A Management Plan for
Herky Huffman/Bull Creek Wildlife Management Area
2019 - 2029

Osceola County, Florida

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

FLORIDA DEPARTMENT OF Environmental Protection

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, FL 32399

Ron DeSantis
Governor

Jeanette Nuñez
Lt. Governor

Noah Valenstein
Secretary

August 23, 2019

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

RE: Herky Huffman/Bull Creek WMA – Lease No. 4116

Dear Mr. Houston:

On **August 16, 2019**, the Acquisition and Restoration Council (ARC) recommended approval of the **Herky Huffman/Bull Creek WMA** management plan. Therefore, Division of State Lands, Office of Environmental Services, acting as agent for the Board of Trustees of the Internal Improvement Trust Fund, hereby approves the **Herky Huffman/Bull Creek WMA** management plan. The next management plan update is due August 16, 2029.

Pursuant to s. 253.034(5)(a), F.S., each management plan is required to "describe both short-term and long-term management goals, and include measurable objectives to achieve those goals. Short-term goals shall be achievable within a 2-year planning period, and long-term goals shall be achievable within a 10-year planning period." Upon completion of short-term goals, please submit a signed letter identifying categories, goals, and results with attached methodology to the Division of State Lands, Office of Environmental Services.

Pursuant to s. 259.032(8)(g), F.S., by July 1 of each year, each governmental agency and each private entity designated to manage lands shall report to the Secretary of Environmental Protection, via the Division of State Lands, on the progress of funding, staffing, and resource management of every project for which the agency or entity is responsible.

Pursuant to s. 259.036(2), F.S., management areas that exceed 1,000 acres in size, shall be scheduled for a land management review at least every 5 years.

Pursuant to s. 259.032, F.S., and Chapter 18-2.021, F.A.C., management plans for areas less than 160 acres may be handled in accordance with the negative response process. This process requires small management plans and management plan amendments be submitted to the Division of State Lands for review, and the Acquisition and Restoration

Council (ARC) for public notification. The Division of State Lands will approve these plans or plan amendments submitted for review through delegated authority unless three or more ARC members request the division place the item on a future council meeting agenda for review. To create better efficiency, improve customer service, and assist members of the ARC, the Division of State Lands will notice negative response items on Thursdays except for weeks that have State or Federal holidays that fall on Thursday or Friday. The Division of State Lands will contact you on the appropriate Friday to inform you if the item is approved via delegated authority or if it will be placed on a future ARC agenda by request of the ARC members.

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

Sincerely,

Callie DeHaven
Director, Division of State Lands
Department of Environmental Protection

St. Johns River
Water Management District
Ann B. Shortelle, Ph.D., Executive Director

4049 Reid Street • P.O. Box 1429 • Palatka, FL 32178-1429 • 386-329-4500
On the internet at www.sjrwmd.com.

November 18, 2019

Dylan Imlah
Senior Conservation Planner
Florida Fish and Wildlife Conservation Commission
Division of Habitat and Species Conservation
Land Conservation and Planning
620 South Meridian Street
Tallahassee, FL 32399

Re: Approval of the Florida Fish & Wildlife Conservation Commission's Land Management Plan for Herky Huffman Bull Creek Wildlife Management Area.

Dear Dylan:

On October 8, 2019 the Governing Board of the St. Johns River Water Management District approved the 10-year management plan for the Herky Huffman Bull Creek Wildlife Management Area. Attached you will find the approved meeting minutes, indicating this action under Agenda Item 8.

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

Sincerely,

Brent Bachelder

Brent Bachelder
Land Resource Specialist
Bureau of Land Resources

Attachment: St. Johns River Water Management District – October 8, 2019 – Governing Board Meeting Minutes

A Management Plan
for the
Herky Huffman/Bull Creek Wildlife Management Area

Osceola County, Florida

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

March 2019

Approved

Kipp Frohlich
Director, Division of Habitat and Species Conservation

LAND MANAGEMENT PLAN EXECUTIVE SUMMARY

Lead Agency: Florida Fish and Wildlife Conservation Commission (FWC)
Common Name of Property: Herky Huffman/Bull Creek Wildlife Management Area
Location: Osceola County, Florida
Acreage Total: 23,495 acres
Acreage Breakdown:

Land Cover Classification	Acres	Percent of Total Area
Baygall	284.7	1.2%
Depression marsh	971.8	4.1%
Dome swamp	1,428.9	6.0%
Dry prairie	544.1	2.3%
Floodplain swamp	2,853.0	12.1%
Hydric hammock	1,179.5	5.0%
Mesic flatwoods	11,838.8	50.4%
Mesic hammock	189.3	0.8%
Pasture - improved	25.9	0.1%
Pasture – semi-improved	1.7	<0.1%
Pine plantation	8.8	<0.1%
Ruderal	459.5	2.0%
Sandhill	4.6	<0.1%
Scrub	155.2	0.7%
Scrubby flatwoods	929.8	4.0%
Wet flatwoods	2,062.5	8.8%
Wet prairie	577.2	2.5%

*GIS-calculated acreage for land cover classification varies slightly from actual total acreage.
Lease/Management Agreement No.: 4116, 4226 (Amendment 3), and 92094 (Appendix 12.1 - 12.3)
Use: Single _____ Multiple X
Management Responsibilities: Agency FWC Responsibilities LEAD, SUBLESSEE (Wildlife Management Area, resource protection, law enforcement)
Designated Land Use: Wildlife Management Area
Sublease (s): None
Encumbrances: List: 3,600-acre flowage easement held by the St. Johns River Water Management District
Type Acquisition: Preservation 2000 Land Acquisition Program and Florida Forever
Unique Features: Natural: Natural communities, Bull Creek
Archaeological/Historical: 25 historical sites, 2 structures, and 1 resource group.
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 the FWC Additions and Inholdings list; 27,656 acres remaining in the Osceola Pine Savannas Florida Forever Project (Figure 4).
Surplus Lands/Acreage: None
Public Involvement: Management Advisory Group consensus building meeting and Public Hearing (Appendix 12.6)

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	iv; 1
2	The land acquisition program, if any, under which the property was acquired.	18-2.018 & 18-2.021	3-4
3	Degree of title interest held by the Board, including reservations and encumbrances such as leases.	18-2.021	3-5
4	The legal description and acreage of the property.	18-2.018 & 18-2.021	iv; 1-4; Appendix 12.1-12.3
5	A map showing the approximate location and boundaries of the property, and the location of any structures or improvements to the property.	18-2.018 & 18-2.021	8-13; 107
6	An **assessment** as to whether the property, or any portion, should be declared surplus. *Provide Information regarding **assessment and analysis** in the plan, and provide **corresponding map**.*	18-2.021	64-65
7	Identification of other parcels of land within or immediately adjacent to the property that should be purchased because they are essential to management of the property. *Please clearly indicate parcels on a map.*	18-2.021	93-95
8	Identification of adjacent land uses that conflict with the planned use of the property, if any.	18-2.021	5-7
9	A statement of the purpose for which the lands were acquired, the projected use or uses as defined in 253.034 and the statutory authority for such use or uses.	259.032(10)	3
10	Proximity of property to other significant State, local or federal land or water resources.	18-2.021	5-7; 11

Section B: Use Items			
Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
11	The designated single use or multiple use management for the property, including use by other managing entities.	18-2.018 & 18-2.021	63-64
12	A description of past and existing uses, including any unauthorized uses of the property.	18-2.018 & 18-2.021	61-62
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	63-64
14	A description of the management responsibilities of each entity involved in the property's management and how such responsibilities will be coordinated.	18-2.018	4; 96-97
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	60-61; 92-93; 102

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	77-96
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)	62-64
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	62-64
19	Letter of compliance from the local government stating that the LMP is in compliance with the Local Government Comprehensive Plan.	BOT requirement	Appendix 12.19
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	14-18; 57; 60; 77-92
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	62-63
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	91-92
23	A statement regarding incompatible use in reference to Ch. 253.034(10).	253.034(10)	64

*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	14; Appendix 12.6
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 12.6.3
26	LMPs and LMP updates for parcels over 160 acres shall be developed with input from an advisory group who must conduct at least one public hearing within the county in which the parcel or project is located. *Include the advisory group members and their affiliations, as well as the date and location of the advisory group meeting.*	259.032(10)	14; Appendix 12.6
27	Summary of comments and concerns expressed by the advisory group for parcels over 160 acres	18-2.021	Appendix 12.6.1
28	During plan development, at least one public hearing shall be held in each affected county. Notice of such public hearing shall be posted on the parcel or project designated for management, advertised in a paper of general circulation, and announced at a scheduled meeting of the local governing body before the actual public hearing. *Include a copy of each County's advertisements and announcements (meeting minutes will suffice to indicate an announcement) in the management plan.*	253.034(5) & 259.032(10)	Appendix 12.5
29	The manager shall consider the findings and recommendations of the land management review team in finalizing the required 10-year update of its management plan. *Include manager's replies to the team's findings and recommendations.*	259.036	N/A; 78
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; 78
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; 78

Section D: Natural Resources			
Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
32	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding soil types. *Use brief descriptions and include USDA maps when available.*	18-2.021	15-18; Appendix 12.7

33	Insert FNAI based natural community maps when available.	ARC consensus	41-42
34	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding outstanding native landscapes containing relatively unaltered flora, fauna and geological conditions.	18-2.021	14-49
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	14-49; 57; 60-61
36	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding beaches and dunes.	18-2.021	60
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	60
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	49-57
39	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding State and Federally listed endangered or threatened species and their habitat.	18-2.021	49-57
40	The identification or resources on the property that are listed in the Natural Areas Inventory. *Include letter from FNAI or consultant where appropriate.*	18-2.021	57; 59; Appendix 12.8
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)	77-99
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.	↓	77-112
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.		99-105
42-C.	The associated measurable objectives to achieve the goals.		99-105
42-D.	The related activities that are to be performed to meet the land management objectives and their associated measures. *Include fire management plans - they can be in plan body or an appendix.*		77-112; Appendix 12.12
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.		108-110; Appendix 12.17

43	***Quantitative data description of the land regarding an inventory of forest and other natural resources and associated acreage. *See footnote.*	253.034(5)	18-49
44	Sustainable Forest Management, including implementation of prescribed fire management	18-2.021, 253.034(5) & 259.032(10) ↓	
44-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).		77-112; Appendix 12.12 and 12.14
44-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		99-105
44-C.	Measurable objectives (see requirement for #42-C).		99-105
44-D.	Related activities (see requirement for #42-D).		77-112
44-E.	Budgets (see requirement for #42-E).		108-110; Appendix 12.17
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).		77-112; Appendix 12.13
45-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		99-105
45-C.	Measurable objectives (see requirement for #42-C).		99-105
45-D.	Related activities (see requirement for #42-D).		77-112
45-E.	Budgets (see requirement for #42-E).		108-110; Appendix 12.17
46	***Quantitative data description of the land regarding an inventory of exotic and invasive plants and associated acreage. *See footnote.*	253.034(5)	29; 55; 86-87
47	Place the Arthropod Control Plan in an appendix. If one does not exist, provide a statement as to what arrangement exists between the local mosquito control district and the management unit.	BOT requirement via lease language	Appendix 12.18
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).		77-112
48-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		99-105
48-C.	Measurable objectives (see requirement for #42-C).		99-105
48-D.	Related activities (see requirement for #42-D).		77-112
48-E.	Budgets (see requirement for #42-E).		108-110; Appendix 12.17

Section E: Water Resources			
Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
49	A statement as to whether the property is within and/or adjacent to an aquatic preserve or a designated area of critical state concern or an area under study for such designation. *If yes, provide a list of the appropriate managing agencies that have been notified of the proposed plan.*	18-2.018 & 18-2.021	7; 60
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	60
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	60
52	***Quantitative description of the land regarding an inventory of hydrological features and associated acreage. *See footnote.*	253.034(5)	60
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).	↓	91
53-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		99-105
53-C.	Measurable objectives (see requirement for #42-C).		99-105
53-D.	Related activities (see requirement for #42-D).		77-112
53-E.	Budgets (see requirement for #42-E).		108-110; Appendix 12.17

Section F: Historical, Archeological and Cultural Resources			
Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
54	**Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding archeological and historical resources. *Include maps of all cultural resources except Native American sites, unless such sites are major points of interest that are open to public visitation.*	18-2.018, 18-2.021 & per DHR's request	60-61; 92
55	***Quantitative data description of the land regarding an inventory of significant land, cultural or historical features and associated acreage.	253.034(5)	60-61; 92
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	92; Appendix 12.15
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).	↓	77-112

57-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		99-105
57-C.	Measurable objectives (see requirement for #42-C).		99-105
57-D.	Related activities (see requirement for #42-D).		77-112
57-E.	Budgets (see requirement for #42-E).		108-110; Appendix 12.17

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

Section G: Facilities (Infrastructure, Access, Recreation)			
Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
58	***Quantitative data description of the land regarding an inventory of infrastructure and associated acreage. *See footnote.*	253.034(5)	92-93; 107
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).	↓	77-112
59-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		99-105
59-C.	Measurable objectives (see requirement for #42-C).		99-105
59-D.	Related activities (see requirement for #42-D).		77-112
59-E.	Budgets (see requirement for #42-E).		108-110; Appendix 12.17
60	*** Quantitative data description of the land regarding an inventory of recreational facilities and associated acreage.	253.034(5)	88-93; 107
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).	↓	77-112
61-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		99-105
61-C.	Measurable objectives (see requirement for #42-C).		99-105
61-D.	Related activities (see requirement for #42-D).		77-112
61-E.	Budgets (see requirement for #42-E).		108-110; Appendix 12.17

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	vi-xiii
63	Place the Executive Summary at the front of the LMP. Include a physical description of the land.	ARC and 253.034(5)	iv-v
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	65-77
65	Key management activities necessary to achieve the desired outcomes regarding other appropriate resource management.	259.032(10)	77-112
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)	108-110; Appendix 12.17
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)	108-110; Appendix 12.17
68	A statement of gross income generated, net income and expenses.	18-2.018	108-110; Appendix 12.17

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

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Management Plan Acronym Key

ADA	Americans with Disabilities Act
ARC	Acquisition and Restoration Council
BEBR	Bureau of Economic and Business Research
BOT	Board of Trustees of the Internal Improvement Trust Fund
CARL	Conservation and Recreation Lands Program
CAS	Conservation Action Strategy
CLC	Florida Cooperative Land Cover Map
CLIP	Critical Lands and Waters Identification Project
DACS	Department of Agriculture and Consumer Services
DEP	Department of Environmental Protection
DHR	Florida Department of Historical Resources
DSL	Division of State Lands
FAC	Florida Administrative Code
FFS	Florida Forest Service
FLEPPC	Florida Exotic Pest Plant Council
FLUE	Florida Land Use Element
FNAI	Florida Natural Areas Inventory
FS	Florida Statute(s)
FWC	Florida Fish and Wildlife Conservation Commission
FWRI	Fish and Wildlife Research Institute
FWHAP	FWC's Fish and Wildlife Habitat Acquisition Program
GFC	Florida Game and Freshwater Fish Commission
GIS	Geographic Information Systems
IMPP	Internal Management Policies and Procedures
IPCC	Intergovernmental Panel on Climate Change
IWHRS	Integrated Wildlife Habitat Ranking System
LAP	Landowner Assistance Program
LMR	Land Management Review
LPIGD	Land Parcel Inventory of Geo-Database and Process
OBVM	Objective-Based Vegetation Management
OCPB	Optimal Conservation Planning Boundary
OFW	Outstanding Florida Waters
ORB	Optimal Resource Boundary
PUD	Planned Unit Development
RSPH	Rare Species Potential Habitat
SCHA	Strategic Habitat Conservation Areas
SJRWMD	St. Johns River Water Management District
TNC	The Nature Conservancy
WCPR	Wildlife Conservation Prioritization and Recovery

1 Introduction and General Information

The Herky Huffman/Bull Creek Wildlife Management Area (HHBCWMA) encompasses approximately 23,495 acres, and contains mostly wet and mesic plant communities, with approximately 15,086 acres of uplands and 8,409 acres of wetlands (Figure 1 and 2). The HHBCWMA provides protection of the floodplain that includes the Crabgrass, Jane Green and Bull Creek systems. The property is connected to the Three Forks Conservation Area to the east by a conservation easement acquired by the St. Johns River Water Management District (SJRWMD) and is directly connected to the Triple N Ranch WMA (TNRWMA) to the west. This area provides an extensive and significant wildlife corridor and floodplain protection for the surrounding areas. The surrounding privately-owned lands are used for agricultural purposes, primarily cattle production and citrus.

The HHBCWMA provides regional flood and natural community protection. This is the only SJRWMD property in the St. Johns River upper basin that represents the entire spectrum of plant communities that occur in this region, and that have had very low impact due to human activities. There are also significant benefits to the public as the HHBCWMA provides both passive recreation (hiking, biking, wildlife viewing, etc.) and hunting and fishing opportunities. It also provides significant habitat for wildlife and provides a wildlife corridor from the TNRWMA to the Three Forks Marsh Conservation Area.

The HHBCWMA is owned by the SJRWMD and the Board of Trustees of the Internal Improvement Trust Fund (Board of Trustees). The Florida Fish and Wildlife Conservation Commission (FWC) holds the lease and has lead management authority for all resources within the HHBCWMA established boundary. The HHBCWMA is managed to conserve and restore natural wildlife habitats, and to provide high-quality opportunities for hunting, fishing, wildlife viewing, environmental education and other fish- and wildlife-based public outdoor recreation opportunities including boating and hiking.

The FWC is responsible for the operation of the HHBCWMA as a wildlife management area, as well as a number of other responsibilities. Further management authority derives from Article IV, Section 9 of the Florida Constitution as well as the guidance and directives of Chapters' 253, 259, 327, 370, 372, 373, 375, 378, 379, 403, 487, 597 and 870 FS. These laws provide the authority for the FWC with regard to protection and management of the State's fish and wildlife resources.

1.1 Management Plan Purpose

This Management Plan serves as the basic statement of policy and direction for the management of the HHBCWMA. It provides information including the past usage, conservation acquisition history, and descriptions of the natural and historical resources found on the HHBCWMA. Furthermore, it identifies the FWC's future management intent,

goals and associated short and long-term objectives, as well as identifying challenges and solutions. This Management Plan has been developed to guide each aspect of the HHBCWMA's resource and operational management for the next ten years.

This Management Plan is submitted for review to the Acquisition and Restoration Council (ARC) acting on behalf of the Board of Trustees of the State of Florida through the Florida Department of Environmental Protection's (DEP) Division of State Lands (DSL), and the SJRWMD in compliance with paragraph seven of BOT Lease 4116 and 4226 (Appendix 12.1 and 12.2) and pursuant to SJRWMD Lease Agreement 92094 (Appendix 12.3), as well as the requirements of Chapters' 253 and 259, Florida Statutes (FS), and Chapters' 18-2 and 18-4, Florida Administrative Code (FAC). Format and content were drafted in accordance with ARC requirements for management plans and the model plan outline provided by the staff of the DSL. Terms (Appendix 12.4) used in this Management Plan describing management activities and associated measurable goals and objectives conform to those developed for the Land Management Uniform Accounting Council Biennial Land Management Operational Report.

1.1.1 **FWC Planning Philosophy**

The FWC's planning philosophy includes emphasizing management recommendation consensus-building among stakeholders and input from user groups and the general public at the beginning of the planning process. The FWC engages stakeholders by convening a Management Advisory Group and solicits additional input from user groups and the general public at a public hearing (Appendix 12.6). The FWC also engages area, district, and regional agency staff, as well as other FWC staff expertise, in developing this Management Plan, thereby facilitating area biologist and manager "ownership" of the Management Plan, and thus the development of meaningful management intent language, goals with associated measurable objectives, timelines for completion and the identification of challenges and solution strategies for inclusion in the HHBCWMA Management Plan (Sections 5 – 7).

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

Furthermore, the FWC maintains transparency and accountability throughout the development and implementation of this Management Plan. A "living document" concept, linking this updated Management Plan to the previous one, is accomplished by reporting on

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

1.2 Location

The HHBCWMA, lies within central Florida in the eastern portion of Osceola County, and is a part of the Upper St. Johns River Basin system. The property is located approximately eight miles east of Holopaw and approximately 30 miles west of Melbourne. The HHBCWMA is bordered by private lands to the north; private lands, and the Jane Green Creek and Kempfer conservation easements to the east; private lands to the south; private lands, the Broussard and Kaschai conservation easements, and the TNRWMA to the west. The southern half of the area lies within Sections 3-11; 14-23; and 26-35 of Township 28 South and Range 34 East, with a small parcel to the south west that lies within Section 36 of Township 28 South and Range 33 East. The north-eastern portion of the area lies within Sections 19-20 and 28-33 of Township 27 South and Range 34 East. While the north-western portion lies within Sections 22-27 of Township 27 South and Range 33 East (Figure 3).

1.3 Acquisition

1.3.1 **Purpose for Acquisition of the Property**

The HHBCWMA was acquired by the SJRWMD and the Board of Trustees to protect and enhance water resources, for flood protection and control and to protect ecological functions and habitat in the Bull Creek area. In addition, according to the Florida Forever Five-year Plan the "Osceola Pine Savannas project will conserve a large part of these lands, maintaining a link of natural lands between the HHBCWMA and the Three Lakes Wildlife Management Area. Preserving these lands will help ensure the survival of wildlife including swallow-tailed kite and the crested caracara. Together with the two wildlife management areas, this project provides a large area for the public to enjoy hunting, wildlife observation, and other activities."

1.3.2 **Acquisition History**

The original 22,055 acres of the HHBCWMA were purchased in 1967 by the Central and Southern Florida Flood Control District and subsequently transferred to the SJRWMD in 1977. In 1970, the area was leased to the then Game and Fresh Water Fish Commission (GFC), now the FWC, to be managed as a wildlife management area. For management purposes, approximately 1,279 acres of the TNRWMA were established as part of the HHBCWMA in 1996. These lands were originally acquired using Save Our Rivers funds

partly appropriated to the SJRWMD from Preservation 2000 Land Acquisition Program (P-2000), and funds appropriated to the FWC as its share of the P-2000 Inholdings and Additions Acquisition Program funding. In 2001, additional lands (161 acres) were added to the HHBCWMA through the Osceola Pines Savannah Florida Forever conservation acquisition project.

The FWC is directed via Lease Number 4116, from the Board of Trustees and the SJRWMD to "…manage the leased premises only for the conservation and protection of natural and historical resources and resource based public outdoor recreation…"

1.4 Management Authority

The FWC is the designated lead managing agency for the HHBCWMA under the authority granted by Lease Number 4116 and 4226 from the Board of Trustees agent, DSL, and Lease Agreement 92094 from the SJRWMD. 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, 597 and 870 and of the Florida Statutes. These constitutional provisions and laws provide the FWC the authority to protect, conserve, and manage the State's fish and wildlife resources.

1.5 Management Directives

The 50-year Board of Trustees' Lease Agreement Number 4116 and 4226 with the FWC directs the FWC to "manage the leased premises only for the conservation and protection of natural and historical resources and resource-based, public outdoor recreation which is compatible with the conservation and protection of these public lands, as set forth in subsection 253.023(11), FS..." The lease agreement further directs the FWC to "implement applicable Best Management Practices for all activities under this lease in compliance with paragraph 18-2.018(2)(h), FAC, which have been selected, developed, or approved by lessor, lessee, or other land managing agencies for the protection and enhancement of the leased premises."

1.6 Title Interest and Encumbrances

As State-owned lands, title to the HHBCWMA is vested in the Board of Trustees (Governor and Cabinet). In 1996, the DSL, as staff to the Board of Trustees, entered into Lease Agreement Number 4116, a 50-year lease agreement, granting the FWC management authority for the HHBCWMA. The SJRWMD holds fee title interest for approximately 22,055 acres of the HHBCWMA. A 50/50 undivided title interest is held jointly by the SJRWMD and the Board of Trustees for approximately 1,279 acres located in the northwest corner of the managed area. Additionally, approximately 161 acres in the southwest corner of the managed area is titled to the Board of Trustees, in association with Lease Agreement Number 4226 (Figure 5). There is also a 3,600-acre flowage easement encumbrance held by the SJRWMD that exists for the Jane Green Creek floodplain, and an apiaries management

contract. There are no other known encumbrances or outstanding mineral rights or other interests within the established boundary.

1.7 Proximity to Other Public Conservation Lands

The HHBCWMA is located in the vicinity of an extensive network of conservation lands, including lands managed by the SJRWMD and Osceola County. Several Florida Forever projects (Figure 4), are also located in the vicinity of the area.

Tables 1 and 2 list the Florida Forever projects and conservation lands within a 15-mile radius of the HHBCWMA, including lands managed by public and private entities, that conserve cultural and natural resources within this region of Florida.

Most of the conservation lands listed in Table 2 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 and being managed by a private landowner while a public agency or not-for-profit organization holds a conservation easement on the land.

Table 1. Florida Forever Projects in a 15-mile Vicinity

Project Name	GIS Acres
Adams Ranch	7,141.13
Big Bend Swamp/Holopaw Ranch	56,729.44
Brevard Coastal Scrub Ecosystem	7,276.76
Conlin Lake X	9,074.82
Osceola Pine Savannas	46,628.01
Ranch Reserve	36,409.91

Table 2. Conservation Lands in a 15-mile Vicinity

Water Management District	Managing Agency
Blue Cypress Conservation Area	SJRWMD
Escape Ranch Conservation Easement	SJRWMD
Far Reach Ranch Conservation Easement	SJRWMD
Jane Green Creek Less-than-fee Easement Additions	SJRWMD
Kaschai Conservation Easement	SJRWMD
Kempfer Property Conservation Easement	SJRWMD
Kempfer Property Flowage Easement	SJRWMD
Kissimmee Chain of Lakes	SFWMD
Mills Ranch Conservation Easement	SJRWMD
River Lakes Conservation Area	SJRWMD
Three Forks Conservation Area	SJRWMD
Willowbrook Conservation Easement	SJRWMD

Wolf Creek Ranch Conservation Easement	SJRWMD

State of Florida	**Managing Agency**
Adams Ranch Agricultural and Conservation Easement #1	DACS-FFS
Adams Ranch Agricultural and Conservation Easement #3	DACS-FFS
Broussard Conservation Easement	DEP-DSL
Camp Lonesome Agricultural and Conservation Easement #1	DACS-FFS
Camp Lonesome Agricultural and Conservation Easement #2	DACS-FFS
Camp Lonesome Conservation Easement	DEP-DSL
Holopaw State Forest	DACS-FFS
Ox Creek Ranch Agricultural and Conservation Easement	DACS-FFS
Three Lakes Wildlife Management Area	FWC
T.M. Goodwin Waterfowl Management Area	FWC
Triple N Ranch Wildlife Management Area	FWC
Whaley Conservation Easement	DEP-DSL

Federal Government	**Managing Agency**
Adams Ranch Conservation Easement	USFWS
Camp Lonesome Conservation Easement	USFWS
Malabar Transmitter Annex	USDOD-Air Force

County/City	**Managing Agency**
Erna Nixon Park	Brevard County
Lake Lizzie Conservation Area	Osceola County
Lonesome Camp Ranch Conservation Area	Osceola County

Private/Public Conservation Organization	**Managing Agency**
Disney Wilderness Preserve	TNC
Mary A Ranch Mitigation Bank	B.K.I., Inc., Consulting Ecologists
Southport Ranch Mitigation Bank	Mitigation Resources, LLC

Acronym Key	Agency Name
DACS-FFS	FL Department of Agricultural and Consumer Service-Florida Forest Service
DEP-DSL	FL Department of Environmental Protection-Division of State Lands
FWC	FL Fish and Wildlife Conservation Commission
SJRWMD	St. Johns River Water Management District
SFWMD	South Florida Water Management District
TNC	The Nature Conservancy
USDOD-Air Force	U.S. Department of Defense- Air Force
USFWS	U.S. Fish and Wildlife Service

1.8 Adjacent Land Uses

As described above, the HHBCWMA is located in Central Florida, south of Kissimmee in the eastern portion of Osceola County. The HHBCWMA in located adjacent to TNRWMA to the west, and Jane Green Creek and Kempfer conservation easements to the east, along with several privately-owned lands to the north and south.

The 2015 U.S. Census estimates that there are 323,993 people living in Osceola County. The Department of Economic Affairs, Bureau of Economic and Business Research's (BEBR) medium-range population projection indicates that in the year 2025, there will be 427,900 people living in Osceola County. The BEBR population projections for the counties surrounding Osceola county for the year 2025 are as follows: Brevard County – 621,000; Indian River County – 166,400; Lake County – 394,000; Okeechobee County – 42,600; Orange County – 1,551,400; and Polk County – 744,600.

The current zoning ordinances for the HHBCWMA are Agricultural Development and Conservation. According to the Osceola County comprehensive plan, Agricultural Development and Conservation allows for 1 unit/5 acres. Osceola County's future land use maps indicate that the HHBCWMA will continue to be zoned for Conservation.

Areas in the vicinity of the HHBCWMA primarily have land-use designations of mixed use, low density residential, incorporated and conservation.

The HHBCWMA is not within an area of critical state concern or presently under study for such a designation.

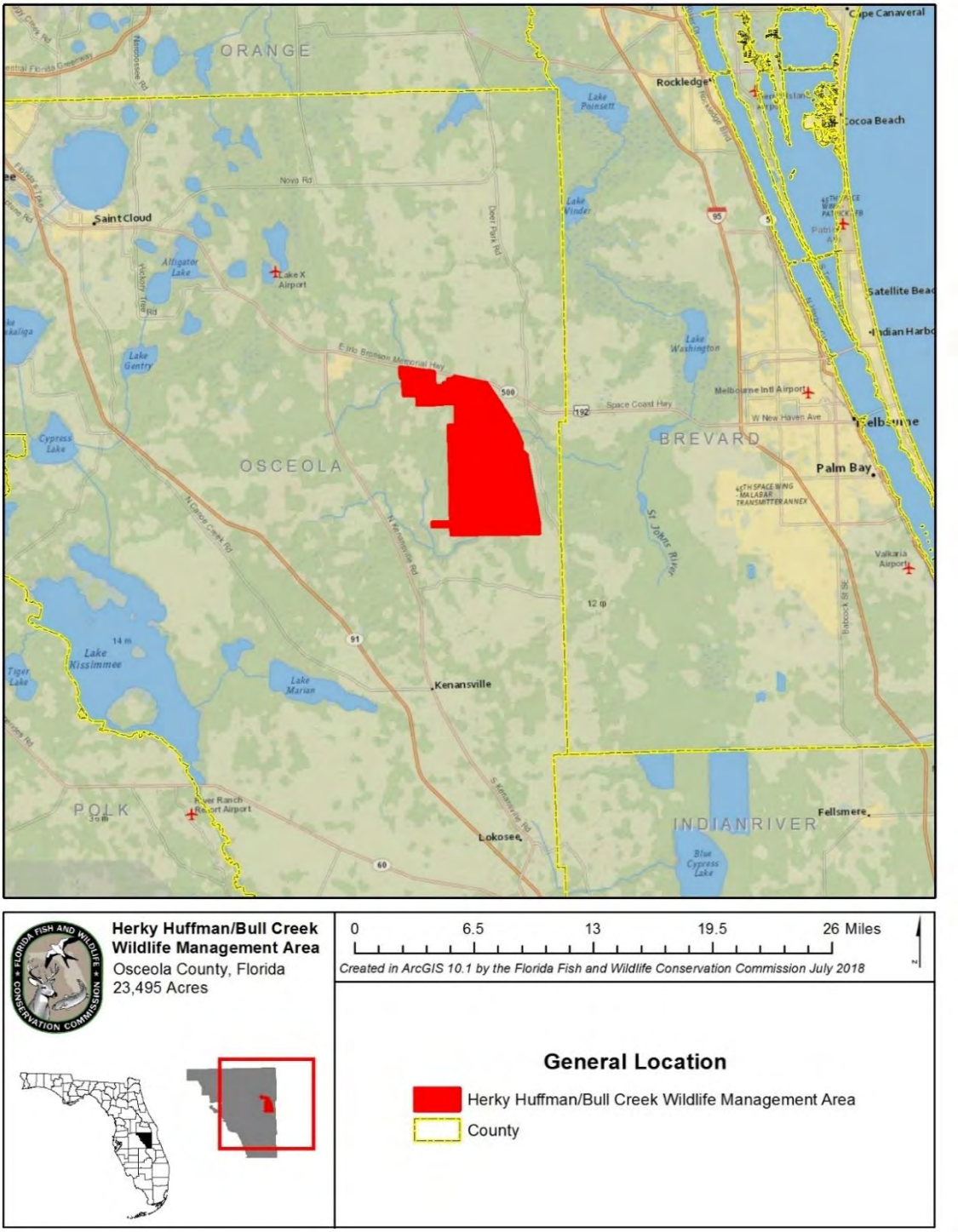


Figure 1. The HHBCWMA Location

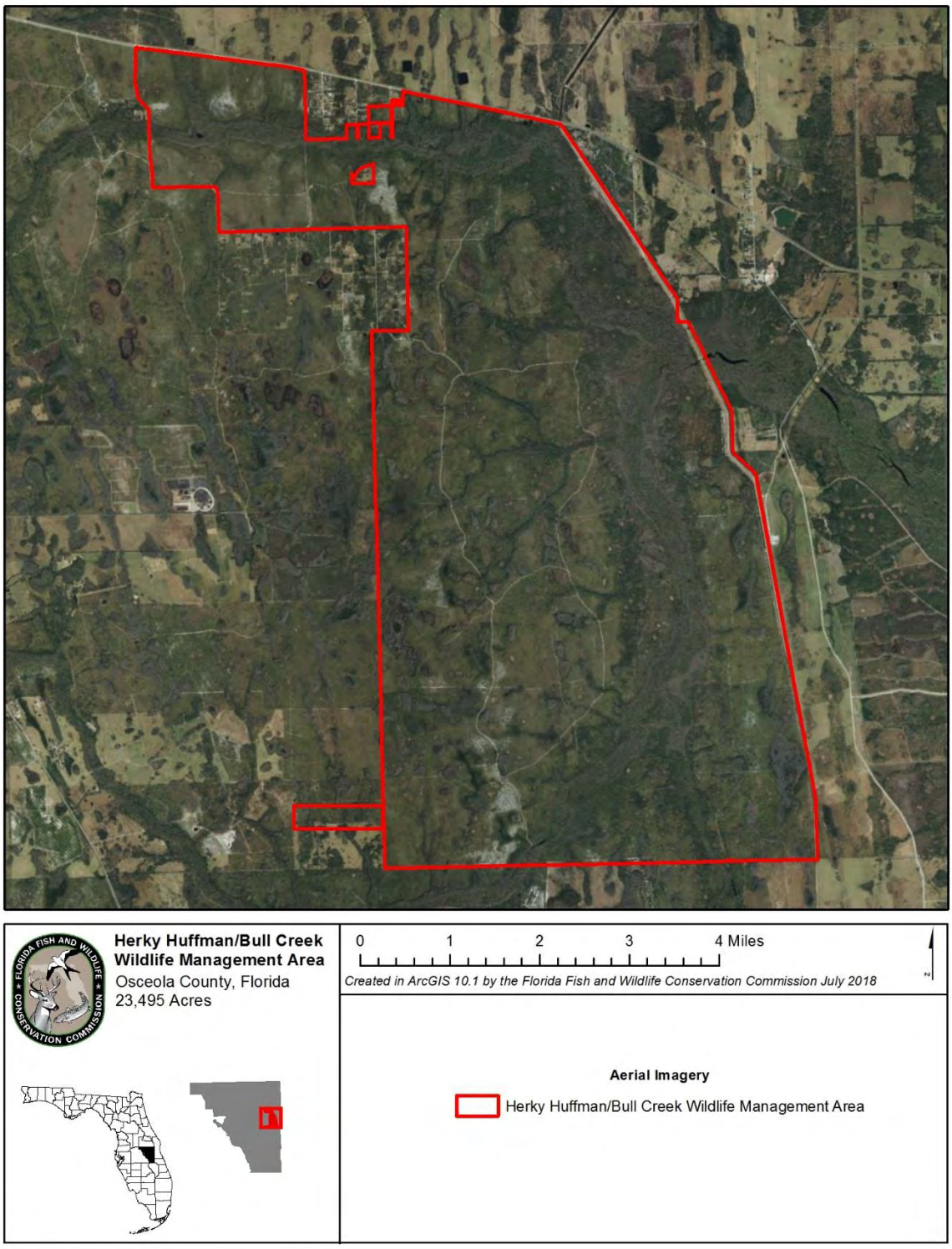


Figure 2. The HHBCWMA Aerial Imagery

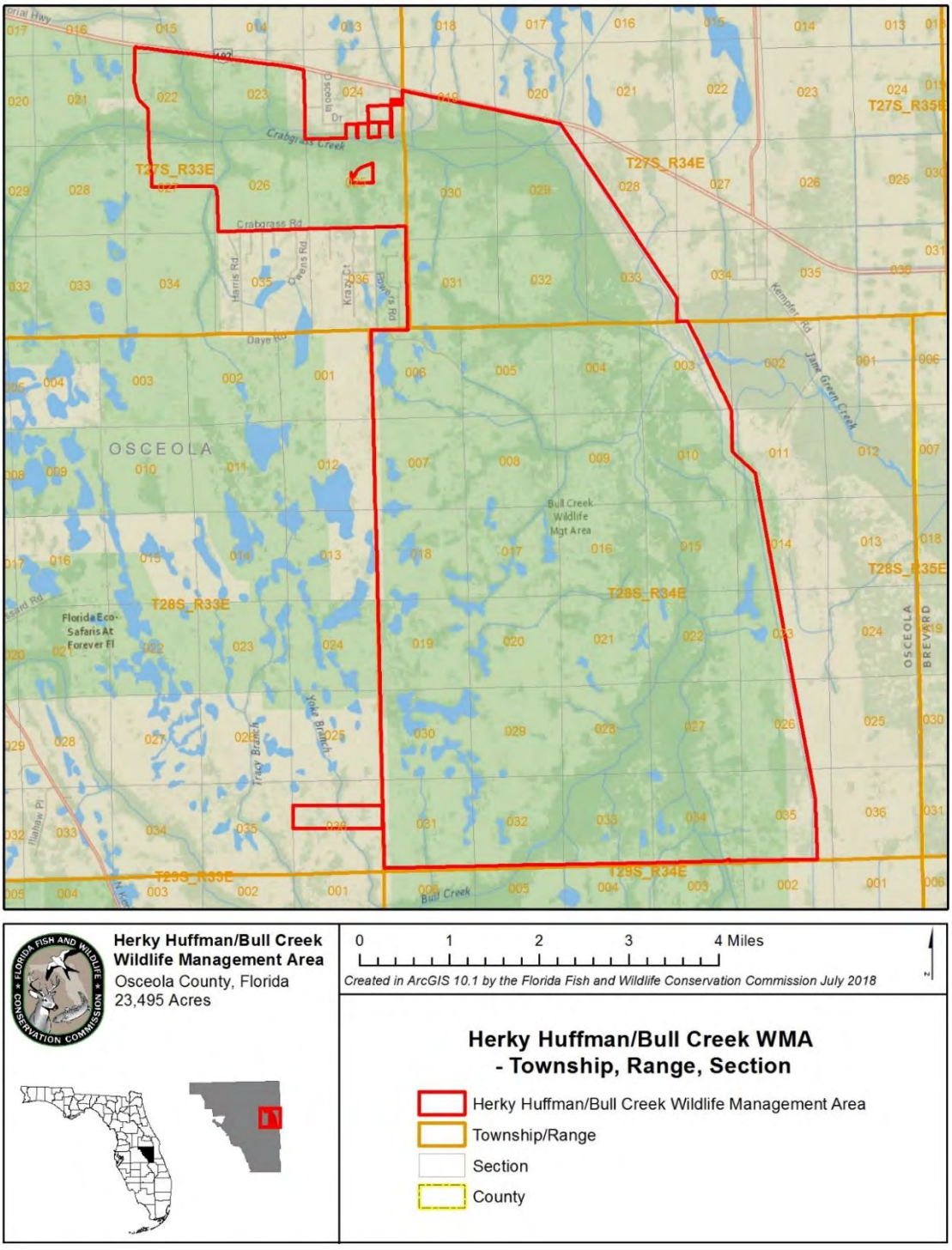
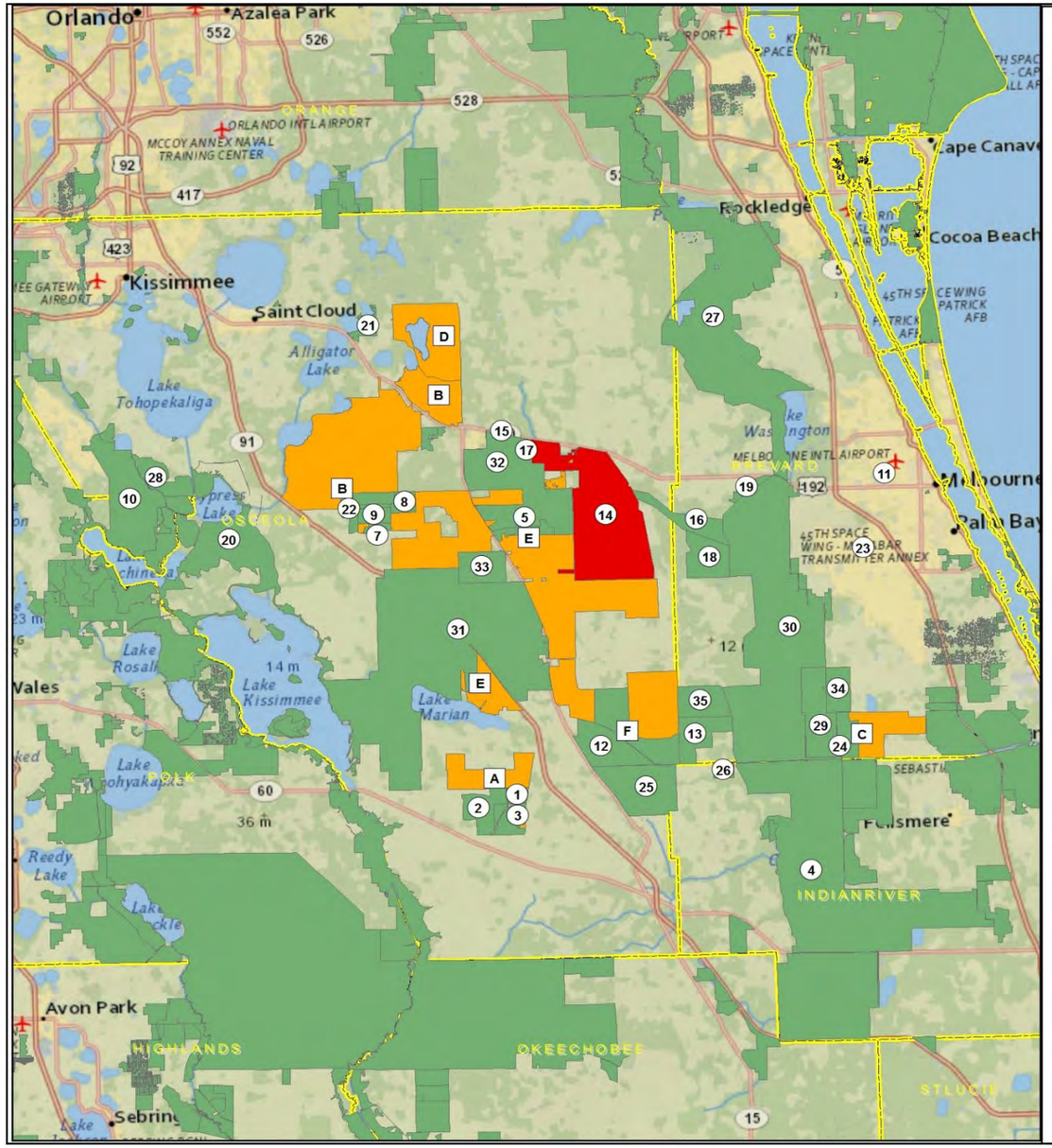


Figure 3. The HHBCWMA – Township, Range, and Section



Conservation Lands within 15 miles of HHBCWMA

1	Adams Ranch Agricultural and Conservation Easement #1
2	Adams Ranch Agricultural and Conservation Easement #3
3	Adams Ranch Conservation Easement
4	Blue Cypress Conservation Area
5	Broussard Conservation Easement
6	Camp Lonesome Agricultural and Conservation Easement #1
7	Camp Lonesome Agricultural and Conservation Easement #2
8	Camp Lonesome Conservation Easement
9	Camp Lonesome Conservation Easement
10	Disney Wilderness Preserve
11	Erna Nixon Park
12	Escape Ranch Conservation Easement
13	Far Reach Ranch Conservation Easement
14	Herky Huffman/Bull Creek Wildlife Management Area
15	Holopaw State Forest
16	Jane Green Creek Less-than-fee Easement Additions
17	Kaschai Conservation Easement
18	Kempfer Property Conservation Easement
19	Kempfer Property Flowage Easement
20	Kissimmee Chain of Lake
21	Lake Lizzie Conservation Area
22	Lonesome Camp Ranch Conservation Area
23	Malabar Transmitter Annex
24	Mary A Ranch Mitigation Bank
25	Mills Ranch Conservation Easement
26	Ox Creek Ranch Agricultural and Conservation Easement
27	River Lakes Conservation Area
28	Southport Ranch Mitigation Bank
29	T.M. Goodwin Waterfowl Management Area
30	Three Forks Conservation Area
31	Three Lakes Wildlife Management Area
32	Triple N Ranch Wildlife Management Area
33	Whaley Conservation Easement
34	Willowbrook Conservation Easement
35	Wolf Creek Ranch Conservation Easement

Florida Forever Projects within 15 miles of HHBCWMA

A	Adams Ranch
B	Big Bend Swamp/Holopaw Ranch
C	Brevard Coastal Scrub Ecosystem
D	Conlin Lake X
E	Osceola Pine Savannas
F	Ranch Reserve

Herky Huffman/Bull Creek Wildlife Management Area
Osceola County, Florida
23,495 Acres

Legend

- Herky Huffman/Bull Creek WMA
- Conservation Lands
- Florida Forever Projects
- County

0 5 10 20 Miles N

Created in ArcGIS 10.1 by the Florida Fish and Wildlife Conservation Commission December 2018

Figure 4. Conservation Lands and Florida Forever Projects within a 15-mile Vicinity of the HHBCWMA

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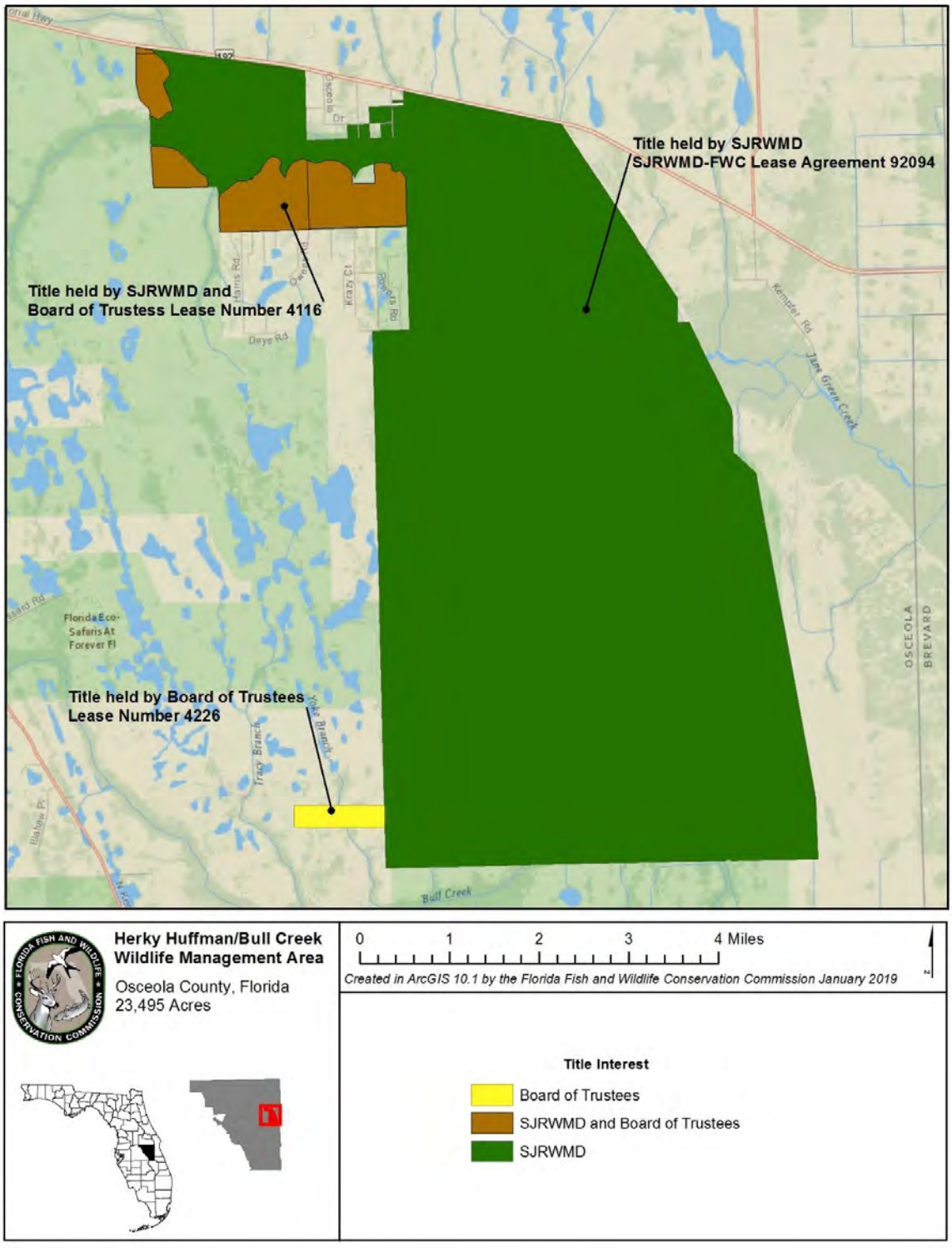

Figure 5. Title Interest for the HHBCWMA

1.9 Public Involvement

The FWC conducted a Management Advisory Group (MAG) meeting in Kissimmee, Florida on August 1, 2018 to obtain input from both public and private stakeholders regarding management of the HHBCWMA. 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 12.6.1. Further, a public hearing, as required by Chapter 259.032(10), FS, was held in Kissimmee on September 20, 2018, to solicit input and comment from the general public regarding this Management Plan. The report of that hearing is also contained in Appendix 12.6.2. A website is also maintained for receipt of public input at http://myfwc.com/conservation/terrestrial/management-plans/develop-mps/ . Further testimony and input is received at a public hearing held by ARC. 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

The HHBCWMA is located within the mid-peninsular physiographic zone south of the Orlando ridge and to the east of the northern portion of the Lake Wales Ridge. The mid-peninsular zone contains discontinuous highlands separated by broad valleys and is composed of distinct physiographic divisions. The HHBCWMA lies within the Osceola Plain physiographic division. The area is predominantly flat, with only gentle slopes and slight changes in elevation.

2.1.1 Climate

The climate of Osceola County, like most of peninsular Florida, is humid and subtropical, with long, warm and humid summers and mild, dry winters. In the summer, temperature tends to remain relatively constant from day to day, with high temperatures being tempered by clouds and frequent afternoon rain showers. In the winter, on the other hand, temperatures tend to vary considerably due to dry, cold air coming in the form of cold fronts from the north. The average annual temperature is 82° Fahrenheit (F) in the summer and 62° F in the winter. The average annual rainfall is approximately 51 inches, with approximately 60% of the rainfall occurring in the wettest months from June to September. Temperatures tend to be the highest in July and August, when the average maximum temperature is 92° F and the average minimum is nearly 74° F. January tends to be the coldest month, with an average maximum temperature of around 71° F and an average minimum temperature of 49° F.

2.1.2 **Topography**

The HHBCWMA occurs in a physiographic district known as the Eastern Flatwoods District. Elevations within the area vary from a maximum of 93 feet above Mean Sea Level (MSL), to a minimum MSL of 60 feet. The HHBCWMA's elevation usually ranges from 60-70 feet. The topography of this area is generally low and flat, with sandy soils and ranging areas of mixed hardwood.

The HHBCWMA does not contain beaches, dunes, or virgin timber.

2.1.3 **Soils**

The U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) data were used to identify the HHBCWMA's soil series and soil depth to water table (Figures 6 and 7). The map units described in the soil survey of the HHBCWMA are distributed as shown in Figure 6. Analyses of depth to water table for map units occurring within the HHBCWMA are also provided in Figure 7. 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. Figure 6 provides aggregation data for the HHBCWMA map units.

Soils found within the HHBCWMA are generally associated with marine terraces on coastal plains and are thus primarily consisting of sandy and loamy marine deposits. Immokalee fine sand makes up over 30% of the HHBCWMA with Smyrna fine sand making up nearly 13% and Basigner fine sand making up around 10% of the area. Various other fine sands that each make up less than 10% of the area include Placid fine sand, depressional, Looksee fine sand, Nittaw muck, Basinger fine sand, depressional, Placid-Riviera-Samsula complex and several others.

2.1.4 **Geologic Conditions**

The Central Highlands Region of peninsular Florida consists of a series of rather localized high grounds, comprising near subparallel north-south ridges that are remnants of beach and sand-dune systems associated with Early Pleistocene shorelines. The region consists of xeric residual sandhills, beach ridges and dune fields, the whole of which is interspersed with numerous sinkholes, lakes and basins caused by erosion of the underlying limestone bedrock. The main axis of the Central Highlands is the Central Ridge, extending from south-eastern Lake County in the north to southern Highlands County in the south. Undifferentiated Quaternary Sediments geological unit is what makes up the HHBCWMA.

Undifferentiated Quaternary Sediments (Pleistocene/Holocene) – Much of Florida's surface is covered by a varying thickness of undifferentiated sediments consisting of siliciclastics, organics and freshwater carbonates. Where these sediments exceed 20 feet (6.1 meters) thick, they were mapped as discrete units. In an effort to subdivide the undifferentiated

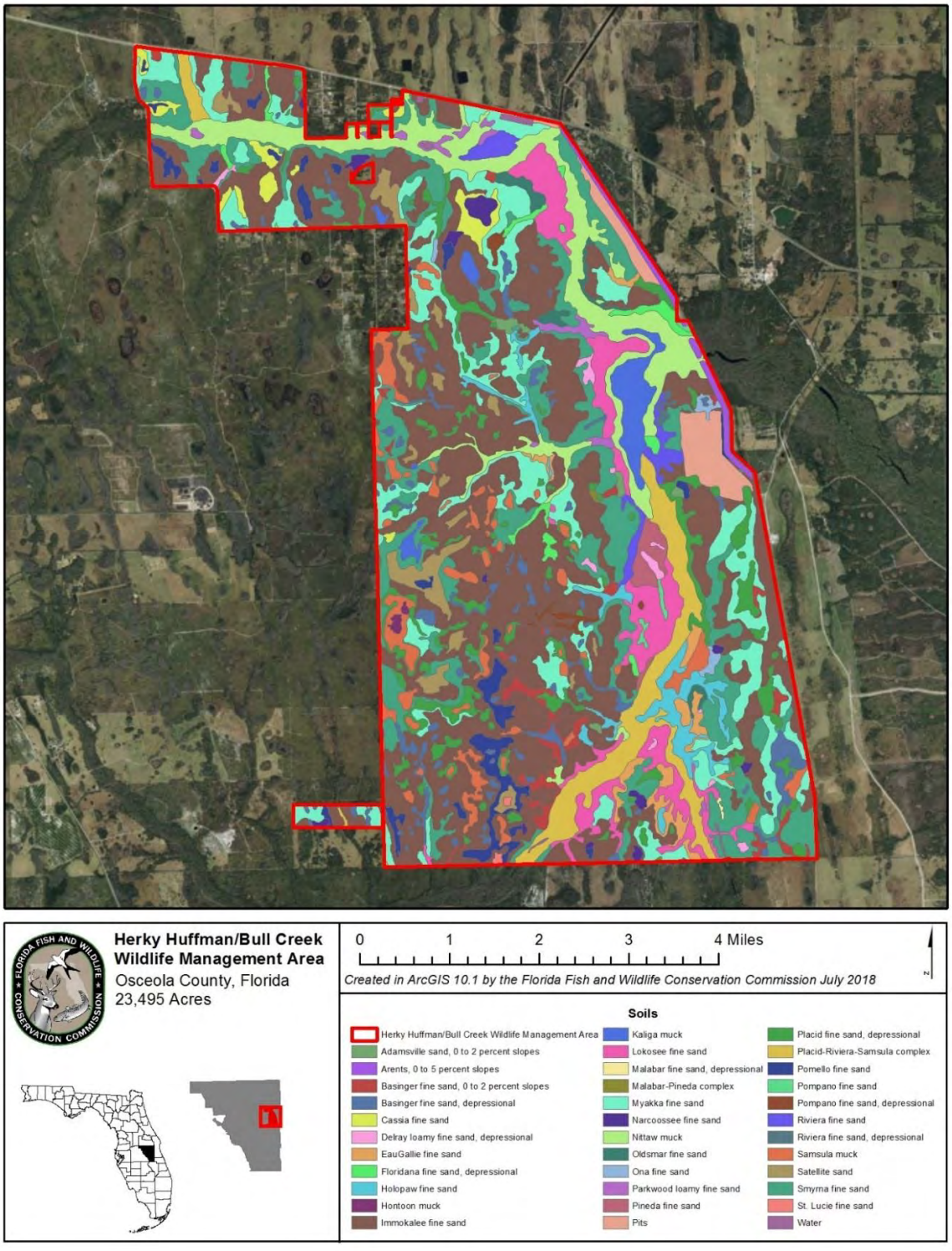

Figure 6. The HHBCWMA Soil Types

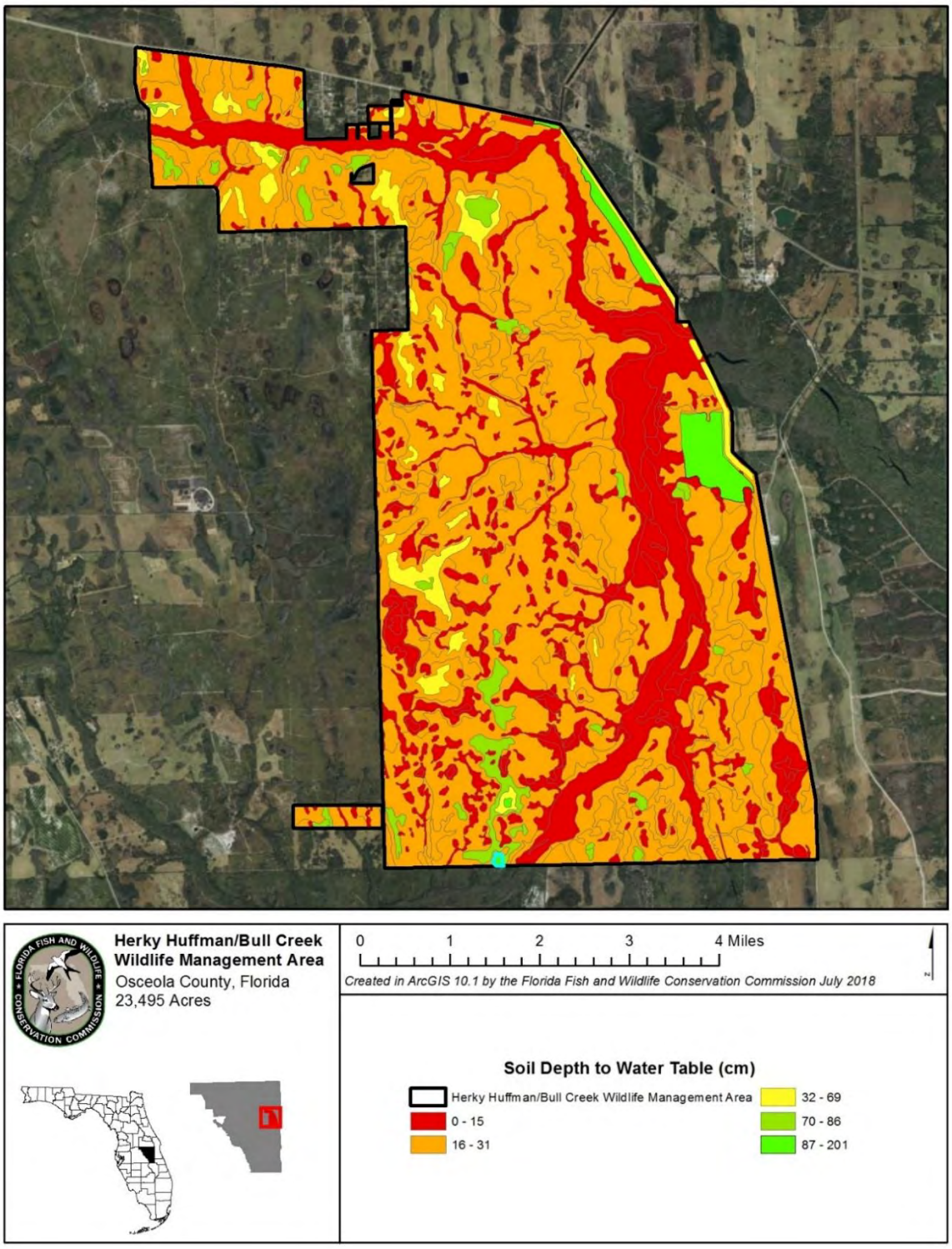

Figure 7. The HHBCWMA Soil Depth to Water Table

sediments, those sediments occurring in flood plains were mapped as alluvial and flood plain deposits. Sediments showing surficial expression of beach ridges and dunes were mapped separately as were the sediments composing Trail Ridge. Terrace sands were not mapped. Refer to Healy [1975] for a discussion of the terraces in Florida. The subdivisions of the Undifferentiated Quaternary Sediments are not lithostratigraphic units but are utilized in order to facilitate a better understanding of the State's geology. The siliciclastics are light gray, tan, brown to black, unconsolidated to poorly consolidated, clean to clayey, silty, unfossiliferous, variably organic-bearing sands to blue green to olive green, poorly to moderately consolidated, sandy, silty clays. Gravel is occasionally present in the panhandle. Organics occur as plant debris, roots, disseminated organic matrices and beds of peat. Freshwater carbonates, often referred to as marls in the literature, are scattered over much of the State. In southern Florida, freshwater carbonates are nearly ubiquitous in the Everglades. These sediments are buff colored to tan, unconsolidated to poorly consolidated, fossiliferous carbonate muds. Sand, silt and clay may be present in limited quantities. These carbonates often contain organics. The dominant fossils in the freshwater carbonates are mollusks.

2.2 Vegetation

Through the services of the Florida Natural Areas Inventory (FNAI), the FWC has mapped the current natural and anthropogenic communities of the HHBCWMA which describes 17 natural and anthropogenic community types existing on the HHBCWMA (Table 3, and Figure 8). The FWC biologists, along with contracted surveys through the FNAI, have documented a variety of exotic and invasive plant species (Table 5) as occurring on the HHBCWMA. Figure 9 also maps out the historic natural communities of the HHBCWMA, which depicts the composition of native plant communities on the area prior to substantial alteration of the region's hydrology and land for agricultural and development uses. Additionally, plant species found at the HHBCWMA have been recorded (Table 4), and there are 22 rare plants (Table 6) and 24 exotic and invasive plants (Table 5) within the HHBCWMA.

Table 3. Natural Community Types on the HHBCWMA

Community Type	GIS Acres	Percentage
Baygall	284.7	1.2%
Depression marsh	971.8	4.1%
Dome swamp	1,428.9	6.0%
Dry prairie	544.1	2.3%
Floodplain swamp	2,853.0	12.1%
Hydric hammock	1,179.5	5.0%
Mesic flatwoods	11,838.8	50.4%

Mesic hammock	189.3	0.8%
Pasture - improved	25.9	0.1%
Pasture - semi-improved	1.7	<0.1%
Pine plantation	8.8	<0.1%
Ruderal	459.5	2.0%
Sandhill	4.6	<0.1%
Scrub	155.2	0.7%
Scrubby flatwoods	929.8	4.0%
Wet flatwoods	2,062.5	8.8%
Wet prairie	577.2	2.5%

Table 4. Native Plant Species Known or Expected to Occur on the HHBCWMA

Common Name	Scientific Name
Adam's needle	*Yucca filamentosa*
Airplant	*Tillandsia sp.*
Alligatorflag	*Thalia geniculata*
American beautyberry	*Callicarpa americana*
American elm	*Ulmus americana*
American hornbeam	*Carpinus caroliniana*
American waterhorehound	*Lycopus americanus*
Arrowfeather threeawn	*Aristida purpurascens*
Aster	*Symphyotrichum sp.*
Atlantic St. John's-wort	*Hypericum tenuifolium*
Bahiagrass	*Paspalum notatum*
Bald cypress	*Taxodium distichum*
Baldwin's milkwort	*Polygala balduinii*
Baldwin's spikerush	*Eleocharis baldwinii*
Ballmoss	*Tillandsia recurvata*
Basswood	*Tilia sp.*
Beaked panicum	*Panicum anceps*
Beaksedge	*Rhynchospora sp.*
Bearded grass-pink	*Calopogon barbatus*
Beggarticks	*Bidens sp.*
Big carpetgrass	*Axonopus furcatus*
Bigleaf snowbell	*Styrax grandifolius*
Blackberry	*Rubus sp.*
Blackroot	*Pterocaulon pycnostachyum*
Bladderwort	*Utricularia sp.*

Blazing star	*Liatris sp.*
Blue huckleberry	*Gaylussacia frondosa var. tomentosa*
Blue maidencane	*Amphicarpum muhlenbergianum*
Blue-eyed grass	*Sisyrinchium sp.*
Bluestem	*Andropogon sp.*
Bluestem	*Schizachyrium sp.*
Bluethread	*Burmannia biflora*
Bog white violet	*Viola lanceolata*
Bogbutton	*Lachnocaulon sp.*
Bottlebrush threeawn	*Aristida spiciformis*
Bracken fern	*Pteridium sp.*
Branched hedgehyssop	*Gratiola ramosa*
Broomsedge bluestem	*Andropogon virginicus*
Bulltongue arrowhead	*Sagittaria lancifolia*
Bully	*Sideroxylon sp.*
Bulrush	*Scirpus sp.*
Bushy bluestem	*Andropogon glomeratus*
Butterwort	*Pinguicula sp.*
Button rattlesnakemaster	*Eryngium yuccifolium*
Cabbage palm	*Sabal palmetto*
Calloose grape	*Vitis shuttleworthii*
Camphorweed	*Pluchea sp.*
Canadian germander	*Teucrium canadense*
Candyroot	*Polygala nana*
Capillary hairsedge	*Bulbostylis ciliatifolia*
Carolina ash	*Fraxinus caroliniana*
Carolina redroot	*Lachnanthes caroliana*
Carolina yellow-eyed grass	*Xyris caroliniana*
Chalky bluestem	*Andropogon virginicus var. glaucus*
Chapman's oak	*Quercus chapmanii*
Chrysogonum	*Chrysogonum sp.*
Climbing hempvine	*Mikania scandens*
Club-moss	*Lycopodiella sp.*
Clustered bushmint	*Hyptis alata*
Clustered mille graines	*Oldenlandia uniflora*
Clustered sedge	*Carex glaucescens*
Coastal rosegentian	*Sabatia calycina*
Coastalplain chaffhead	*Carphephorus corymbosus*
Coastalplain honeycomb-head	*Balduina angustifolia*

Coastalplain milkwort	*Polygala setacea*
Coastalplain St. John's-wort	*Hypericum brachyphyllum*
Coastalplain staggerbush	*Lyonia fruticosa*
Coastalplain willow	*Salix caroliniana*
Colic-root	*Aletris sp.*
Combleaf mermaidweed	*Proserpinaca pectinata*
Common buttonbush	*Cephalanthus occidentalis*
Common persimmon	*Diospyros virginiana*
Coneflower	*Rudbeckia sp.*
Coral greenbrier	*Smilax walteri*
Crabgrass	*Digitaria sp.*
Creeping primrose willow	*Ludwigia repens*
Crimson bluestem	*Schizachyrium sanguineum*
Crowngrass	*Paspalum sp.*
Cypress	*Taxodium sp.*
Dahoon	*Ilex cassine*
Darrow's blueberry	*Vaccinium darrowii*
Deerberry	*Vaccinium stamineum*
Dense gayfeather	*Liatris spicata*
Dixie Whitetop aster	*Sericocarpus tortifolius*
Dock	*Rumex sp.*
Dogfennel	*Eupatorium capillifolium*
Dotted smartweed	*Polygonum punctatum*
Drumheads	*Polygala cruciata*
Dwarf huckleberry	*Gaylussacia dumosa*
Dwarf live oak	*Quercus minima*
Dwarf sundew	*Drosera brevifolia*
Earleaf greenbrier	*Smilax auriculata*
Early blue violet	*Viola palmata*
Early whitetop fleabane	*Erigeron vernus*
Eastern gamagrass	*Tripsacum dactyloides*
Eastern milkpea	*Galactia regularis*
Eastern poison ivy	*Toxicodendron radicans*
Elderberry	*Sambucus nigra ssp. canadensis*
Elliott's bluestem	*Andropogon gyrans*
Elliott's milkpea	*Galactia elliottii*
Elliott's yellow-eyed grass	*Xyris elliottii*
Erectleaf witchgrass	*Dichanthelium erectifolium*
Eryngo	*Eryngium sp.*

False foxglove	*Agalinis sp.*
False nettle	*Boehmeria cylindrica*
Fetterbush	*Lyonia lucida*
Fewflower gayfeather	*Liatris pauciflora*
Fimbry	*Fimbristylis sp.*
Fireweed	*Erechtites hieraciifolius*
Flatsedge	*Cyperus sp.*
Flattened pipewort	*Eriocaulon compressum*
Fleabane	*Erigeron sp.*
Florida air-plant	*Tillandsia simulata*
Florida bluestem	*Andropogon floridanus*
Florida dropseed	*Sporobolus floridanus*
Florida false sunflower	*Phoebanthus grandiflorus*
Florida rosemary	*Ceratiola ericoides*
Florida tickseed	*Coreopsis floridana*
Fourpetal St. John's-wort	*Hypericum tetrapetalum*
Fragrant eryngo	*Eryngium aromaticum*
Fringed bluestar	*Amsonia ciliata*
Fringed nutrush	*Scleria ciliata*
Fringed yellow stargrass	*Hypoxis juncea*
Fringed yellow-eyed grass	*Xyris fimbriata*
Gallberry	*Ilex glabra*
Georgia tickseed	*Coreopsis nudata*
Giant sedge	*Carex gigantea*
Giant white-top	*Rhynchospora latifolia*
Golden polypody	*Phlebodium aureum*
Goldenclub	*Orontium aquaticum*
Goldenrod	*Solidago sp.*
Gopher apple	*Geobalanus oblongifolius*
Grassleaf roseling	*Callisia graminea*
Grassy arrowhead	*Sagittaria graminea*
Greater bladder sedge	*Carex intumescens*
Green ash	*Fraxinus pennsylvanica*
Groundsel tree	*Baccharis halimifolia*
Hairawn muhly	*Muhlenbergia capillaris*
Hairsedge	*Bulbostylis sp.*
Hawkweed	*Hieracium sp.*
Hedgehyssop	*Gratiola sp.*
Highbush blueberry	*Vaccinium corymbosum*

Hoary-pea	*Tephrosia sp.*
Hog plum	*Ximenia americana*
Hop sedge	*Carex lupulina*
Horned bladderwort	*Utricularia cornuta*
Hottentot fern	*Thelypteris interrupta*
Humped bladderwort	*Utricularia gibba*
Iris	*Iris sp.*
Jack-in-the-pulpit	*Arisaema triphyllum*
Jamaica swamp sawgrass	*Cladium jamaicense*
Jeweled blue-eyed grass	*Sisyrinchium xerophyllum*
Jointgrass	*Coelorachis sp.*
Knotted spikerush	*Eleocharis interstincta*
Largeflower jointweed	*Polygonella robusta*
Lattice jointgrass	*Coelorachis tessellata*
Laurel greenbrier	*Smilax laurifolia*
Laurel oak	*Quercus hemisphaerica*
Lax hornpod	*Mitreola petiolata*
Leafless swallowwort	*Orthosia scoparia*
Leather flower	*Clematis sp.*
Lemon bacopa	*Bacopa caroliniana*
Lesser creeping rush	*Juncus repens*
Lesser Florida spurge	*Euphorbia polyphylla*
Licoriceweed	*Scoparia dulcis*
Little bluestem	*Schizachyrium scoparium*
Little floating bladderwort	*Utricularia radiata*
Live oak	*Quercus virginiana*
Lizard's tail	*Saururus cernuus*
Lobelia	*Lobelia sp.*
Loblolly bay	*Gordonia lasianthus*
Loblolly pine	*Pinus taeda*
Longleaf pine	*Pinus palustris*
Longleaf threeawn	*Aristida palustris*
Lopsided Indiangrass	*Sorghastrum secundum*
Lovegrass	*Eragrostis sp.*
Low pinebarren milkwort	*Polygala ramosa*
Maiden fern	*Thelypteris sp.*
Maidencane	*Panicum hemitomon*
Maleberry	*Lyonia ligustrina var. foliosiflora*
Manyflower marsh pennywort	*Hydrocotyle umbellata*

Marsh fern	*Thelypteris palustris var. pubescens*
Marsh pennywort	*Hydrocotyle sp.*
Meadowbeauty	*Rhexia sp.*
Milkpea	*Galactia sp.*
Milkweed	*Asclepias sp.*
Milkwort	*Polygala sp.*
Millet beaksedge	*Rhynchospora miliacea*
Mock orange	*Philadelphus sp.*
Mohr's thoroughwort	*Eupatorium mohrii*
Muscadine	*Vitis rotundifolia*
Myrtle oak	*Quercus myrtifolia*
Myrtleleaf St. John's-wort	*Hypericum myrtifolium*
Narrowleaf blue-eyed grass	*Sisyrinchium angustifolium*
Narrowleaf silkgrass	*Pityopsis graminifolia*
Narrowleaf sunflower	*Helianthus angustifolius*
Netted chain fern	*Woodwardia areolata*
Netted nutrush	*Scleria reticularis*
Netted pawpaw	*Asimina reticulata*
Nutrush	*Scleria sp.*
Nuttall's meadowbeauty	*Rhexia nuttallii*
Oakleaf fleabane	*Erigeron quercifolius*
October flower	*Polygonum polygamum*
Orange milkwort	*Polygala lutea*
Pale meadowbeauty	*Rhexia mariana*
Panic grass	*Panicum sp.*
Panicum	*Panicum longifolium*
Partridge pea	*Chamaecrista fasciculata*
Partridge berry	*Mitchella repens*
Peelbark St. John's-wort	*Hypericum fasciculatum*
Pickerelweed	*Pontederia cordata*
Piedmont blacksenna	*Seymeria pectinata*
Piedmont pinweed	*Lechea torreyi*
Pignut hickory	*Carya glabra*
Pinebarren frostweed	*Helianthemum corymbosum*
Pinebarren goldenrod	*Solidago fistulosa*
Pinebarren Whitetop aster	*Oclemena reticulata*
Pineland chaffhead	*Carphephorus carnosus*
Pineland daisy	*Chaptalia tomentosa*
Pineland pimpernel	*Samolus valerandi ssp. parviflorus*

Pineland rayless goldenrod	*Bigelowia nudata*
Pineland scalypink	*Stipulicida setacea*
Pineywoods dropseed	*Sporobolus junceus*
Pink sundew	*Drosera capillaris*
Pinweed	*Lechea sp.*
Pond cypress	*Taxodium ascendens*
Poor joe	*Diodia teres*
Possumhaw	*Viburnum nudum*
Prairie clover	*Dalea sp.*
Prairie iris	*Iris hexagona*
Pricklypear	*Opuntia humifusa*
Primroseleaf violet	*Viola primulifolia*
Primrose willow	*Ludwigia sp.*
Purple bluestem	*Andropogon glomeratus var. glaucopsis*
Purple thistle	*Cirsium horridulum*
Queen-devil	*Hieracium gronovii*
Queen's delight	*Stillingia sylvatica*
Rabbitbells	*Crotalaria rotundifolia*
Rattan vine	*Berchemia scandens*
Red bay	*Persea borbonia*
Red cedar	*Juniperus virginiana*
Red maple	*Acer rubrum*
Red mulberry	*Morus rubra*
Resurrection fern	*Pleopeltis michauxiana*
Rice button aster	*Symphyotrichum dumosum*
Rosy camphorweed	*Pluchea baccharis*
Rough hedgehyssop	*Gratiola hispida*
Roundleaf bluet	*Houstonia procumbens*
Roundleaf thoroughwort	*Eupatorium rotundifolium*
Roundpod St. John's-wort	*Hypericum cistifolium*
Runner oak	*Quercus pumila*
Rush	*Juncus sp.*
Rustweed	*Polypremum procumbens*
Rusty staggerbush	*Lyonia ferruginea*
Saltmeadow cordgrass	*Spartina patens*
Sand blackberry	*Rubus cuneifolius*
Sand cordgrass	*Spartina bakeri*
Sand holly	*Ilex ambigua*
Sand live oak	*Quercus geminata*

Sand pine	*Pinus clausa*
Sand spike-moss	*Selaginella arenicola*
Sandyfield beaksedge	*Rhynchospora megalocarpa*
Sarsaparilla vine	*Smilax pumila*
Savannah yellow-eyed grass	*Xyris flabelliformis*
Saw greenbrier	*Smilax bona-nox*
Saw palmetto	*Serenoa repens*
Sawtooth blackberry	*Rubus pensilvanicus*
Scaleleaf aster	*Symphyotrichum adnatum*
Scrub oak	*Quercus inopina*
Seaside primrose willow	*Ludwigia maritima*
Sedge	*Carex sp.*
Sensitive pea	*Chamaecrista nictitans*
Sensitive plant	*Mimosa sp.*
Shiny blueberry	*Vaccinium myrsinites*
Shoestring fern	*Vittaria lineata*
Shortbristle horned beaksedge	*Rhynchospora corniculata*
Shortleaf gayfeather	*Liatris tenuifolia*
Shortleaf gayfeather	*Liatris tenuifolia var. quadriflora*
Shortleaf rosegentian	*Sabatia brevifolia*
Shortleaf wild coffee	*Psychotria sulzneri*
Shortleaf yellow-eyed grass	*Xyris brevifolia*
Shortspike bluestem	*Andropogon brachystachyus*
Skeletongrass	*Gymnopogon sp.*
Skyblue lupine	*Lupinus diffusus*
Slash pine	*Pinus elliottii*
Slender flattop goldenrod	*Euthamia caroliniana*
Slimleaf pawpaw	*Asimina angustifolia*
Small butterwort	*Pinguicula pumila*
Smallfruit beggarticks	*Bidens mitis*
Sneezeweed	*Helenium sp.*
Snoutbean	*Rhynchosia sp.*
Soft rush	*Juncus effusus ssp. solutus*
Sour orange	*Citrus x aurantium*
Southern bogbutton	*Lachnocaulon beyrichianum*
Southern cattail	*Typha domingensis*
Southern dewberry	*Rubus trivialis*
Southern needleleaf	*Tillandsia setacea*
Southern umbrellasedge	*Fuirena scirpoidea*

Southern wood fern	*Dryopteris ludoviciana*
Spadeleaf	*Centella asiatica*
Spanish moss	*Tillandsia usneoides*
Sparkleberry	*Vaccinium arboreum*
Spikerush	*Eleocharis sp.*
Splitbeard bluestem	*Andropogon ternarius*
Spurge	*Euphorbia sp.*
St. Andrew's cross	*Hypericum hypericoides*
St. Augustine grass	*Stenotaphrum secundatum*
St. John's-wort	*Hypericum sp.*
Starrush white-top	*Rhynchospora colorata*
Stiff sunflower	*Helianthus radula*
Sugarcane plumegrass	*Saccharum giganteum*
Summer farewell	*Dalea pinnata*
Sundew	*Drosera sp.*
Swamp bay	*Persea palustris*
Swamp dock	*Rumex verticillatus*
Swamp laurel oak	*Quercus laurifolia*
Swamp milkweed	*Asclepias perennis*
Swamp rosemallow	*Hibiscus grandiflorus*
Swamp tupelo	*Nyssa sylvatica var. biflora*
Swampforest beaksedge	*Rhynchospora decurrens*
Sweet goldenrod	*Solidago odora*
Sweetbay	*Magnolia virginiana*
Sweetgum	*Liquidambar styraciflua*
Switchgrass	*Panicum virgatum*
Tall elephantsfoot	*Elephantopus elatus*
Tall pinebarren milkwort	*Polygala cymosa*
Tangerine	*Citrus reticulata*
Taperleaf waterhorehound	*Lycopus rubellus*
Tarflower	*Bejaria racemosa*
Tenangle pipewort	*Eriocaulon decangulare*
Thin paspalum	*Paspalum setaceum*
Threadleaf arrowhead	*Sagittaria filiformis*
Threeawn	*Aristida sp.*
Tickseed	*Coreopsis sp.*
Toothache grass	*Ctenium aromaticum*
Toothed midsorus fern	*Blechnum serrulatum*
Toothpetal false rein orchid	*Habenaria floribunda*

Tracy's bluestem	*Andropogon tracyi*
Tread-softly	*Cnidoscolus stimulosus*
Tridens	*Tridens sp.*
Turkey oak	*Quercus laevis*
Umbrellasedge	*Fuirena sp.*
Vanillaleaf	*Carphephorus odoratissimus*
Violet	*Viola sp.*
Virginia buttonweed	*Diodia virginiana*
Virginia chain fern	*Woodwardia virginica*
Virginia creeper	*Parthenocissus quinquefolia*
Virginia marsh St. John's-wort	*Triadenum virginicum*
Virginia willow	*Itea virginica*
Walter's viburnum	*Viburnum obovatum*
Wand goldenrod	*Solidago stricta*
Ware's hairsedge	*Bulbostylis warei*
Warty sedge	*Carex verrucosa*
Water cowbane	*Tiedemannia filiformis*
Water hickory	*Carya aquatica*
Water locust	*Gleditsia aquatica*
Water oak	*Quercus nigra*
Wax myrtle	*Morella cerifera*
Whip nutrush	*Scleria triglomerata*
White waterlily	*Nymphaea odorata*
Whitehead bogbutton	*Lachnocaulon anceps*
Wild coffee	*Psychotria nervosa*
Wild olive	*Osmanthus americanus*
Wild pennyroyal	*Piloblephis rigida*
Winged sumac	*Rhus copallinum*
Wiregrass	*Aristida stricta var. beyrichiana*
Witchgrass	*Dichanthelium sp.*
Woolly huckleberry	*Gaylussacia mosieri*
Woolly witchgrass	*Dichanthelium scabriusculum*
Yellow colic-root	*Aletris lutea*
Yellow hatpins	*Syngonanthus flavidulus*
Yellow jessamine	*Gelsemium sempervirens*
Yellow milkwort	*Polygala rugelii*
Yellow stargrass	*Hypoxis sp.*
Yellow-eyed grass	*Xyris sp.*
Zigzag bladderwort	*Utricularia subulata*

Table 5. Exotic and Invasive Plant Species Known to Occur on the HHBCWMA

Common Name	Scientific Name	FLEPPC Category
Air-potato	*Dioscorea bulbifera*	I
Brazilian pepper	*Schinus terebinthifolius*	I
Caesar weed	*Urena lobata*	I
Castorbean	*Ricinus communis*	II
Chinese tallowtree	*Triadica sebifera*	I
Cogongrass	*Imperata cylindrica*	I
Coral ardisia	*Ardisia crenata*	I
Golden bamboo	*Phyllostachys aurea*	II
Guineagrass	*Panicum maximum*	II
Guava	*Psidium guajava*	I
Japanese climbing fern	*Lygodium japonicum*	I
Lantana, shrub verbena	*Lantana camara*	I
Natalgrass	*Rhynchelytrum repens*	I
Old World climbing fern	*Lygodium microphyllum*	I
Paragrass	*Urochloa mutica*	I
Peruvian primrosewillow	*Ludwigia peruviana*	I
Praxelis	*Praxelis clematidea*	II
Purple sesban	*Sesbania punicea*	II
Sword fern	*Nephrolepis cordifolia*	I
Torpedograss	*Panicum repens*	I
Water-hyacinth	*Eichhornia crassipes*	I
Water-lettuce	*Pistia stratiotes*	I
Water spangles	*Salvinia minima*	I
Wild taro	*Colocasia esculenta*	I

2.2.1 FNAI Natural Community Descriptions

Baygall (~284.7 acres)

Baygall is a forested or shrub dominated community that occurs on muck rich hydric soils and typically receives its water inputs from ground water seepage. At the HHBCWMA this community can also develop in disturbed historic swamp communities. Winter fires can often burn into swamps when water is absent and cause muck fires and/or kill canopy cypress trees. Bay species often repopulate these fire disturbed areas more quickly than regenerating cypress and the community can transform into a baygall community. Many areas that currently contain a baygall vegetation assemblage appear as cypress swamps or

open marsh/wet prairie habitats in the historic aerial photography. Once a baygall vegetation assemblage establishes, this community often resists prescribed fire and can spread to adjacent wetlands and to adjacent upslope flatwoods habitats. Growing season prescribed fire is the best management tool for reducing non-historic baygall and maintaining a low and sparse structure of historic baygall habitats.

The canopy of the baygall community at the HHBCWMA is typically sparse on the perimeter of the community which is attributable to prescribed fire application. The canopy of this community often becomes denser and infrequently closed in the central portions of this habitat. Common canopy species typically include red maple, loblolly bay, sweetbay, swamp tupelo, slash pine and pond cypress. Baygall at the HHBCWMA typically lacks a well formed subcanopy. Tall shrubs such as loblolly bay, dahoon, fetterbush, sweetbay, wax myrtle and swamp bay form a dense tangle and compose the characteristic stratum of this natural community. Short shrubs are often found in dense cover percentages as well and are often on the ecotone of the community. Common short shrubs include gallberry, fetterbush, sweetbay, wax myrtle, swamp bay and highbush blueberry. Vines such as laurel greenbrier, coral greenbrier and muscadine are commonly found in the shrub stratum. Laurel wilt disease was evident in many habitats containing swamp bay. Herbaceous species are commonly sparse but are found in higher percentages on the perimeter of the baygall community. This community replaces surrounding wet prairie and wet flatwoods when prescribed fires have been ineffective at reducing woody establishment and growth. In these situations, the herbaceous layer often contains wet prairie species such as shortspike bluestem, tenangle pipewort, whitehead bogbutton, shortbristle horned beaksedge and sugarcane plumegrass. On the interior of the community herbaceous species often include cinnamon fern, lizard's tail, sphagnum moss, netted chain fern and Virginia chain fern.

Depression marsh (~971.8 acres)

Depression marsh is an herbaceous wetland community with concentric zones of vegetation found in circular depressions. Depression marshes are commonly shallowly inundated with a gradual transition occurring between the surrounding community and the marsh center. The ecotone and often the center of the community will contain a diverse mixture of grasses and forbs that commonly carry fire. This characteristic often limits both tree and shrub establishment. Depression marshes that have been excluded from fire typically contain shrubby perimeters. The depression marsh communities present at the HHBCWMA commonly receive prescribed fire and have maintained their historic vegetation assemblage and open community structure.

At the HHBCWMA depression marsh is frequently found scattered through the flatwoods communities and is most often found without canopy trees or dense shrub cover. Shrubs

are typically short and sparse and often include peelbark St. John's-wort, myrtleleaf St. John's-wort, water toothleaf, common buttonbush and roundpod St. John's-wort.

The groundcover layer of this community often contains a dense and diverse herbaceous assemblage including blue maidencane, shortspike bluestem, longleaf threeawn, bottlebrush threeawn, wiregrass, sawgrass, dwarf sundew, pink sundew, flattened pipewort, pipewort, Carolina redroot, maidencane, pickerelweed, shortbristle horned beaksedge, sugarcane plumegrass, hooded pitcherplant, sand cordgrass, saltmeadow cordgrass, Virginia chain fern and fringed yellow-eyed grass.

Canopy trees are typically very sparse in this habitat but can be present in areas that have not received effective prescribed fire applications. The presence of trees in this community's canopy increases closer to floodplain areas. Red maple, swamp tupelo, slash pine, cabbage palm and pond cypress are the common canopy associates in fire-excluded areas. Likewise, shrub heights and covers increase with closer proximity to the floodplain systems. In these areas, less desirable depression marsh shrubs can be found including groundsel tree, sweetbay, wax myrtle, slash pine, coastalplain willow and pond cypress.

Dome Swamp (~1,428.9 acres)

Dome Swamp is an isolated wetland community occurring in shallow basins within a fire-maintained community and is forested with conifers and/or deciduous trees. Fire occurs along the periphery, spreading from the surrounding uplands, but is infrequent in the deeper portions of the swamp due to decreased fuels and wetter conditions. Trees in the center are generally taller than those on the edges, giving the stand its characteristic dome-shaped profile. Dome Swamps at the HHBCWMA are frequently scattered across the property within the flatwood's matrix. This community occurs in a wide variety of shapes and sizes and typically burns along with the surrounding pyrogenic community. Often the ecotone of this community contains a wet prairie or marsh habitat characterized by herbaceous species, primarily graminoids. In some instances, historic dome swamps that appear to have been dominated by cypress are currently colonized by baygall species. This is typically due to past fire disturbance. Winter burning when groundwater levels are too low can burn into the muck soils that accumulate in dome swamps. The burning of this muck can kill the canopy cypress trees and allow for baygall species to establish. Increased shrub fuel loads in fire-excluded dome swamps can also cause this community to burn too hot, thus also killing the historic cypress canopy.

The majority of the Dome Swamp communities at the HHBCWMA contain younger mature to mature canopies. Pond cypress is the dominant canopy species, with red maple, loblolly bay and swamp bay commonly occurring in many of the larger swamps. This community generally lacks a distinct subcanopy. Shrub covers vary depending on location, but shrubs are generally sparse to moderately dense. Common shrub species include loblolly bay,

dahoon, gallberry, fetterbush and wax myrtle. The herbaceous layer of the dome swamp community commonly includes chalky bluestem, big carpetgrass, toothed midsorus fern, cinnamon fern, netted chain fern and Virginia chain fern. Epiphytes are fairly common in this community and often include Balbis' airplant, common wild-pine, Florida air-plant and Spanish moss.

Dry Prairie (~544.1 acres)

Dry prairies are upland areas of dwarf shrubs and grasses with few or no pines and many of the same species in the shrub and herbaceous layers as are found in a mesic flatwoods community. At the HHBCWMA, wiregrass, low shrubs, stunted saw palmetto and dwarf live oak form most of the cover, with taller shrubs being infrequent to absent. Due to past fire history and applied roller-chopping techniques, dry prairie is often difficult to discern from mesic flatwoods. Roller-chopped mesic flatwoods commonly have very low structured shrub layer that appears to be stunted and is very similar in structure to a dry prairie habitat. Areas of dry prairie that have not received sufficient prescribed fire have excessively tall shrubs and/or canopy pines. These areas are difficult to impossible to differentiate from historic flatwoods. Historic aerial photography is useful in the delineation of these two similar habitats but may not show or represent true historic conditions. Dry prairie at the HHBCWMA tends to occur adjacent to scrubby flatwoods habitats. Frequent fires are necessary to prevent the establishment of a longleaf pine canopy in this community. In fire excluded areas of this community sparse sand live oak and live oak are present. Short shrubs form the characteristic stratum of this community. Commonly shrubs are less than one meter tall and include netted pawpaw, Atlantic St. John's-wort, fourpetal St. John's-wort, gallberry, gopher apple, coastalplain staggerbush, fetterbush, wax myrtle, dwarf wax myrtle, wild pennyroyal, dwarf live oak, runner oak, saw palmetto and shiny blueberry. Herbaceous cover is variable and is commonly sparse to moderately dense. Characteristic dry prairie herbaceous species at the HHBCWMA include bottlebrush threeawn, wiregrass, witchgrass skeletongrass, fringed yellow stargrass, whitehead bogbutton, shortleaf gayfeather, narrowleaf silkgrass, blackroot, little bluestem, sweet goldenrod, lopsided indiangrass and Carolina yellow-eyed grass.

Floodplain Swamp (~2,853.0 acres)

Floodplain Swamp is a hydric forested community that occurs within the floodplain of a creek, stream or river. This community at the HHBCWMA occurs along its namesake Bull Creek, Crabgrass Creek and their various tributaries. Floodplain swamp, hydric hammock and black water stream communities together create a varied mosaic within the canopied floodplain systems of this site. Hydric hammock is typically separated from floodplain swamp by containing a predominance of cabbage palm and live oak and is typically saturated, rather than inundated. Floodplain swamp becomes more common to the south as the floodplain system accumulates greater amounts of water inputs. The canopy of this

community is typically dominated by cypress. The flood control structures associated with Bull Creek have severe effects on floodplain swamp community by creating unnaturally high-water depths and long hydroperiods that reduce vegetation cover in all strata. Canopy trees are typically the only vegetation component that can tolerate such inundation. The central and southern portions of the Bull Creek floodplain on the HHBCWMA are the most severely flood impacted areas.

The floodplain swamp community at the HHBCWMA is commonly a closed canopy system. In areas that are excessively inundated, the canopy is generally sparse and unhealthy. Common canopy associates include red maple, sweetgum, swamp tupelo, swamp laurel oak, pond cypress, bald cypress and American elm. The subcanopy contains younger individuals found in the canopy layer in addition to Carolina ash and cabbage palm. Epiphytes are common in the canopy layer and include resurrection fern, common wild-pine and ballmoss. The shrub layer is very sparse due to shading provided by the canopy layers. Common shrubs include common buttonbush, Virginia willow, water locust, wax myrtle, cabbage palm, coastalplain willow and Walter's viburnum. The herbaceous layer density is directly related to the depth of water commonly present in this community with more cover in less inundated situations. Herbaceous layer associates include toothed midsorus fern, false nettle, hop sedge, manyflower marsh pennywort, prairie iris, cardinal flower, cinnamon fern, dotted smartweed, shortbristle horned beaksedge, swamp dock, coastal rosegentian, sugarcane plumegrass, pineland pimpernel, lizard's tail, Canadian germander, alligatorflag, hottentot fern, eastern poison ivy and Virginia chain fern.

Hydric Hammock (~1,179.5 acres)

Hydric Hammock is a forested community with saturated soils that commonly supports a canopy of live oak and cabbage palm. At the HHBCWMA this community occurs intermixed in a mosaic with floodplain swamp. These two communities and blackwater stream compose the floodplain habitats at the HHBCWMA. Small drainages that originate in the pyrogenic communities at this site typically coalesce down gradient and when they collect enough water to exclude fire, hydric hammock develops.

Hydric hammocks at the HHBCWMA are forested wetlands with a canopy of hardwoods, usually including swamp laurel oak and cabbage palm, often occurring along edges of floodplains or swamps. At the HHBCWMA this community is well developed, consisting of a tall forest of mature trees occurring along Bull Creek, Crabgrass Creek and its tributaries. The diverse, closed canopy consists of five equally abundant tree species, including swamp laurel oak, red maple, sweetbay magnolia and American elm. Cabbage palm is common in the subcanopy and also in the tall shrub layer. Wax myrtle is also frequent in the tall shrub layer, which is usually sparse. The short shrub layer is also sparse and consists primarily of blue palmetto. Two tropical species, twinberry and wild coffee, are found at a few sites in the tall and short shrub layers, respectively. The

herbaceous layer is usually sparse, with occasional dense patches of ferns which include cinnamon fern, netted chain fern, Virginia chain fern, hottentot fern and marsh fern. Epiphytes are abundant, including bromeliads, ferns and an orchid. Mesic hammock or a pine dominated hydric hammock habitat form the ecotone between hydric hammock and the open flatwoods matrix. Fire appears to be very infrequent in the hydric hammock community.

Mesic Flatwoods (~11,838.8 acres)

Mesic flatwoods are an upland forest community with an open pine canopy and an understory composed of varying mixtures of shrubs and grasses. At the HHBCWMA mesic flatwoods typically contains a sparse canopy of longleaf pine or slash pine. Pine canopies are often very sparse when adjacent to scrubby flatwoods, scrub and prairie communities and much denser when grading down slope towards hammock communities.

Shrubs are primarily represented by saw palmetto but may also include coastalplain staggerbush, fetterbush, wax myrtle, Atlantic St. John's-wort, gallberry, dwarf wax myrtle, dwarf live oak and shiny blueberry. Due to frequent prescribed fire applications, shrubs are commonly short and form a well-structured flatwoods habitat. Wiregrass is the common herbaceous species observed in the mesic flatwoods community. Associated species are broomsedge bluestem, bottlebrush threeawn, witchgrass, tall elephantsfoot, blackroot, little bluestem and lopsided indiangrass. Vines were typically sparse to nonexistent in mesic flatwoods at the HHBCWMA.

In the 1944 aerial photography, scattered bare patches of sand can be observed, while trees are generally absent. This might be the result of stump removal for the turpentine industry of the early and middle 19th century. Some of the area classified as historic mesic flatwoods may have been historic dry prairie communities. Due to past fire history and applied roller chopping techniques, dry prairie is often difficult to discern from mesic flatwoods. Roller chopped mesic flatwoods commonly has very low structured shrub layer that appears to be stunted and is very similar in structure to a dry prairie habitat. Areas of dry prairie that have not received sufficient prescribed fire have excessively tall shrubs and/or canopy pines. These areas are difficult to impossible to differentiate from historic flatwoods. Historic aerial photography is useful in the delineation of these two similar habitats but may not show or represent true historic conditions.

Mesic Hammock (~189.3 acres)
Mesic hammocks are closed-canopy forests of temperate hardwood species occurring along wetlands or as islands within wetlands where they are sheltered from fire. Fire is rare, and when mesic hammocks burn they may convert to the community they border. Mesic hammocks at the HHBCWMA have formed in both fire-shadowed sites and areas that were historically cleared or developed. Mesic hammock is best represented by a closed or nearly closed canopy community of live oak that is occurring on well drained sands. This community can also be found intermixed with hydric hammock on higher rises within the floodplain systems of the HHBCWMA. Disturbances to the flatwoods community at the HHBCWMA are relatively few and prescribed fire is regularly used to maintain its pyrogenic communities. These two factors minimize the amount of lands that could succeed to mesic hammock.

The canopy of mesic hammock is commonly closed and consists of primarily live oak and additionally sweetgum, southern magnolia, slash pine, swamp laurel oak, water oak and cabbage palm. Cabbage palm is also common in the shrub stratum with yaupon, American beautyberry, fetterbush, wax myrtle, coastalplain staggerbush, water oak and saw palmetto. Herbaceous species are commonly sparse or not present. Herbaceous species found in mesic hammock at the HHBCWMA include witchgrass, bracken fern and sandyfield beaksedge. The canopy live oaks of this community frequently hold numerous epiphytes including golden polypody, resurrection fern, common wild-pine, ballmoss, southern needleleaf, Florida air-plant, Spanish moss, spreading air-plant and shoestring fern. Vines such as earleaf greenbrier and muscadine are commonly found in this habitat.

Sandhill (~4.6 acres)
Sandhill is characterized by a canopy of widely spaced pine trees with a sparse midstory of deciduous oaks, and a moderate to dense groundcover of grasses, herbaceous and low shrubs occurring over a rolling topography composed of deep sands. The HHBCWMA contains only one small 4.6-acre area of sandhill. This community contains all the components needed to be classified as high quality, despite its minimal size. The open canopy contains mature longleaf pine with a sparse subcanopy of turkey oak. Shrubs are also sparse and represented by sand live oak, turkey oak, gopher apple, dwarf live oak, live oak, saw palmetto, shiny blueberry and deerberry. The herbaceous layer is fairly dense and contains mostly wiregrass and to a less extent coastalplain chaffhead, narrowleaf silkgrass, blackroot and snoutbean. Open areas of bare sand can be found throughout.

Scrub (~155.2 acres)
Scrub is a xeric woodland that occurs on well drained sand soils and supports a vegetation assemblage characterized by scrub oaks. This community burns infrequently relative to the typical flatwoods matrix it is formed within. The majority of the scrub found at the HHBCWMA lacks any canopy stratum and is best characterized by 6-15 ft. tall scrub oaks

intermixed with sandy openings. The openings allow the rare large-flowered rosemary and nodding pinweed to persist in the sparse ground cover. The scrub community often occurs in isolated islands within the flatwoods communities. This landscape position maximizes the opportunity for fire to enter this community. Areas that have been excluded from prescribed fire may contain canopy associates including sand pine, slash pine, and longleaf pine. Sand pine scrub is not common at this site and the majority of this community is best classified as the oak scrub variant. Tall shrubs are often present and are moderately dense and intermixed with open areas of bare sand. Tall shrubs include rusty staggerbush, coastalplain staggerbush, fetterbush, sand pine, Chapman's oak, sand live oak and myrtle oak. These same species can be found in the short shrub layer in addition to Florida rosemary, Atlantic St. John's-wort, gopher apple, dwarf live oak, saw palmetto, shiny blueberry and deerberry. Herbaceous species are commonly sparse, which is typical for this community. Two rarities present in groundcover stratum of scrub at the HHBCWMA are large-flowered rosemary and nodding pinweed. The presence of these species indicates the high quality of the herbaceous layer. Other common groundcover species include arrowfeather threeawn, coastalplain honeycomb-head, Ware's hairsedge, coastalplain chaffhead, flatsedge, witchgrass, Elliott's milkpea, southern bogbutton, October flower, sandyfield beaksedge and sand spike moss. Epiphytes are fairly common in this community on scrub oaks. Commonly documented epiphytes include ballmoss and Spanish moss. Vines were infrequent and represented by one species, earleaf greenbrier.

Scrubby Flatwoods (~929.8 acres)

Scrubby flatwoods at the HHBCWMA occur in association with the mesic flatwoods and scrub communities on the property. Scrubby flatwoods contain scrub oaks but differ from scrub by having a greater percent cover of saw palmetto and herbaceous groundcover species, and by typically having a canopy of longleaf pine. In addition to the herbaceous layer, the pines add fine fuel to the system in the form of needle drop. This helps this community carry fire more frequently and effectively than pure oak-dominated scrub. Also, the scrubby flatwoods community often occurs in isolated islands within the mesic flatwoods matrix at the HHBCWMA. This landscape position maximizes the opportunity for fire to enter this community.

Longleaf pine is the dominant canopy species, while sand pine, slash pine, and sand live oak are found much less frequently in the canopy layer. Tall shrubs are common and vary in densities from one stand to another. Common tall shrub species include tarflower, rusty staggerbush, coastalplain staggerbush, fetterbush, Chapman's oak, sand live oak, myrtle oak, cabbage palm, saw palmetto and deerberry. The short shrub layer often contains the same species in addition to netted pawpaw, dwarf huckleberry, Atlantic St. John's-wort, fourpetal St. John's-wort, gopher apple, dwarf wax myrtle, pricklypear, wild pennyroyal, dwarf live oak, winged sumac, shiny blueberry and Adam's needle. Herbaceous species are

typically sparse, which is common for this community. Wiregrass is the dominant herbaceous species. Additional groundcover associates include arrowfeather threeawn, bottlebrush threeawn, wiregrass, coastalplain honeycomb-head, Ware's hairsedge, coastalplain chaffhead, witchgrass, tall elephantsfoot, wedge-leaved button-snakeroot, Elliott's milkpea, blazing star, skyblue lupine, narrowleaf silkgrass, candyroot, October flower, largeflower jointweed, rustweed, bracken fern, blackroot, sandyfield beaksedge, little bluestem, sweet goldenrod, lopsided indiangrass, queen's delight and Carolina yellow-eyed grass. Vines are uncommon but may include small percentages of earleaf greenbrier and muscadine.

Wet Flatwoods (~2,062.5 acres)

Wet flatwoods typically have an open pine canopy with an understory of hydrophytic herbaceous species and shrubs. Wet flatwoods that burn frequently typically have a sparse understory and a dense complement of herbaceous and smaller shrubs species. Conversely, thick, shrubby understory layers tend to suppress ground cover plants.

Wet flatwoods at the HHBCWMA occurs in two unique forms. The first subtype is generally in line with typical wet flatwoods landscape positioning, structure, and species composition. This community can be described as a mosaic of wet prairie interspersed with small mesic flatwoods islands that are dominated by saw palmetto and occasional pines. The mix of mesic flatwoods and wet prairie is often not easily represented in map form and is best lumped into a wet flatwoods classification. Often times with exclusion of fire, wet prairie can become invaded by pines. These areas, if thought not to be historically wet flatwoods, were not classified as such.

Regardless of canopy densities, these areas were typed as wet prairie in order to guide management towards a prairie condition, rather than a canopied system. Typical wet flatwoods situations contain a sparse to moderately dense canopy of longleaf pine. The subcanopy is often absent, but when present includes red maple, cabbage palm, and pond cypress. Shrubs are often very sparse but can be dense in fire excluded areas. Common shrubs include buttonbush, gallberry, fetterbush, wax myrtle, slash pine, cabbage palm, saw palmetto, roundpod St. John's-wort and peelbark St. John's-wort. Herbaceous species are often very diverse, and the dominant species often include bottlebrush threeawn,

wiregrass, pineland daisy, pink sundew, maidencane, shortbristle horned beaksedge, sugarcane plumegrass and bog white violet.

The second subtype of wet flatwoods at the HHBCWMA occurs on low lying elevations that occur between floodplain systems and mesic flatwoods habitats. These areas appear to receive infrequent floodwater inputs and commonly contain more organic soils than sandy flatwoods soils. These habitats are impacted by additional unnatural flooding events caused by water manipulation devices located on the eastern side of the HHBCWMA. The results of such flooding limit species diversity and only allow for species that are able to persist after flooding events. The frequent presence of cabbage palm in this habitat also indicates less acidic and/or lime rich soils. Longleaf pine is replaced by slash pine in the canopy of this wet flatwoods variant which is referred to as a "cabbage palm flatwoods" (FNAI, 2010). Additional canopy species occurring in this variant of wet flatwoods include sweetgum, red maple, live oak and cabbage palm. Shrubs are generally sparse to moderately dense and kept in check by flooding impacts and prescribed fire applications. Common shrubs in the cabbage palm variant include common buttonbush, common persimmon, dahoon, fetterbush, wax myrtle, coastalplain willow, saw palmetto, roundpod St. John's-wort, peelbark St. John's-wort, St. Andrew's cross and gallberry. Herbaceous species are much less diverse than the more typical wet flatwoods situations. Common herbaceous species include blue maidencane, shortspike bluestem, bushy bluestem, chalky bluestem, spadeleaf, sawgrass, slender flattop goldenrod, clustered bushmint, maidencane and Virginia chain fern.

This community often occurs interspersed with mesic flatwoods that is dominated by slash pine and saw palmetto. Cabbage palm wet flatwoods and mesic flatwoods found in low lying areas adjacent to the floodplain communities of the HHBCWMA are typically not distinguishable from one another on aerial photography. These communities are best classified as a mosaic of the two.

Wet Prairie (~577.2 acres)

Wet prairie is a wetland herbaceous community characterized by a seasonally high-water table and frequent fire, with dense stands of grass species intermingled with high quality wetland herbaceous species. At the HHBCWMA, wet prairie commonly borders dome swamps and depression marshes. In most cases, these bordering prairie-like areas are small and often included as part of the community they fringe. Wet prairie may also form irregular and sometimes large patches within a mesic flatwoods matrix. These habitats commonly contain rounded "islands" of saw palmetto scattered throughout. In areas that have been disturbed in the past, wiregrass may be replaced as the dominant species by shortspike bluestem. Wiregrass requires fire to reproduce; many of the herbaceous species that are growing with it require fire to flower or have their flowering enhanced by fire. In the absence of fire, wet prairies are readily invaded by wax myrtle, and the height and

cover of the latter is an indicator of past fire history in any given stand. A few areas of wet prairie at the HHBCWMA occur in linear drainages that terminate into lower elevation hydric hammock. These areas are created by seepage rather than pooling of water. This character maintains constant hydrology levels and often supports rare and unique vegetation associations, such as pitcher plant prairies. Hooded pitcherplant is commonly observed in most areas of wet prairie. Many wet prairie habitats on the HHBCWMA are very small and fall below the minimum mapping unit adopted by the FWC (> 0.5 acres).

Wet prairie at the HHBCWMA typically lacks a canopy or contains only a few scattered longleaf pines. In areas that have been disturbed, commonly from hydrology alterations, slash pine can be a common invader. Shrubs are sparse and include roundpod St. John's-wort, peelbark St. John's-wort, myrtleleaf St. John's-wort, fourpetal St. John's-wort, gallberry, fetterbush, wax myrtle, dwarf live oak, saw palmetto and pond cypress. This community contains a very diverse suite of herbaceous species commonly dominated by wiregrass and to a lesser extent blue maidencane, longleaf threeawn, bottlebrush threeawn, pineland rayless goldenrod, bearded grass-pink, pineland daisy, toothache grass, woolly witchgrass, dwarf sundew, pink sundew, early whitetop fleabane, flattened pipewort, tenangle pipewort, whitehead bogbutton, water cowbane, orange milkwort, sugarcane plumegrass and bog white violet. Vines are generally present in fire excluded wet prairies and may include earleaf greenbrier, laurel greenbrier and muscadine.

Altered Community Descriptions

Pasture - Improved (~25.9 acres)

Improved pastures are defined as natural areas that have been stripped of most or all native vegetation and replanted in pasture grasses. At the HHBCWMA, improved pasture accounts for only 26 acres of the entire site. There is only one example of this anthropogenic ecological community occurring in the extreme southwest corner of the property. This community has heavy disturbance from cattle, clearing and invasive plant establishment. This community lacks canopy trees but does contain scattered wax myrtle shrubs. No native vegetation is evident and dogfennel and bahiagrass dominate the groundcover.

Pasture – Semi-Improved (~1.7 acres)

Semi-improved pasture is defined as natural areas that have been stripped of a significant percentage of their native vegetation and seeded in pasture grasses, but still retain some natural structure. Semi-improved pasture at the HHBCWMA occurs in one area of former scrubby flatwoods. This site contains a canopy of sand live oak and live oak. Shrubs are locally dense or have been removed and replaced with open areas of bahiagrass. Shrub species include sour orange, saw palmetto, Chapman's oak, sand live oak and cabbage palm.

Pine Plantation (~8.8 acres)

Pine plantation at the HHBCWMA is defined as densely planted pines occurring in rows and lacking a significant or diverse assemblage of groundcover/ herbaceous species. The HHBCWMA contains one occurrence of pine plantation that is located in the extreme southwestern portion of the property. Prior to acquisition by the state of Florida, slash pine was planted in rows on what was historically mesic flatwoods. This community lacks both subcanopy and tall shrub strata. Short shrubs are sparse to moderately dense with generally low shrub heights. Short shrub species include gallberry, fetterbush, saw palmetto and sparkleberry. The herbaceous layer is very sparse and species poor. Bluestem, slender flattop goldenrod, crowngrass, bracken fern, blackroot and queen's delight are the only noted herbaceous species. This community has received numerous applications of prescribed fire and with the exception of fairly dense pines in the canopy this community has decent vegetation structure.

Ruderal (~459.5 acres)

Ruderal communities are areas where the natural community has been overwhelmingly altered as a result of human activity. Seven ruderal types were mapped on the HHBCWMA: clearing, ditch/canal, agriculture, developed, impoundment/artificial pond, spoil area and abandoned field. The largest and most significant ruderal feature of the HHBCWMA is the flood control berm and associated water control devices. This feature alters the natural hydroperiod of the adjacent floodplain swamp and hydric hammock mosaic associated with Bull Creek.

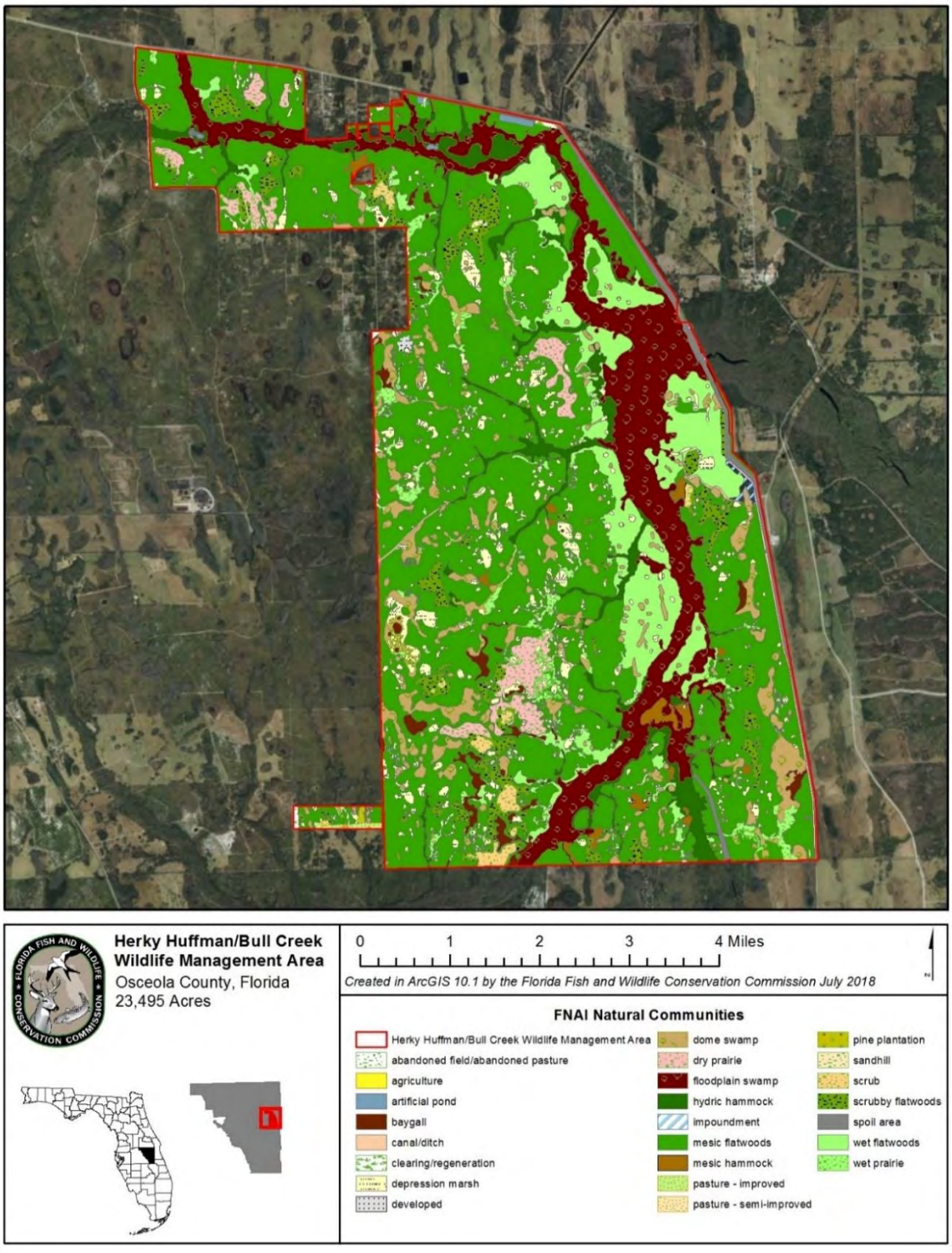

Figure 8. Natural Communities Found on the HHBCWMA

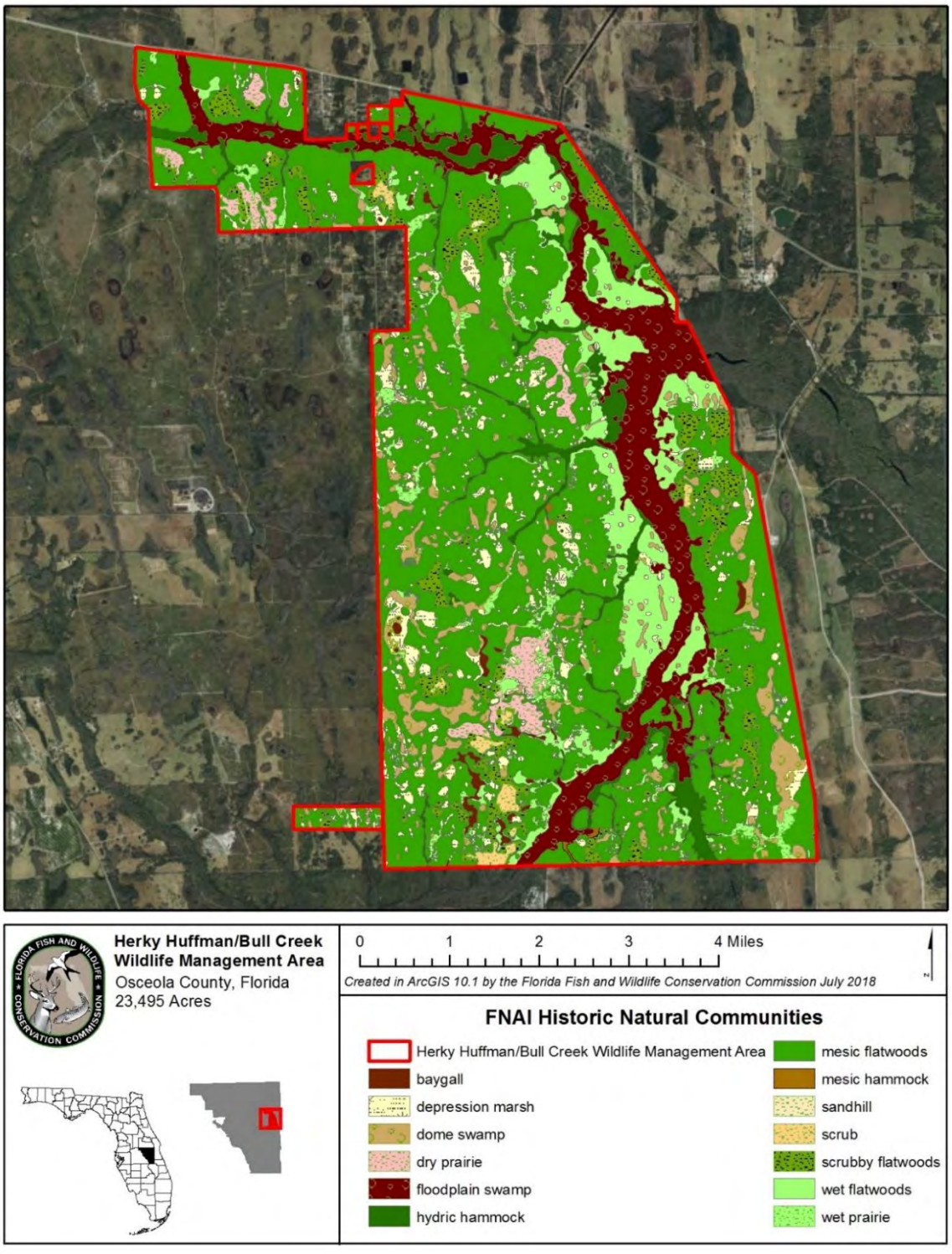

Figure 9. Historic Natural Communities Found on the HHBCWMA

2.2.2 **Imperiled Plants**

For the purposes of this Management Plan, the term "imperiled species" as it relates to plants refers to plant species that the DACS or USFWS designated as endangered or threatened. This designation is commonly known as "listed species", and all names and status determinations were derived from Florida's Regulated Plant Index Rule (5B-40.0055 F.A.C.) that is maintained by the DACS.

The FWC manages the lands in the WMA system using a proactive natural community focused approach. As applied by the FWC, natural resource management starts by classifying lands into distinct natural communities. The FWC then conducts management activities to maintain or enhance each communities' structure and function. Land management that has a positive influence on natural community conditions benefits the species occurring in these habitats.

Table 6. Imperiled Plant Species observed on the HHBCWMA

Common Name	Scientific Name	Status
Blue-flowered butterwort	*Pinguicula caerulea*	ST
Butterfly orchid	*Encyclia tampensis*	CE
Cardinalflower	*Lobelia cardinalis*	ST
Catesby's lily	*Lilium catesbaei*	ST
Cinnamon fern	*Osmunda cinnamomea*	CE
Common wild-pine	*Tillandsia fasciculata*	SE
Curtiss's milkweed	*Asclepias curtissii*	SE
Cutthroatgrass	*Coleataenia abscissa*	SE
Giant wild-pine	*Tillandsia utriculata*	SE
Hooded pitcher-plant	*Sarracenia minor*	ST
Inflated and reflexed wildpine	*Tillandsia balbisiana*	ST
Large-flowered rosemary	*Conradina grandiflora*	ST
Long-lip ladies' tresses	*Spiranthes longilabris*	ST
Non-crested eulophia	*Eulophia ecristata*	ST
Plume polypody	*Pecluma plumula*	SE
Royal fern	*Osmunda regalis*	CE
Scrub pinweed	*Lechea cernua*	ST
Simpson's stopper	*Myrcianthes fragrans*	ST
Simpson's zephyr-lily	*Zephyranthes simpsonii*	ST
Spiny-pod	*Matelea sp.*	SL
Swamp plume polypody	*Pecluma ptilodon*	SE
Yellow-flowered butterwort	*Pinguicula lutea*	ST

Acronym	Status
CE	Commercially Exploited
SE	State Endangered
SL	State Listed
ST	State Threatened

During their natural community mapping of the HHBCWMA in 2010 and 2011, the FNAI identified and documented 22 imperiled plant species, of which six are state endangered and 12 are state threatened (Table 6). The protections afforded plants that occur on conservations lands, in conjunction with management actions that include exotic and invasive plant removal and prescribed fire, will continue to maintain and enhance habitat for these and other rare plants. As such, these species should persist under planned management on the HHBCWMA.

In addition to the imperiled plants, three plants State listed as commercially exploited, are known to occur on the HHBCWMA (Table 6). The FWC will continue to monitor the known occurrences of these species and report any illegal collection to the appropriate authorities.

It is possible other imperiled species occur on the HHBCWMA, and if encountered, staff will document these occurrences. Florida's imperiled species are adapted to natural communities and should continue to benefit from the FWC's ongoing and planned management to maintain and enhance natural community structure and function. Under the FWC's management, these species have a higher probability of persistence than in the absence of this management. However, while habitat management provides overall benefits to a host of species reliant upon these natural communities, imperiled species sometimes require specific attention.

Blue-Flowered Butterwort (*Pinguicula caerulea*) and Yellow-Flowered Butterwort (*Pinguicula lutea*) – These butterworts prefer open, moist to wet, sandy-peaty soils of pine flatwoods, wet prairies and seepage bogs and may occupy moist to wet ditches and roadsides. However, yellow-flowered butterwort frequently occupies somewhat drier habitats than other *Pinguicula* species. These species need a fire regime that includes frequent (2-3 years) growing season fires that reduce the encroachment of woody species, and creates open areas allowing sunlight to reach the ground. Soil and hydrologic disturbances negatively affect these species; therefore, the natural hydrology should be maintained and restored where practicable and use of heavy machinery should be avoided in wetlands with known occurrences of this species. Flowering, which occurs primarily from February to April, is the best time to conduct surveys.

Butterfly Orchid (*Encyclia tampensis*) – Butterfly orchid is epiphytic on many different trees in dome and strand swamps, floodplain swamps, hydric hammocks, and mesic hammocks. This species does not require fire, but staff should allow fire to naturally enter and extinguish within its habitats when feasible. Illegal collecting negatively affects this species; therefore, protect known occurrences and make sure not to negatively influence areas with known occurrences. While plants are identifiable all year by their well-developed pseudobulbs, surveys for flowers can occur during peak flowering, which occurs May to September, and surveys for fruits can occur throughout the year.

Cardinalflower (*Lobelia cardinalis*) – Cardinalflower prefers sunny areas near sources of water in bottomland forests, dome swamps, hydric hammocks, floodplain swamps, and spring run streams. Cardinalflower is sensitive to fire, and it typically prefers non-pyrogenic habitats, which occasionally burn during periods of drought. Hydrologic disturbance negatively affects this species; therefore, avoid logging or other mechanical clearing in natural hammocks in which this species occurs, and maintain or restore the natural hydrology where practicable. Flowering, which primarily occurs from July to September, is the best time for conducting surveys.

Catesby's lily (*Lilium catesbaei*) – Catesby's lily, also known as pine lily, prefers open areas in wet pine flatwoods and wet prairies, especially in pitcher plant bogs with sphagnum. Unlike most lily species, pine lilies require warm, moist, acidic soil, and will grow in saturated soil conditions. This species requires a fire regime that includes frequent (2-3 year) fire to maintain and promote the open grassy habitats that it favors, with most fire occurring during the growing season. This species thrives with disturbance from fire demonstrating a more vigorous flowering. Soil and hydrologic disturbances negatively affect this species; therefore, limit the impact of disruptive activities, and maintain and restore the natural hydrology where practicable. Flowering, which occurs from August to November, is the best time for conducting surveys.

Cinnamon Fern (*Osmunda cinnamomea*) and Royal Fern (*O. regalis*) – These ferns occur in many natural communities in Florida, both wet and dry. While these species grow in many communities that the FWC typically does not actively manage, if conducting management activities near known occurrences, make efforts to protect known occurrences from chemical and mechanical treatments. These species do not require fire. However, some of the natural communities in which these species occur are fire adapted, and this fern resprouts after fire. Illegal collecting and hydrological disturbances negatively affect this species; therefore, areas with known occurrences should be protected, and staff should maintain and restore the natural hydrology where practicable. As fronds are present year-round, these species can be identified throughout the year.

Inflated and Reflexed Wildpine (*Tillandsia balbisiana*), Common Wild-pine (*T. fasciculata*), and Giant Wild-pine (*T. utriculata*) – Airplants occur in many natural communities in Florida, both wet and dry. Most airplants are epiphytes (plants that grow harmlessly upon another plant and derive its moisture and nutrients from the air, rain and sometimes from debris accumulating around it) that grow on stumps, tree trunks and branches. However, large individuals may fall to the ground and successfully continue to live. While many airplants grow in communities that the FWC typically does not actively manage, if conducting management activities near known occurrences, make efforts to protect the plant and host plant from fire, chemicals, and mechanical treatments. When an individual plant occurs in a fire-maintained habitat, prior to conducting a prescribed fire, to the extent practicable, staff will take appropriate actions to protect known occurrences. Airplants are experiencing massive population losses due to the Mexican bromeliad weevil (*Metamasius callizona*), an exotic pest, making the protection and management of these plants from other threats all the more critical.

Curtiss' Milkweed (*Asclepias curtissii*) – Curtiss' milkweed prefers open sunny areas in scrub and scrubby flatwoods. It may occur along the edges of fire lanes, and sand roads in open areas caused by soil disturbance. While Curtiss' milkweed is able to persist for long periods in xeric habitats without fire, occasional fire is needed to reduce competition and shading by shrubs. Altered fire regimes and fire suppression negatively affect this species, therefore, prescribed fire intervals should vary by season, frequency and fire intensity to ensure species diversity and scrub management programs should strive to mimic natural processes that create openings this species prefers. Flowering, which occurs primarily from June to September (peak blooming occurs in late July), is the best time for conducting surveys.

Cutthroatgrass (*Coleataenia abscissa*) – Cutthroatgrass prefers areas of slight to strong groundwater seepage. It grows mainly on the eastern and western sandy seepage slopes of the Lake Wales Ridge. Cutthroatgrass also occurs around depression marshes, ponds and in low spots in wet and mesic flatwoods. This species needs prescribed fire every 1-3 years during the growing season for it to survive. Cutthroatgrass very rarely flowers without fire, and it blooms vigorously within a few months after a fire. If cutthroat grass it top-killed by fire, it survives by resprouting from rhizomes. Hydrologic disturbances negatively affect this species; therefore, protect seepage habitats from erosion by limiting vehicular and foot traffic in the seepage habitats to the extent practicable, especially during wet periods. Cutthroatgrass is identifiable all year, and the best time for conducting flower surveys is from mid-June to late September or a few months after a growing season fire.

Hooded Pitcherplant (*Sarracenia minor*) – Hooded pitcherplant prefers sunny to lightly shaded, moist to wet, sandy, acidic soil in basin swamps, depression marshes, dome swamps, dry prairies, mesic flatwoods, wet flatwoods, wet prairies, shrub bogs, seepage

slopes and edges of seepage streams. This species may occur on boggy roadsides and ditches. This species has the widest ecological range compared to other *Sarracenia* species, and grows on both wet and dry sites, and it is more shade tolerant than most species of the genus. This species needs a fire regime that includes frequent (2-3 years) growing season fires that reduce the encroachment of woody species. Fire usually top-kills pitcherplants, but they survive by resprouting from rhizomes. Pitchers are identifiable all year, and surveys for flowers can occur from late March to mid-May. Soil and hydrologic disturbances negatively affect this species; therefore, staff should maintain and restore the natural hydrology where practicable.

Large-flowered Rosemary (*Conradina grandiflora*) – Large-flowered rosemary prefers sandy openings in scrub, and scrubby flatwoods with a scattered overstory of pines and interspersed with evergreen scrub oaks. This species requires periodic, patchy fires that reduce overstory competition and provide open sandy areas. Altered fire regimes and fire suppression negatively affect this species, therefore, prescribed fire intervals should vary by season, frequency and fire intensity to ensure species diversity, and scrub management programs should strive to mimic natural processes that create openings this species prefers. Flowering, which occurs throughout the year, is the best time for conducting surveys.

Long-lip Ladies' Tresses (*Spiranthes longilabris*) – Long-lip ladies' tresses prefer open areas in depression marshes, dome swamps, hydric hammocks, marl prairies, mesic flatwoods, sloughs, slough marshes, wet flatwoods and wet prairies. This species may occur along dry to moist roadsides and ditches. The specific fire requirements are unknown for this species. However, since this species occurs in fire-maintained communities, a fire regime that includes frequent growing season fires that reduce the encroachment of woody species, and fires allowed to naturally enter and extinguish in wetlands and ecotones will be beneficial for this species. Hydrological disturbances and illegal collecting negatively affect this species; therefore, staff should maintain and restore the natural hydrology where practicable and protect known occurrences. Flowering, which occurs from late October to December, is the best time for conducting surveys. However, if staff plan on making opportunistic observations for this species, they may need to react when they notice blooming, since this species has a short blooming period (10-40 days).

Non-Crested Eulophia (*Eulophia ecristata*) – Non-crested eulophia prefers open areas, with at least filtered sunlight and no dense shrub competition in mesic flatwoods, pine rocklands, sandhills, scrub, scrubby flatwoods and wet flatwoods. While this species may persist for long periods in xeric habitats without fire, occasional fire is needed to reduce competition and shading by shrubs. However, non-crested eulophia is dependent on frequent fire in moist habitats that experience rapid shrub growth, and prescribed fire should occur with a frequency that will create or maintain open areas, limit the shrub layer, and encourage diverse herbaceous cover. Excessive site preparation and illegal

collecting negatively affect this species; therefore, protect areas with known occurrences. Flowering, which occurs from July to September, or fruiting, which occurs from September to November, is the best time for conducting surveys.

Plume Polypody (*Polypodium plumula*) and Swamp Plume Polypody (*P. ptilodon*) – Plume Polypody is an epiphytic fern typically growing on live oaks (*Quercus virginiana*) and limestone outcroppings in bottomland forests, floodplain swamps, hydric hammocks, mesic hammocks and sinkholes. Swamp plume polypody is usually a terrestrial fern growing primarily around tree bases in basin swamps, hydric hammocks, rockland hammocks and strand swamps. These species are sensitive to fire, and some of their preferred habitats occasionally burn during periods of drought. Hydrological disturbances negatively affect this species; therefore, staff should maintain and restore the natural hydrology where practicable. Surveys may occur throughout the year for these species.

Scrub Pinweed (*Lechea cernua*) – Scrub pinweed prefers sunny, dry sandy areas in scrub, scrubby flatwoods, and sandhills. This species is well adapted to growing season fires that reduce the encroachment of woody species, and create open areas allowing sunlight to reach the ground. It responds positively to fire by re-sprouting and increasing seed production after a fire. Altered fire regimes and fire suppression negatively affect this species, therefore, prescribed fire intervals should vary by season, frequency, and fire intensity to ensure species diversity, and scrub management programs should strive to mimic natural processes that create openings this species prefers. Fruiting, which occurs primarily from June to October, is the best time for conducting surveys.

Simpson's Stopper (*Myrcianthes fragrans*) – Simpson's stopper prefers hydric hammocks (including the variant coastal hydric hammock), mesic hammocks, prairie hammocks, rockland hammocks. This species occasionally occurs in dome swamps, floodplain swamps and wet flatwoods. This species is not a fire-adapted species. While fires may reach the edge of hammocks, saturated soils and humid conditions within the hammocks typically limit the extent of a burn. However, periodic burns in adjoining communities can reduce woody encroachment and lessen the likelihood of fires spreading into hammocks. Hydrologic disturbance negatively affects this species; therefore, avoid logging or other mechanical clearing near known occurrences, and maintain or restore the natural hydrology where practicable. Flowering, which occurs throughout the year with the heaviest blooming occurring from February to June, is the best time to conduct surveys.

Simpson's Zephyr-lily (*Zephyranthes simpsonii*) – Simpson's zephyr-lily prefers open-canopied mesic and wet flatwoods. However, this species may occur in bottomland forests, hydric hammocks, mesic hammocks, upland hardwood forests, upland mixed forests and wet prairies. This species does not require fire. However, it vigorously flowers following fires. Hydrological disturbances, illegal collecting, and fire suppression in flatwoods

negatively affect this species; therefore, staff should maintain and restore the natural hydrology where practicable, protect areas with known occurrences, and prescribed fire conducted within flatwoods should occur with a frequency that will create or maintain open areas, limit the shrub layer and encourage diverse herbaceous cover. Flowering, which occurs from late February to May, is the best time to conduct surveys.

Milkvines (*Matelea* spp) – The Florida Natural Areas Inventory identified a *Metalea* on the area but did not specify the species. This documentation could either be for Florida spiny pod (*M. floridana*) or Sandhill spiny pod (*M. pubiflora*), both are state listed as endangered. Regardless of which species this documentation is for, milkvines prefer to grow and flower in well-drained soils in sunny or semi-shaded areas, upland hardwood forests, hardwood forests and sandhill ecotones, sinkholes, sandhills, upland pine and hammocks. However, Florida spiny pod is able to grow and flower in full shade, and sandhill spiny pod always occurs in xeric conditions. Milkvines require a fire regime that includes frequent fire that reduces the encroachment of woody species and creates open areas that allow sunlight to reach the ground. Fire suppression and hydrologic disturbances negatively affect these species; therefore, avoid constructing fire breaks in ecotones, restore ecotones by removing existing roads and fire breaks, and maintain and restore natural hydrology where practicable. Since *Matelea* species are difficult to distinguish without flowers or fruits, flowering or fruiting is the best time for conducting surveys. Florida spiny pod flowers from May-July, while sandhill spiny pod flowers from April-June. Both species produce fruit from August-October.

2.2.3 **Forest Resources**

Approximately 11,839 acres of the HHBCWMA are comprised of mesic flatwoods and represent the natural community with the most potential for forest resource (timber) production. At the HHBCWMA the mesic flatwoods natural community typically contains a sparse canopy of slash pine or longleaf pine. These pine canopies are often very sparse when adjacent to scrubby flatwoods, scrub and prairie communities and somewhat denser when grading down slope towards hammock communities.

A Timber Assessment of the forest resources of the HHBCWMA was conducted in 2016 by the Florida Forest Service (FFS) (Appendix 12.14). The management of forest resources will be considered in the context of the Timber Assessment and the overall land management goals and activities.

2.3 Fish and Wildlife Resources

In association with the varied assemblage of natural communities described above, a rich diversity of wildlife species is found on the HHBCWMA. The FWC maintains an inventory of wildlife that occurs on the HHBCWMA. These species include mammals (Table 7), birds (Table 8), reptiles and amphibians (Table 9), fish (Table 10), invertebrates (Table 11) and

exotic and invasive species (Table 12). These inventories are continuously updated by FWC staff.

Table 7. Mammal Species Observed at the HHBCWMA.

Common Name	Scientific Name
Bobcat	*Lynx rufus*
Cotton mouse	*Peromyscus gossypinus*
Coyote	*Canis latrans*
Eastern cottontail rabbit	*Sylvilagus floridanus*
Eastern spotted skunk	*Spilogale putorius*
Feral hog	*Sus scrofa*
Florida long-tailed weasel*	*Mustela frenata peninsulae*
Florida panther	*Puma concolor coryi*
Gray squirrel	*Sciurus carolinensis*
Hispid cotton rat	*Sigmodon hispidus*
Marsh rabbit	*Sylvilagus palustris*
Nine-banded armadillo	*Dasypus novemcinctus*
Otter	*Lontra canadensis*
Raccoon	*Procyon lotor*
Fox squirrel	*Sciurus niger*
Striped skunk	*Mephitis mephitis*
Virginia opossum	*Didelphis virginiana*
White-tailed deer	*Odocoileus virginianus*

Table 8. Birds Species Observed at the HHBCWMA

Common Name	Scientific Name
American crow	*Corvus brachyrhynchos*
American kestrel	*Falco sparverius*
American redstart	*Setophaga ruticilla*
American woodcock	*Scolopax minor*
Anhinga	*Anhinga anhinga*
Bachman's sparrow	*Peucaea aestivalis*
Barred owl	*Strix varia*
Belted kingfisher	*Megaceryle alcyon*
Black-and-white warbler	*Mniotilta varia*
Black-bellied whistling duck	*Dendrocygna autumnalis*

Black vulture	*Coragyps atratus*
Blue-gray gnatcatcher	*Polioptila caerulea*
Blue grosbeak	*Passerina caerulea*
Blue jay	*Cyanocitta cristata*
Brown thrasher	*Toxostoma rufum*
Brown-headed nuthatch	*Sitta pusilla*
Carolina chickadee	*Poecile carolinensis*
Carolina wren	*Thryothorus ludovicianus*
Common grackle	*Quiscalus quiscula*
Common ground-dove	*Columbina passerina*
Common yellowthroat	*Geothlypis trichas*
Cooper's hawk	*Accipiter cooperii*
Crested caracara	*Caracara cheriway*
Downy woodpecker	*Dryobates pubescens*
Eastern bluebird	*Sialia sialis*
Eastern meadowlark	*Sturnella magna*
Eastern phoebe	*Sayornis phoebe*
Eastern screech owl	*Megascops asio*
Eastern towhee	*Pipilo erythrophthalmus*
Eastern whip-poor-will	*Caprimulgus vociferus*
Florida sandhill crane	*Grus canadensis*
Gray-cheeked thrush	*Catharus minimus*
Gray catbird	*Dumetella carolinensis*
Great blue heron	*Ardea herodias*
Great crested flycatcher	*Myiarchus crinitus*
Great egret	*Ardea alba*
Great horned owl	*Bubo virginianus*
Hairy woodpecker	*Picoides villosus*
Hooded warbler	*Setophaga citrina*
House wren	*Troglodytes aedon*
Indigo bunting	*Passerina cyanea*
Limpkin	*Aramus guarauna*
Little blue heron	*Egretta caerulea*
Magnolia warbler	*Setophaga magnolia*
Mourning dove	*Zenaida macroura*
Northern bobwhite	*Colinus virginianus*
Northern cardinal	*Cardinalis cardinalis*
Northern harrier	*Circus cyaneus*

Northern mockingbird	*Mimus polyglottos*
Northern parula	*Setophaga americana*
Northern waterthrush	*Parkesia noveboracensis*
Ovenbird	*Seiurus aurocapilla*
Painted bunting	*Passerina ciris*
Palm warbler	*Setophaga palmarum*
Pileated woodpecker	*Dryocopus pileatus*
Pine warbler	*Setophaga pinus*
Prairie warbler	*Setophaga discolor*
Red-bellied woodpecker	*Melanerpes carolinus*
Red-cockaded woodpecker	*Picoides borealis*
Red-shouldered hawk	*Buteo lineatus*
Red-winged blackbird	*Agelaius phoeniceus*
Sharp-shinned hawk	*Accipiter striatus*
Short-tailed hawk	*Buteo brachyurus*
Snipe	*Gallinago delicata*
Snowy egret	*Egretta thula*
Southern bald eagle	*Haliaeetus leucocephalus leucocephalus*
Summer tanager	*Piranga rubra*
Swainson's thrush	*Catharus ustulatus*
Swallow-tailed kite	*Elanoides forficatus*
Tufted titmouse	*Baeolophus bicolor*
Turkey vulture	*Cathartes aura*
White-eyed vireo	*Vireo griseus*
White ibis	*Eudocimus albus*
Wild turkey	*Meleagris gallopavo osceola*
Wood duck	*Aix sponsa*
Wood stork	*Mycteria americana*
Yellow-bellied sapsucker	*Sphyrapicus varius*
Yellow-billed cuckoo	*Coccyzus americanus*
Yellow-rumped warbler	*Setophaga coronata*
Yellow-throated warbler	*Setophaga dominica*

Table 9. Amphibians and Reptiles Observed on the HHBCWMA

Common Name	Scientific Name
American alligator	*Alligator mississippiensis*
Barking treefrog	*Hyla gratiosa*
Common gartersnake	*Thamnophis sirtalis*

Cuban flat-headed frog	*Eleutherodactylus planirostris*
Eastern coachwhip	*Coluber flagellum*
Eastern diamondback rattlesnake	*Crotalus adamanteus*
Eastern hog-nosed snake	*Heterodon platirhinos*
Eastern indigo snake	*Drymarchon couperi*
Eastern narrow-mouthed frog	*Gastrophryne carolinensis*
Eastern ratsnake	*Pantherophis alleghaniensis*
Eastern ribbonsnake	*Thamnophis sauritus*
Florida cottonmouth	*Agkistrodon conanti*
Gopher frog	*Rana capito (Lithobates capito)*
Gopher tortoise	*Gopherus polyphemus*
Green anole	*Anolis carolinensis*
Green treefrog	*Hyla cinerea*
Little brown skink	*Scincella lateralis*
Little grass frog	*Pseudacris ocularis*
North American racer	*Coluber constrictor*
Oak toad	*Anaxyrus quercicus*
Peninsula newt	*Notophthalmus viridescens*
Pig frog	*Lithobates grylio*
Pine woods littersnake	*Rhadinaea flavilata*
Pine woods treefrog	*Hyla femoralis*
Pygmy rattlesnake	*Sistrurus miliarius*
Ring-necked snake	*Diadophis punctatus*
Scarlet kingsnake	*Lampropeltis elapsoides*
Six-lined racerunner	*Aspidoscelis sexlineata*
Southeastern five-lined skink	*Plestiodon inexpectatus*
Southern cricket frog	*Acris gryllus*
Southern leopard frog	*Lithobates sphenocephalus*
Southern toad	*Anaxyrus terrestris*
Southern watersnake	*Nerodia fasciata*
Squirrel treefrog	*Hyla squirella*
Striped crayfish snake	*Liodytes alleni*
Two-toed amphiuma	*Amphiuma means*

Table 10. Fish Species Observed at the HHBCWMA

Common Name	Scientific Name
Bluegill	*Lepomis macrochirus*

Brown hoplo	*Hoplosternum littorale*
Everglades pygmy sunfish	*Elassoma evergladei*
Flagfish	*Jordanella floridae*
Golden topminnow	*Fundulus chrysotus*
Mosquitofish	*Gambusia affinis*
Spotted sunfish	*Lepomis punctatus*
Walking catfish	*Clarias batrachus*
Warmouth	*Lepomis gulosus*

Table 11. Invertebrates Observed at the HHBCWMA

Common Name	Scientific Name
Arogos skipper	*Atrytone arogos*
Barred yellow	*Eurema daira*
Black swallowtail	*Papilio polyxenes*
Carolina satyr	*Hermeuptychia sosybius*
Ceraunus blue	*Hemiargus ceraunus*
Cloudless sulphur	*Phoebis sennae*
Common buckeye	*Junonia coenia*
Delaware skipper	*Anatrytone logan*
Eastern Meske's skipper*	*Hesperia meskei straton*
Eastern tiger swallowtail	*Papilio glaucus*
Fiery skipper	*Hylephila phyleus*
Giant swallowtail	*Papilio cresphontes*
Gray hairstreak	*Strymon melinus*
Horace's duskywing	*Erynnis horatius*
Little yellow	*Eurema lisa*
Loammi skipper*	*Atrytonopsis loammi*
Monarch	*Danaus plexippus*
Monk skipper	*Asbolis capucinus*
Northern cloudywing	*Thorybes pylades*
Palamedes swallowtail	*Papilio palamedes*
Pearl crescent	*Phyciodes tharos*
Phaon crescent	*Phyciodes phaon*
Queen	*Danaus gilippus*
Rainbow scarab beetle	*Phanaeus vindex*
Sachem	*Atalopedes campestris*
Seminole skipper*	*Hesperia attalus slossonae*

Southern broken-dash	*Wallengrenia otho*
Spicebush swallowtail	*Papilio troilus*
Swarthy skipper	*Nastra lherminier*
Tawny-edged skipper	*Polites themistocles*
Twin-spot skipper	*Oligoria maculata*
Variegated fritillary	*Euptoieta claudia*
Viceroy	*Limenitis archippus*
Whirlabout	*Polites vibex*
White peacock	*Anartia jatrophae*
Zarucco duskywing	*Erynnis zarucco*
Zebra swallowtail	*Eurytides marcellus*

Table 12. Exotic and Invasive Species Observed at the HHBCWMA

Common Name	***Scientific Name***
Brown anole	*Anolis sagrei*
Cuban treefrog	*Osteopilus septentionalis*
European starling	*Sturnus vulgaris*
Feral hog	*Sus scrofa*
Greenhouse frog	*Eleutherodactylus planirostris*
Indo-Pacific gecko	*Hemidactylus garnotii*

* Species not directly observed by FWC staff, however species have appeared in FNAI's element occurrences.

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 HHBCWMA has a very high mean wildlife value of 8.1 (Figure 10).

2.3.2 Imperiled Fish and Wildlife

For the purposes of this Management Plan, the term "Imperiled Species" refers to plant and animal species that are designated as Endangered, Threatened, or a Species of Special Concern by the FWC, or that are designated as Endangered or Threatened by the U.S. Fish and Wildlife Service. This designation is also commonly known as "listed species."
At its November, 2016, Commission meeting, the FWC approved Florida's Imperiled Species Management Plan (http://myfwc.com/wildlifehabitats/imperiled/plan/), which included changes to the listing status for many wildlife species. Subsequent rule changes (68A-27.003 and 68A-27.005 FAC) reflecting changes came into effect in January 2017. All federally listed species that occur in Florida are included in Florida's Endangered and Threatened Species list (http://myfwc.com/media/1515251/threatened-endangered-species.pdf) as federally-designated Endangered or federally-designated Threatened. Species that are not federally listed, but which have been identified by the FWC as being at some level of risk of extinction, are listed as state-designated Threatened. This category was reviewed as part of Florida's Imperiled Species Management Plan, with the majority of the species previously contained within the category either being removed from Florida's Endangered and Threatened Species list due to conservation success, or had their status changed to state-designated Threatened.

Table 13. Imperiled Wildlife Species observed at the HHBCWMA

Common Name	*Scientific Name*	Status
American alligator	*Alligator mississippiensis*	FT (S/A)
Ceraunus blue	*Hemiargus ceraunus*	FT (S/A)
Crested caracara	*Caracara cheriway*	FT
Eastern indigo snake	*Drymarchon couperi*	FT
Florida Panther	*Puma concolor coryi*	FE
Florida sandhill crane	*Grus canadensis pratensis*	ST
Gopher tortoise	*Gopherus polyphemus*	ST
Little blue heron	*Egretta caerulea*	ST
Red-cockaded woodpecker	*Picoides borealis*	FE

Abbreviation	Status
FE	Federal Endangered
FT	Federal Threatened
F(XN)	Federally Listed as an experimental population in Florida
FT(S/A)	Federally Threatened due to similarity of appearance
SSC	State Species of Special Concern

ST	State Threatened

2.3.3 FNAI Element Occurrences

A diversity of wildlife species is found on the HHBCWMA. The FNAI element occurrence records include several occurrences of the American alligator, bald eagle, Bachman's sparrow, crested caracara, eastern indigo snake, gopher frog, gopher tortoise, little blue heron, fox squirrel, snowy egret, tricolored heron, wood stork, and many others on and in the vicinity of the HHCBWMA. As defined by the FNAI, an "element" is any exemplary or rare component of the natural environment, such as a species, natural community, bird colony, spring, sinkhole, cave, or other ecological feature. An element occurrence is a single extant habitat which sustains or otherwise contributes to the survival of a population or a distinct, self-sustaining example of a particular element. The FNAI assigns a rank to each "element" occurrence. This ranking system was developed by The Nature Conservancy and the Natural Heritage Program Network based on the element's global rank (element's worldwide status) or state rank (status of element in Florida). The FNAI ranking system and definitions are located on the following website: www.fnai.org/ranks.cfm.

Known locations of FNAI element occurrences from the most recent GIS databases of the respective agencies are displayed in Figure 11. Appendix 12.8 contains a letter from the FNAI authorizing the FWC to utilize their database for the purpose of displaying known plant and animal resources.

2.4 Native Landscapes

Native landscapes of the HHBCWMA include thirteen identified natural communities. Vast low-density canopy tree pine savannahs and dry prairies allow for extensive vistas of this Florida landscape. Other native landscapes include the forested wetlands, especially cypress domes and strands, as well as the open waterbody of Billy Lake. The natural communities of the HHBCWMA are regarded as being in excellent condition and represent benchmark examples of Florida native habitat. Complete descriptions of the natural communities found on the HHBCWMA may be found in Section 2.2.1 of this Management Plan.

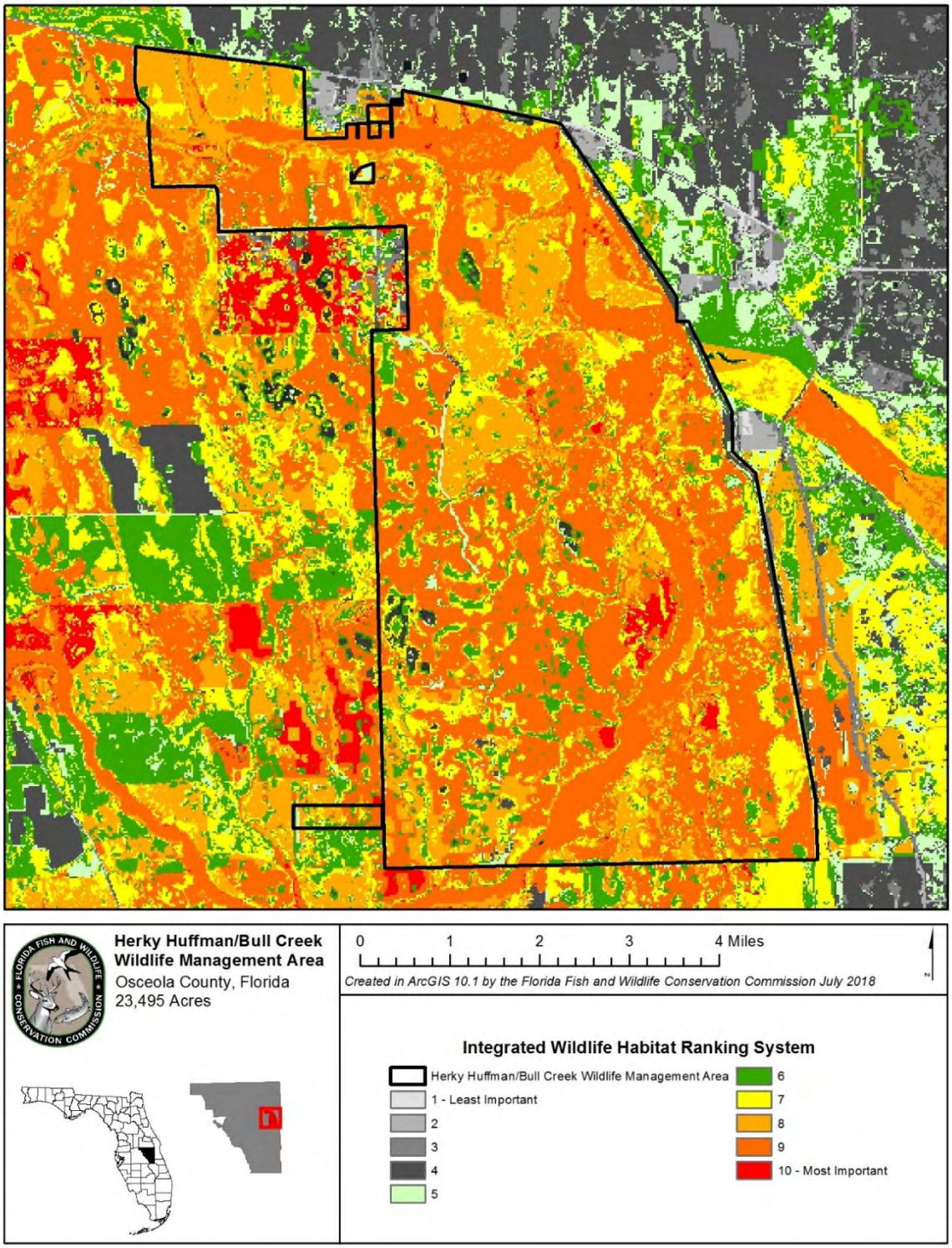
Herky Huffman/Bull Creek Wildlife Management Area
Osceola County, Florida
23,495 Acres
0 1 2 3 4 Miles
Created in ArcGIS 10.1 by the Florida Fish and Wildlife Conservation Commission July 2018
Integrated Wildlife Habitat Ranking System
Herky Huffman/Bull Creek Wildlife Management Area
1 - Least Important
2
3
4
5
6
7
8
9
10 - Most Important

Figure 10. Integrated Wildlife Habitat Ranking System for the HHBCWMA

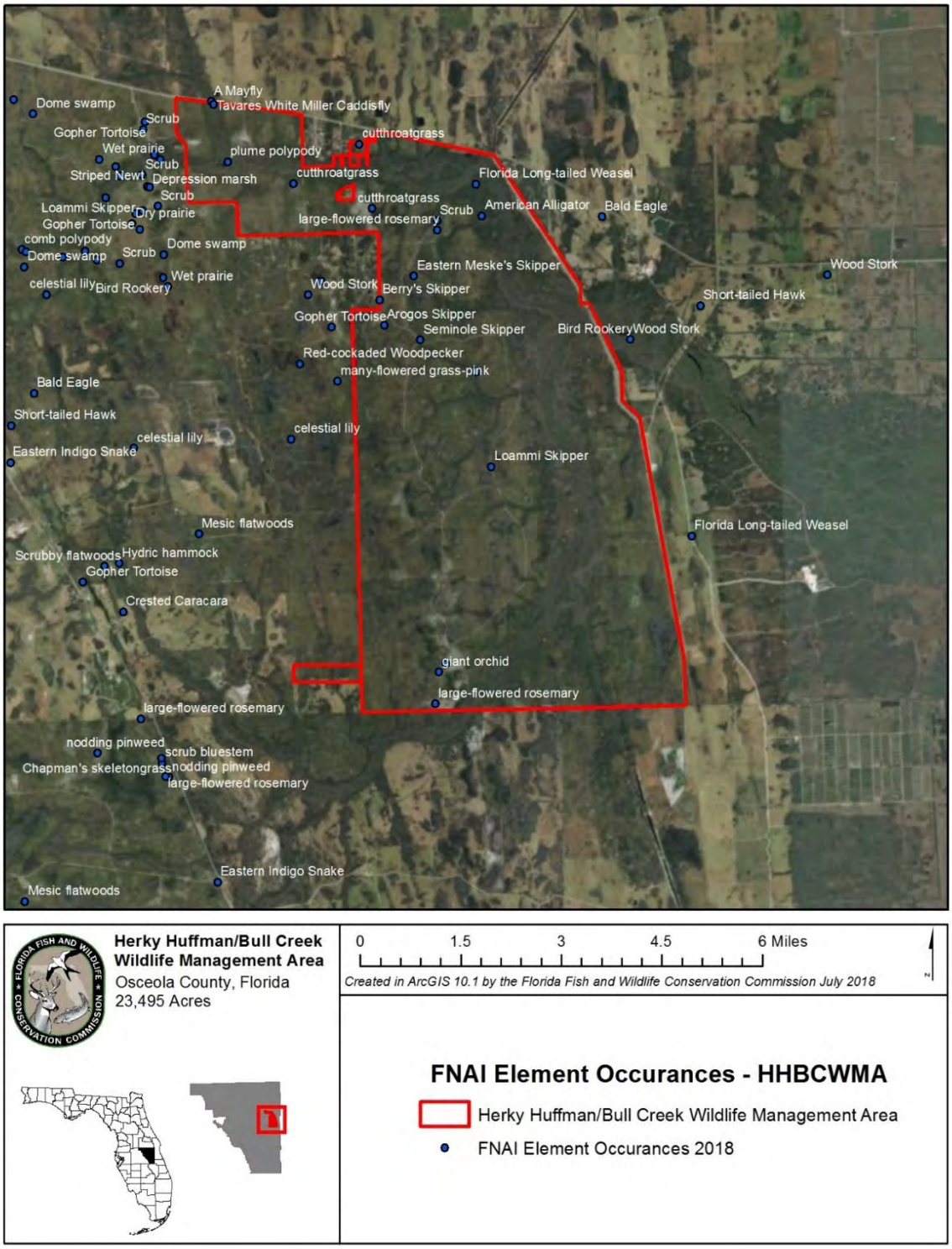

Figure 11. FNAI Element Occurrences for the HHBCMWA

2.5 Water Resources

All surface waters of the State are classified by the DEP according to designated uses as described in Chapter 62-302.44 FAC. The surface waters of the HHCBWMA are designated as Class III, and classified for fish consumption; recreation, as well as propagation and maintenance of a healthy, well-balanced population of fish and wildlife. Additionally, it is the policy of the DEP to afford the highest protection to Outstanding Florida Waters (OFW) and Outstanding National Resource Waters (Chapter 62-302.700 FAC).

Bull Creek is the dominant water feature of the management area. Bull Creek is located in the eastern one-third of the area and flows from the south to the north. Approximately 75 percent of the HHBCWMA is drained through Bull Creek and its secondary streams and sloughs. The northern part of the area is drained by Crabgrass Creek, which flows from the west to the east and then south to join Bull Creek. Water control structures S-161 and S-161A are located downstream of the confluence of Bull and Crabgrass creeks. These structures are located within Levee 73. This confluence marks the formation of Jane Green Creek, which flows easterly to the St. Johns River.

Billy Lake is located in the south-central portion of the area, approximately 0.2 miles north of the southern boundary of the HHBCWMA. While a relatively small open waterbody (~3 acres), under normal conditions Billy Lake typically holds water year-round, and therefore provides angling and paddling opportunities throughout the year. No portions of the HHCBWMA are designated as OFW.

2.6 Beaches and Dunes

There are no beaches or dunes associated with the HHBCWMA.

2.7 Mineral Resources

There are no known mineral resources within the HHBCWMA.

2.8 Historical Resources

A review of the Florida Master Site File by the Florida Department of State's Division of Historical Resources (DHR), revealed 25 historical sites, 2 structures and 1 resource group on the HHBCWMA. These sites represent a historic cemetery, lithic scatters, historic bridge remains, and others. The FWC will coordinate with the DHR to assess the need for conducting a historical resource survey (Appendix 12.15). Two pre-historic lithic scatters and one historic site were found on the area in 1984. One of the lithic scatters and the historic site were partially destroyed by the construction of Levee 73 during the early 1970s. Both historic sites were used as non-permanent hunting camps by the Timucua Indians, and were probably occupied between 5000 and 3000 B.C.

The Crab Grass Cemetery is located in the north central portion of the HHBCWMA. The origins of this cemetery date back to the late-nineteenth century. The cemetery is actively utilized to this day. While wholly contained within the boundaries of the HHBCWMA, Osceola County property parcel data indicates title interest to the cemetery parcel is held by Osceola County.

2.9 Scenic Resources

Scenic resources of the HHBCWMA include the views of the vast pine savannahs and dry prairies. The low-density of canopy tree species associated with these habitats allow for extensive vistas. Other scenic resources include the forested wetlands, especially cypress domes and strands, as well as the open waterbody of Billy Lake. The natural communities of the HHBCWMA are regarded as being in excellent condition and represent benchmark examples of Florida native habitat. Complete descriptions of the natural communities found on the HHBCWMA may be found in Section 2.2.1 of this Management Plan.

3 Uses of the Property

3.1 Previous Use and Development

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

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

Historical development associated with the early settlement of the Bull Creek area is similar to other early settlements in east-central Florida. Timber resources and agricultural development were the main factors that opened the area to settlers. One of the original settlers, George W. Hopkins, purchased approximately 104,000 acres in 1902. The

HHBCWMA represents a portion of the Hopkins' original tract. Construction of the Union Cypress Railroad began in 1902 and was followed by the development of a timber company of the same name. Completion of Henry Flagler's east coast railroad to Melbourne provided the means to move timber to northern markets. Timber harvesting operations in the Bull Creek and Jane Green Swamp areas began in 1912 and were concluded by 1928.

3.2 Current Use of the Property

Currently, the HHBCWMA is managed for the conservation and protection of fish and wildlife habitat and fish and wildlife based public outdoor recreation. A wide range of operational and resource management actions are conducted on the HHBCWMA 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 diverse. Hunting continues to be a popular recreational activity on the HHBCWMA. The area also offers excellent opportunities for bird watching, especially for wading birds. The diversity of vegetation not only harbors a variety of bird species but also provides good opportunities for mammalian wildlife viewing. Other uses include hiking, photography, biking, sightseeing and horseback riding.

Due to the proximity of population centers in Osceola County, public use can be expected to increase as public awareness of opportunities increases. Annual use of the HHBCWMA is estimated to be 365 user-days for all activities combined. The FWC administers hunts in the fall and spring for various game species including small game, deer, turkey and feral hogs, which account for a little more than half of the user-days.

3.2.1 Visitation and Economic Benefits

Visitation and public use of the area for fish and wildlife based public outdoor recreational opportunities are the primary sources of economic benefits from the HHBCWMA and contribute to the overall economy for this region of Florida. In Fiscal Year 2016-17, an estimated 17,616 people visited the HHBCWMA. Primarily, as a result of this visitation and use of the area, the FWC economic analysis estimates indicate that the HHBCWMA generated an estimated annual economic impact of $3,441,990 for the State and the HHCBWMA Florida region. This estimated annual economic impact has aided in the support or creation of an estimated 35 jobs.

Further revenue generating potential of the HHBCWMA will depend upon future uses described in this Management Plan. Additional revenue from environmental lands such as the HHBCWMA 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 HHBCWMA will be managed under the multiple-use concept as a Wildlife Management Area. The HHBCWMA 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 HHBCWMA will be managed under the guidance of the ARC, the Conceptual State Lands Management Plan, and as outlined in the original purposes for acquisition.

3.3.1 **Analysis of Multiple-use Potential**

The following actions or activities have been considered under the multiple-use concept as possible uses to be allowed on the HHBCMWA. 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 12.9). Uses classified as "Conditional" indicate that the use may be acceptable but will be allowed only if approved through a process other than the management plan development and approval process (e.g., special-use permitting, managed-area regulation and rule development). Uses classified as "Rejected" are not considered to be in accordance with the original purpose of acquisition or one or more of the various forms of guidance available for planning and management:

	Approved	**Conditional**	**Rejected**
Apiaries	✓		
Astronomy	✓		
Bicycling	✓		
Cattle grazing		✓	
Citrus or other agriculture			✓
Ecosystem services and maintenance	✓		
Ecotourism		✓	
Environmental Education	✓		
First-responder training		✓	

Fishing	✓		
Geocaching		✓	
Hiking	✓		
Horseback riding	✓		
Hunting		✓	
Linear facilities			✓
Military training		✓	
Preservation of historical resources	✓		
Primitive camping		✓	
Protection of imperiled species	✓		
Off-road vehicle use			✓
Shooting sports park			✓
Soil and water conservation	✓		
Timber harvest		✓	

3.3.2 **Incompatible Uses and Linear Facilities**

Consideration of incompatible uses and linear facilities on the HHBCWMA 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 the DEP-DSL, the ARC and the Board of Trustees prior to any incompatible use or linear facility being authorized on the HHBCWMA.

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 and with associated objectives, identified challenges and solution strategies have been developed for the HHBCWMA (Sections 5 -8). 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.

3.4 Acreage Recommended for Potential Surplus Review

On conservation lands where the FWC is the lead manager, the FWC evaluates and identifies recommended areas for a potential surplus designation by the DSL, the ARC and the Board of Trustees. This evaluation consists of GIS modeling and analysis, aerial

photography interpretation, analysis of fish and wildlife resources, a review of resource and operational management needs, and a review of public access and recreational use of the area. Also, the FWC considers recommendations for surplus lands as they relate to Florida's "No Net Loss of Hunting Lands" legislation (Ch. 379.3001 F.S.), as well as surplus restrictions for lands acquired through the Federal Aid in Wildlife Restoration Act (Pittman-Robertson) or through other federal grant programs.

The evaluation of the HHBCWMA by the FWC has determined that all portions of the area are being managed and operated for the original purposes of acquisition and remain integral to the continued conservation of important fish and wildlife resources and continue to provide good fish and wildlife resource based public outdoor recreational opportunities. Therefore, no portion of the HHBCWMA is recommended for potential surplus review.

4 Accomplished Objectives from the HHBCWMA Management Plan 2011-2021 or Interim Management Activities

This section is dedicated to reporting the extent to which the Objectives described in the HHBCWMA Management Plan 2011 – 2021 were successfully completed. Accomplishments for the HHBCWMA 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 2011 – 2021 HHBCWMA Management Plan describe the planned activities for the HHBCWMA 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.

Goals and Objectives	Percent Accomplished
Goal 1: Habitat Restoration and Improvement: Improve extant habitat and restore disturbed areas.	
Objective 1: Conduct prescribed burning on 6,000 acres of fire-adapted communities per year. (October 2011-October 2013) *Comment: From 2011 to 2013 the FWC burned approximately 12,600 acres of fire adapted communities.*	100%
Objective 2: Maintain 17,800 acres (100%) of fire-adapted communities within a 2 - 4 year target fire return interval. (October 2011-October 2013)	100%

Comment: The FWC has, and continues to, regularly conduct prescribed burning on the fire-adapted communities, according to fire return intervals established for each of the area's natural communities.	
Objective 3: Develop and implement the OBVM program. (October 2011-October 2013) *Comment: OBVM strategies were developed for the area and continue to be implemented.*	100%
Objective 4: Pursuant to the OBVM program, conduct habitat and natural community improvements (i.e., mechanical/chemical treatments, hardwood removal, and timber stand improvement) on 500 acres per year. (October 2011-October 2013) *Comment: From 2011-2013 the FWC treated approximately 1,330 acres.*	100%
Objective 5: Develop and implement a prescribed burn plan. (October 2011-October 2013) *Comment: Since 2010, the FWC has followed the burn plan guidelines developed for the neighboring Triple N Ranch WMA. However, an area specific burn plan for the HHBCWMA has been completed and is included in the Appendices of this plan.*	50%
Objective 6: Continue to conduct prescribed burning on 6,000 acres of fire-adapted communities per year. (October 2013-October 2021) *Comment: The FWC has, and continues to, regularly conduct prescribed burning on the fire-adapted communities, according to fire return intervals established for each of the area's natural communities.*	100%
Objective 7: Pursuant to the OBVM program, continue to conduct habitat and natural community improvements (i.e., mechanical/chemical treatments, hardwood removal, and timber stand improvement) on 500 acres per year. (October 2013-October 2021) *Comment: Since early 2013, the FWC has chemically treated approximately 9,200 acres, and mechanically treated approximately 4,700 acres on the area.*	100%
Goal 2: Imperiled Species Habitat Maintenance, Enhancement, Restoration, or Population Restoration: Maintain, improve, and restore imperiled species, populations, and habitats.	
Objective 1: Develop a WCPR strategy for selected imperiled species. (October 2011-October 2013) *Comment: The WCPR Strategy for the HHBCWMA was completed in September 2012 and subsequently revised in July 2015.*	100%

Objective 2: In accordance with the development of the WCPR strategy, develop associated monitoring protocols for selected imperiled species. (October 2011-October 2013) *Comment: The FWC identified and developed monitoring protocols for the following species: Bachman's Sparrow, Brown-headed Nuthatch, Northern Bobwhite, Gopher Tortoise, and Gopher Frog. Other species are monitored through opportunistic observations.*	100%
Objective 3: In accordance with the FWC red-cockaded woodpecker (RCW) Management Plan, and the USFWS RCW Recovery Plan, enhance the RCW population by translocation of approximately four to eight individuals biennially. (October 2011-October 2013) *Comment: In 2011 the HHBCWMA subpopulation of RCWs received 3 pairs and 3 pairs again in 2012.*	100%
Objective 4: Monitor the extant RCW clusters. (October 2011-October 2013) *Comment: Continually, the RCW Biologist & HHBCWMA Biologists monitor all RCW clusters on the area.*	100%
Objective 5: Conduct a population density gopher tortoise survey and assessment. (October 2011-October 2013) *Comment: The FWC performed a pilot survey of gopher tortoises in order to determine effort needed. Due to the large amount of effort and/or cost associated with this survey, further surveys were not completed. However, due to recent funding availability a survey will be completed on the area by June 2019.*	100%
Objective 6: In accordance with the development of WCPR strategies for imperiled species, conduct appropriate baseline inventories for appropriate species. (October 2013-October 2021) *Comment: In 2013, the FWC conducted baseline surveys for the Bachman's Sparrow and Brown-headed Nuthatch. RCWs are included in the WCPR strategy, however it was determined no baseline inventory was needed.*	100%
Objective 7: Implement a WCPR strategy for selected imperiled species. (October 2013-October 2021) *Comment: The WCPR Strategy for the HHBCWMA was completed and implemented in September 2012 and subsequently revised in July 2015.*	100%
Objective 8: In accordance with the development of the WCPR strategy, implement monitoring protocols for priority imperiled species. (October 2013-October 2021) *Comment: Continually the FWC has implemented and revised monitoring protocols for the following species: Bachman's Sparrow, Brown-headed Nuthatch, Northern Bobwhite, and Gopher Frog.*	100%

Objective 9: In accordance with the FWC RCW Management Plan, continue to enhance the RCW population by translocating approximately four to eight individuals biennially. (October 2013-October 2021) *Comment: The HHBCWMA received 4 RCW pairs in 2013, 3 pairs plus 1 single in 2014, 4 pairs in 2015, 4 pairs in 2016, and 5 pairs in 2017. Currently the HHBCWMA subpopulation is slated to receive at least 3 pairs annually.*	100%
Objective 10: Continue to monitor the extant RCW clusters. (October 2013-October 2021) *Comment: Continually, the RCW Biologists & HHBCWMA Biologists monitor all RCW clusters on the area.*	100%
Objective 11: To assess the occurrence of Eastern indigo snake and other imperiled reptiles and amphibians, conduct a herpetological species occurrence survey. (October 2013-October 2021) *Comment: In 2017-2018, the FWC contracted the FNAI to complete a herpetological species occurrence survey on the HHBCWMA, however no indigo snakes were detected.*	100%
Objective 12: Continue to conduct a population density gopher tortoise survey and assessment at least once every five years. (October 2013-October 2021) *Comment: The FWC performed a pilot survey of gopher tortoises in order to determine effort needed. Due to the large amount of effort and/or cost associated with this survey, further surveys were not completed. However, due to recent funding availability a survey will be completed on the area by June 2019.*	100%
Goal 3: Focal Species Habitat Maintenance, Enhancement, Restoration, or Population Restoration: Maintain, improve, or restore focal species populations and habitats.	
Objective 1: Develop a WCPR strategy for selected FWC focal species. (October 2011-October 2013) *Comment: The WCPR Strategy for the HHBCWMA was completed and implemented in September 2012 and subsequently revised in July 2015.*	100%
Objective 2: In accordance with the development of the WCPR strategy, develop monitoring protocols for selected FWC focal species. (October 2011-October 2013) *Comment: The FWC identified and developed monitoring protocols for the following species: Bachman's Sparrow, Brown-headed Nuthatch, Northern Bobwhite, Gopher Tortoise, and Gopher Frog. Other species will be monitored through opportunistic observations.*	100%

Objective 3: Implement a WCPR strategy for selected focal species. (October 2013-October 2021) *Comment: The WCPR Strategy for the HHBCWMA was completed and implemented in September 2012 and subsequently revised in July 2015.*	100%
Objective 4: Continue to include the HHBCWMA in statewide aerial bald eagle surveys conducted by the FWC approximately every three years. (October 2013-October 2021) *Comment: The HHBCWMA has participated in statewide aerial bald eagle surveys, however during this planning period this program was discontinued and is no longer occurring on the area.*	100%
Goal 4: Other Game and Non-game Wildlife Species: Maintain, improve, or restore game and non-game species populations and habitats.	
Objective 1: Conduct annual spotlight monitoring surveys for white-tailed deer. (October 2011-October 2013) *Comment: The FWC continually conducts annual monitoring for white-tailed deer in July of each year.*	100%
Objective 2: Collect biological harvest data at the check station. (October 2011-October 2013) *Comment: Annually, from September through April, biological harvest data is collected on the area.*	100%
Objective 3: Collect opportunistic wildlife occurrence data. (October 2011-October 2013) *Comment: Continually, the FWC collects and records opportunistic wildlife observations on the area.*	100%
Objective 4: Conduct a Northern bobwhite (quail) survey. (October 2013-October 2021) *Comment: Annually, from October through November, Northern bobwhite quail surveys are conducted on the area.*	100%
Objective 5: Continue to conduct annual spotlight monitoring surveys for white-tailed deer. (October 2013-October 2021) *Comment: The FWC continually conducts annual monitoring for white-tailed deer in July of each year.*	100%
Objective 6: Continue to collect biological harvest data at the check station. (October 2013-October 2021) *Comment: Annually, from September through April, biological harvest data is collected on the area.*	100%
Objective 7: Continue to collect opportunistic wildlife occurrence data. (October 2013-October 2021) *Comment: Continually, the FWC collects and records opportunistic wildlife observations on the area.*	100%

Goal 5: Exotic and Invasive Species Maintenance and Control: Remove exotic and invasive plants and animals and conduct needed maintenance and control activities.	
Objective 1: Annually treat at least 25 acres of EPPC Category I and Category II invasive exotic plant species in areas documented or discovered to have exotic invasive plant species occurrences; cooperate and coordinate treatment applications with the SJRWMD Invasive Plant Management Program. (October 2011-October 2013) *Comment: Area staff work towards assessing and treating large tracts of land for invasive plant infestations on an ongoing basis. Areas much greater than 25 acres are assessed and treated annually for exotics.*	100%
Objective 2: Contract to conduct surveys and mapping of invasive exotic invasive plant species. (October 2011-October 2013) *Comment: The FWC conducts surveys and mapping continually on the HHBCWMA. Additionally, the FWC contracts for the spraying of exotics, and area staff document occurrences during these treatments.*	100%
Objective 3: Continue to annually treat at least 25 acres of EPPC Category I and Category II invasive exotic plant species in areas documented or discovered to have exotic invasive plant species occurrences; cooperate and coordinate treatment applications with the SJRWMD Invasive Plant Management Program. (October 2013-October 2021) *Comment: Since 2012, the FWC has treated approximately 9,200 acres, this includes area staff treatments as well as large-scale contract projects through the FWC – Invasive Program Management.*	100%
Goal 6: Public Access and Recreational Opportunities: Provide public access, and fish- and wildlife-based recreational opportunities.	
Objective 1: Maintain public access and recreational opportunities to allow for a recreational carrying capacity of 774 visitors per day. (October 2011-October 2013) *Comment: The FWC has continued to maintain all recreational opportunities in order to sustain a carrying capacity of 774 visitors per day.*	100%
Objective 2: Continue to provide one vehicle main entrance access point and two walk-in foot traffic access points. (October 2013-October 2021) *Comment: The FWC has continued to provide and maintain the vehicle main entrance access point and two walk-in foot traffic access points on the area.*	100%

Objective 3: Develop a Recreation Master Plan. (October 2013-October 2021) *Comment: In October of 2012, the FWC developed and implemented the Recreation Master Plan for the area.*	100%
Objective 4: Maintain small game seasonal multi-use trails annually. (October 2013-October 2021) *Comment: The FWC continually maintains the area's small game trails through mowing and adding rock material, as needed.*	100%
Objective 5: Continue to cooperate with the Florida Trail Association (FTA) to maintain the Florida National Scenic Trail (FNST). (October 2013-October 2021) *Comment: The FWC continues to cooperate with the FTA for maintenance of the FNST, including providing FTA crews with permits for vehicle access to work sites, providing materials for repairing FNST structures, and providing storage for trail maintenance equipment.*	100%
Objective 6: Reassess recreational opportunities every three years. (October 2013-October 2021) *Comment: Through the Recreation Master Plan, and FWC staff, recreational opportunities are continually assessed on the area.*	100%
Objective 7: Continue to provide fishing opportunities on Billy Lake and other appropriate water systems. (October 2013-October 2021) *Comment: The FWC continually continues to provide fishing opportunities on appropriate waterbodies through the area.*	100%
Objective 8: Cooperate with other agencies, Osceola County, stakeholders, and regional landowners to investigate regional recreational opportunities including linking hiking and multi-use trail systems between adjacent public areas. (October 2013-October 2021) *Comment: In 2016, the FWC met with relevant stakeholders regarding the re-routing of the FNST from the HHBCWMA through the Triple N Ranch WMA onto County property. This is in order to eliminate the road-walk section between the HHBCWMA and the Tosohatchee WMA.*	100%
Objective 9: Design and develop public access and interpretive information for the main entrance. (October 2013-October 2021) *Comment: In 2017, the FWC replaced kiosk and interpretive panel displays at the main entrance.*	100%
Objective 10: Continue to identify partnerships that could provide for environmental educational programs and outreach. (October 2013-October 2021) *Comment: The FWC continually evaluates any potential partnerships and programs in order to enhance environmental education on the area.*	100%

Goal 7: Hydrological Preservation and Restoration: Protect water quality and quantity, restore hydrology to the extent feasible, and maintain the restored condition.	
Objective 1: To maintain and enhance natural hydrological functions, install and maintain low-water crossings and culverts as appropriate. (October 2011-October 2013) *Comment: Continually, FWC staff replace and maintain culverts and low-water crossing as needed and appropriate.*	100%
Objective 2: Conduct or otherwise obtain a site-specific hydrological assessment to identify potential hydrology restoration needs. (October 2013-October 2021) *Comment: During this planning period, the FWC determined a hydrological assessment was not necessary or appropriate for this area.*	0%
Objective 3: To enhance natural hydrological functions, continue to install and maintain low-water crossings and culverts as appropriate. (October 2013-October 2021) *Comment: Continually, FWC staff replace and maintain culverts and low-water crossing as needed and appropriate.*	100%
Objective 4: In cooperation with the SJRWMD, continue to collect data from water monitoring telemetry locations. (October 2013-October 2021) *Comment: The FWC continues to cooperate with the SJRWMD with their efforts in collecting data from water monitoring locations and establishing new monitoring wells.*	100%
Objective 5: Continue to communicate with the SJRWMD to monitor the water gauge at US 192 and the St. Johns River; continue to coordinate with the SJRWMD regarding operation of the off-site Army Corp of Engineers' water control structures on the eastern levee. (October 2013-October 2021) *Comment: The FWC continues to coordinate with the SJRWMD regarding water gauges and control structures. FWC staff is continually aware of when structure closure is imminent and may cause flooding on the area.*	100%
Objective 6: Pursuant to the results of the hydrological assessment and where feasible, plug existing ditches at Donovan's ditch (western boundary) and others as appropriate. (October 2013-October 2021) *Comment: During this planning period, the FWC determined a hydrological assessment was not necessary or appropriate for this area. However, the FWC determined it was only necessary and appropriate to plug areas of Donovan's ditch on the Triple N Ranch WMA property.*	50%

Objective 7: In cooperation with the SJRWMD, periodically sample select locations for water quality. (October 2013-October 2021) *Comment: The SJRWMD primarily samples for water quality on the area, however the FWC continue to cooperate with them in their efforts.*	100%
Goal 8: Forest Resource Management: Manage timber resources for resource conservation and wildlife habitat improvement.	
Objective 1: Cooperate with the Florida Forest Service (FFS) or a private forestry consultant, to complete a Timber Assessment. (October 2011-October 2013) *Comment: The FFS completed their Timber Assessment for the HHBCWMA in December 2016.*	100%
Goal 9: Cultural and Historical Resources: Protect, preserve and maintain cultural and historic resources.	
Objective 1: Ensure all known sites are recorded in the Division of Historical Resources (DHR) Master Site file. (October 2011-October 2013) *Comment: The FWC continues to cooperate with the DHR in the management of historical resources found at the HHBCWMA.*	100%
Objective 2: Coordinate with the DHR to assess the need for conducting a cultural resource survey. (October 2011-October 2013) *Comment: The FWC contacted the DHR to determine the need to conduct a cultural resource survey. At the time, the HHBCWMA was a low priority for a survey, but a survey will likely be conducted in the next planning period.*	100%
Objective 3: Monitor three priority recorded sites and send updates to the DHR Master Site file as needed and appropriate. (October 2011-October 2013) *Comment: The FWC continues to monitor recorded historical sites on the area, however one of the three sites have yet to be located by FWC staff. The DHR plans to assess this information during the next planning period.*	66%
Objective 4: Coordinate with the DHR to schedule cultural resource management staff training as necessary and appropriate. (October 2013-October 2021) *Comment: The HHBCWMA lead area biologist has completed cultural resource management training as of September 2013.*	100%
Goal 10: Capital Facilities and Infrastructure: Develop and maintain the capital facilities and infrastructure necessary to meet the goals and objectives of this management plan.	
Objective 1: Maintain seven facilities (check station, kiosk, shed, three restrooms, and staff office), 16.8 miles of roads, and 19.5 miles of trails existing. (October 2011-October 2013)	100%

Comment: The FWC continues to maintain all seven facilities located on the area, as well as all existing trail and roads.	
Objective 2: Design, develop, and construct two walk-in access point kiosks. (October 2011-October 2013) *Comment: The FWC has developed secondary signs for each walk-in entrance on the area and a small kiosk for day use sign-in sheets.*	100%
Objective 3: Continue to maintain seven facilities (check station, kiosk, shed, three restrooms, and office), 16.8 miles of roads, and 19.5 miles of trails, including the two walk-in access point kiosks (Objective 5.10.2). (October 2013-October 2021) *Comment: The FWC continues to maintain all seven facilities located on the area, as well as all existing trails and roads.*	100%
Goal 11: Conservation Acquisition and Stewardship Partnerships: Enhance fish and wildlife conservation, resource and operational management through development of an optimal conservation planning boundary.	
Objective 1: Identify potential important wildlife habitat, landscape-scale linkages, wildlife corridors, and operational/resource management needs. (October 2011-October 2013) *Comment: During the development of the HHBCWMA Management Plan, the FWC develops an OCPB for the area to determine potential habitat and resource needs in order to further enhance the area.*	100%
Objective 2: Identify and develop conservation stewardship partnerships. (October 2011-October 2013) *Comment: FWC staff regularly interact with adjoining landowners and other agencies and assess potential conservation stewardship partnerships.*	100%
Objective 3: Identify and pursue conservation acquisition needs. (October 2011-October 2013) *Comment: FWC staff continue to work to identify and pursue any potential conservation acquisition needs.*	100%
Objective 4: Develop and maintain a GIS shapefile and other necessary data to facilitate nominations from the FWC/SJRWMD OCPB and for FWC's LAP and Land Acquisition Programs. (October 2011-October 2013) *Comment: The FWC continues to maintain a GIS shapefile and geodatabase in order to further assist acquisition program needs and potential partnership programs.*	100%
Objective 5: Develop a Conservation Action Strategy. (October 2011-October 2013) *Comment: The FWC has developed a Conservation Action Strategy for the HHBCWMA.*	100%

Objective 6: Contact and inform adjoining landowners about the FWC LAP to pursue non-acquisition conservation stewardship partnerships. (October 2011-October 2013) *Comment: FWC staff regularly interact with multiple adjoining landowners and talk with them about the voluntary Landowners Assistance Program.*	100%
Objective 7: Determine which parcels should be added to the FWC/SJRWMD acquisition list. (October 2011-October 2013) *Comment: FWC staff developed an OCPB for the HHBCWMA, however at this time no parcels have been identified for nomination to the FWC Additions and Inholdings list.*	100%
Objective 8: Identify potential non-governmental organization partnerships and grant program opportunities. (October 2011-October 2013) *Comment: The FWC continues to work towards identifying partnerships and grant opportunities as needed and appropriate.*	100%
Objective 9: Determine efficacy of conducting an adjacent landowner's assistance/conservation stewardship partnership workshop. (October 2011-October 2013) *Comment: The FWC assessed the need and feasibility of a landowner's assistance/conservation stewardship partnership workshop and determine it not to be necessary at this time.*	100%
Objective 10: Identify potential conservation easements donations. (October 2011-October 2013) *Comment: The FWC continues to assess any and all possible conservation easement donations.*	100%
Objective 11: Evaluate and determine if any portions of the HHBCWMA are no longer needed for conservation purposes, and therefore may be designated as surplus lands. (October 2011-October 2013) *Comment: The FWC continues to evaluate lands and their role in promoting conservation and maintaining the area's habitat. At this time there are no lands on the HHBCWMA that have been assessed to be designated as surplus lands.*	100%
Objective 12: To minimize fragmentation of the area, continue to identify strategic parcels to revise the completed OCPB boundary for the HHBCWMA as appropriate and necessary. (October 2011-October 2013) *Comment: During the development of the HHBCWMA Management Plan, the FWC developed an OCPB for the area to determine potential habitat and resource needs in order to further enhance the area, and continues to maintain and revises this boundary as necessary.*	100%
Objective 13: Continue to identify and develop conservation stewardship partnerships. (October 2011-October 2013)	100%

Comment: FWC staff regularly interact with adjoining landowners and other agencies and assess potential conservation stewardship partnerships.	
Objective 14: Continue to identify and pursue conservation acquisition needs. (October 2013-October 2021) *Comment: FWC staff continues to work to identify and pursue any potential conservation acquisition needs.*	100%
Objective 15: Continue to maintain a GIS shapefile and other necessary data to facilitate nominations from the FWC/SJRWMD OCPB and for the FWC LAP and Land Acquisition Program. (October 2013-October 2021) *Comment: The FWC continues to maintain a GIS shapefile and geodatabase in order to further assist acquisition program needs and potential partnership programs.*	100%
Objective 16: Continue to consider selected properties as additions to the FWC/SJRWMD acquisition list. (October 2013-October 2021) *Comment: The FWC developed an optimal conservation planning boundary for the HHBCWMA, however at this time no parcels have been identified for nomination to the FWC Additions and Inholdings list.*	100%
Objective 17: Continue to pursue acquisition of parcels added to the FWC/SJRWMD acquisition list as acquisition work plan priorities and funding allow. (October 2013-October 2021) *Comment: The FWC developed an OCPB for the HHBCWMA, however at this time no parcels have been identified for nomination to the FWC Additions and Inholdings list.*	100%
Objective 18: Periodically (every three to five years) continue to contact and meet with adjacent landowners to determine their willingness to participate in the Conservation Action Strategy. (October 2013-October 2021) *Comment: FWC staff regularly interact with multiple adjoining landowners and talk with them about the voluntary Landowners Assistance Program, however the Conservation Action Strategy for this area has not yet been approved for implementation.*	0%
Objective 19: Coordinate and conduct landowner assistance/conservation stewardship partnership workshop(s) as necessary and appropriate. (October 2013-October 2021) *Comment: The FWC assessed the need and feasibility of a landowner's assistance/conservation stewardship partnership workshop and determine it not to be necessary at this time.*	100%
Objective 20: Continue to identify potential conservation easement donations. (October 2013-October 2021) *Comment: The FWC continues to assess any and all possible conservation easement donations.*	100%

Objective 21: Continue to evaluate and determine if any portions of the HHBCWMA are no longer needed for conservation purposes, and therefore may be designated as surplus lands. (October 2013-October 2021) *Comment: The FWC continues to evaluate lands and their role in promoting conservation and maintaining the area's habitat. At this time there are no lands on the HHBCWMA that have been assessed to be designated as surplus lands.*	100%
Goal 12: Research Opportunities: Explore and pursue cooperative research opportunities.	
Objective 1: Cooperate with researchers, universities, and others as feasible and appropriate. (October 2011-October 2013) *Comment: The FWC continually cooperates and evaluates all potential researchers and organizations that may want to utilize the area, as appropriate.*	100%
Objective 2: Assess the need for and pursue research and environmental education partnership opportunities as appropriate. (October 2011-October 2013) *Comment: The FWC continually evaluates the need to pursue further partnerships in order to enhance the management of the area.*	100%
Objective 3: Continue to cooperate with researchers, universities, and others as feasible and appropriate. (October 2013-October 2021) *Comment: The FWC continually cooperates and evaluates all potential researchers and organizations that may want to utilize the area, as appropriate.*	100%

5 Management Activities and Intent

The following section provides a description of agency plans to locate, identify, protect, preserve or otherwise use fragile natural resources and nonrenewable historical resources. In general, the FWC management intent for the HHBCWMA is to restore and maintain natural communities in a condition that sustains ecological processes and conserves biological diversity, especially fish and wildlife resources. In conjunction with this primary emphasis, it is the FWC's intent to provide quality fish and wildlife resource based public outdoor recreational opportunities on the HHBCWMA. 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

In 1996, the DSL, as staff to the Board of Trustees, entered into Lease Agreement Number 4116 for the Triple N Ranch WMA (TNRWMA). Approximately 1,279 acres in the northwest corner of this area's lease was established at part of the HHBCWMA. Approximately 161 acres in the southwest corner of the HHBCWMA are also titled to the Board of Trustees, under the TNRWMA lease agreement number 4116.

An LMR has occurred on the Board of Trustees leased portion of the HHBCWMA in November 2014, as part of the TNRWMA LMR. Details from this LMR can be found in the TNRWMA Management Plan. Additionally, the portions of the HHBCWMA titled to the SJRWMD have also had management reviews conducted by the SJRWMD in coordination with the FWC.

5.2 Adaptive Management

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

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

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

5.2.1 **Monitoring**

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

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

For natural communities, monitoring protocols are established through the FWC's Objective-Based Vegetation Management (OBVM, Section 5.3.1) program, which monitors how specific vegetative attributes are responding to FWC management. For imperiled and locally important 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 and Wildlife Viewing program, and work in conjunction with the establishment and adjustment of public access carrying capacities (Section 5.6). 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 HHBCWMA Management Plan serves as the guiding framework to implement this adaptive management process. It serves as the underpinning for the integration of management programs (OBVM, WCPR, Public Access and Wildlife Viewing, Recreation Master Plans, etc.) underway to accomplish needed conservation actions that are planned to manage the natural resources of the HHCBWMA and resolve conservation threats to fish and wildlife and the habitats they occupy. Based on evaluations of project results, the conservation actions are revised as necessary, and the adaptive management process is repeated.

5.3 Habitat Restoration and Improvement

On the HHBCWMA, 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 forest management techniques as appropriate. Retention of the native old growth component of forests, while also providing for natural regeneration, remains an important consideration. The HHBCWMA has high-quality native communities including mesic and wet flatwoods, floodplain and dome swamp, hydric hammock, and several others listed in Table 3, that the FWC will continue to manage and protect.

The FNAI has conducted surveys and mapped the current vegetative communities and historic vegetation communities on the HHBCWMA. 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 to manage the 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 the 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, the FWC land managers will identify those natural communities that will influence and guide management decisions, known as the actively managed natural communities. Through OBVM monitoring, the FWC collects data on a number of specific vegetation attributes that provide insight about the condition of the natural community. Because the FWC is interested in the overall effect of management on the natural communities, OBVM data is analyzed at the natural community level.

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

FWC staff considers the reference site attribute values when setting area-specific desired future conditions for natural communities.

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

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 at a given point in time and trends over time. Using this information, managers can evaluate, adjust and modify their management practices to meet the stated objectives. By comparing natural community mapping products through the years, managers can track progress in moving altered communities to functioning natural communities.

5.3.2 **Prescribed Fire and Fire Management**

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

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

The FWC employs a fire management regime to increase both species and habitat diversity and will continue a prescribed burning program on the HHBCWMA in accordance with vegetative management objectives. As fire moves across a landscape, some areas carry fire

better than others. Areas with higher vegetative fuel loads typically burn more evenly and with greater intensity. Areas with lower vegetative fuel loads or wetland areas inundated with water typically will not carry fire as evenly, and usually burn at a lower intensity. Employing a burning program with different burning frequencies, intensities and seasonality (dormant season vs. growing season) of prescribed burns create habitat diversity and a mosaic of vegetation patterns. This mosaic is designed to have both frequently burned and infrequently burned aspects.

On some areas, prescribed burning is limited by the buildup of mid-story brush and a lack of pyrogenic groundcover fuels. This condition creates unsuitable habitat for many wildlife species. Mechanical control of brush on upland sites by roller chopping, logging, shredding, or incidentally by equipment during commercial thinning operations, can reduce shading and encourage the grasses and forbs that are necessary to sustain prescribed fire. However, roller chopping may damage the herbaceous ground cover, especially wiregrass. Therefore, its application will be limited to situations where burning is unable to reduce woody vegetation sufficiently without prior mechanical treatment.

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

The transitional areas between two adjacent but different vegetative cover types, such as forests and wetlands, are known as ecotones. With the possible exception of wildfire suppression, mechanical soil disturbance in ecotones will be avoided in order to protect habitats for important rare species that often occur between flatwoods and riparian drainages. Silvicultural site preparation and creation of firebreaks are avoided when possible in these zones. Additionally, fires are allowed to burn into the edges of marshes, swamps and other wetlands in order to maintain these habitats. 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 has been developed (Appendix 12.12) and will continue to be implemented for the HHBCWMA. 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.

During the previous 10-year planning period, 100% of the area's fire adapted communities have been treated with prescribed fire. Approximately 100% of the 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% of the area's fire adapted communities resulting in 100% of the area being maintained within the recommended fire return intervals during this planning period. 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 HHBCWMA are discussed in more detail below.

5.3.3 **Habitat Restoration**

Significant habitat management activities have taken place within many of the natural communities of the HHBCWMA over the course of the previous management period. Since 2011, all management units with fire-adapted natural communities have been treated with prescribed fire on a repeated basis as established within the management plan. This aided the enhancement of native ground cover and improved wildlife habitat throughout the HHBCWMA. In addition to conducting prescribed burning, roller chopping has been conducted on 3,485 acres, and mowing has been conducted on 211 acres to improve the wildlife habitat value of the natural communities at HHBCWMA especially for imperiled species such as the gopher tortoise.

The FWC has established OBVM to describe the structural character of managed natural communities, allowing FWC staff to make informed management decisions. Habitat management activities on the area will focus on enhancing natural communities, maintaining the appropriate prescribed fire frequency for fire adapted communities, and controlling invasive plant species. Ideally, vegetation control will be through regular prescribed fire with mowing and roller chopping supporting and supplementing fire when needed. Invasive species control is more extensively discussed in Section 5.5. Further habitat management and improvement objectives planned for the area are delineated in Section 6.

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

5.4.1 Fish and Wildlife

Due to the variety of natural communities, a diversity of associated wildlife, including rare, imperiled, and common game and non-game species, can be found on the HHBCWMA. In managing for wildlife species, an emphasis will be placed on conservation, protection and management of natural communities. As noted above, natural communities important to wildlife include mesic and wet flatwoods, floodplain and dome swamp, and hydric hammock. Natural communities that are less represented on the HHBCWMA include baygall, depression marsh, dry prairie, hydric and mesic hammock, pasture, pine plantation, sandhill, scrub, scrubby flatwoods and wet prairie.

The size and natural community diversity of the HHBCWMA 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 HHBCWMA provides resources critical to many migratory birds including waterfowl, passerines, raptors and others. Habitats important to migratory species will be protected, maintained or enhanced.

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

Wildlife 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 emphasis on rare and imperiled fish and wildlife species. Monitoring of wildlife species will continue as an ongoing effort for the area.

Concurrent with ongoing species inventory and monitoring activities, management practices are designed to restore, enhance or maintain rare and imperiled species, and their habitats. This will be further augmented by following approved Federal and FWC species recovery plans, guidelines, and other scientific recommendations for these species. Guided by these recommendations, land management activities including prescribed burning and

timber stand improvements will address rare and imperiled species requirements and habitat needs. Section 5.4.2 below 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 Locally Important Species: Wildlife Conservation Prioritization and Recovery

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

The goal of the WCPR is to provide assessment, recovery, and planning support for the FWC-managed areas to enhance management of locally important species and the recovery of imperiled species. The WCPR program objectives include prioritizing what the FWC does for imperiled and locally important species on the FWC-managed areas; ensuring the actions taken on these areas are part of statewide conservation programs and priorities; and informing others about the work accomplished on lands the FWC manages (Appendix 12.13).

The WCPR program helps the FWC take a proactive, science-based approach to species management on the FWC-managed lands, 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 locally important species which are the focus of the WCPR program. Staff combines these assessments with area-specific management considerations to develop a Species Management Strategy for the area. Each Strategy contains area-specific measurable objectives for managing priority species and their habitat, prescribes management actions to achieve these objectives, and identifies monitoring protocols to verify progress towards meeting the objectives. By providing the

FWC managers with information on actions they should undertake, the FWC intends for the Strategy to assure the presence and persistence of Florida's endangered and threatened fish and wildlife species (see http://myfwc.com/media/1515251/Threatened-Endangered-Species.pdf), as well as locally-important species found on the area.

In summary, for the FWC-managed areas, the WCPR program helps assess imperiled and locally-important wildlife species needs and opportunities, prioritize what the FWC does for imperiled and locally important 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 locally important and imperiled wildlife species on the HHBCWMA. In the long-term, by implementing these strategies on the 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.

During the previous planning period, the FWC conducted eight imperiled and locally important species surveys, including Bachman's sparrow, brown-headed nuthatch, eastern indigo snake, gopher frog, gopher tortoise, northern bobwhite, red-cockaded woodpecker, and white-tailed deer. The FWC also monitored four bat boxes and 24 wood duck nest boxes. Other imperiled and locally important species were documented through opportunistic observations and include American alligator, crested caracara, Florida sandhill crane, limpkin, fox squirrel, short-tailed hawk, and southern bald eagle. These imperiled species projects, along with other ongoing imperiled species management activities, will continue to be implemented in accordance with the HHBCWMA and the Triple N Ranch WMA WCPR Species Management Strategies.

5.5 Exotic and Invasive Species Maintenance and Control

The FWC will continue efforts to control the establishment and spread of Florida Exotic Pest Plant Council (FLEPPC) Category I or II plants on the HHBCWMA. Control technologies may include mechanical, chemical, biological, and other appropriate treatments. Treatments utilizing herbicides will comply with instructions found on the herbicide label and employ the Best Management Practices for their application.

Exotic and invasive plant species known to occur on the HHBCWMA, and treated annually according to the appropriate treatment return intervals, by the FWC include air-potato, Brazilian pepper, Caesar weed, castor bean, Chinese tallowtree, cogongrass, coral ardisia, golden bamboo, guinea grass, guava, Japanese climbing fern , lantana, shrub verbena, natal grass, Old World climbing fern, paragrass, Peruvian primrosewillow, praxelis, purple sesban, sword fern, torpedograss, water-hyacinth, water-lettuce, water spangles and wild

taro. Exotic and invasive plant species have been identified as occurring at varying densities throughout the HHBCWMA. 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 HHBCWMA 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 HHBCWMA is the feral hog. These animals have high reproductive rates, and when populations reach high densities, feral hogs can significantly degrade natural communities through foraging activity (rooting). The FWC will consult with other regional natural resource managing agencies and private landowners to coordinate feral hog control measures as necessary. Feral hog populations are controlled by hunts during the archery, general gun, and muzzleloading gun seasons. Feral hog populations may also be controlled by trapping, as necessary, to aid in minimizing the negative impacts caused by feral hog populations on the area.

Currently, maintenance and control of exotic and invasive plant species (Table 5) continues to be a significant management challenge at the HHBCWMA. During the previous 10-year planning period, the FWC continued to implement extensive exotic and invasive species control and maintenance activities throughout the HHBCWMA. These included exotic and invasive plant species treatments on a total of 9,200 acres within areas classified as infested. The FWC will continue to focus control and maintenance activities on areas identified as having invasive and exotic plant occurrences, as well as treating any new occurrences as they are identified through continued monitoring activities. Ongoing exotic and invasive plant species objectives and challenges for the HHBCWMA are further detailed in Sections 6 – 7 below.

5.6 Public Access and Recreational Opportunities

5.6.1 Americans with Disabilities Act

When public facilities are developed on areas managed by the FWC, every effort is made to comply with the Americans with Disabilities Act (Public Law 101-336). As new facilities are developed, the universal access requirements of this law are followed in all cases except where the law allows reasonable exceptions. Recreation facilities in semi-primitive or primitive zones will be planned to be universally accessible to the degree possible except as allowed by the ADA[4] where:

1. Compliance will cause harm to 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 HHBCWMA. To accomplish this, the FWC will work with recreational stakeholders and the general public to update the Recreation Master Plan for the HHBCWMA 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 the 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 the FWC-managed areas desire. Carrying capacities are just a first step; management of recreational use requires a means of monitoring visitor impacts. Responding to these impacts may require adjusting the carrying capacities as necessary. The carrying capacities generated through this process are used as a tool to help plan and develop public access, wildlife viewing and fish and wildlife resource based public outdoor recreation opportunities.

Based on an analysis of the overall approved uses and supported public access user opportunities, and the anticipated proportional visitation levels of the various user groups, the FWC has determined that the HHBCWMA can currently support 774 visitors per day. It is important to note that public access carrying capacities are not developed to serve as a goal for expanding the public use of a particular area to match the established carrying capacity. Rather, they are developed to establish maximum thresholds for public use of the respective area in order to protect the natural and historical resources on the HHBCWMA and to ensure that visitors will have a high-quality visitor experience. The public access carrying capacity will be periodically reevaluated, and additional capacity may be contemplated as part of the Recreation Master Plan development and implementation process.

5.6.4 **Wildlife Viewing**

The HHBCWMA affords a wide variety of native wildlife species, both resident and seasonally migratory, that are available for visitors' enjoyment for observation and photography. The diversity of habitats found on the HHBCWMA attract an equally diverse suite of wildlife species, including many waterfowl and wading bird species in the wetlands, passerine bird species in the uplands, and various mammalian, reptile and amphibian wildlife throughout the HHBCWMA. Lists of wildlife species that may be observed by visitors to the HHBCWMA can be found in Section 2.3 of this management plan.

5.6.5 **Hunting**

The HHBCWMA currently offers limited entry (quota hunt) hunting opportunities during the archery (first two days), muzzleoading gun and general gun (first two days) seasons. Hunting opportunities during archery (after the first two days), general gun (after the first two days), small game, migratory bird and spring turkey seasons are offered exclusive of the limited entry hunt program.

An evaluation of the hunting opportunities offered on the HHBCWMA is performed by the FWC biennially. Hunting seasons, as well as other area regulations, may be revised annually as necessary and appropriate to provide a quality outdoor experience, and to responsibly manage the natural resources of the HHBCWMA.

5.6.6 **Fishing**

The HHBCWMA offers year-round fishing opportunities. Fishing opportunities are primarily concentrated at Billy Lake, with some limited fishing opportunities occurring in the waters of Bull Creek and its tributaries.

5.6.7 **Boating**

Boat, canoe and kayak access is established at Billy Lake. Other portions of the HHBCWMA, including bottomland swamp and cypress strands may afford paddling

opportunities on a seasonal basis dependent on rainfall amounts and on-site water retention.

5.6.8 Trails

20.2 miles of marked trails are established within the HHBCWMA along with a portion of the Florida National Scenic Trail, offering both long and short loop hikes. Also, service roads and firebreaks are maintained as trails for expanded foot traffic access year-round. Additional multi-use trails may be contemplated and designed as part of the Recreation Master Plan development and implementation process.

5.6.8.1 Hiking

Hiking is allowed throughout the HHBCWMA. Additional trail-hiking opportunities may be developed as part of the Recreation Master Plan development and implementation process.

5.6.8.2 Bicycling

Bicycling is currently permitted on the HHBCWMA but is primarily restricted to named and numbered roads. Additional designated vehicle trails may also be accessed during the small game season.

5.6.8.3 Equestrian

Currently, equestrian use is allowed on established roads and trails. Additional support for equestrian use will be investigated as part of the Recreation Master Plan development process.

5.6.9 Camping

Currently, camping is allowed only at a designated campground during periods in which hunting is allowed, and throughout the year at two designated campsites on the Florida National Scenic Trail, provided that access to the area is via the Trail. The feasibility of expanding camping opportunities will be investigated as part of the Recreation Master Plan update process.

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 the FWC-managed lands is governed by specific guidelines. These guidelines may be found on the following the FWC website: https://myfwc.com/license/public-land-use/geocaching/guidelines/ .

5.6.11 **Interpretation**

The FWC considers interpretation of the natural and cultural resources of the HHBCWMA to be an important component of the overall outdoor recreational experience enjoyed by visitors to the area. Interpretive signage and area regulation information are provided within kiosks located at designated public access points for the HHBCWMA.

To facilitate wildlife viewing recreational opportunities on the area, the FWC has continued to establish and maintain hiking trails, kiosks, and other interpretative materials. During the previous 10-year planning period, the FWC completed several public access, recreational and facility improvements on the HHBCWMA, including developing public access and interpretive information at the main entrance. Further planned public access facility improvements are detailed in Section 6 below. Ongoing public access and recreational opportunity management challenges are addressed in Section 7 below. In addition, the FWC will continue to implement public access, recreational and educational opportunities on the area in accordance with the HHCBWMA Recreational Master Plan upon the development and approval.

5.7 Hydrological Preservation and Restoration

In cooperation with the SJRWMD and the Army Corps of Engineers, natural water regimes will be re-established to the extent feasible and appropriate. This is consistent with the primary purpose for the acquisition of the land and relates directly to the water quantity and quality aspects of the ecosystem.

While conducting management activities in proximity to area wetlands and water systems, best management practices will be utilized.

The FWC will continue to communicate and cooperate with the SJRWMD to provide monitoring of the water gauge located at US 192 and the St. Johns River, and continue to coordinate with the SJRWMD regarding operation of the off-site Army Corp of Engineers' water control structures located on the eastern levee. As necessary, water quality and quantity monitoring will be conducted in cooperation with the SJRWMD.

5.8 Forest Resource Management

A Timber Assessment of the timber resources of the HHBCWMA was conducted on the area in 2016 by the Florida Forest Service. The management of timber resources will be considered in the context of the Timber Assessment and the overall land management goals and activities.

Timber resources include some pine plantations in need of thinning for habitat improvement. Thinning of the forest over-story, hydrological restoration and reintroduction of prescribed burning are the most important factors in re-establishment of natural communities and the enhancement of wildlife habitats in these areas. Upland pine forest planted with off-site pines will be reforested with longleaf pine or other on-site species as appropriate. Degraded or disturbed bottomland hardwood sites will be encouraged to reforest naturally with native wetland oaks, hardwoods, and other appropriate native plant species.

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

5.9 Historical Resources

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

To date, the DHR Master Site File indicates 25 known historic sites, 2 structures, and 1 resource group on the HHBCWMA. The FWC will submit subsequently located historic sites on the HHBCWMA to the DHR for inclusion in their Master Site File. In cooperation with the DHR, all of the overall known historic sites on the HHBCWMA have been identified as meeting the DHR's criteria; the FWC will continue to monitor and report on these sites.

5.10 Capital Facilities and Infrastructure

The FWC's land management philosophy is designed to conserve the maximum amount of wildlife habitat while providing the minimal number of capital facilities and infrastructure necessary to effectively conduct operational and resource management activities and

provide ample opportunities for fish and wildlife resource based public outdoor recreation. For these reasons, planned capital facilities and infrastructure will focus on improving access, recreational potential, hydrology, or other resource and operational management objectives.

Current capital facilities and infrastructure on the HHBCWMA include a hunter check station and game cleaning station, three vault toilets, a kiosk, a volunteer utility trailer, and a foot bridge.

As described in Section 2.4.1 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).

5.11 Land Conservation and Stewardship Partnerships

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

5.11.1 **Optimal Resource Boundary**

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

5.11.2 **Optimal Conservation Planning Boundary**

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

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

5.11.3 **Conservation Action Strategy**

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

Primary components of the CAS may include:

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

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

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

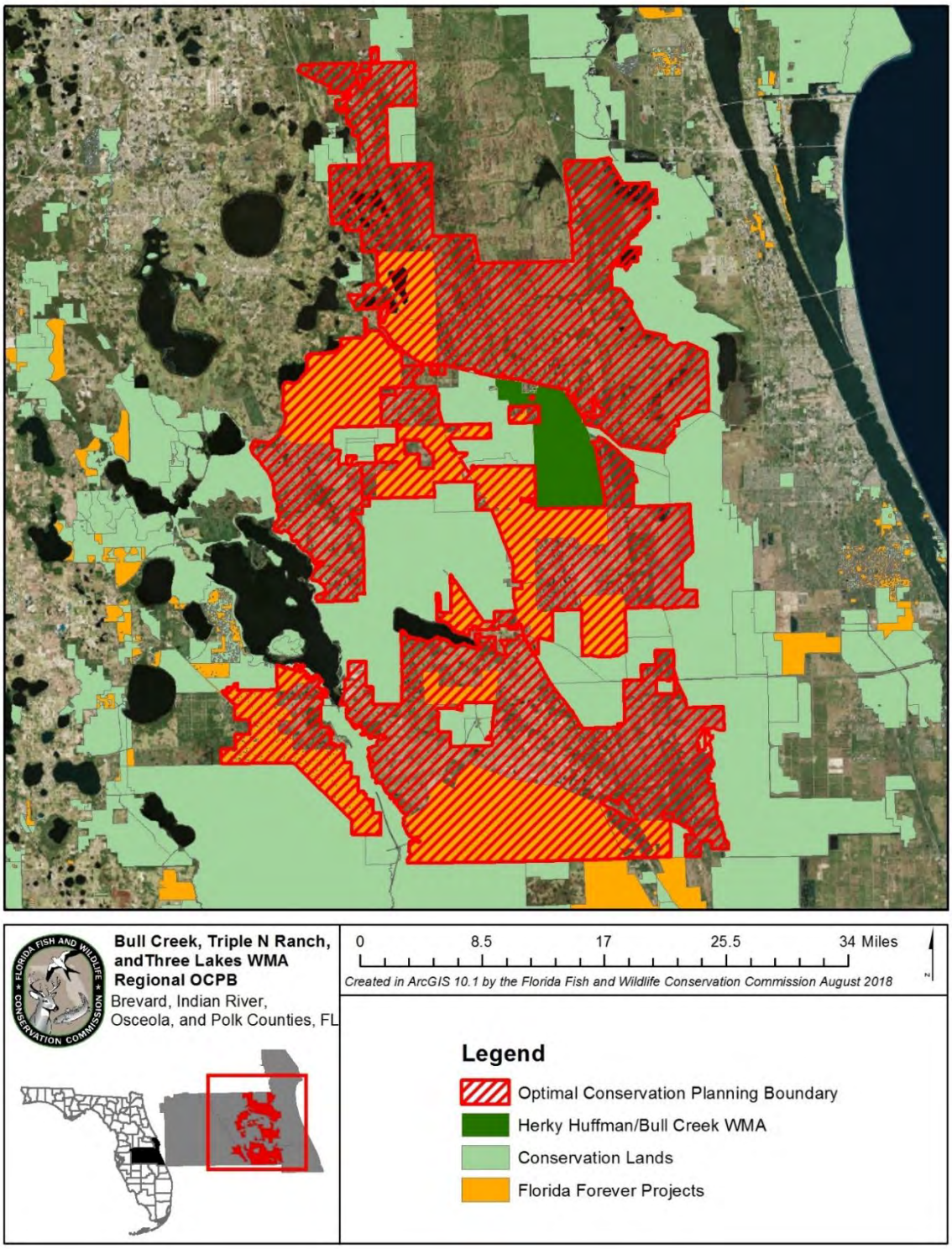

Figure 12. Optimal Conservation Planning Boundary

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

Currently, the FWC has identified zero acres of potential additions or privately held inholdings for the HHBCWMA. Any potential additions and inholdings to the HHBCWMA, will be a part of the adjacent Triple N Ranch WMA lease and management plan. However, 27,656 acres of the Osceola Pines Savannas Florida Forever project remain to be acquired. Upon completion of the CAS, additions to the FWC Florida Forever Additions and Inholdings acquisition list may be recommended.

5.12 Research Opportunities

The FWC intends to cooperate with researchers, universities, and others as feasible and appropriate. For the HHBCWMA, 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 HHBCWMA 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 HHBCWMA as set forth in the lease agreements with the Board of Trustees and the SJRWMD. In keeping with the lease agreements, and in order to conduct its management operations in the most effective and efficient manner, the FWC cooperates with other agencies to achieve management goals and objectives described in this management plan. These include cooperating with the DHR to ensure the requirements of the Management Procedures Guidelines - Management of Archaeological and Historical Resources document (Appendix 12.15) are followed with regard to any ground-disturbing activities. In addition, the FFS assists the FWC by providing technical assistance on forest resource management. Also, the FWC cooperates and consults with the SJRWMD and the DEP for the monitoring and management of both ground and surface water resources and the overall management of the HHBCWMA.

5.13.2 **First Responder and Military Training**

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

intermittent and occasional would require an amendment to this management plan, and therefore will be submitted by the FWC to the DSL and the ARC for approval consideration prior to authorization.

5.13.3 **Apiaries**

Currently, there are apiaries operating on the HHBCWMA under private contract. Use of apiaries is conditionally approved for the HHBCWMA 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 12.9). Location, management and administration of apiaries on the HHBCWMA will be guided by the FWC Apiary Policy and existing apiary contract (Appendix 12.10 and 12.11).

5.14 Climate Change

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

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

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

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

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

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

To address the potential impacts of climate change on the HHBCWMA, Goals and Objectives have been developed as a component of this Management Plan (Section 6.11). Depending on the recommendations of the adaptive management strategies described

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

6.1 Habitat Restoration and Improvement

Goal: Improve extant habitat and restore disturbed areas.

Long-term

6.1.1 Continue to conduct prescribed burning on 5,000 acres of fire adapted communities (depression marsh, dry prairie, mesic flatwoods, pine plantation, sandhill, scrub, scrubby flatwoods, wet flatwoods and wet prairie) per year.

6.1.2 Continue to maintain 17,370 acres of fire adapted communities (100%) per year within target fire return intervals.

6.1.3 Utilize OBVM monitoring to evaluate actively managed natural communities and adjust management efforts to meet desired future conditions.

6.1.4 Continue to implement prescribed burn plan.

6.1.5 Continue to conduct habitat/natural community improvements, as necessary.

6.1.6 Continue to identify areas for potential habitat/natural community restoration activities, as necessary.

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

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

Long-term

6.2.1 Continue to implement the WCPR strategy by managing identified habitats and monitoring identified species.

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

6.2.3 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.

Long-term

6.3.1 Continue to monitor locally important wildlife species, as identified in the WCPR strategy.

6.3.2 Continue to conduct annual surveys for white-tailed deer, as appropriate.

6.3.3 Continue to collect biological harvest data at check station.

6.3.4 Continue to collect opportunistic wildlife occurrence data.

6.3.5 Continue to monitor bat houses on the area.

6.4 Exotic and Invasive Species Maintenance and Control

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

Long-term

6.4.1 Continue to annually inspect approximately 1,500 acres of EPPC Category I and Category II invasive exotic plant species and treat as needed and appropriate (Air-potato, Brazilian pepper, Caesar weed, Castor bean, Chinese tallow, Cogon grass, Coral ardisia, Golden bamboo, Guinea grass, Guava, Lantana, Japanese climbing fern, Natal grass, Old World Climbing fern, Para grass, Peruvian primrose willow, Praxelis, Purple sesban, Sword fern, Torpedo grass, Water hyacinth, Water lettuce, Water spangles and Wild taro).

6.4.2 Continue to manage feral hogs on the area.

6.5 Public Access and Recreational Opportunities

Goal: Provide public access and recreational opportunities.

Short-term

6.5.1 Update the Recreation Master Plan.

Long-term

6.5.2 Maintain public access and recreational opportunities to allow for a recreational carrying capacity of 774 visitors per day.

6.5.3 Continue to provide website and kiosk for interpretation and education.

6.5.4 Continue to maintain 20.2 miles of designated trails and evaluate the potential of developing up to 1.5 miles of hiking trails.

6.5.5 Continue to provide hunting opportunities.

6.5.6 Continue to provide paddling opportunities.

6.5.7 Continue to provide fishing opportunities.

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

6.5.9 Monitor trails annually for visitor impacts.

6.5.10 Continue to implement the Recreation Master Plan.

6.6 Hydrological Preservation and Restoration

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

Long-term

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

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

6.7 Forest Resource Management

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

Long-term

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

6.8 Historical Resources

Goal: Protect, preserve and maintain historical resources.

Long-term

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

6.8.2 Coordinate with the DHR to schedule and conduct a historical resource reconnaissance survey.

6.8.3 Cooperate with the DHR to manage and maintain known existing historical resources.

6.8.4 Continue to monitor, protect, and preserve as necessary 28 identified sites.

6.8.5 Coordinate with the DHR for cultural resource management guideline staff 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 cultural and 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 Conduct a boundary survery of 25-acre inholding located on northwest portion of the HHBCWMA.

Long-term

6.9.2 Maintain facilities (check station, kiosk, shed, three restrooms and staff office) and 31.7 miles of roads existing.

6.9.3 Monitor infrastructure annually for visitor impacts.

6.10 Land Conservation and Stewardship Partnerships

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

Long-term

6.10.1 Continue to identify and evaluate potential important wildlife habitat, landscape-scale linkages, wildlife corridors and operational management needs, and update the OCPB for the HHBCWMA as appropriate and necessary.

6.10.2 Continue to contact and inform adjoining private landowners about the FWC Landowners Assistance Program, and coordinate with public entities to pursue conservation stewardship partnerships.

6.10.3 Continue to evaluate and identify FWC inholdings and additions priority parcels for potential conservation acquisition and pursue acquisitions as funding allows.

6.10.4 Continue to maintain a GIS shapefile and other necessary data to facilitate nominations within the FWC OCPB for the FWC landowner assistance and conservation acquisition programs.

6.10.5 Continue to update the FWC Conservation Action Strategy for the HHBCWMA as necessary.

6.10.6 Continue to identify potential non-governmental land stewardship organization partnerships and grant program opportunities.

6.10.7 Determine the efficacy of conducting a landowner assistance/conservation stewardship partnership workshop(s) and pursue as necessary and appropriate.

6.10.8 Continue to evaluate and determine if any portions of the HHBCWMA are no longer needed for conservation purposes, and therefore may be designated as surplus lands.

6.11 Climate Change

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

Long-term

6.11.1 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 HHBCWMA.

6.11.2 As appropriate, update the HHBCWMA Prescribed Fire Plan, WCPR Strategy and Recreation Master Plan to incorporate new scientific information regarding projected climate change.

6.11.3 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.

6.12 Cooperative Management, Special Uses and Research Opportunities

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

Long-term

6.12.1 Continue to cooperative with the SJRWMD on overall management activities on the area.

6.12.2 Continue to cooperate with the FTA to maintain the FNST.

6.12.3 Coordinate and cooperate with Department of Defense military branches to allow for training opportunities for military personnel and other initiatives as appropriate and compatible with the conservation of the HHBCWMA.

6.12.4 Continue to assess the need for research opportunities and cooperate with researchers, universities and environmental education partnership opportunities as appropriate.

7 Resource Management Challenges and Strategies

The following section identifies and describes further management needs and challenges associated with the HHBCWMA 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.

7.1 Challenge 1: Currently, the FWC aims to meet FWC law enforcement and management staff standards and needs.

7.1.1 Strategy: Agency staff levels will continue to be evaluated to determine if increased staffing or other alternatives can improve management needs.

7.1.2 Strategy: Pursue funding for increased law enforcement, management staffing, and additional private sector contract services as appropriate.

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

7.2 Challenge 2: Currently, exotic plant infestations exist at a level beyond ability of area staff to maintain.

7.2.1 Strategy: Establish a treatment rotation and continue funding projects for contract spraying.

7.2.2 Strategy: Continue to utilize contractual services for appropriate activities.

7.2.3 Strategy: Cooperate with other nearby FWC staff to assist when needed.

7.3 Challenge 3: Currently intentional flooding occurs on the area.

7.3.1 Strategy: Continue to cooperate with the SJRWMD.

7.3.2 Strategy: Prepare habitat with fire and other habitat management activities following flooding activities.

7.4 Challenge 4: The HHBCWMA is not a well-known public outdoor recreation destination.

7.4.1 Strategy 1: Explore adding additional public access points to increase visibility and accessibility.

7.4.2 Strategy 2: Work with local and Osceola County tourism boards to promote the HHBCWMA.

7.4.3 Strategy 3: Cross-promote the HHBCWMA with other regional public conservation lands.

7.4.4 Strategy 4: Work with Osceola County to install directional signage along area roads.

7.5 Challenge 5: Potential future development on adjacent lands can result in incompatible land uses increasing management challenges for the area.

7.5.1 Strategy: Cooperate and work with Osceola County to ensure land use and zoning designations adjacent to the HHBCWMA will continue to be compatible with the management of the area.

7.6 Challenge 6: Certain management units are difficult to access due to wet conditions.

7.6.1 Strategy: Utilize stabilization material to improve access.

7.6.2 Strategy: Request funding for obtaining equipment such as a Swamp Buggy to assist with management actions.

7.7 Challenge 7: There is an inholding within the HHBCWMA, that can cause management challenges.

7.7.1 Strategy: Explore conservation strategies for the inholding, including, but not limited to, fee simple or less-than-fee acquisition to ensure long term conservation of the site.

7.7.2 Strategy: Maintain inholding within the OCPB.

7.7.3 Strategy: Coordinate with existing landowners regarding management of exotic plant species.

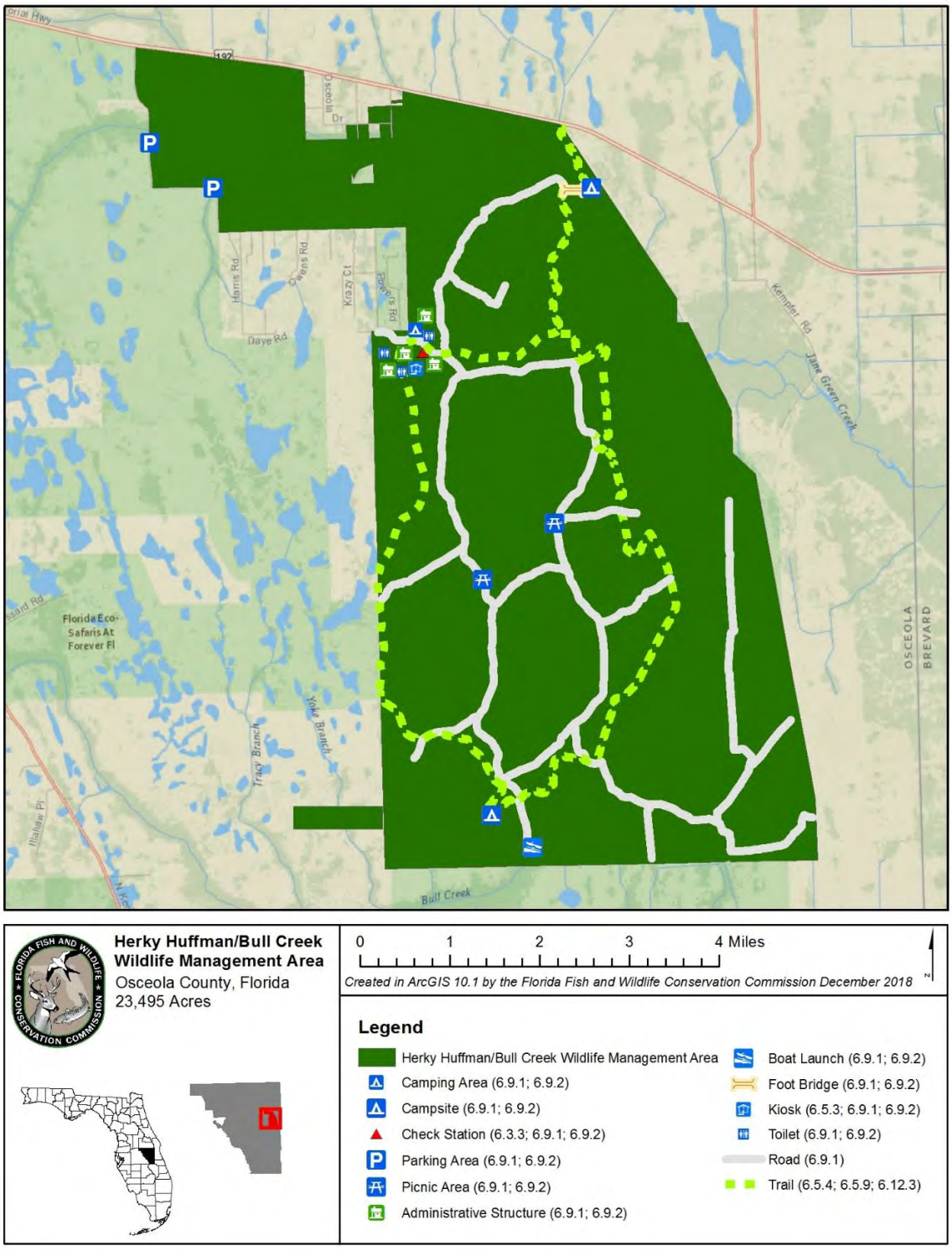

Figure 13. Project Locations on the HHBCWMA

8 Cost Estimates and Funding Sources

The following represents the actual and unmet budgetary needs for managing the lands and resources of the HHBCWMA. This cost estimate was developed using data developed by the FWC and other cooperating entities and is based on actual costs for land management activities, equipment purchase and maintenance and for development of fixed capital facilities. Funds needed to protect and manage the property and to fully implement the recommended program are derived primarily from the Land Acquisition Trust Fund and from State Legislative appropriations. However, private conservation organizations may be cooperators with the agency for funding of specific projects. Alternative funding sources, such as monies available through 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 and is consistent with the current and planned resource management and operation of the HHBCWMA. 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 2017-2018 operational plan showing detailed cost estimates by activity and categories of expenditures, may be found in Appendix 12.17.

Herky Huffman/Bull Creek WMA Management Plan Cost Estimate

Maximum expected one-year expenditure

Resource Management	Expenditure	Priority
Exotic Species Control	$199,898	(1)
Prescribed Burning	$40,716	(1)
Cultural Resource Management	$558	(1)
Timber Management	$0	(1)
Hydrological Management	$0	(1)
Other (Restoration, Enhancement, Surveys, Monitoring, etc.)	$56,696	(1)
Subtotal	**$297,868**	
Administration		
General administration	**$1,673**	(1)
Support		
Land Management Planning	$25,772	(1)
Land Management Reviews	$2,973	(3)
Training/Staff Development	$22,717	(1)
Vehicle Purchase	$254,988	(2)
Vehicle Operation and Maintenance	$68,919	(1)
Other (Technical Reports, Data Management, etc.)	$4,781	(1)
Subtotal	**$380,150**	
Capital Improvements		
New Facility Construction	$2,686	(2)
Facility Maintenance	$178,973	(1)
Subtotal	**$181,659**	
Visitor Services/Recreation		
Info./Education/Operations	**$8,334**	(1)
Law Enforcement		
Resource protection	**$0**	(1)
Total	**$869,685**	*

Priority schedule:
(1) Immediate (annual)
(2) Intermediate (3-4 years)
(3) Other (5+ years)

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

Herky Huffman/Bull Creek WMA Management Plan Cost Estimate

Ten-year projection

Resource Management	Expenditure	Priority
Exotic Species Control	$1,756,326	(1)
Prescribed Burning	$357,739	(1)
Cultural Resource Management	$4,899	(1)
Timber Management	$0	(1)
Hydrological Management	$0	(1)
Other (Restoration, Enhancement, Surveys, Monitoring, etc.)	$498,139	(1)
Subtotal	**$2,617,104**	
Administration		
General administration	**$14,698**	(1)
Support		
Land Management Planning	$226,439	(1)
Land Management Reviews	$8,509	(3)
Training/Staff Development	$199,591	(1)
Vehicle Purchase	$897,315	(2)
Vehicle Operation and Maintenance	$605,531	(1)
Other (Technical Reports, Data Management, etc.)	$42,005	(1)
Subtotal	**$1,979,391**	
Capital Improvements		
New Facility Construction	$7,760	(2)
Facility Maintenance	$1,572,477	(1)
Subtotal	**$1,580,236**	
Visitor Services/Recreation		
Info./Education/Operations	**$73,223**	(1)
Law Enforcement		
Resource protection	**$0**	(1)
Total	**$6,264,652**	*

Priority schedule:
(1) Immediate (annual)
(2) Intermediate (3-4 years)
(3) Other (5+ years)

* Based on the characteristics and requirements of this area, three FTE positions 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, 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 HHBCWMA 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 12.9). 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 HHBCWMA in compliance with Chapter 388.4111 F.S. (Appendix 12.18). This plan was developed in cooperation with the local Osceola County arthropod control agency. This plan is also in conformance with the Local Government Comprehensive Plan as approved and adopted for Osceola County, Florida, (Appendix 12.19).

11 Endnotes

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