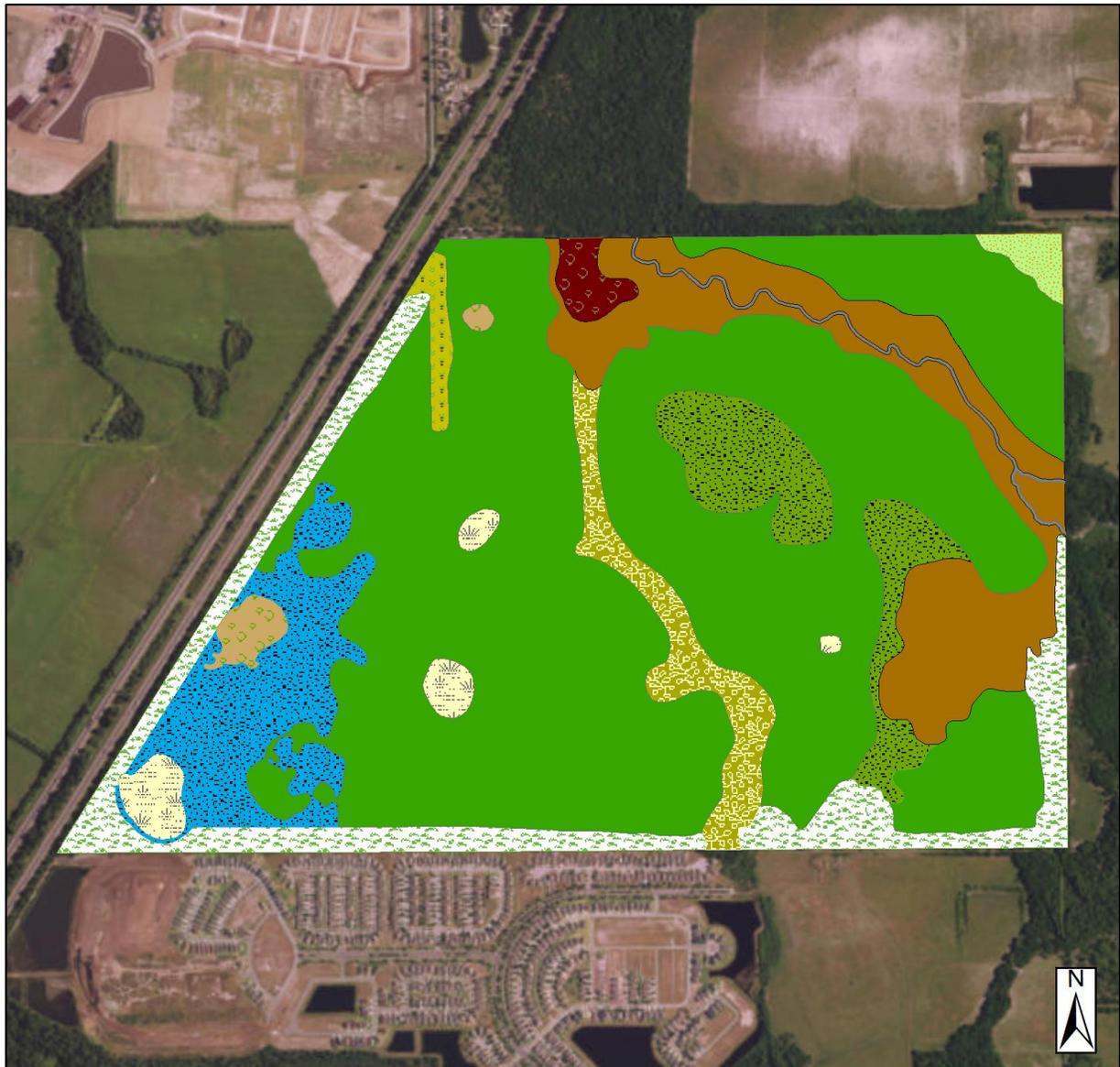


Figure 7. BCWEA – FNAI Natural and Anthropogenic Communities

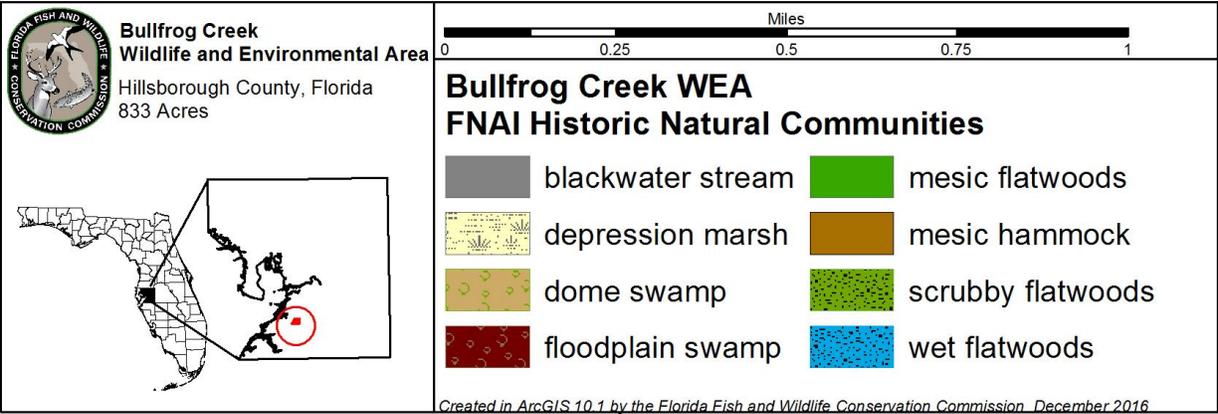
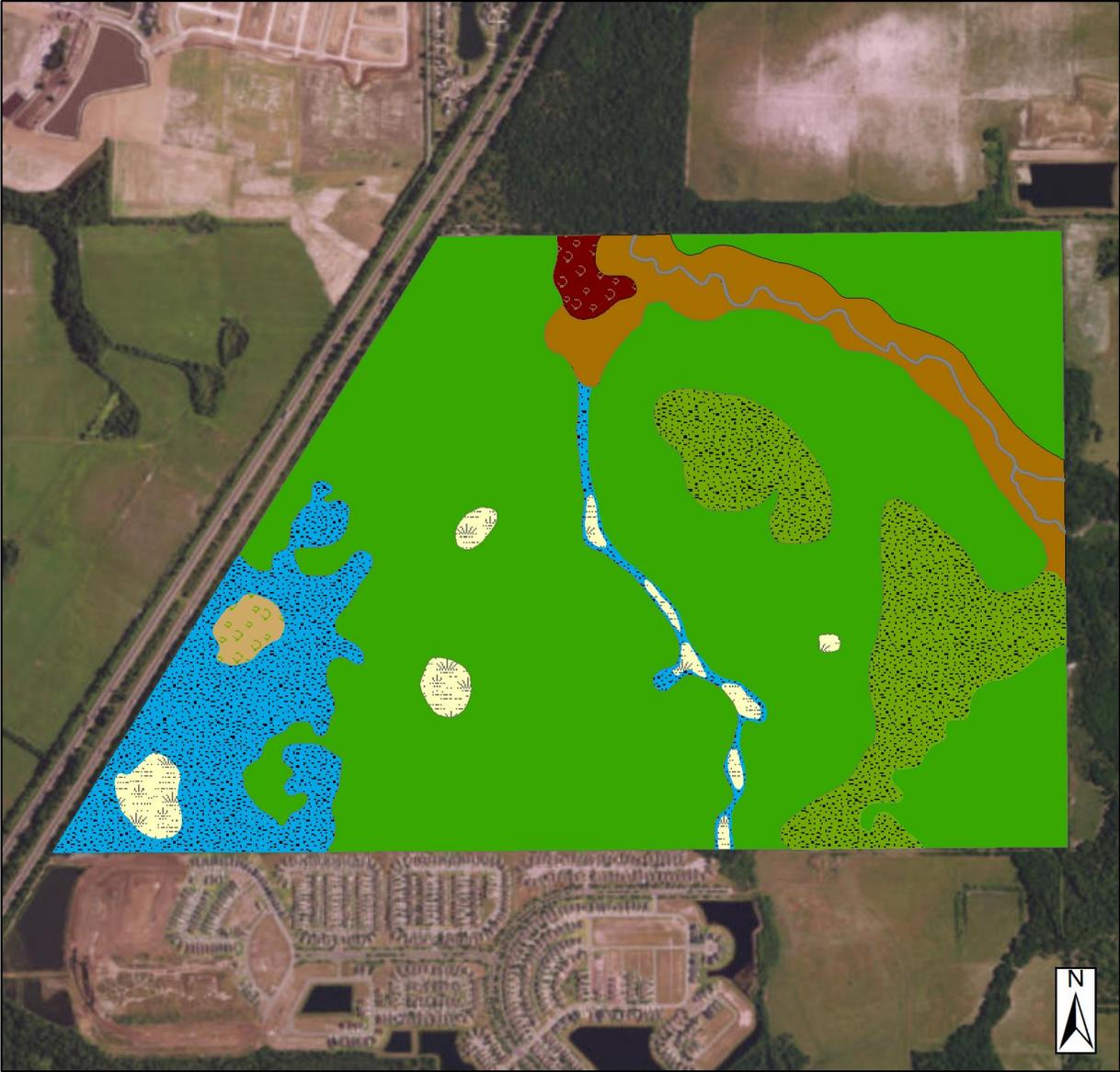


Figure 8. BCWEA – FNAI Historic Natural Communities

Table 4. Native Plant Species Known to Occur on the BCWEA

Common Name	Scientific Name
Alligatorflag	<i>Thalia geniculata</i>
American beautyberry	<i>Callicarpa americana</i>
American cupscale	<i>Sacciolepis striata</i>
Atlantic St. John's wort	<i>Hypericum tenuifolium</i>
Beaked panicum	<i>Panicum anceps</i>
Beaksedge	<i>Rhynchospora</i> sp.
Beggarticks	<i>Bidens alba</i>
Blackroot	<i>Pterocaulon pycnostachyum</i>
Blue maidencane	<i>Amphicarpum muhlenbergianum</i>
Bottlebrush threeawn	<i>Aristida spiciformis</i>
Broomsedge bluestem	<i>Andropogon virginicus</i>
Bushy bluestem	<i>Andropogon glomeratus</i>
Cabbage palm	<i>Sabal palmetto</i>
Camphorweed	<i>Pluchea</i> sp.
Carolina redroot	<i>Lachnanthes caroliana</i>
Catesby lily	<i>Lilium catesbaei</i>
Chapman's oak	<i>Quercus chapmanii</i>
Cinnamon fern	<i>Osmunda cinnamomea</i>
Climbing hempvine	<i>Mikania scandens</i>
Clustered bushmint	<i>Hyptis alata</i>
Coastalplain chaffhead	<i>Carphephorus corymbosus</i>
Coastalplain milkwort	<i>Polygala setacea</i>
Coastalplain staggerbush	<i>Lyonia fruticosa</i>
Coastalplain willow	<i>Salix caroliniana</i>
Common buttonbush	<i>Cephalanthus occidentalis</i>
Creeping primrosewillow	<i>Ludwigia repens</i>
Crowngrass	<i>Paspalum</i> sp.
Dahoon holly	<i>Ilex cassine</i>
Deerberry	<i>Vaccinium stamineum</i>
Dentate lattice-vein fern	<i>Thelypteris serrata</i>
Dogfennel	<i>Eupatorium capillifolium</i>
Dwarf live oak	<i>Quercus minima</i>
Earleaf greenbrier	<i>Smilax auriculata</i>
Eastern poison ivy	<i>Toxicodendron radicans</i>
Fall panicgrass	<i>Panicum dichotomiflorum</i>
False nettle	<i>Boehmeria cylindrica</i>
Fascicled beaksedge	<i>Rhynchospora fascicularis</i>
Fetterbush	<i>Lyonia lucida</i>

Table 4. Native Plant Species Known to Occur on the BCWEA

Common Name	Scientific Name
Flatsedge	<i>Cyperus</i> sp.
Flattened pipewort	<i>Eriocaulon compressum</i>
Flaxleaf false foxglove	<i>Agalinis linifolia</i>
Floating marshpennywort	<i>Hydrocotyle ranunculoides</i>
Florida golden aster	<i>Chrysopsis floridana</i>
Fragrant eryngo	<i>Eryngium aromaticum</i>
Fringed yellow stargrass	<i>Hypoxis juncea</i>
Gallberry	<i>Ilex glabra</i>
Giant orchid	<i>Pteroglossaspis ecristata</i>
Goldenrod	<i>Solidago</i> sp.
Gopher apple	<i>Licania michauxii</i>
Greenbriar	<i>Smilax</i> sp.
Groundsel tree	<i>Baccharis halimifolia</i>
Hairy chaffhead	<i>Carphephorus paniculatus</i>
Hairy jointweed	<i>Polygonella ciliata</i>
Laurel greenbrier	<i>Smilax laurifolia</i>
Live oak	<i>Quercus virginiana</i>
Lopsided indiagrass	<i>Sorghastrum secundum</i>
Maidencane	<i>Panicum hemitomon</i>
Muscadine	<i>Vitis rotundifolia</i>
Myrtleleaf St. John's wort	<i>Hypericum myrtifolium</i>
Netted chain fern	<i>Woodwardia areolata</i>
Netted pawpaw	<i>Asimina reticulata</i>
Pale meadowbeauty	<i>Rhexia mariana</i>
Panicgrass	<i>Panicum</i> sp.
Pickerelweed	<i>Pontederia cordata</i>
Pinebarren goldenrod	<i>Solidago fistulosa</i>
Pineland passion vine	<i>Passiflora pallens</i>
Pineywoods dropseed	<i>Sporobolus junceus</i>
Pond cypress	<i>Taxodium ascendens</i>
Possumhaw	<i>Viburnum nudum</i>
Red maple	<i>Acer rubrum</i>
Rosegiantian	<i>Sabatia</i> sp.
Roundleaf thoroughwort	<i>Eupatorium rotundifolium</i>
Royal fern	<i>Osmunda regalis</i> var. <i>spectabilis</i>
Sand blackberry	<i>Rubus cuneifolius</i>
Sand live oak	<i>Quercus geminata</i>
Saw greenbrier	<i>Smilax bona-nox</i>
Saw palmetto	<i>Serenoa repens</i>

Table 4. Native Plant Species Known to Occur on the BCWEA

Common Name	Scientific Name
Shiny blueberry	<i>Vaccinium myrsinites</i>
Slender flattop goldenrod	<i>Euthamia caroliniana</i>
South Florida slash pine	<i>Pinus elliottii</i> var. <i>densa</i>
Southern umbrellasedge	<i>Fuirena scirpoidea</i>
Spanish moss	<i>Tillandsia usneoides</i>
Sparkleberry	<i>Vaccinium arboreum</i>
St. John's wort	<i>Hypericum</i> sp.
Sugarcane plumegrass	<i>Saccharum giganteum</i>
Swamp bay	<i>Persea palustris</i>
Swamp laurel oak	<i>Quercus laurifolia</i>
Sweetbay	<i>Magnolia virginiana</i>
Sword fern	<i>Nephrolepis exaltata</i>
Tenangle pipewort	<i>Eriocaulon decangulare</i>
Tick trefoil	<i>Desmodium</i> sp.
Tickseed	<i>Bidens</i> sp.
Toothed lattice-vein fern	<i>Thelypteris serrata</i>
Toothed midsorus fern	<i>Blechnum serrulatum</i>
Toothpetal false rein orchid	<i>Habenaria floribunda</i>
Tracy's beaksedge	<i>Rhynchospora tracyi</i>
Vanillaleaf	<i>Carphephorus odoratissimus</i>
Virginia chain fern	<i>Woodwardia virginica</i>
Ware's hairsedge	<i>Bulbostylis warei</i>
Water oak	<i>Quercus nigra</i>
Wax myrtle	<i>Myrica cerifera</i>
Whitehead bogbutton	<i>Lachnocaulon anceps</i>
Wild pennyroyal	<i>Piloblephis rigida</i>
Winged sumac	<i>Rhus copallinum</i>
Wiregrass	<i>Aristida stricta</i> var. <i>beyrichiana</i>
Witchgrass	<i>Dichanthelium</i> sp.
Yellow jessamine	<i>Gelsemium sempervirens</i>
Yellow-eyed grass	<i>Xyris</i> sp.

Table 5. Imperiled Plants Known to Occur on the BCWEA

Common Name	Scientific Name	Status
Catesby lily	<i>Lilium catesbaei</i>	ST
Dentate lattice-vein fern	<i>Thelypteris serrata</i>	FE/SE
Florida golden aster	<i>Chrysopsis floridana</i>	FE/SE
Giant orchid	<i>Pteroglossaspis ecristata</i>	ST

Abbreviations: FE - Federal listed endangered; SE - State listed endangered; ST - State listed threatened

Table 6. Exotic Plant Species Known to Occur on the BCWEA

Common Name	Scientific Name	FLEPPC Category
Asian sword fern	<i>Nephrolepis brownii</i>	I
Bahiagrass	<i>Paspalum notatum</i>	
Brazilian pepper	<i>Schinus terebinthifolius</i>	I
Burma reed	<i>Neyraudia reynaudiana</i>	I
Caesar's weed	<i>Urena lobata</i>	I
Camphor tree	<i>Cinnamomum camphora</i>	I
Carrotwood	<i>Cupaniopsis anacardioides</i>	I
Cogongrass	<i>Imperata cylindrica</i>	I
Downy rose-myrtle	<i>Rhodomyrtus tomentosa</i>	I
Japanese climbing fern	<i>Lygodium japonicum</i>	I
Lantana	<i>Lantana camara</i>	I
Melaleuca	<i>Melaleuca quinquenervia</i>	I
Old World climbing fern	<i>Lygodium microphyllum</i>	I
Peruvian primrosewillow	<i>Ludwigia peruviana</i>	I
Skunkvine	<i>Paederia foetida</i>	I
Smutgrass	<i>Sporobolus indicus</i>	
Tickclover	<i>Desmodium incanum</i>	
Tropical soda apple	<i>Solanum viarum</i>	I

2.2.1 FNAI Natural Community Descriptions

The following are descriptions of the nine natural and three altered or anthropogenic community types that occur on the BCWEA. These descriptions were prepared by the FNAI and modified by the FWC.

2.2.1.1 FNAI Natural Community Descriptions

Blackwater stream (3.6 acres)

Blackwater streams are perennial or intermittent seasonal watercourses originating deep in sandy lowlands where extensive wetlands with organic soils function as reservoirs, collecting rainfall and discharging it slowly to the stream. The tea-colored waters of

blackwater streams are laden with tannins, particulates, and dissolved organic matter and iron derived from drainage through swamps and marshes. The dark-colored water reduces light penetration and thereby inhibits the growth of submerged aquatic plants. Emergent and floating aquatic vegetation may occur along shallower and slower moving sections, but



their presence is often reduced because of the typically steep banks and considerable seasonal fluctuations in water level. The distinction between blackwater streams and sloughs can be obscure, with the main difference being that blackwater streams usually have constantly moving water and are rarely covered in vegetation.

Bullfrog Creek, which flows northwest through the BCWEA and accounts for over three acres of the area, is classified as a blackwater stream. The waters of Bullfrog Creek are generally very shallow and are relatively faster flowing and clearer than typical blackwater streams.

Bottomland forest (30 acres)

Bottomland forests occur within floodplain forests and swamps on higher ground that is rarely inundated except during unusual flood events. Found in areas intermediate between swamps and uplands, the canopy may be quite diverse with both deciduous and evergreen hydrophytic to mesophytic trees. Bottomland forest is a closed-canopy forest found on terraces and levees within riverine floodplains and in shallow depressions. Bottomland forests along smaller streams are prone to periodic flooding attributable to localized rainfall that increases seepage and runoff from surrounding uplands. In floodplains along larger rivers and tributaries, bottomland forests on higher terraces, ridges, and levees are subject to only short seasonal floods due to high relief or quickly drained sandy soils, or both conditions. The water table in these forests is high in blackwater or spring-fed floodplains, but relatively low during dry periods in alluvial floodplains. Inundation occurs only during higher floods, regardless of the stream type.

The approximately 29 acres classified as bottomland forest on the BCWEA are narrow and linear in nature and form a wetland system that contains an ephemeral seepage stream. In historic photography, this system appears as a series of depression marshes connected by a seepage stream and surrounded by a hydric community that was very open and presumably graminoid-dominated. The historic open depression marshes that are visible in the 1938 aerials have over time experienced shrub and hardwood tree encroachment and the historic depression marshes have formed a less discrete, more interconnected wetland system.

Depression Marsh (13.2 acres)

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

Depression marshes at the BCWEA are associated with mesic and wet flatwoods. Short shrubs are limited to myrtleleaf St. John's wort. The herbaceous layer includes flaxleaf false foxglove, blue maidencane, broomsedge bluestem, flattened pipewort, tenangle pipewort, dogfennel, southern umbrellasedge, Carolina redroot, creeping primrosewillow, beaked panicum, fall panicgrass, maidencane, panicgrass, camphorweed, and pickerelweed, fascicled beaksedge, beaksedge, Tracy's beaksedge, sugarcane plumegrass, American cupscale, alligatorflag, Virginia chain fern, and yellow-eyed grass.

No rare or invasive exotic species were observed in the depression marshes of the BCWEA, though some hog damage was evident. Prescribed fire is allowed to burn through these areas when surrounding uplands are treated. Historic coverage of depression marshes is similar to the current conditions, though some areas of historic depression marsh appear to have converted to wet flatwoods.

Dome Swamp (7.2 acres)

Dome swamp is an isolated, forested, depression wetland often occurring within a fire-maintained community such as mesic flatwoods. These swamps are generally small, but may also be large and shallow. The characteristic dome shape is created by smaller trees that grow in the shallower waters of the outer edge, while taller trees grow in the deeper water in the interior of the swamp. Dome swamps are most often found on flat terraces, where they develop when the overlying sand has slumped into a depression in the underlying limestone, creating a rounded depression connected to a shallow water table. In uplands with clay soils, dome swamps may occupy depressions over a perched water table. Soils in dome swamps are variable, but are most often composed of a layer of peat, which may be thin or absent at the periphery, becoming thicker toward the center of the dome.

There are two areas classified as dome swamp on the BCWEA. One of these areas is a historic dome swamp located near the western edge of the area and is just over six acres in size. This dome swamp is a high quality community dominated by pond cypress in the canopy and in the sub-canopy layers. Dahoon holly is also a component of the sub-canopy.

The tall shrub layer includes common buttonbush, wax myrtle, and swamp laurel oak. The herbaceous layer includes toothed midsorus fern, maidencane, panicgrass, netted chain fern, and Virginia chain fern. Spanish moss was the only epiphyte observed.

The other area currently classified as dome swamp is approximately one acre in size and is located in the northwest corner of the BCWEA. This area was historically a depression marsh as determined by the historical aerial photography and has succeeded to a dome swamp-like community. This area is dominated by red maple, dahoon holly, laurel oak, and wax myrtle. Saw palmetto, eastern poison ivy, and muscadine were also found at this site with an herbaceous layer consisting of ferns.

Floodplain Swamp (7 acres)

Floodplain Swamps occur on flooded soils along stream channels and in low spots and oxbows within river floodplains. Dominant trees are usually buttressed hydrophytic trees such as cypress and tupelo; the understory and ground cover are generally very sparse. Canopy coverage is generally high, but can be sparse as the community grades into open water areas. Shrub and herbaceous layers are usually sparse and concentrated in open areas of the community and on included hummocks and stumps.

There is one area of floodplain swamp, totaling just under seven acres, near the northern boundary of the BCWEA just west of Bullfrog Creek. Pond cypress is the dominant canopy tree in this community. The tall shrub layer includes groundsel tree, common buttonbush, Peruvian primrosewillow, wax myrtle, Brazilian pepper, cabbage palm, and coastalplain willow. Short shrubs include common buttonbush and Peruvian primrosewillow. The herbaceous layer includes false nettle, floating marshpennywort, Old World climbing fern, climbing hempvine, cinnamon fern, beaked panicum, maidencane, pickerelweed, toothed lattice-vein fern, and Virginia chain fern. Epiphytes were restricted to Spanish moss. Vines include laurel greenbrier and muscadine.

This community appears to be a very open community in the historical photography and may even be better classified as a floodplain marsh with scattered trees, presumably cypress.

Mesic Flatwoods (483.4 acres)

Mesic flatwoods is the most widespread natural community in Florida, covering the flat sandy terraces left behind by former high sea levels. Mesic flatwoods is characterized by an open canopy of tall pines and a dense, low ground layer of shrubs, grasses, and forbs. Longleaf pine is the principal canopy tree in northern and Central Florida, transitioning to predominately slash pine in south Florida. Soils are acidic, nutrient-poor, fine sands with upper layers darkened by organic matter. Drainage in this flat terrain can be impeded by a loosely cemented organic layer (spodic horizon) formed within several feet of the soil

surface. The soils may be alternately xeric during dry periods, and saturated or even inundated after heavy rain events.

Mesic flatwoods is the most prevalent natural community on the BCWEA, accounting for over 483 acres on the area. Mesic flatwoods on the BCWEA are for the most part very high quality with widely spaced pines, low shrub heights and high herbaceous coverage. This community has been actively managed on the BCWEA, with both regular prescribed fire and recurring mechanical treatments. These management actions have limited shrub encroachment. The primary canopy tree species found within the mesic flatwoods on the area include South Florida slash pine and live oak. These species are also present in the

sub-canopy layer and are complemented by dahoon holly. Taxonomic elements in the tall shrub layer include groundsel tree, common buttonbush, dahoon holly, sweetbay, wax myrtle, swamp bay, South Florida slash pine, Chapman's oak, sand live oak, swamp laurel oak, water oak, live oak, winged sumac, cabbage palm, and possumhaw. Among the short shrubs were netted pawpaw, camphor tree, Atlantic St. John's wort, dahoon holly,



gallberry, gopher apple, coastalplain staggerbush, fetterbush, sweetbay, wax myrtle, swamp bay, South Florida slash pine, Chapman's oak, sand live oak, swamp laurel oak, dwarf live oak, water oak, live oak, winged sumac, cabbage palm, saw palmetto, sparkleberry, and shiny blueberry. The herbaceous layer of the mesic flatwoods community includes broomsedge bluestem, bottlebrush threeawn, wiregrass, tickseed, toothed midsorus fern, vanillaleaf, hairy chaffhead, witch grass, roundleaf thoroughwort, slender flattop goldenrod, toothpetal false rein orchid, whitehead bogbutton, cinnamon fern, royal fern, rosegentian, pinebarren goldenrod, lopsided indianguass, Caesar's weed, netted chain fern, and yellow-eyed grass. Epiphytes are restricted to Spanish moss. The vine layer includes yellow jessamine, laurel greenbrier, eastern poison ivy, and muscadine.

Mesic Hammock (91.9 acres)

Mesic hammock is a well-developed evergreen hardwood and/or palm forest, typically with a closed canopy of live oak. Mesic hammock may occur as “islands” on high ground within basin or floodplain wetlands, as patches of oak/palm forest in dry prairie or flatwoods communities, on river levees, or in ecotones between wetlands and upland communities. Historically, mesic hammocks were likely restricted to fire shadows, or other naturally fire-protected areas such as islands and peninsulas of lakes. Other landscape positions that can provide protection from the spread of fire are likely places for mesic hammock development, including edges of lakes, sinkholes, other depressional or basin wetlands, and river

floodplains. Although mesic hammock is not generally considered a fire-adapted community, some small patches of hammock occurring as islands within marshes or prairies may experience occasional low-intensity ground fires. Mesic hammocks occur on well-drained sands mixed with organic matter and are rarely inundated. High moisture is maintained by heavy shading of the ground layer and accumulation of litter. Where limestone is near the surface, rocky outcrops are common in mesic hammocks.

Mesic hammocks on the BCWEA can be found primarily along Bullfrog Creek and near the eastern boundary of the area. Canopy trees of mesic hammock at the BCWEA include

South Florida slash pine and live oak. Among the sub-canopy trees present are sand live oak, water oak, and live oak. Taxonomic elements in the tall shrub layer include common buttonbush, Chapman's oak, sand live oak, water oak, cabbage palm, and Caesar's weed. Short shrubs include American beautyberry, St. John's wort, cabbage palm, saw palmetto, and deerberry. The herbaceous species are represented by beggarticks, false nettle, flatsedge, crown grass, pinebarren goldenrod, and Caesar's weed.



Taxonomic elements in the epiphytic layer include sword fern and Spanish moss. Vines noted for this community include earleaf greenbrier, saw greenbrier, greenbrier, eastern poison ivy, and muscadine.

The mesic hammock community on the BCWEA appears to have grown in acreage over time, based on historical aerial photography. The line between mesic hammock and surrounding pyrogenic communities has been obscured due to changes in fire frequency and timing, as well as woody encroachment.

Scrubby Flatwoods (44.9 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).

Approximately 45 acres of the BCWEA are classified as scrubby flatwoods. The canopy layer in this community is comprised of South Florida slash pine and sand live oak. The

tall shrub layer is defined by sand live oak. Species present as short shrubs include gopher apple, wild pennyroyal, sand live oak, staggerbush, Chapman's oak, dwarf live oak, saw palmetto, and shiny blueberry. Herbaceous plants are represented by wiregrass, Ware's hairsedge, the rare Florida goldenaster, coastalplain chaffhead, lopsided indiagrass, fragrant eryngo, fringed yellow stargrass, whitehead bogbutton, coastalplain milkwort, hairy jointweed, blackroot, and pineywoods dropseed. Spanish moss is the primary epiphyte.

Areas of this community can be considered scrub, but likely exist as scrub currently due to previous fire suppression within a historically scrubby flatwoods community. The sand live oaks that form the canopy of scrubby flatwoods at the BCWEA were not present in the historical photography and have the potential to negatively affect groundcover if left unchecked. However, the scrubby flatwoods on the BCWEA have been actively managed by FWC staff, through both the application of prescribed fire and repeated mechanical treatments, in order to restore and maintain desirable vegetative attributes for this community type. The federally-endangered Florida goldenaster was documented in some of the best examples of this community and even in those areas canopy oaks have affected the herb components of this community. Canopy density, due to historical fire suppression, increases as one moves from west to east across the BCWEA. The westernmost areas that were historical scrubby flatwoods have evolved to a mesic hammock community dominated by live oak and sand live oak.

Wet Flatwoods (57.9 acres)

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

Nearly 58 acres of the BCWEA are classified as wet flatwoods, all of which are concentrated in the southwest corner of the area. The canopy of wet flatwoods on the BCWEA includes South Florida slash pine, swamp laurel oak, and live oak. Tall shrubs includes common buttonbush, dahoon holly, sweetbay, swamp bay, swamp laurel oak, and Brazilian pepper. The short shrub layer includes dahoon holly, wax myrtle, swamp bay, and saw palmetto. Herbs include broomsedge bluestem, wiregrass, tenangle pipewort, slender flattop

goldenrod, Carolina redroot, pale meadowbeauty, goldenrod cinnamon fern, netted chain fern, and Virginia chain fern. Epiphytes were limited to Spanish moss. The vine layer consisted of laurel greenbrier, greenbriar, eastern poison ivy, and muscadine.

The wet flatwoods community on the BCWEA occurs in a relatively flat area that surrounds a depression marsh and dome swamp. It is a transition from these wetland communities to the upland mesic flatwoods areas. This area was previously in the process of becoming overtaken by shrub encroachment, but management actions and application of fire have limited shrub encroachment. Historical conditions can be achieved with continued fire management that removes woody cover from this community.

2.2.1.2 FNAI Anthropogenic Community Descriptions

Clearing/regeneration (71 acres)

Areas classified as clearing/regeneration are ruderal areas that reflect anthropogenic disturbance, and can include old fields, fallow pastures, or 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.

On the BCWEA, there are approximately 71 acres classified as clearing/regeneration, evident in 1995 aerial photography, which were historically mesic flatwoods. These areas are concentrated along the western, southern, and southeastern edges of the property and consist primarily of land clearing for perimeter fire break purposes. Within the herbaceous layer exist such species as blue maidencane, broomsedge bluestem, dogfennel, slender flattop goldenrod, clustered bushmint, Carolina redroot, bahiagrass, sand blackberry, and goldenrod. Brazilian pepper and lantana, both invasive exotic species, were documented in this habitat. One rare plant species, giant orchid, has also been documented in this community on the BCWEA.

Improved Pasture (5.3 acres)

Areas dominated by pasture grasses with little to no intact native species are classified as improved pasture. Evidence of current or recent pasture maintenance may be present. In any case, these activities typically result in the loss of native species.

The BCWEA has one example of this anthropogenic ecological community occurring in the extreme northeast corner of the property. The current entrance to the BCWEA is situated in the same location as this five-acre patch of improved pasture. This community has severe disturbance to all strata that historically existed. Live oaks are present as tall shrubs, while Peruvian primrosewillow and winged sumac exist as short shrubs. Herbs include bushy bluestem, tick trefoil, dogfennel, slender flattop goldenrod, bahiagrass, smutgrass, and Caesar's weed.

Pine Plantation (6 acres)

Areas altered by silvicultural activities are classified as pine plantation. These include lands where either planted pines are having or will have an ongoing detrimental effect on native groundcover, the history of planted pines has damaged ground cover to the point where further restoration beyond thinning and burning is required, and/or the method of planting has severely impacted groundcover. Pine plantations in Florida are often dominated by even-aged loblolly, sand, or slash pine. Dense pine plantations typically have sparse to absent herbaceous vegetation as a result of shading or a cover of deep pine needle duff. These plantations may be very shrubby or vine-dominated or open at ground level. The groundcover in most cases has been severely impacted by mechanical site preparation, such as rolled chopping and bedding. However, while perennial grasses such as wiregrass may be greatly reduced, many components of the native groundcover persist even though the relative abundance is altered.

On the BCWEA, there are six acres in the northwest corner of the area that are currently classified as pine plantation, but which may better be described as mesic flatwoods with high pine density. The canopy in this community is dominated by South Florida slash pine. In the short shrub layer, netted pawpaw, dwarf live oak, saw palmetto, and shiny blueberry persist. Herbaceous species include broomsedge bluestem, flatsedge, slender flattop goldenrod, bahiagrass, pinebarren goldenrod, and Caesar's weed. The pine plantation on the BCWEA contains bahiagrass and its pines are planted in relatively dense rows. While some native vegetation still persists, this area has had other unknown disturbances in its past.

2.2.2 Forest Resources

Over half of the BCWEA is composed of mesic flatwoods with an open, mixed-aged pine overstory, low shrub heights, and high herbaceous coverage. Timber management activities on the BCWEA will be designed exclusively to enhance habitat for the benefit of wildlife and to achieve the desired future conditions of natural communities on the area. As a result, these activities will be long-term oriented and are likely to be infrequent. There are currently approximately 100 acres of flatwoods on the BCWEA that have a higher than desirable pine basal area and are in need of thinning to reach optimal conditions. The FWC intends to conduct timber thinning to



promote habitat conditions on the BCWEA in the future, once management access to the area is improved. These activities are discussed further in Sections 5.8 and 6.7.

The FWC will cooperate with the FFS regarding forest management on the BCWEA and to produce a timber assessment for the area. This timber assessment will evaluate the area’s timber resources and provide recommendations regarding the management of those timber resources and the feasibility of utilizing silvicultural techniques as a management activity on the area. The timber assessment will be incorporated into Appendix 12.5 of this Management Plan once it is completed by the FFS.

2.3 Fish and Wildlife Resources

As previously described, the BCWEA has a variety of high-quality natural communities and habitat types that support a wide array of imperiled, rare, and more prevalent wildlife species. Active wildlife management practices and a diversity of habitat types make the BCWEA an excellent place to view wildlife. The BCWEA’s mesic flatwoods, mesic hammocks, scrubby flatwoods, wet flatwoods, marshes, swamps, and other communities provide critical habitat for resident and migratory wildlife. In addition to the four imperiled plant species noted in Table 5, there are nine imperiled wildlife species documented as occurring on the BCWEA. Those imperiled wildlife species are listed in Table 12.

The FWC also maintains an inventory of fauna occurring on or near the BCWEA, including amphibians (Table 7), birds (Table 8), mammals (Table 9), and reptiles (Table 10). Additionally, Table 11 contains an inventory of the exotic wildlife species that have been documented on or near the BCWEA.

Table 7. Amphibian Species Known to Occur at BCWEA

Common Name	Scientific Name
Florida chorus frog	<i>Pseudacris nigrita verrucosa</i>
Florida cricket frog	<i>Acris gryllus dorsalis</i>
Pig frog	<i>Lithobates grylio</i>
Pinewoods treefrog	<i>Hyla femoralis</i>
Squirrel treefrog	<i>Hyla squirella</i>

Table 8. Avian Species Known to Occur at BCWEA

Common Name	Scientific Name
American robin	<i>Turdus migratorius</i>
Anhinga	<i>Anhinga anhinga</i>
Barred owl	<i>Strix varia</i>
Black vulture	<i>Coragyps atratus</i>

Table 8. Avian Species Known to Occur at BCWEA

Common Name	Scientific Name
Black-and-white warbler	<i>Mniotilta varia</i>
Blue jay	<i>Cyanocitta cristata</i>
Blue-gray gnatcatcher	<i>Poliophtila caerulea</i>
Blue-headed vireo	<i>Vireo solitarius</i>
Bobolink	<i>Dolichonyx oryzivorus</i>
Brown thrasher	<i>Toxostoma rufum</i>
Carolina chickadee	<i>Poecile carolinensis</i>
Carolina wren	<i>Thryothorus ludovicianus</i>
Cattle egret	<i>Bubulcus ibis</i>
Common grackle	<i>Quiscalus quiscula</i>
Common ground dove	<i>Columbina passerina</i>
Common nighthawk	<i>Chordeiles minor</i>
Common yellowthroat	<i>Geothlypis trichas</i>
Downy woodpecker	<i>Picoides pubescens</i>
Eastern bluebird	<i>Sialia sialis</i>
Eastern meadowlark	<i>Sturnella magna</i>
Eastern phoebe	<i>Sayornis phoebe</i>
Eastern towhee	<i>Pipilo erythrophthalmus</i>
Fish crow	<i>Corvus ossifragus</i>
Florida sandhill crane	<i>Grus canadensis pratensis</i>
Glossy ibis	<i>Plegadis falcinellus</i>
Gray catbird	<i>Dumetella carolinensis</i>
Great blue heron	<i>Ardea herodias</i>
Great egret	<i>Ardea alba</i>
Great horned owl	<i>Bubo virginianus</i>
House wren	<i>Troglodytes aedon</i>
Killdeer	<i>Charadrius vociferus</i>
Little blue heron	<i>Egretta caerulea</i>
Loggerhead shrike	<i>Lanius ludovicianus</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>
Ovenbird	<i>Seiurus aurocapilla</i>
Palm warbler	<i>Setophaga palmarum</i>
Pileated woodpecker	<i>Dryocopus pileatus</i>

Table 8. Avian Species Known to Occur at BCWEA

Common Name	Scientific Name
Pine warbler	<i>Setophaga pinus</i>
Prairie warbler	<i>Setophaga discolor</i>
Red-bellied woodpecker	<i>Melanerpes carolinus</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>
Roseate spoonbill	<i>Platalea ajaja</i>
Ruby-crowned kinglet	<i>Regulus calendula</i>
Sedge wren	<i>Cistothorus platensis</i>
Southern bald eagle	<i>Haliaeetus leucocephalus</i>
Summer tanager	<i>Piranga rubra</i>
Swallow-tailed kite	<i>Elanoides forficatus</i>
Tree swallow	<i>Tachycineta bicolor</i>
Tricolored heron	<i>Egretta tricolor</i>
Tufted titmouse	<i>Baeolophus bicolor</i>
Turkey vulture	<i>Cathartes aura</i>
White ibis	<i>Eudocimus albus</i>
White-eyed vireo	<i>Vireo griseus</i>
Wood duck	<i>Aix sponsa</i>
Wood stork	<i>Mycteria americana</i>
Yellow-billed cuckoo	<i>Coccyzus americanus</i>
Yellow-rumped warbler	<i>Setophaga coronata</i>
Yellow-throated warbler	<i>Setophaga dominica</i>

Table 9. Mammal Species Known to Occur at BCWEA

Common Name	Scientific Name
Bobcat	<i>Lynx rufus</i>
Cotton mouse	<i>Peromyscus gossypinus</i>
Cotton rat	<i>Sigmodon hispidus</i>
Eastern cottontail	<i>Sylvilagus floridanus</i>
Eastern gray squirrel	<i>Sciurus carolinensis</i>
Eastern mole	<i>Scalopus aquaticus</i>
Florida mouse	<i>Podomys floridanus</i>
Gray fox	<i>Urocyon cinereoargenteus</i>
Raccoon	<i>Procyon lotor</i>
Sherman's fox squirrel	<i>Sciurus niger shermani</i>
White-tailed deer	<i>Odocoileus virginianus</i>

Table 10. Reptile Species Known to Occur at BCWEA

Common Name	Scientific Name
American alligator	<i>Alligator mississippiensis</i>
Chicken turtle	<i>Deirochelys reticularia</i>
Eastern diamondback rattlesnake	<i>Crotalus adamanteus</i>
Eastern indigo snake	<i>Drymarchon couperi</i>
Gopher tortoise	<i>Gopherus polyphemus</i>
Green anole	<i>Anolis carolinensis</i>
Ground skink	<i>Scincella lateralis</i>
Six-lined racerunner	<i>Aspidoscelis sexlineata</i>
Southeastern five-lined skink	<i>Plestiodon inexpectatus</i>
Southern black racer	<i>Coluber constrictor priapus</i>

Table 11. Exotic Wildlife Species Known to Occur at BCWEA

Common Name	Scientific Name
African spurred tortoise*	<i>Geochelone sulcata*</i>
Feral hog	<i>Sus scrofa</i>
Greenhouse frog	<i>Eleutherodactylus planirostris</i>
Nine-banded armadillo	<i>Dasypus novemcinctus</i>

*A single occurrence of this species has been documented on the BCWEA, a population of the species is not present on the area.

2.3.1 Integrated Wildlife Habitat Ranking System

The FWC has developed the Integrated Wildlife Habitat Ranking System (IWHRS) as a Geographic Information Systems (GIS)-based assessment tool that incorporates a wide variety of land cover and wildlife species data. The IWHRS evaluates the Florida landscape based upon the habitat needs of wildlife as a way to identify ecologically significant lands in the state, and to assess the potential impacts of management and land-use changes. The IWHRS was developed to provide technical assistance to various local, regional, state, and federal agencies, and entities interested in wildlife needs and conservation in order to: (1) determine ways to avoid or minimize project impacts by evaluating alternative placements, alignments, and transportation corridors during early planning stages, (2) assess direct, secondary, and cumulative impacts to habitat and wildlife resources, and (3) identify appropriate parcels for public land acquisition for wetland and upland habitat mitigation purposes. The IWHRS (2009) indicates that the BCWEA has a mean wildlife value of 4.9 (Figure 9).

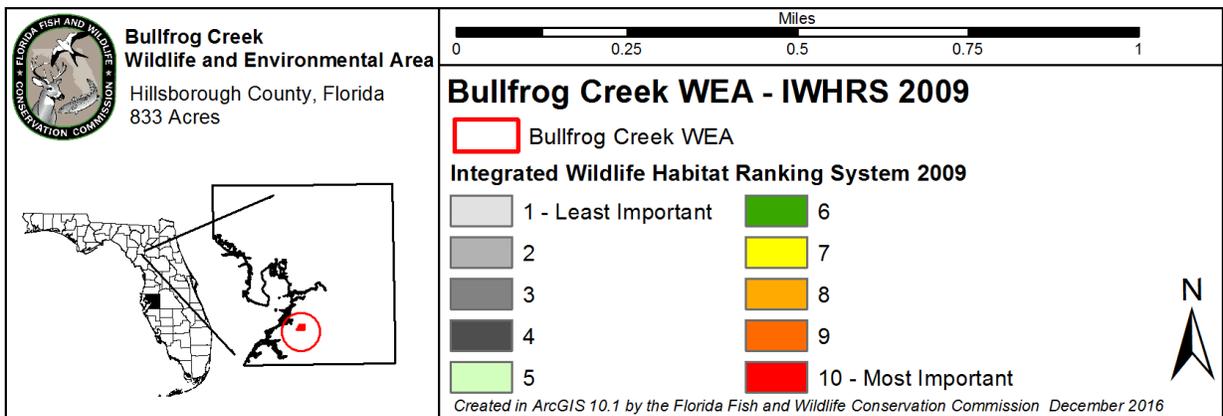
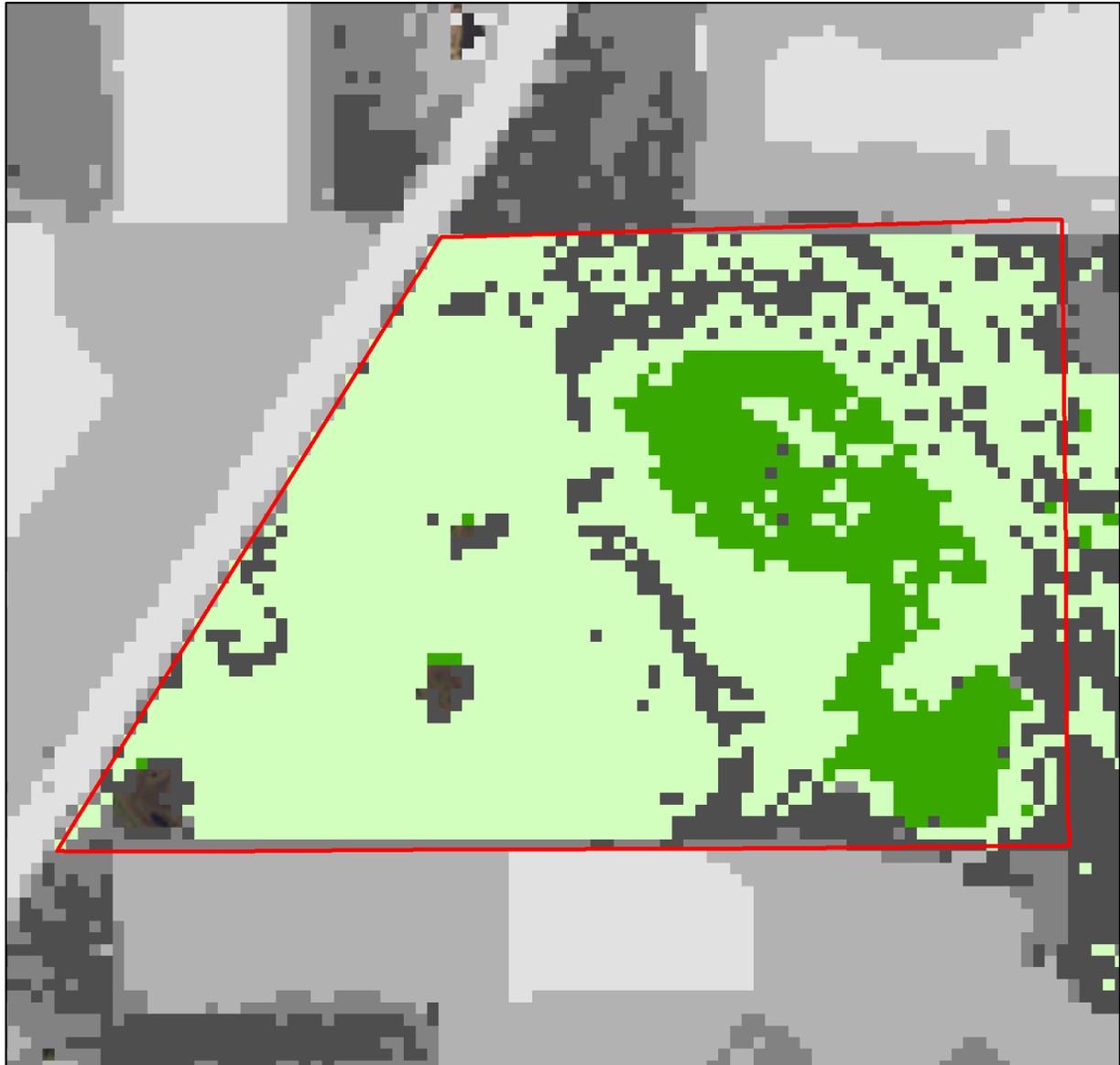


Figure 9. BCWEA – Integrated Wildlife Habitat Ranking System 2009

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 species of special concern by the FWC, or that are designated as endangered or threatened by the U.S. Fish and



Wildlife Service. This designation is also commonly known as “listed species.” An inventory of imperiled species documented on the BCWEA can be found in Table 12, below.

At its November 2016 Commission Meeting, the FWC approved the Imperiled Species Management Plan, which includes changes

to the listing status for many species. The rule changes included in the Imperiled Species Management Plan came into effect in January 2017. The list of wildlife presented here reflects those changes to the rules. All federally listed species that occur in Florida are included on Florida’s list as federally-designated endangered or federally-designated threatened species. Additionally, species that are not federally listed but which have been identified by the state as being at risk of extinction are listed as state-designated threatened. Finally, the FWC maintains a separate species of special concern category. This category was reviewed as part of the January 2017 rule changes and the majority of the species contained within the category were either removed from the imperiled species list due to conservation success or had their status changed to state threatened. However, six species remain listed as species of special concern. More detailed descriptions and management recommendations are available on the FWC website:

<http://www.myfwc.com/wildlifehabitats/profiles/>.

Due to conservation successes, fifteen species that were previously listed as species of species concern have improved their status and, as of the January 2017 rule changes, they are no longer listed as imperiled species. Two of these species, white ibis and Florida mouse, are present on the BCWEA.

Table 12. Imperiled Wildlife Species Known to Occur at BCWEA

Common Name	Scientific Name	Status
Birds		
Florida sandhill crane	<i>Grus canadensis pratensis</i>	ST
Little blue heron	<i>Egretta caerulea</i>	ST
Roseate spoonbill	<i>Platalea ajaja</i>	ST
Tricolored heron	<i>Egretta tricolor</i>	ST
Wood stork	<i>Mycteria americana</i>	FT

Table 12. Imperiled Wildlife Species Known to Occur at BCWEA

Common Name	Scientific Name	Status
Mammals		
Sherman's fox squirrel	<i>Sciurus niger shermani</i>	SSC
Reptiles		
American alligator	<i>Alligator mississippiensis</i>	FT (S/A)
Eastern indigo snake	<i>Drymarchon couperi</i>	FT
Gopher tortoise	<i>Gopherus polyphemus</i>	ST

Abbreviations: Listed by the State of Florida as Federally-designated Endangered (FE), Federally-designated Threatened (FT), Federally-designated Threatened due to similarity of appearance (FT [S/A]), State-designated Threatened (ST), or State Species of Special Concern (SSC).

2.3.3 FWC Wildlife Observations and FNAI Element Occurrences

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



Known locations of FNAI element occurrences and FWC observations of focal wildlife species from the most recent GIS databases are shown in Figure 10. Appendix 12.6 contains a letter from the FNAI authorizing the FWC to utilize their database for the purpose of displaying known plant and animal resources.

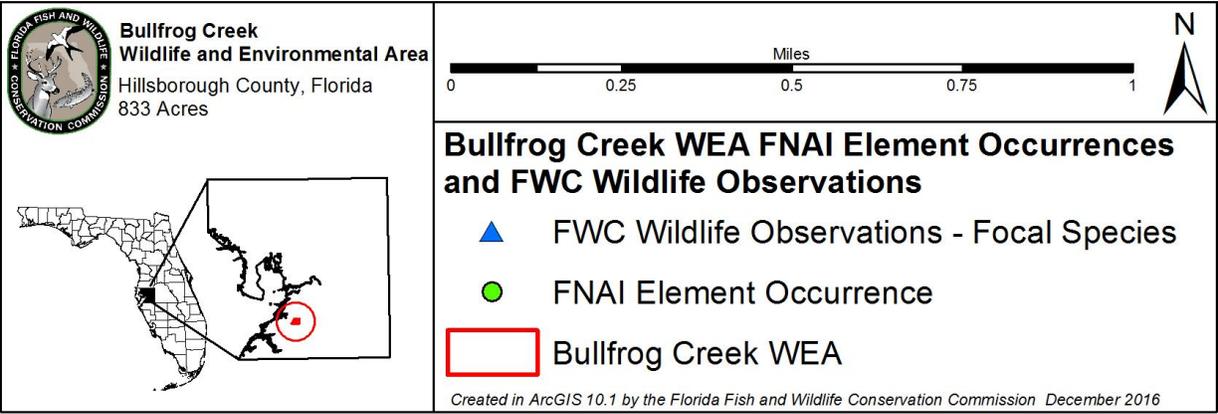


Figure 10. FWC Focal Species Observations and FNAI Element Occurrences

2.4 Native Landscapes

The most prominent native landscapes on the BCWEA are the areas high-quality mesic flatwoods with the characteristic widely-spaced pine overstory and wiregrass groundcover. Other significant landscapes include mesic hammock, scrubby flatwoods, wet flatwoods, and bottomland forest. Complete descriptions of the natural communities found on the BCWEA can be found in Section 2.2.1.

2.5 Water Resources

As previously noted, Bullfrog Creek runs for approximately one mile through the BCWEA, entering the area at its eastern boundary and flowing northwest and out of the northern boundary. Bullfrog Creek's drainage basin occupies approximately 40 square miles, with the creek's headwaters located near Wimauma, Florida, to the east of the BCWEA. From



there, Bullfrog Creek flows northward and westward into Hillsborough Bay, approximately one mile south of the Alafia River. Other water resources on the BCWEA include several depression marshes and dome swamps ranging from less than one acre to over six acres in size, and a bayhead/slough community that runs north-to-south through the central portion of the area and which can contribute flow to Bullfrog Creek during times of high rainfall.

No portion of the BCWEA is designated as an Outstanding Florida Water by the DEP. However, all of the surface waters within the area are classified by the DEP as Class III. Class III waters are intended for recreation and propagation and maintenance of a healthy, well-balanced population of fish and wildlife. Approximately 105 acres of the BCWEA are classified within the National Wetlands Inventory as either freshwater emergent wetland or freshwater forested/shrub wetland.

2.6 Beaches and Dunes

There are no beaches or dunes on the BCWEA.

2.7 Mineral Resources

The BCWEA does not contain any known commercially-exploitable mineral resources.

2.8 Historical Resources

The Florida Department of State's Division of Historical Resources (DHR) Master Site File observations are broken down into five categories: sites, structures, resource groups, historic bridges, and historic cemeteries. Currently, there are no records listed in the DHR Master Site File that are located within the boundary of the BCWEA. However, the DHR

Master Site File lists 31 records within a two-mile radius of the BCWEA. As a result, it is possible that there are archaeological or historical resources on the BCWEA that have not yet been recorded in the DHR Master Site File. The FWC will work with the DHR to determine if a historical resource survey is necessary for the area and to document any unrecorded historical or archaeological sites on the BCWEA. At present, the DHR believes that historical resources are unlikely to be found on the BCWEA due to historic disturbance to the area's uplands. However, FWC staff will cooperate with DHR if any such sites are discovered. All Master Site recordings, assessments, and preservation strategies will be coordinated with the DHR.

2.9 Scenic Resources

Primary among the scenic resources of the BCWEA are the expansive flatwoods, with areas of uneven-aged pine stands and an understory that provides a diverse habitat for native plants and wildlife. The area's swamps, marshes, and bottomlands represent a stark contrast to the large areas of open flatwoods. The shallow, clear waters of Bullfrog Creek run through a corridor of mesic hammock in the northeastern portion of the area.

3 Uses of the Property

3.1 Previous Use and Development

Thousands of years before Europeans arrived, Native Americans hunted, fished, and gathered wild plants throughout Florida. Historical research indicates that thousands of years ago, Native Americans were mining the limestone formations in Florida for chert, a flint-like stone that was chipped into tools. These early people lived by hunting small and large animals and gathering wild plants.

The climate was much drier than today, the portion of the Florida peninsula above sea level was much larger, and the springs, lakes, rivers, and wetlands that greeted Spanish explorers were nonexistent. Instead there were open grassy prairies, scrub oaks, and pine forests. Water holes were critical to the survival of people and the animals—mammoths, horses, and bison—they hunted.

Though some land alteration occurred during this period, only minor alteration of the landscape is thought to have taken place until the advent of European settlement, beginning with the Spanish occupation of Florida in the sixteenth century. Along with more advanced agricultural practices, the Spanish and other settlers brought livestock, primarily cattle and hogs, as well as horses to Florida. This began an era of broad use of the landscape for agriculture.

Rangeland cattle grazing and other agricultural practices began to be utilized in a more systematic way and occurred throughout much of the central Florida peninsula through

most of the European settlement era from the 16th through 20th centuries. Use of these agricultural practices led to increased alteration of the natural landscape. However, it wasn't until the 19th and 20th centuries that major settlement and more extensive alteration of the landscape in the area began with the widespread use of more intensive agriculture such as row cropping, silviculture, and associated development.

Prior to the conservation of the area, most of what is now the BCWEA was preserved in a relatively natural state and utilized predominantly for cattle grazing. The previous landowners conducted periodic prescribed burning on the area and the Florida Division of Forestry (now the Florida Forest Service) helped maintain the open pine flatwoods found throughout the site. Upon acquisition, all cattle operations at the BCWEA ceased.

3.2 Current Use of the Property

Currently, the BCWEA is managed for the conservation and protection of fish and wildlife habitat, with the primary management goal of enhancing and maintaining habitat conditions critical to meeting the life history requirements of gopher tortoises and other upland species. The BCWEA is also managed to provide limited fish and wildlife based public outdoor recreation. A wide range of operational and resource management actions are conducted on the BCWEA 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 historical resources monitoring and protection; and research-related activities.

Current and anticipated resource uses of the property are relatively limited due to the BCWEA's primary function as a gopher tortoise mitigation park. Higher impact recreational uses, such as hunting and horseback riding, are prohibited on the area. However, the area offers excellent opportunities for bird watching. The diversity of vegetation not only harbors a variety of bird species but also provides good opportunities for wildlife viewing and gopher tortoises and their burrows can frequently be seen on the area. Other uses include hiking, photography, and nature study.

Due to the proximity of population centers in Hillsborough County, as well as increased facilitation of public access to the area as set forth in this Management Plan, public use of the BCWEA can be expected to increase in the future.

3.2.1 Visitation and Economic Benefits

Visitation and public use of the area for fish and wildlife based public outdoor recreational opportunities is the primary source of economic benefits from the BCWEA, and contributes to the overall economy for the southwest region of Florida. Currently, public access to the BCWEA is limited and there are no visitor counters located at the entrance, so collecting precise visitation data for the area is not feasible at this time. The FWC expects to install

vehicle counters on the area in conjunction with planned improvements to the entrance facility on the BCWEA, which is detailed in Section 6 of this plan. However, the FWC has determined that the BCWEA currently has a recreational carrying capacity of eight visitors per day and this Management Plan contains provisions to expand and improve public access infrastructure, which will result in an increase of the area's carrying capacity to 42 visitors per day. For a more detailed discussion of these carrying capacities, see Section 5.6.3 of this Management Plan.

If the current maximum visitation level of eight visitors per day were achieved, a total of 2,920 visitors per year could be expected. Such visitation and public use of the area for fish and wildlife based public outdoor recreation would provide a significant source of potential economic impacts from the BCWEA for this region of Florida. If the area were at carrying capacity, FWC economic analysis estimates indicate that the BCWEA could potentially generate an estimated economic impact of \$333,610 for the State and the southwest region of Florida. This estimated annual economic impact would help support an estimated six jobs.

However, with development of additional public access and recreational opportunities on the BCWEA, the carrying capacity of the area is projected to increase to approximately 42 visitors per day and a maximum total of 15,330 visitors per year could be expected. This increased visitation level would generate an estimated economic impact of \$1,751,452, which would help support an estimated 30 jobs. However, it should be noted that the current visitation rates for the BCWEA are estimated to be far below the area's established carrying capacity.

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

3.3 Single- or Multiple-use Management

The BCWEA will be managed under the multiple-use concept as a Wildlife and Environmental Area, but with the primary emphasis being to manage the area for the benefit of the gopher tortoise and its associated habitat. The BCWEA will provide fish and wildlife resource based public outdoor recreation and educational opportunities, while protecting the natural and historical resources found on the area. Any natural and historical resources of the BCWEA will be managed under the guidance of the FWC and

Hillsborough County, as well as relevant partner agencies, and as outlined in the original purposes for acquisition of the area.

3.3.1 Analysis of Multiple-use Potential

The following actions or activities have been considered under a potential multiple-use concept as possible uses to be allowed on the BCWEA. 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 12.7). Uses classified as "Conditional" indicate that the use may be acceptable but will be allowed only if approved through a process other than the management plan development and approval process (e.g., special-use permitting, managed-area regulation and rule development). Uses classified as “Rejected” are not considered to be in accordance with the original purpose of acquisition or one or more of the various forms of guidance available for planning and management:

	<u>Approved</u>	<u>Conditional</u>	<u>Rejected</u>
Apiaries		✓	
Astronomy		✓	
Bicycling			✓
Cattle grazing			✓
Citrus or other agriculture			✓
Ecosystem services and maintenance	✓		
Ecotourism		✓	
Environmental Education	✓		
First-responder training			✓
Fishing		✓	
Geocaching		✓	
Hiking	✓		
Horseback riding			✓
Hunting		✓	
Linear facilities			✓
Military training			✓
Preservation of historical resources	✓		
Primitive camping			✓
Protection of imperiled species	✓		
Off-road vehicle use			✓
Shooting sports park			✓
Soil and water conservation	✓		
Timber harvest		✓	
Wildlife observation	✓		

3.3.2 Incompatible Uses and Linear Facilities

Consideration of incompatible uses and linear facilities on the BCWEA 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 consideration to Hillsborough County, and as an informational item to the DEP-DSL and the ARC, prior to any incompatible use or linear facility being authorized on the BCWEA.

3.3.3 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 with associated objectives, identified challenges, and solution strategies have been developed for the BCWEA (Sections 5 -7). A detailed assessment of the benefits and potential impacts of planned uses and activities on natural and historical resources was an integral part of the development of the management activities and intent, goals, objectives, challenges, and strategies sections of this Management Plan.

4 Accomplished Objectives from the 2004 BCWEA Conceptual Management Plan

This section is dedicated to reporting the extent to which the objectives described in the 2004 BCWEA Conceptual Management Plan were successfully completed.

Accomplishments for the BCWEA 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 2004 BCWEA Conceptual Management Plan describe the planned activities for the BCWEA during this period. The degree to which the FWC was able to accomplish the planned activities during this period is reflected as **Percent Accomplished** for each associated Objective.

Objectives Accomplished from the 2004 Bullfrog Creek WEA Conceptual Management Plan

Goals and Objectives	Percent Accomplished
<p>Goal 1: Promote habitat conditions most critical to meeting the life history requirements of the gopher tortoise and other upland listed wildlife.</p>	
<p>Objective 1: Maintain a minimum average gopher tortoise density of 0.8 individuals per acre in suitable tortoise habitat. <i>Comment: In 2016, the FWC, through the services of a contractor, conducted a gopher tortoise survey on the BCWEA that measured a gopher tortoise density of 0.826 per acre in 457 acres of suitable gopher tortoise habitat.</i></p>	100%
<p>Objective 2: Promote herbaceous ground cover by maintaining the pine overstory at a maximum average level of 40% canopy cover. <i>Comment: The FWC continues to promote herbaceous ground cover by conducting prescribed fire and mechanical treatments in an effort to maintain optimal canopy cover.</i></p>	100%
<p>Objective 3: Monitor factors that could affect the tortoise population, such as disease transmission, illegal relocation, or other negative influences. <i>Comment: Based on gopher tortoise population surveys conducted in 2004 and 2016, gopher tortoise populations on the BCWEA have increased slightly over that time period. No significant negative influences on the gopher tortoise population on the area have been observed.</i></p>	100%
<p>Objective 4: Utilize appropriate management tools, such as prescribed fire, mechanical vegetation treatments, and herbicides, to facilitate habitat restoration and management. <i>Comment: The FWC has managed habitat on the BCWEA using a combination of prescribed fire, mechanical treatments, and control of exotic and invasive species.</i></p>	100%
<p>Goal 2: Promote habitat conditions most critical to meeting the life history requirements of the Florida sandhill crane.</p>	
<p>Objective 1: Use prescribed fire in freshwater marshes and surrounding wet and dry prairies to prevent invasion by woody shrubs that could degrade nesting habitat. <i>Comment: When conducting prescribed burns, the FWC allows fire to run through the ecotones between natural communities</i></p>	100%

<i>and into the marshes and wetland communities on the area in order to promote optimal habitat conditions in those communities.</i>	
Objective 2: Roller-chop heavy wax myrtle infestations to enhance foraging habitat in pastures. <i>Comment: The FWC conducted roller chopping on the BCWEA in 2001, in part to control wax myrtle infestations, and has continued to maintain habitat on the area through mowing. Additionally, the FWC mechanically and chemically treats wax myrtle as necessary in the flatwoods throughout the area.</i>	100%
Objective 3: Monitor the use of freshwater marshes as nesting sites. <i>Comment: The FWC opportunistically monitors the marshes and other habitat types on the BCWEA for nesting activity.</i>	100%
Goal 3: Protect, restore, and maintain native plant communities and the threatened and endangered plants and wildlife they support.	
Objective 1: Use prescribed fire to maintain light fuel loads in pine flatwoods to minimize potential habitat damage from wildfire and prescribed burns. Increase emphasis on growing season burns to optimize community health and vigor. <i>Comment: The FWC has implemented a prescribed fire program throughout the flatwoods on the BCWEA.</i>	100%
Objective 2: Survey and treat exotic plants to reduce or eliminate cogongrass and Brazilian pepper. Increase surveillance and treatment for Japanese and old world climbing ferns, Chinese tallow, lead tree, carrotwood, guava, and other invasive exotics. <i>Comment: The FWC controls exotic and invasive plants throughout the BCWEA through chemical and mechanical treatments.</i>	100%
Objective 3: Cooperate with Hillsborough County in efforts to reduce the feral hog population through their contract trapping program. <i>Comment: The FWC cooperated with Hillsborough County to trap and remove feral hogs on the BCWEA in 2008 and 2009. Additionally, FWC staff conducted feral hog removal on the area in 2011.</i>	100%
Objective 4: Conduct triennial habitat assessment and photomonitoring to quantify management effects and monitor qualitative changes in vegetation. <i>Comment: The FWC maintained photomonitoring plots on the BCWEA from 2001 to 2004. Since that time, the FWC has</i>	100%

<i>transitioned to Objective-Based Vegetation Management on the BCWEA, with monitoring and data collection occurring every five years.</i>	
Objective 5: Expand monitoring efforts to determine distribution of Florida goldenaster on the property. Continue management practices that favor this plant, including prescribed fire, minimal mechanical disturbance, and limited clearing of trees and shrubs, as outlined in the Recovery Plan (U.S. Fish and Wildlife Service 1988). <i>Comment: The FWC contracted with the FNAI to conduct surveys for the Florida golden aster on the BCWEA in 2004 and 2006. The FWC has and continues to implement management practices on the area that promote conditions favorable to the Florida golden aster.</i>	100%
Objective 6: Provide protection for sensitive plant communities and individual species by prohibiting uses of vehicles, all-terrain vehicles, bicycles, and horses. <i>Comment: The FWC limits access to the BCWEA to foot traffic only. Vehicular access to the BCWEA is prohibited.</i>	100%
Objective 7: Coordinate with FWC law enforcement patrols necessary to provide resource protection. <i>Comment: Area staff continually coordinates with FWC Law Enforcement to provide for resource protection and to enforce the rules and regulations of the area.</i>	100%
Goal 4: Protect the integrity of Bullfrog Creek and its floodplain.	
Objective 1: Restrict recreational uses to those least disruptive to soil and vegetation. <i>Comment: The FWC limits access to the BCWEA to foot traffic only. Vehicular access to the BCWEA is prohibited.</i>	100%
Objective 2: Limit access to foot traffic only. <i>Comment: The FWC limits access to the BCWEA to foot traffic only. Vehicular access to the BCWEA is prohibited.</i>	100%
Objective 3: Implement Best Management Practices for road and facility construction and maintenance practices. <i>Comment: The FWC utilizes Best Management Practices in all road and facility construction and maintenance on the area.</i>	100%
Goal 5: Provide public access and compatible recreational and educational opportunities that minimize disturbance and adverse impacts on listed wildlife and their habitat.	

Objective 1: Provide low intensity, resource-based recreation including hiking, nature study, and wildlife viewing. <i>Comment: The FWC limits access to the BCWEA to foot traffic only. Vehicular access to the BCWEA is prohibited.</i>	100%
Objective 2: Install interpretive signs to inform visitors of on-going management efforts, mitigation philosophy, and featured species' life histories. <i>Comment: The FWC installed a kiosk at the main gate in the northeast corner of the BCWEA which provides information regarding the FWC mitigation park program, gopher tortoises, and prescribed fire management.</i>	100%
Objective 3: Build a loop nature trail that incorporates views of the Bullfrog Creek floodplain, oak hammock, and pine flatwoods communities. Incorporate self-interpretive trails with signs. <i>Comment: The FWC determined that construction of a loop nature trail was infeasible due to ongoing constraints to public access to the BCWEA, in part due to restoration activities on the adjacent Hillsborough County-managed Bullfrog Creek Scrub Preserve.</i>	0%
Objective 4: Develop a brochure for visitors to provide general information, trail maps, regulations, and noteworthy features. <i>Comment: Due to the lack of public access and recreational opportunities on the area, no information brochure was developed for the BCWEA.</i>	0%
Goal 6: Provide adequate infrastructure to manage resources and provide public use programs.	
Objective 1: Improve low-water crossings for access by management vehicles. <i>Comment: The FWC has improved and continues to maintain existing low-water crossings on the BCWEA to facilitate management access.</i>	100%
Objective 2: Install new culverts as needed. <i>Comment: The FWC has installed and maintained culverts on the BCWEA where needed and installation of additional culverts is currently under consideration.</i>	100%
Objective 3: Maintain FDOT Type A Field Fence to reduce hog access and vandalism. <i>Comment: The FWC maintains fencing along the entire boundary of the BCWEA.</i>	100%

<p>Objective 4: Maintain parking lot, trails, and roads. <i>Comment: The FWC maintains roads and firebreaks on the BCWEA, however due to constraints to public access, partially as a result of ongoing restoration at the adjacent Hillsborough County-managed Bullfrog Creek Scrub Preserve, no parking lot or designated trails have been developed on the area.</i></p>	<p>100%</p>
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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 historical resources. In general, the FWC management intent for the BCWEA is to restore and maintain natural communities in a condition that sustains ecological processes and conserves biological diversity, especially fish and wildlife resources, and to promote habitat conditions critical to meeting the life history requirements of the gopher tortoise. 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 the BCWEA. The FWC will utilize the best available data, guidelines, natural resource management practices, and recreational management practices to achieve these outcomes in accordance with the original purposes for acquisition. Furthermore, as noted earlier, the management activities described in this section are in compliance with those of the Conceptual State Lands Management Plan.

5.1 Land Management Review

Pursuant to Chapter 259.036, FS, the DEP-DSL is required to “cause periodic management reviews to be conducted” on Board of Trustees conservation lands to determine if they “are being managed for the purposes for which they were acquired and in accordance with a land management plan adopted pursuant to s. 259.032.” However, title to the BCWEA is held by Hillsborough County and the area contains no land owned by the Board of Trustees and, therefore, no land management review (LMR) is required for the area. As a result, no LMR has been conducted for the BCWEA.

5.2 Adaptive Management

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

An adaptive management process produces the strongest inference and most reliable results when experimental design components are incorporated into the monitoring process. Adaptive management is most rigorously applied in an active format when components of

experimental design (e.g., controls, replication, and randomization) are included in the monitoring process.^{2,3} Incorporating valid statistical analyses of results will further enhance the value of the adaptive management process. However, in some situations, rigorous experimental design procedures can be relaxed without invalidating monitoring results. In a passive format, adaptive management can involve applying a conservation action at a site, observing the results, and adjusting the action in the future if warranted.^{2,3}

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

5.2.1 Monitoring

A well-developed monitoring protocol is also one of the principal required criteria for the management of the BCWEA. 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 trends in those characteristics. Monitoring provides essential feedback, the data needed to understand the costs, benefits, and effectiveness of planned conservation actions and the management projects undertaken to address them.²

For natural communities, monitoring protocols are established through the FWC's Objective-Based Vegetation Management (OBVM, Section 5.3.1) program, which monitors how specific vegetative attributes are responding to FWC management. For imperiled and focal fish and wildlife species, monitoring protocols are established through the FWC's Wildlife Conservation Prioritization and Recovery (WCPR, Section 5.4.2) program. FWC staff may monitor additional fish and wildlife species when deemed appropriate. Exotic and invasive plant and animal species (Section 5.5) are also monitored as needed and appropriate. Recreational uses are monitored through the FWC's Public Access Services Office, and management of those uses works in conjunction with the establishment and adjustment of public access carrying capacities (Section 5.6.3). 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 BCWEA 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 Services Office, Recreation Master Plans, etc.) underway to accomplish needed conservation actions that are planned to manage the natural resources of the BCWEA and to resolve conservation threats to fish and wildlife and the habitats they occupy. Based on evaluations of project results, conservation actions are revised as necessary and the adaptive management process is repeated.

5.3 Habitat Restoration and Improvement

On the BCWEA, the FWC will focus on managing for native habitat diversity, emphasizing maintenance of high-quality natural communities, and restoration of disturbed areas. Restoration may be achieved on disturbed areas by the re-introduction of fire, restoring historic hydrological conditions, and/or the use of mechanical or chemical habitat management techniques as appropriate. Retention of the native old growth component of forests, while also providing for natural regeneration, remains an important consideration. The BCWEA has high-quality native communities including mesic flatwoods, mesic hammock, wet flatwoods, and scrubby flatwoods that the FWC will continue to manage and protect.

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

5.3.1 Objective-Based Vegetation Management

The FWC uses a comprehensive resource management approach on 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 have been mapped, FWC land managers will identify those natural communities which will influence and guide management decisions. These communities are known as the actively-managed natural communities. Through OBVM monitoring, the FWC collects data on a number of specific vegetative attributes that provide insight about the condition of the natural community. Because the FWC is primarily interested in the overall impact of management on each area's natural communities, OBVM data is analyzed at the natural community level.

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

Vegetation monitoring samples the selected attributes and those results are compared to the established desired future conditions. All monitoring performed under OBVM is completed using the program's Standard Operating Procedures.

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

Initial mapping and vegetation sampling provides FWC staff with baseline data indicating natural community structure, distribution, and condition on the area. Comparing the subsequent monitoring results to desired future conditions provides important operational information on a natural community's vegetation structural status both at a discrete point in time and as a 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 restoring altered communities to functioning natural communities.

5.3.2 Prescribed Fire and Fire Management

Historically, 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.

Historic disturbances, including timber removal, site preparation, drainage, and lack of fire, have all combined to alter the plant species composition on portions of the BCWEA, 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, and restoration of natural water regimes are likely necessary actions needed to restore the area to its historic natural communities.

The FWC employs a fire management regime designed to increase both species and habitat diversity and will continue a prescribed burning program on the BCWEA in accordance with the area’s 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 that includes 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 straight blades), one-pass roller chopping can be a valuable management tool, enabling the use of prescribed fires in areas heavily invaded by dense woody vegetation. However, roller chopping may damage herbaceous ground cover, especially wiregrass. Therefore, its application will be limited to situations where burning can only be accomplished by first reducing woody vegetation by mechanical means.

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

The transitional areas between two adjacent but different vegetative cover types, such as forests and wetlands, are known as ecotones. With the possible exception of wildfire suppression, mechanical soil disturbance in ecotones will be avoided in order to protect habitats for important rare species that often occur between flatwoods and riparian drainages. 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 optimally maintain these habitats. Depending on the community type, once fuel loads have been reduced and a more open appearance has returned, vegetative management objectives will likely dictate a fire return interval that averages 1-4 years, preferably during the spring and early summer months.

In addition to the general prescribed fire management guidelines described above, an area-specific Prescribed Fire Plan will be developed and implemented for the BCWEA. This plan will include, but not be limited to, delineation of burn management units, detailed descriptions of prescribed fire methodology, safety, and smoke management guidelines. Upon its completion, the BCWEA Prescribed Fire Plan will be included in this Management Plan as Appendix 12.8.

An important factor that has a significant impact on the FWC's ability to conduct prescribed burning on the BCWEA is the nature of surrounding land uses. Prescribed fire activities on the area are heavily influenced and at times restricted by Interstate 75 along the western boundary and the intensive residential development directly adjacent to both the northern and southern boundaries, as well as the general residential and commercial density in Hillsborough County as a whole. In particular, these surrounding land uses present significant challenges for smoke management when conducting prescribed burns on the BCWEA.

However, despite these challenges, 100% of the BCWEA's fire adapted communities have been treated with prescribed fire during the previous 10-year planning period and approximately 75% of the area's fire-adapted communities are maintained within the recommended fire return intervals. As detailed in the goals and objectives in Section 6 below, the FWC plans to conduct prescribed burning on 100 acres of the area's fire-adapted communities per year in the short-term, thereby continuing to maintain 75% of the area within the recommended fire return intervals. In the long-term, the FWC plans to expand prescribed burning on the BCWEA so as to maintain 100% of the area's fire-adapted natural communities within the recommended fire return intervals by burning at least 150 acres per year. Potential projected challenges with continuing to successfully implement prescribed fire on the area are described further in Section 7. The continuing benefits of prescribed fire on the area's wildlife habitats along with other ongoing habitat restoration activities that are being implemented on the BCWEA are discussed in more detail below.

5.3.3 Habitat Restoration

During the previous planning period, the FWC implemented resource management regimes and restoration initiatives throughout the BCWEA, including prescribed burning, exotic species control, and mechanical treatments. Previous to its acquisition by Hillsborough County and the FWC, fire was largely excluded from the BCWEA, which led to hardwood encroachment and altered some of the area's natural communities. The FWC has reintroduced fire to the area and every management unit and fire-adapted natural community on the BCWEA has been burned multiple times since the area was established in 1998. In addition to these prescribed burning activities, the FWC employs OBVM, with established desired future conditions (DFCs) and periodic natural community monitoring, to track restoration progress by structural attributes. To aid the maintenance and restoration of habitat on the area, the FWC has conducted mechanical treatments where necessary, including mowing fields, shredding shrubs, and removing hardwoods. The FWC continues to treat invasive plant species throughout the area, through both in-house treatments and contracted control activities.

Continuing habitat management activities on the BCWEA will focus on enhancing natural communities, maintaining recommended fire return intervals for fire adapted communities, treating and removing exotic plant species, and controlling vegetation through mowing and roller chopping as needed. Chemical and mechanical treatments may also be implemented in some select hardwood habitats in the BCWEA's flatwoods to restore these areas to an earlier successional condition. Some timber thinning may also take place in the area's mesic flatwoods to achieve optimal basal areas in those communities. Exotic species control is more extensively discussed in Section 5.5. Further habitat management and improvement objectives planned for the BCWEA are delineated in Section 6.

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 on the BCWEA, a diversity of associated wildlife, including rare, imperiled, and more common species, can be found on the area. In managing for wildlife species, an emphasis will be placed on the conservation, protection, and management of natural communities. As noted above, natural communities important to wildlife on the BCWEA include mesic flatwoods, mesic hammocks, scrubby flatwoods, and wet flatwoods. Natural communities that are less represented on the area, but which are still important to wildlife, include bottomland forest, depression marsh, blackwater stream, dome swamp, and floodplain swamp.

The size and natural community diversity of the BCWEA creates a habitat mosaic for a wide variety of wildlife species. Resident wildlife will be managed for optimum richness,

diversity, and abundance. In addition to resident wildlife, the BCWEA provides resources critical to many migratory birds including waterfowl, passerines, raptors, and others. Habitats important to migratory species will be protected, maintained, or enhanced.

Currently, hunting is prohibited on the BCWEA and, therefore, the FWC does not manage the area explicitly to promote game populations. The FWC will continue to periodically evaluate the status of game populations and potential hunting opportunities on the area.

Wildlife monitoring 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 an emphasis on rare and imperiled fish and wildlife species.

Monitoring of wildlife species will continue as an ongoing effort on the area.

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

5.4.2 Imperiled and Focal 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 employs a comprehensive resource management approach on FWC-managed areas. Restoring the form and function of Florida's natural communities is the foundation of this management philosophy. While the OBVM program is used to monitor how specific vegetative parameters are responding to FWC management, the WCPR program is used to ensure management is having the desired effect on wildlife.

The goal of WCPR is to provide assessment, recovery, and planning support for FWC-managed areas to enhance management of focal species and the recovery of imperiled species. WCPR program objectives include prioritizing what the 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 that the FWC manages.

The WCPR program helps the FWC take a proactive, science-based approach to species management on FWC-managed lands. This approach assesses information from statewide potential habitat models and Population Viability 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. FWC staff combines these assessments with area-specific management considerations to develop a Species Management Strategy for the managed 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 ensure the presence and persistence of Florida's endangered and threatened fish and wildlife species (see <http://myfwc.com/media/1515251/Threatened-Endangered-Species.pdf>), as well as select focal species found on the area.

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

The FWC held a WCPR workshop for the BCWEA in June 2014. After incorporating input from a review by experts, the WCPR Strategy was approved in January 2015. Using statewide landcover-based habitat models, the BCWEA WCPR Strategy identifies 16 focal species and one group of species (wading birds) as having potential habitat on the area (Table 13). Of the focal species identified as having habitat on the area, the BCWEA WCPR Strategy provides measurable objectives or recommends some level of monitoring for gopher tortoise. The BCWEA WCPR Strategy also identifies eastern indigo snake as occurring in the vicinity of the area and recommends opportunistic monitoring for this species and possible documentation during future surveys of gopher tortoise burrows.

Over the previous planning period, surveys for both Florida mouse and gopher tortoise were conducted on the BCWEA. Florida mice were confirmed as occurring on the BCWEA through surveys in 1998 and 2003. Gopher tortoise surveys were conducted on the area in 2003 and 2016. The 2016 survey, utilizing line transect distance sampling and multiple covariate distance sampling methods, found gopher tortoise density to be 0.826 tortoises per acre on the BCWEA. This survey estimated the total population of gopher tortoises on the

area to be 378, with a lower confidence limit of 293 and an upper confidence limit of 487. As a result, the BCWEA meets the criteria for a viable population and received a population evaluation and habitat suitability ranking of “(1) high quality” demonstrating that the area is likely to have a viable population in suitable habitat. This ranking indicates that, although continued management is required, no population manipulation or augmentation is necessary.

The FWC has also continued to monitor the area for other imperiled species occurrences. These imperiled species projects, along with other ongoing imperiled species management activities, will continue to be implemented in accordance with the BCWEA WCPR Species Management Strategy.

Table 13. Focal Species Identified for the BCWEA

Common Name	Scientific Name	Status
Bachman’s sparrow	<i>Peucaea aestivalis</i>	
Brown-headed nuthatch	<i>Sitta pusilla</i>	
Cooper’s hawk	<i>Accipiter cooperii</i>	
Florida black bear	<i>Ursus americanus floridanus</i>	
Florida mottled duck	<i>Anas fulvigula</i>	
Florida mouse	<i>Podomys floridanus</i>	
Florida sandhill crane	<i>Grus canadenses pratensis</i>	ST
Florida scrub-jay	<i>Aphelocoma coerulescens</i>	FT
Gopher frog	<i>Lithobates capito</i>	
Gopher tortoise	<i>Gopherus polyphemus</i>	ST
Northern bobwhite	<i>Colinus virginianus</i>	
Sherman’s fox squirrel	<i>Sciurus niger shermani</i>	SSC
Short-tailed hawk	<i>Buteo brachyurus</i>	
Southeastern American kestrel	<i>Falco sparverius paulus</i>	ST
Southern bald eagle	<i>Haliaeetus leucocephalus</i>	
Swallow-tailed kite	<i>Elanoides forficatus</i>	
Wading birds	<i>Multiple species</i>	

5.5 Exotic and Invasive Species Maintenance and Control

The FWC will continue efforts to control the establishment and spread of FLEPPC Category I or II plants on the BCWEA. Integrated pest management practices utilizing the most up-to-date control technologies will be used to control invasive plants. Treatments utilizing herbicides will comply with instructions found on the herbicide label.

The FWC will also continue to monitor the BCWEA for occurrences of Early Detection/Rapid Response (EDRR) plant species and implement control measures as necessary. EDRR species are invasive plant species that occur within a geographic area but which are limited in range and density, and are thus likely able to be eradicated if appropriate control measures are implemented in a timely manner. A list of EDRR plant species for the area encompassing the BCWEA is maintained by the Suncoast Cooperative Invasive Species Management Area (Suncoast CISMA).

Exotic and invasive plant species that have been documented on the BCWEA include Brazilian pepper, Burma reed, cogongrass, melaleuca, Old World climbing fern, and downy rose-myrtle. In part due to the intensity of land uses and development surrounding the area, exotic and invasive vegetation has been identified as occurring in varying density on all 833 acres of the BCWEA. However, the FWC's methodology for determining the number of acres "infested" with invasive exotic plants only represents a cumulative acreage, and does not reflect the degree of the invasive exotic occurrence. The degree of infestation among areas identified with invasive exotic plant occurrences often varies substantially by species, level of disturbance, environmental conditions, and the status of ongoing eradication and control efforts. The FWC will continue to focus treatments on areas identified as having invasive exotic plant occurrences, as well as treating any new occurrences as they are identified through continued monitoring.

Additionally, the FWC will continue efforts to control the introduction of exotic and invasive species, as well as pests and pathogens, on the BCWEA 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 BCWEA 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 actively cooperates with Hillsborough County and the management staff of the adjacent BCSP to coordinate feral hog control measures on the BCWEA. As necessary and to aid in minimizing the negative impacts caused by feral hog populations on the area, feral hog populations can be controlled by trapping.

Currently, the prevention and control of invasive exotic plant species (Table 6) continues to be a significant management challenge at the BCWEA. During the previous planning

period, the FWC continued to implement extensive exotic and invasive species control and maintenance activities throughout the area. These included exotic plant species treatments on a total of 122 acres in fiscal year 2014-2015. Due to the intensity of surrounding development, exotic plant species continue to occur throughout the BCWEA, and thus ongoing treatment is necessary. The FWC will prioritize infested areas and continue to focus control and maintenance activities on areas identified as having high densities of invasive exotic plant occurrences, as well as treating any new occurrences as they are identified through continued monitoring activities. Ongoing exotic plant species objectives and challenges for the BCWEA are further detailed in Sections 6 and 7.

5.6 Public Access and Recreational Opportunities

To facilitate public use of the BCWEA, the FWC has continued to provide opportunities for low-intensity, passive recreation on the area. Over the previous planning period, the FWC maintained nine miles of unmarked trails and service roads that are available for use by the public. However, visitation to the area has historically been very low due to impediments to public access, including the closure of the access road running along the northern extent of the BCSP from US 301 to the entrance of the BCWEA. The FWC will cooperate with Hillsborough County to ease these constraints on public access to and use of the BCWEA. Further planned public access facility improvements are detailed in Section 6 of this Management Plan. Ongoing public access and recreational opportunity management challenges are addressed in Section 7. In addition, the FWC will continue to implement public access, recreational, and educational opportunities on the area in accordance with the BCWEA Recreational Master Plan upon its development and approval.

5.6.1 Americans with Disabilities Act

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

1. Compliance will cause harm to historical resources, or significant natural features and their characteristics.
2. Compliance will substantially alter the nature of the setting and therefore the purpose of the facility.
3. Compliance would not be feasible due to terrain or prevailing construction practices.
4. Compliance would require construction methods or materials prohibited by federal or state statutes, or local regulations.

5.6.2 Recreation Master Plan

The FWC has adopted a comprehensive approach to the planning and administration of fish and wildlife resource-based public outdoor recreational opportunities for the BCWEA. To accomplish this, the FWC will work with recreational stakeholders and the general public to develop a Recreation Master Plan for the BCWEA that will be used to further design and develop appropriate infrastructure that will support the recreational use of the area by the general public. This Recreation Master Plan will include planning for parking, trail design, and area resource interpretation.

5.6.3 Public Access Carrying Capacity

Baseline carrying capacities for users on FWC-managed lands are established by conducting a site-specific sensitivity analysis using available data for the site. The intent of the carrying capacity analysis is to minimize wildlife and habitat disturbance and provide the experience of being “immersed in nature” that visitors to FWC-managed areas desire. Carrying capacities are just a first step; effective management of recreational use further 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, as well as the anticipated proportional visitation levels of the various user groups, the FWC has

determined that the BCWEA can currently support eight visitors per day. However, an objective to improve access and facilities resulting in an increase of the public access carrying capacity to 42 visitors per day has been proposed in Section 6.5 of this Management Plan. Easing constraints currently limiting public access to the BCWEA will be critical to achieving this increased carrying capacity, including working with Hillsborough County to allow year-round public access to the road leading from US 301 to the BCWEA entrance.

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 historical resources on the BCWEA and to ensure that the public is able to 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 BCWEA is home to a variety of resident wildlife found within its mesic flatwoods, mesic hammocks, wet flatwoods, scrubby flatwoods, and other natural communities. The BCWEA's size and variety of habitat types create good wildlife viewing opportunities. Additionally, wildlife viewing opportunities are projected to increase upon the completion of planned improvements for public access outlined in Section 6.5 of this Management Plan.

5.6.5 Hunting

Hunting is currently prohibited on the BCWEA.

5.6.6 Fishing

Fishing is allowed at the BCWEA, but there are no appropriate waterbodies on the area for fishing. Bullfrog Creek itself is extremely shallow and unlikely to provide adequate opportunities for fishing.

5.6.7 Boating

The BCWEA contains no appropriate waterbodies for boating.

5.6.8 Roads and trails

Currently, the BCWEA contains approximately nine miles of unmarked trails and service roads. There are no marked and designated trails located on the area at this time, however the unmarked trails and service roads are available for hiking and public use. Additionally, Section 6.5 of this Management Plan proposes the development of up to two miles of designated trails on the BCWEA.

5.6.8.1 Hiking

Hiking is allowed throughout the BCWEA. The area currently contains nine miles of unmarked trails and service roads that provide excellent opportunities for hiking. Additionally, Section 6.5 of this Management Plan proposes the development of up to two miles of designated trails on the BCWEA for use by hikers.

5.6.8.2 Bicycling

Bicycling is currently prohibited on the BCWEA as access to the area is by foot only.

5.6.8.3 Equestrian

Horseback riding is currently prohibited on the BCWEA.

5.6.9 Camping

All forms of camping are currently prohibited on the BCWEA. The area regulations stipulate that public access to the BCWEA is prohibited from one-half hour after sunset to one-half hour before sunset.

5.6.10 Geocaching

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

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

5.6.11 Environmental Education

The FWC will assess the need for and pursue research and environmental education partnership opportunities on the BCWEA as appropriate. The FWC will continue to identify opportunities to provide and/or expand as feasible interpretive and educational programs. Additionally, the FWC will continue to identify partnerships that could provide for environmental educational programs and outreach opportunities.

5.6.11.1 Interpretation

Interpretive facilities on the BCWEA include a two-panel kiosk to provide interpretation and education to visitors regarding gopher tortoises, FWC management activities such as prescribed burning, and the area's natural resources.

5.7 Hydrological Preservation and Restoration

As described in Section 2.5, the major hydrological features of the BCWEA include Bullfrog Creek, which runs for approximately one mile through the northeastern portion of the area, and a bayhead/slough community, which runs north-to-south through the central portion of the area.

Currently, the FWC cooperates with the DEP, the SWFWMD, and the Environmental Protection Commission of Hillsborough County (EPCHC) for the monitoring of surface and ground water quality and quantity, and will continue to cooperate with those agencies to develop and implement any additional surface water quality and quantity monitoring protocols for the BCWEA. In this capacity, the FWC will primarily rely on the expertise of the SWFWMD, the DEP, and the EPCHC to facilitate these monitoring activities. As necessary, the FWC may independently conduct or contract for water resource monitoring, as guided by these agencies.

5.7.1 Hydrologic Assessment

The FWC obtained a Hydrologic Assessment for the BCWEA in 2015. This document provides both a detailed assessment of the BCWEA's current hydrology and drainage characteristics, as well as recommended improvements to restore the natural hydrology and drainage on the area. The FWC will continue to implement the recommendations of the BCWEA Hydrologic Assessment as necessary to restore and maintain the natural hydrological functions on the area.

5.8 Forest Resource Management

A Timber Assessment of the timber resources of the BCWEA will be conducted by the FFS or a contracted professional forester. The management of timber resources on the area will be considered in the context of the Timber Assessment and the overall land management goals and activities for the BCWEA.

Timber resources include mesic flatwoods and an approximately six acre area classified as pine plantation but more accurately described as mesic flatwoods 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. Degraded or disturbed bottomland hardwood sites will be encouraged to reforest naturally with native wetland oaks, hardwoods, and other appropriate native plant species.

Pursuant to OBVM management goals, 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 the protection of young trees and seedlings on these sites from damage. However, where natural regeneration is lacking, artificial reforestation may be implemented. Planting trees on these selected sites is used to increase the rate of reforestation and to ensure diversity. Forested wetlands are managed for stands with old growth characteristics. Snags will be protected to benefit cavity-nesting species.

The forest resources of the BCWEA are generally in very good condition. The area's mesic flatwoods are characterized by widely spaced pines and low shrub heights, which provide very high quality habitat for gopher tortoises and a variety of other species. However, some portions of the mesic flatwoods on the BCWEA contain higher-than-desirable pine densities. As a result, the FWC intends to conduct timber thinning within these areas to achieve the desired future conditions for this community and to promote optimal habitat for wildlife.

5.9 Historical Resources

Procedures outlined by the DHR will be followed to preserve any historical sites discovered on the BCWEA and the FWC will consult with the DHR in an attempt to locate any historical features on the area. In addition, the FWC will ensure management staff has received DHR Archaeological Resources Monitoring training. 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 or other ground-disturbing activities. Furthermore, as appropriate and necessary, the FWC will contact professionals from the DHR for assistance prior to any ground-disturbing activity on the BCWEA.

As discussed in Section 2.8, the DHR Master Site File indicates that there are no recorded archaeological sites or historical resources within the boundaries of the BCWEA. Further, although there are 31 recorded sites within a two-mile radius of the area, the DHR believes that historical resources are unlikely to be found within the boundaries of the BCWEA due to historic disturbance to the area's uplands. However, FWC staff will cooperate with DHR if any such sites are discovered.

5.10 Capital Facilities and Infrastructure

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



Current capital facilities and infrastructure on the BCWEA include a two-panel kiosk, an unimproved entrance, and nearly nine miles of unmarked trails and service roads (Figure 11). The FWC intends to enhance public access by improving the entrance facility and parking area located in the northeast corner of the BCWEA. Additionally, the FWC will

assess the need for a pole barn on the BCWEA to facilitate management and will construct one on the area if it is determined to be necessary and feasible. Planned capital facilities and infrastructure improvements are described in Section 6.9 of this Management Plan.

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

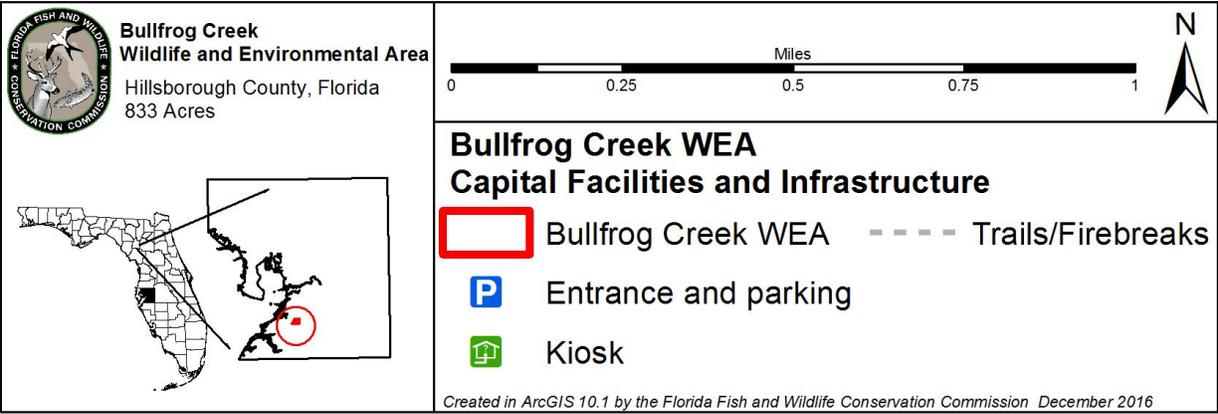


Figure 11. BCWEA Capital Facilities and Infrastructure

5.11 Land Conservation and Stewardship Partnerships

The FWC utilizes a three-tiered approach to identifying, acquiring, or otherwise protecting important conservation lands adjacent to or in proximity to existing FWC-managed areas. This involves the 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 play an integral role in this effort in addition to ongoing land conservation, either through fee-simple acquisition or less-than-fee conservation easements. In combination, this tiered model helps the FWC to further the regional conservation of important fish and wildlife habitats through a proactive, comprehensive, and cooperative approach towards conservation.

5.11.1 Optimal Resource Boundary

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

5.11.2 Optimal Conservation Planning Boundary

The second tier is known as the OCPB. The OCPB combines the regional natural resources identified in the ORB with regional and local area conservation planning considerations, 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 historical resources.

The OCPB provides the basis for development of a broader CAS for the BCWEA. 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 and does not constrain or otherwise restrict the use and development of the properties contained within the 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. The OCPB for the BCWEA is shown in Figure 12, below.

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.

Private landowners seeking assistance with habitat management will likely find it offered through 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 reward landowners who manage their wildlife habitat responsibly. More information on the FWC's LAP program and online habitat management tools are available online at: <http://myfwc.com/conservation/special-initiatives/lap/> .

5.11.4 FWC Florida Forever Additions and Inholdings Acquisition List

Currently, there are no parcels included on the FWC Florida Forever Additions and Inholdings list for the BCWEA. Upon completion of the CAS for the area, additions to the FWC Florida Forever Additions and Inholdings acquisition list may be recommended.

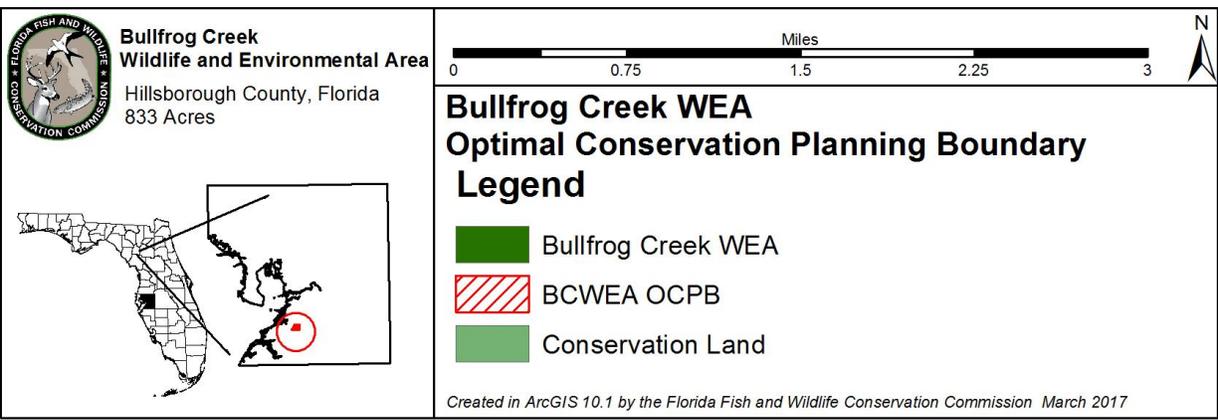
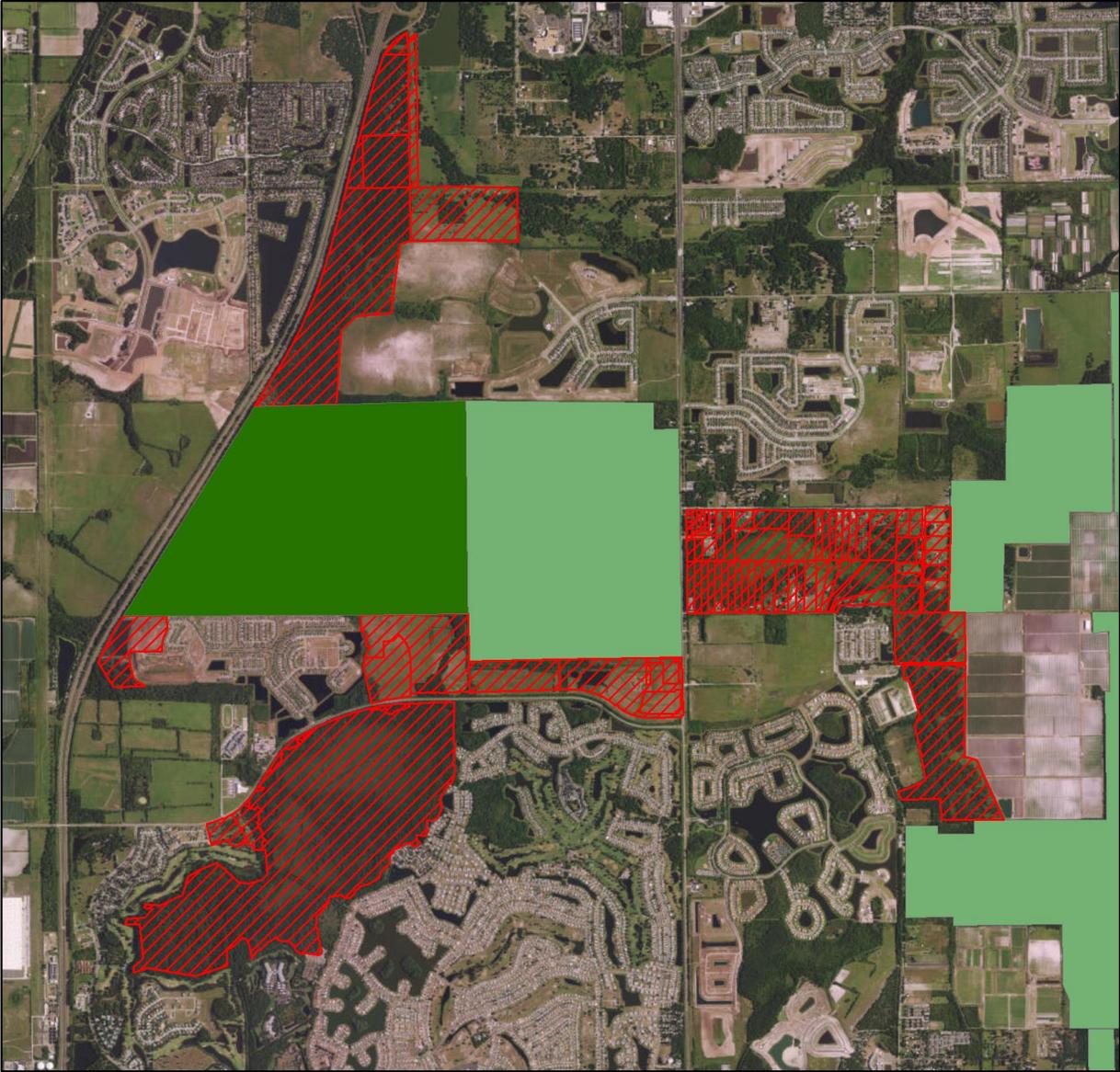


Figure 12. BCWEA Optimal Conservation Planning Boundary

5.12 Research Opportunities

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

5.13 Cooperative Management and Special Uses

5.13.1 Cooperative Management

The FWC is responsible for the overall management and operation of the BCWEA as set forth in MOA 97056 with Hillsborough County. In keeping with the MOA, and to aid in conducting its management operations in the most effective and efficient manner, the FWC cooperates with other agencies to achieve management goals and objectives described in this management plan. These include cooperating with the DHR to ensure the requirements of the Management Procedures Guidelines - Management of Archaeological and Historical Resources document (Appendix 12.10) are followed with regard to any ground-disturbing activities. In addition, the FFS assists the FWC by developing timber assessments and providing technical assistance on forest resource management. The FWC also cooperates and consults with the SWFWMD, the DEP, and the EPCHC for the monitoring and management of both ground and surface water resources and the overall management of the BCWEA.

The FWC also cooperates extensively with Hillsborough County, which holds title to the land encompassed by the BCWEA. In that regard, the FWC will cooperate with Hillsborough County to ensure that the provisions of the 1998 Memorandum of Agreement between the FWC and Hillsborough County regarding the management of the BCWEA continue to be fulfilled. Additionally, the FWC will continue to cooperate with Hillsborough County and the management staff at the adjacent BCSP to facilitate effective management of the two areas and their shared boundary.

5.13.2 Apiaries

Currently, there are no apiaries operating on the BCWEA. However, use of apiaries is conditionally approved for the area 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 12.7). Location, management, and administration of any apiaries on the BCWEA will be guided by the FWC Apiary Policy (Appendix 12.9).

The FWC has conducted an Apiary Assessment for the BCWEA (Appendix 12.9.1) and has determined that there is one suitable location for an apiary on the BCWEA.

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 an array of economic, agricultural, environmental, and health factors 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 are projected and could include changes in precipitation, temperature, increased frequency and intensity of extreme weather events, rising sea levels, tidal fluctuations, and ocean acidification. 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° F to 11.5° F by the end of the century.⁵

This apparent change in global climate has the potential to disrupt natural processes; in some areas, climate change may cause significant degradation of ecosystems that provide services such as clean and abundant water, sustainable natural resources, protection from flooding, as well as hunting, fishing and other recreational opportunities. Consequently, climate change is a challenge not only because of its likely direct effects, but also because of its potential to amplify the stress on ecosystems, habitats, and species from existing threats such as exponential increases in surface and ground water use, habitat loss due to increased urbanization, introduction of invasive species, and fire suppression.

Potential impacts that may be occurring as a result of climate change include: change in the timing of biological processes, such as flowering, breeding, hibernation, and migration;^{6, 7, 8} more frequent invasions and outbreaks of exotic invasive species;⁹ and loss of habitat in coastal areas due to sea level rise.¹⁰ Some species are projected to adjust to these conditions through ecological or evolutionary adaptation, whereas others are projected to exhibit range shifts as their distributions track changing climatic conditions. Those species that are unable to respond to changing climatic conditions are projected to go extinct. Some estimates suggest that as many as 20% - 30% of the species currently assessed by the IPCC are at risk of extinction within this century if global mean temperatures exceed increases of 2.7° F to 4.5° F.¹¹ A number of ecosystems are projected to be affected even by temperature increases well below these levels.

At this time, the potential effects of climate change on Florida's conservation lands are just beginning to be studied and are not yet well understood. For example, the FWC has begun a process for currently developing climate change adaptation strategies for monitoring, evaluating, and determining what specific actions, if any, may be recommended to

ameliorate the projected impacts of climate change on fish and wildlife resources, native vegetation, and the possible spread of exotic and invasive species. Currently, the FWC is continuing its work on the development of these potential adaptation strategies. However, as noted above, the effects of climate change may become more frequent and severe within the time period covered by this Management Plan.

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

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

The elements of climate change that may potentially affect the BCWEA include inundation and saltwater intrusion from sea level rise (Figure 13), more frequent and more potent storm events, alteration of vegetation reproductive cycles, and changes in the fire regime. The results of a Sea Level Affecting Marsh Model for the BCWEA shows habitats that may potentially be impacted.

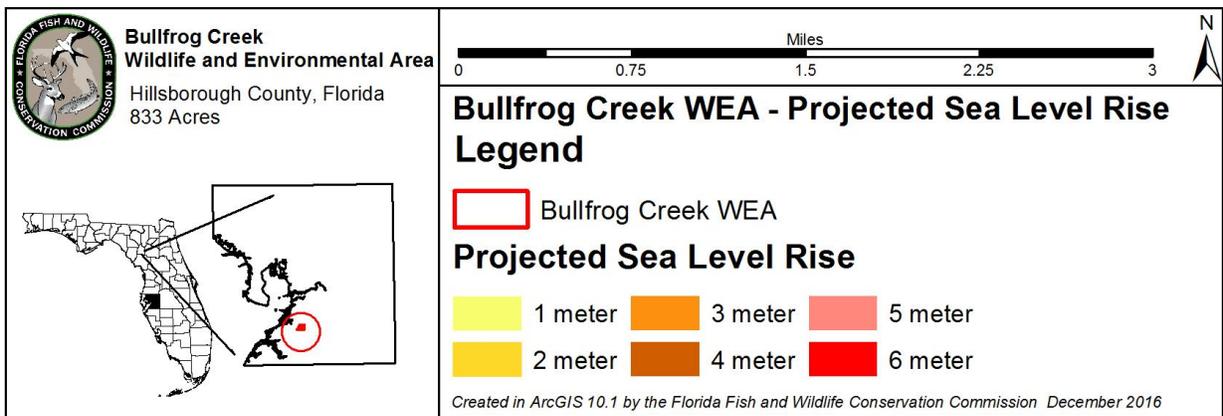
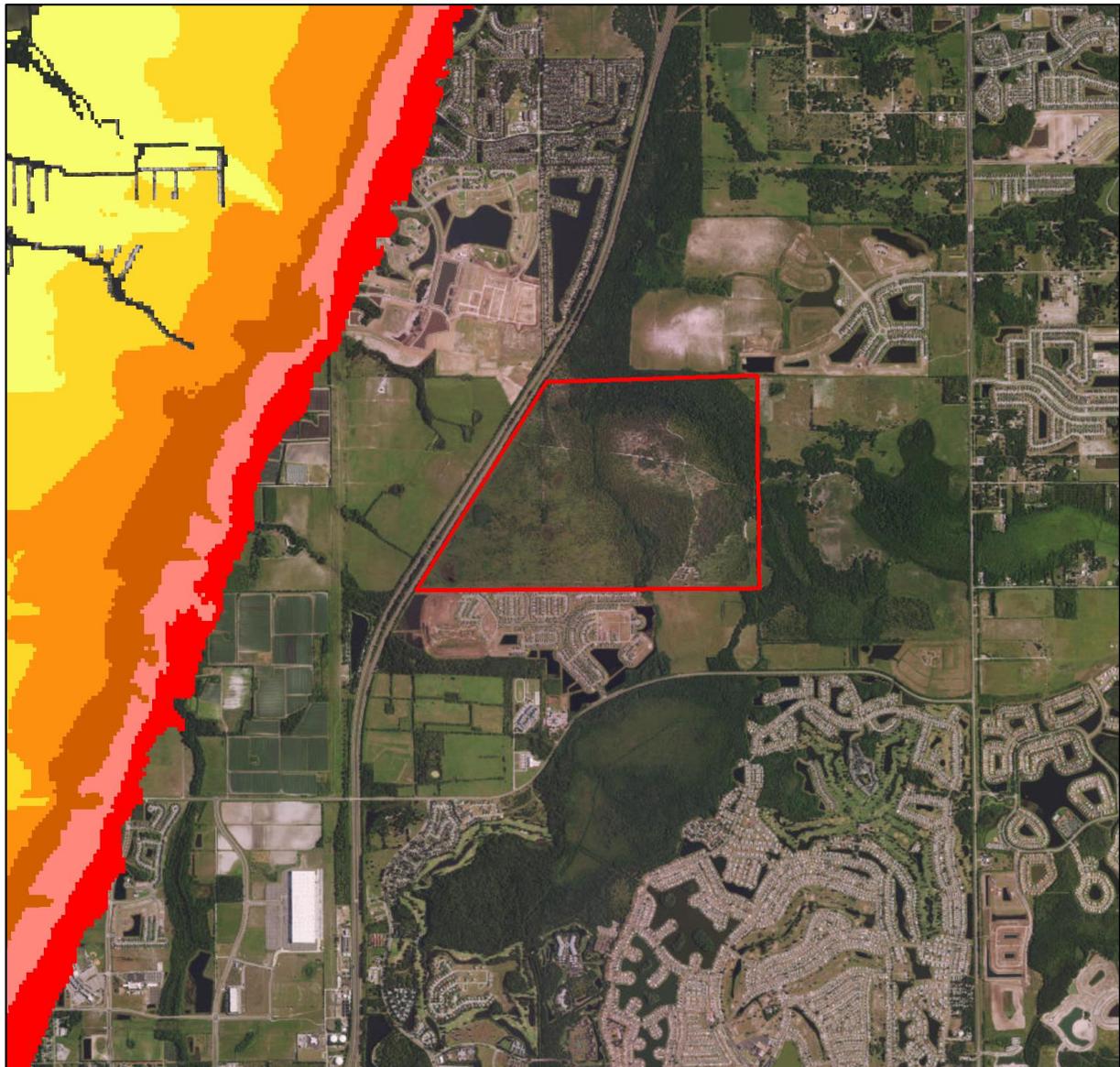


Figure 13. Sea Level Rise Potential Inundation

To address the potential impacts of climate change on the BCWEA, 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 BCWEA 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.

6 Resource Management Goals and Objectives

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

6.1 Habitat Restoration and Improvement

Goal: Improve extant habitat and restore disturbed areas.

Short-term

- 6.1.1 Conduct prescribed burning on 100 acres of fire-adapted natural communities (mesic flatwoods, wet flatwoods, and scrubby flatwoods) per year (Figure 14).
- 6.1.2 Continue to maintain approximately 440 acres of fire-adapted natural communities (75%) within a 2 - 5 year target fire return interval (Figure 14).
- 6.1.3 Develop and implement a prescribed burn plan.
- 6.1.4 Conduct habitat/natural community improvement on 70 acres per year including mechanical treatment of native vegetation.
- 6.1.5 Continue to implement the OBVM program

Long-term

- 6.1.6 Continue to conduct prescribed burning on 150 acres of fire adapted communities

(mesic flatwoods, wet flatwoods, and scrubby flatwoods) per year (Figure 14).

- 6.1.7 Continue to maintain 587 acres of fire-adapted natural communities (100%) per year within target fire return interval (Figure 14).
- 6.1.8 Contract for updated mapping of current natural communities on the area.
- 6.1.9 Conduct a rare plant inventory.
- 6.1.10 Continue implementing OBVM program.
- 6.1.11 Continue to implement prescribed burn plan.
- 6.1.12 Conduct timber harvest for the purposes of habitat restoration on approximately 100 acres (Figure 14).
- 6.1.13 Continue to conduct habitat/natural community improvement on 70 acres per year.

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

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

Short-term

- 6.2.1 Continue to implement the WCPR Strategy.
- 6.2.2 As described in the WCPR Strategy, continue to collect opportunistic wildlife species occurrence data.

Long-term

- 6.2.3 Continue to implement the WCPR strategy.
- 6.2.4 As described in the WCPR Strategy, conduct Florida mouse survey to document their presence on the area, if determined to be feasible.
- 6.2.5 As described in the WCPR Strategy, conduct gopher tortoise surveys every five years (by 2022), unless statewide gopher tortoise monitoring protocols dictate otherwise.
- 6.2.6 As described in the WCPR Strategy, continue to collect and record opportunistic wildlife species occurrence data.
- 6.2.7 Update the WCPR Strategy.

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

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

Short-term

6.3.1 Continue to collect and record opportunistic wildlife species occurrence data.

Long-term

6.3.2 Continue to collect and record opportunistic wildlife species occurrence data.

6.4 Exotic and Invasive Species Maintenance and Control

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

Short-term

6.4.1 Annually treat at least 100 acres of FLEPPC Category I and Category II invasive exotic plant species, including cogongrass, Old World climbing fern, melaleuca, Burma reed, downy rose-myrtle, and Brazilian pepper.

6.4.2 Continue to monitor for any Early Detection, Rapid Response (EDRR) species that may be found within the Suncoast Cooperative Invasive Species Management Area (CISMA).

6.4.3 Continue to monitor for occurrences of invasive exotic plant and animal species and implement control measures as necessary.

6.4.4 As necessary, implement control measures, including trapping, on feral hogs.

Long-term

6.4.5 Continue to annually treat at least 100 acres of FLEPPC Category I and Category II invasive exotic plant species, including cogongrass, Old World climbing fern, melaleuca, Burma reed, downy rose-myrtle, and Brazilian pepper.

6.4.6 Continue to monitor for any EDRR species that may be found within the Suncoast CISMA.

6.4.7 Continue to monitor for occurrences of invasive exotic plant and animal species and implement control measures as necessary.

- 6.4.8 As necessary, continue to implement control measures, including trapping, on feral hogs.

6.5 Public Access and Recreational Opportunities

Goal: Provide public access and recreational opportunities.

Short-term

- 6.5.1 Maintain public access and recreational opportunities to allow for a recreational carrying capacity of eight visitors per day.
- 6.5.2 Continue to provide a two-panel kiosk for interpretation and education (Figure 14).
- 6.5.3 Develop one new interpretive/education program, a website for the area.
- 6.5.4 Cooperate with other agencies, Hillsborough County, stakeholders, and regional landowners to investigate regional recreational opportunities, including linking hiking and trail systems between adjacent public areas.
- 6.5.5 Continue to identify partnerships that could provide for environmental educational programs and outreach.
- 6.5.6 Develop a Recreation Master Plan for the area.
- 6.5.7 Monitor area annually for visitor impacts.

Long-term

- 6.5.8 Increase public access and recreational opportunities to allow for a recreational carrying capacity of 42 visitors per day.
- 6.5.9 Continue to provide two-panel kiosk and website for interpretation and education (Figure 14).
- 6.5.10 Develop a bird list for the area.
- 6.5.11 Design up to two miles of designated trails (Figure 14).
- 6.5.12 Monitor trails annually for visitor impacts (Figure 14).
- 6.5.13 Reassess recreational opportunities every three years.
- 6.5.14 Cooperate with other agencies, Hillsborough County, stakeholders, and regional landowners to investigate regional recreational opportunities, including linking hiking and trail systems between adjacent public areas.

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

6.6 Hydrological Preservation and Restoration

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

Short-term

- 6.6.1 To maintain and enhance natural hydrological functions, install and maintain low-water crossings and culverts as needed.
- 6.6.2 Initiate implementation of the recommendations of the 2015 BCWEA Hydrologic Assessment.
- 6.6.3 Continue to cooperate with the DEP, the SWFWMD, and the EPCHC for the monitoring of surface and ground water quality and quantity.
- 6.6.4 Monitor for impacts to the area's hydrology due to surrounding development and land use changes.

Long-term

- 6.6.5 To enhance natural hydrological functions, continue to install and maintain low-water crossings and culverts as appropriate.
- 6.6.6 Continue to implement the recommendations of the 2015 BCWEA Hydrologic Assessment.
- 6.6.7 Continue to cooperate with the DEP, the SWFWMD, and the EPCHC for the monitoring of surface and ground water quality and quantity.
- 6.6.8 Continue to monitor for impacts to the area's hydrology due to surrounding development and land use changes.
- 6.6.9 If determined to be necessary due to surrounding land use changes, obtain an updated hydrology assessment and restoration plan.

6.7 Forest Resource Management

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

Short-term

- 6.7.1 Cooperate with the FFS to complete a Timber Assessment.
- 6.7.2 As described in the WCPR Strategy, develop and implement a Timber Management Plan.
- 6.7.3 Consult with the FFS or a professional forestry consultant regarding forest management activities as appropriate.

Long-term

- 6.7.4 Continue to implement the Timber Management Plan.
- 6.7.5 Continue to consult with the FFS or a professional forestry consultant regarding forest management activities as appropriate.

6.8 Historical Resources

Goal: Monitor, protect, preserve, and maintain the historical resources of the BCWEA.

Short-term

- 6.8.1 Ensure all known sites are recorded in the Florida Division of Historical Resources Master Site file.
- 6.8.2 Cooperate with the DHR to manage and maintain any archaeological or historical resources discovered on the area.
- 6.8.3 Coordinate with the DHR to assess the need for conducting a site-specific archaeological and historical resource survey.
- 6.8.4 As necessary, cooperate with the DHR in designing site plans for development of infrastructure.
- 6.8.5 Continue to ensure that FWC management staff receive DHR Archaeological Resource Management training.
- 6.8.6 Continue to follow the DHR's Management Procedures for Archaeological and Historical Sites and Properties on State-Owned or Controlled Properties for the management of historic resources.

Long-term

- 6.8.7 Continue to ensure all known sites are recorded in the Florida Division of Historical Resources Master Site file.

- 6.8.8 Continue to cooperate with the DHR to manage and maintain any archaeological or historical resources discovered on the area.
- 6.8.9 Continue to coordinate with the DHR to assess the need for conducting a site-specific archaeological and historical resource survey.
- 6.8.10 As necessary, cooperate with the DHR in designing site plans for development of infrastructure.
- 6.8.11 Continue to coordinate with DHR for archaeological resource management guideline staff training.
- 6.8.12 Continue to follow DHR's Management Procedures for Archaeological and Historical Sites and Properties on State-Owned or Controlled Properties for the management of historic resources.

6.9 Capital Facilities and Infrastructure

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

Short-term

- 6.9.1 Continue to maintain one facility, a two-panel kiosk (Figure 14).
- 6.9.2 Maintain approximately nine miles of unmarked trails and service roads (Figure 14).
- 6.9.3 Improve service roads on the area as necessary.
- 6.9.4 Monitor the facility on the area annually.
- 6.9.5 Continue to maintain boundary fencing and signage on the area.

Long-term

- 6.9.6 Monitor trails and infrastructure biannually.
- 6.9.7 Continue to maintain one facility.
- 6.9.8 Continue to maintain nine miles of unmarked trails and service roads (Figure 14).
- 6.9.9 Develop up to two miles of trails (Figure 14).
- 6.9.10 Maintain up to two miles of new trails.
- 6.9.11 Assess the need for a pole barn on the area and construct if feasible.

6.9.12 Improve the entrance facility on the area by replacing the two-panel kiosk and improving the parking area (Figure 14).

6.9.13 Continue to maintain boundary fencing on the area.

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 the FWC's LAP and Land Acquisition Programs.

6.10.5 Develop a Conservation Action Strategy.

6.10.6 Contact and inform adjoining landowners about the FWC Landowners Assistance Program to pursue non-acquisition conservation stewardship, partnerships, and potential conservation easements.

6.10.7 Determine which parcels 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.

Long-term

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

6.10.12 Continue to identify and develop conservation stewardship partnerships.

- 6.10.13 Continue to identify and pursue conservation acquisition needs.
- 6.10.14 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.
- 6.10.15 Continue to propose nominations of selected properties as additions to the FWC acquisition list.
- 6.10.16 Continue to pursue acquisition of parcels added to the FWC acquisition list as acquisition work plan priorities and funding allow.
- 6.10.17 As feasible, continue to periodically contact and meet with adjacent landowners for willingness to participate in the Conservation Action Strategy, and coordinate landowner assistance/conservation stewardship partnership workshops as deemed appropriate.
- 6.10.18 Coordinate and conduct landowner assistance/conservation stewardship partnership workshop(s) as necessary and appropriate.
- 6.10.19 Continue to identify potential conservation easements donations.

6.11 Cooperative Management and Special Uses

Goal: Provide access and use of the BCWEA to current cooperative managers and continue collaborative management efforts.

Short-term

- 6.11.1 Continue to cooperate with Hillsborough County regarding the management and use of the area.
- 6.11.2 Continue to cooperate with management staff at the adjacent BCSP on issues regarding resource management and public access.
- 6.11.3 Continue to cooperate with adjacent landowners with prescribed burning, exotic species control, and other management issues as needed.

Long-term

- 6.11.4 Continue to cooperate with Hillsborough County regarding the management and use of the area.
- 6.11.5 Continue to cooperate with management staff at the adjacent BCSP on issues

regarding resource management and public access.

- 6.11.6 Continue to cooperate with adjacent landowners with prescribed burning, exotic species control, and other management issues as needed.

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 the BCWEA.

Long-term

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

6.13 Research Opportunities

Goal: Explore and pursue cooperative research opportunities.

Long-term

- 6.13.1 Explore and pursue cooperative research opportunities through universities, Fish and Wildlife Research Institute, and other entities, as appropriate.
- 6.13.2 Continue to cooperate with researchers, universities, and others, as appropriate.
- 6.13.3 Continue to assess the need for and pursue research and environmental education partnership opportunities, as appropriate.

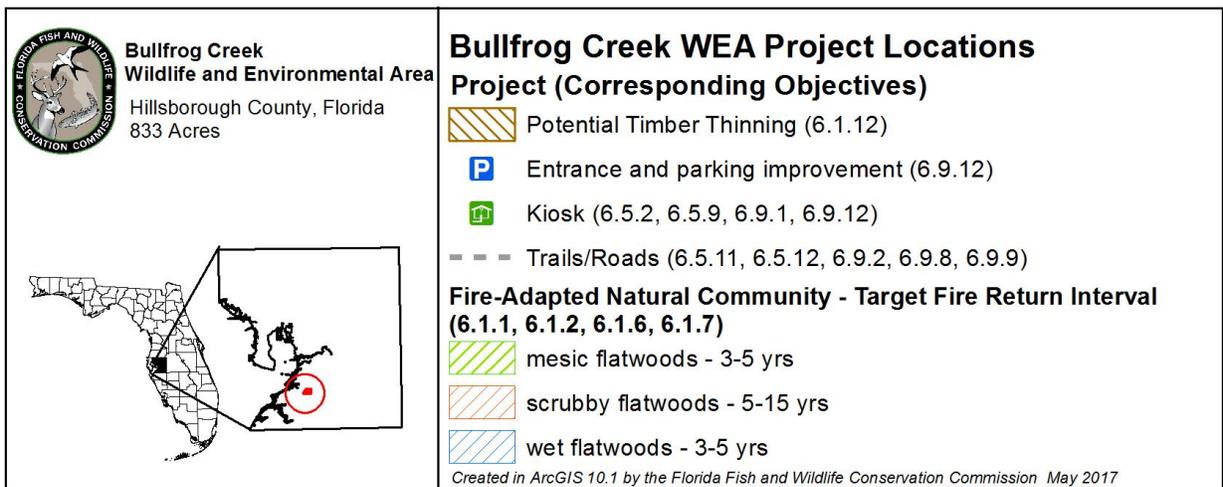


Figure 14. BCWEA Project Locations

7 Resource Management Challenges and Strategies

The following section identifies and describes further management needs and challenges associated with the BCWEA 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 in order to supplement the management intent, goals, and objectives sections of this Management Plan (Sections 5-6).

7.1 Challenge: Currently, the BCWEA is understaffed for both land management and law enforcement, with two full-time equivalent (FTE) staff responsible for management of six widely distributed areas spread across three counties, including the BCWEA.

7.1.1 Strategy: Continue to seek approval for additional funding for appropriate staffing levels.

7.1.2 Strategy: Seek approval for one FTE staff position dedicated to the BCWEA.

7.1.3 Strategy: Pursue funding for increased law enforcement and management staffing and additional private sector contract services.

7.1.4 Strategy: Through the regional FWC volunteer coordinator, explore the feasibility of establishing volunteer programs on the BCWEA.

7.2 Challenge: The BCWEA's proximity to major roadways and residential areas presents significant smoke management challenges during prescribed burning.

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

7.2.2 Strategy: Coordinate with management staff at the adjacent BCSP to conduct prescribed burns and to increase outreach potential.

7.2.3 Strategy: Utilize reverse 911 technologies through Hillsborough County to inform surrounding residents of fire management activities and planned prescribed burns.

7.3 Challenge: Exotic invasive plants and animals from adjacent private lands are spreading to the BCWEA.

7.3.1 Strategy: Coordinate with the FWC's Landowner Assistance Program to work with adjacent landowners to control and manage exotic invasive plants on adjacent properties.

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

7.3.3 Strategy: Coordinate with management staff at the adjacent BCSP to control the spread of exotic invasive plants and animals.

7.4 Challenge: Public access to the BCWEA is limited due to ongoing management activities and restoration on the adjacent BCSP.

7.4.1 Strategy: Work with Hillsborough County to develop a strategy for allowing regular public access to the BCWEA by way of the unimproved road from US 301 to the BCWEA entrance facility.

7.4.2 Coordinate with adjacent private property landowners to explore the possibility of creating a designated walk-through access point.

7.5 Challenge: Development adjacent to the BCWEA boundary may result in increased illegal access as well as public demand for additional public access points.

7.5.1 Strategy: Cooperate with developers and landowners to facilitate access to the existing entrance at the northeast corner of the BCWEA.

7.5.2 Strategy: Increase public awareness of the designated entrance location to the BCWEA.

7.5.3 Strategy: Coordinate with FWC Law Enforcement to prevent illegal access to the BCWEA.

7.6 Challenge: The diversity of surrounding land uses and development poses difficulties for maintaining adequate communication with regional private and public landowners, adjacent residents, and others regarding management activities on the BCWEA.

7.6.1 Strategy: Develop a communication network with surrounding landowners utilizing e-mail, phone, and staff public outreach.

7.6.2 Strategy: Conduct outreach to facilitate public education and communication with surrounding landowners.

7.7 Challenge: The BCWEA is not a well-known recreation destination and

users may be unfamiliar with the area's rules and regulations.

7.7.1 Strategy: Cross-promote the BCWEA with other regional public conservation lands.

7.7.2 Strategy: Work with county tourism boards to promote the BCWEA as a recreation destination.

7.7.3 Strategy: Increase public outreach and education efforts, including a website and improved kiosk panels, to explain the BCWEA's purpose for acquisition, the area's management goals, and rules and regulations regarding public use of the area.

7.8 Challenge: Insufficient area exists within and around the BCWEA for long-term conservation of far-ranging species that have been documented on the BCWEA, such as eastern indigo snake and Sherman's fox squirrel.

7.8.1 Strategy: Explore conservation stewardship and acquisition opportunities to secure habitat necessary for far-ranging species.

8 Cost Estimates and Funding Sources

The following represents the actual and unmet budgetary needs for managing the lands and resources of the BCWEA. This cost estimate was developed using data from the FWC and other cooperating entities, and is based on actual costs for land management activities, equipment purchase and maintenance, and 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 grants and potential project-specific mitigation, may be sought to supplement existing funding as needed.

The cost estimate below, although exceeding what the FWC typically receives through the appropriations process, is estimated to be what is necessary for optimal management of the area, and is consistent with the current and planned resource management and operation of the BCWEA. Cost estimate categories are those currently recognized by the FWC and the Land Management Uniform Accounting Council. More information on these categories, as well as the Fiscal Year 2017 operational plan showing detailed cost estimates by activity and categories of expenditures, may be found in Appendix 12.13.

Bullfrog Creek WEA Management Plan Cost Estimate
Maximum expected one year expenditure

<u>Resource Management</u>	<u>Expenditure</u>	<u>Priority</u>	<u>Priority schedule:</u>
Exotic Species Control	\$88,912	(1)	(1) Immediate (annual)
Prescribed Burning	\$41,838	(1)	(2) Intermediate (3-4 years)
Cultural Resource Management	\$301	(1)	(3) Other (5+ years)
Timber Management	\$3,268	(1)	
Hydrological Management	\$13,348	(1)	
Other (Restoration, Enhancement, Surveys, Monitoring, etc.)	\$53,229	(1)	
Subtotal	\$200,896		
<u>Administration</u>			
General administration	\$12,934	(1)	
<u>Support</u>			
Land Management Planning	\$8,705	(1)	
Land Management Reviews	\$0	(3)	
Training/Staff Development	\$1,032	(1)	
Vehicle Purchase	\$55,402	(2)	
Vehicle Operation and Maintenance	\$4,062	(1)	
Other (Technical Reports, Data Management, etc.)	\$4,561	(1)	
Subtotal	\$73,763		
<u>Capital Improvements</u>			
New Facility Construction	\$35,865	(2)	
Facility Maintenance	\$18,511	(1)	
Subtotal	\$54,376		
<u>Visitor Services/Recreation</u>			
Info./Education/Operations	\$2,547	(1)	
<u>Law Enforcement</u>			
Resource protection	\$761	(1)	
Total	\$345,277	*	

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

Bullfrog Creek WEA Management Plan Cost Estimate
Ten-year projection

<u>Resource Management</u>	<u>Expenditure</u>	<u>Priority</u>	<u>Priority schedule:</u>
Exotic Species Control	\$781,190	(1)	(1) Immediate (annual)
Prescribed Burning	\$367,594	(1)	(2) Intermediate (3-4 years)
Cultural Resource Management	\$2,642	(1)	(3) Other (5+ years)
Timber Management	\$28,710	(1)	
Hydrological Management	\$117,281	(1)	
Other (Restoration, Enhancement, Surveys, Monitoring, etc.)	\$467,679	(1)	
Subtotal	\$1,765,095		
<u>Administration</u>			
General administration	\$113,644	(1)	
<u>Support</u>			
Land Management Planning	\$76,486	(1)	
Land Management Reviews	\$0	(3)	
Training/Staff Development	\$9,072	(1)	
Vehicle Purchase	\$194,961	(2)	
Vehicle Operation and Maintenance	\$35,688	(1)	
Other (Technical Reports, Data Management, etc.)	\$40,075	(1)	
Subtotal	\$356,281		
<u>Capital Improvements</u>			
New Facility Construction	\$77,841	(2)	
Facility Maintenance	\$162,639	(1)	
Subtotal	\$266,233		
<u>Visitor Services/Recreation</u>			
Info./Education/Operations	\$22,380	(1)	
<u>Law Enforcement</u>			
Resource protection	\$6,685	(1)	
Total	\$2,530,318	*	

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

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

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

Approved Conditional Rejected

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

10 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, and training, as well as accounting, purchasing, and budgetary procedures.

When public facilities are developed on areas managed by the FWC, every effort is made to comply with Public Law 101 - 336, the Americans with Disabilities Act. As new facilities

are developed, the universal access requirements of this law are followed in all cases except where the law allows reasonable exceptions (e.g., where handicap access is structurally impractical or where providing such access would change the fundamental character of the facility being provided).

Uses planned for the BCWEA 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 the FWC as described in its Agency Strategic Plan (Appendix 12.7). Such uses also comply with the authorities of the FWC as derived from Article IV, Section 9 of the Florida Constitution as well as the guidance and directives of Chapters, 253, 259, 327, 370, 379, 403, 870, 373, 375, 378, 487, and 597 FS.

The FWC has developed and utilizes an Arthropod Control Plan for the BCWEA in compliance with Chapter 388.4111 F.S. (Appendix 12.14). This plan was developed in cooperation with the local Hillsborough County arthropod control agency. This plan is also in conformance with the Local Government Comprehensive Plan as approved and adopted for Hillsborough County, Florida (Appendix 12.15).

11 Endnotes

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- ¹⁵ Mann, M.E. and K.A. Emanuel. 2006. Atlantic Hurricane Trends Linked to Climate Change. *Eos Trans. AGU* 87: 233-244.
- ¹⁶ Stanton, E.A. and F. Ackerman. 2007. *Florida and Climate Change: The Costs of Inaction*. Tufts University Global Development and Environment Institute and Stockholm Environment Institute–US Center, Tufts University, Medford, MA.
- ¹⁷ Clough, J.S. 2008. Application of the Sea-Level Affecting Marshes Model (SLAMM 5.0) to Crystal River NWR. Warren Pinnacle Consulting, Inc. for U.S. Fish and Wildlife Service. 46 pp.

12 Appendices

The appendix to the BCWEA Management Plan is not included in this online version, in part due to the page total and size of the appendices. Any individual appendix document, as well as the entire compiled appendix, is available upon request. Please contact FWC Land Conservation and Planning at (850) 487-7063 to request copies of these appendix documents.

Below is a list of the Appendix to the BCWEA Management Plan:

12.1 Agreement 97056 – Deed of Conservation Easement and Memorandum of Agreement

12.2 Definitions of Management Plan Terms

12.3 Public Input

12.3.1 Management Advisory Group Meeting Results

12.3.2 Public Hearing Notice, Advertisements, and Press Release

12.3.3 Public Hearing Report

12.3.4 Management Prospectus

12.4 Soil Series Descriptions

12.5 BCWEA Timber Assessment

12.6 FNAI Element Occurrence Data Usage Letter

12.7 FWC Agency Strategic Plan

12.8 BCWEA Prescribed Fire Plan

12.9 FWC Apiary Policy

12.9.1 BCWEA Apiary Assessment

12.10 BCWEA Historical Resources

12.10.1 Management Procedures Guidelines - Management of Archaeological and Historical Resources

12.10.2 DHR Guidelines for Ground Disturbing Activities

12.11 WCPR Strategy

12.12 BCWEA Recreation Master Plan

**12.13 Land Management Uniform Accounting Council Categories -
Operation Plan Fiscal Year 2017**

12.14 Arthropod Control Plan

**12.15 Hillsborough County Letter of Compliance with Local
Government Comprehensive Plan**