

A Management Plan for  
Tenoroc  
Public Use Area  
2018 - 2028



Polk County, Florida

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**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, Florida 32399-3000

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Governor  
Carlos Lopez-Cantera  
Lt. Governor  
Noah Valenstein  
Secretary

October 19, 2018

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

**RE: Tenoroc Public Use Area - Lease No. 3977**

Dear Mr. Houston:

On **October 19, 2018**, the Acquisition and Restoration Council (ARC) recommended approval of the **Tenoroc Public Use Area** 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 **Tenoroc Public Use Area** management plan. The next management plan update is due October 19, 2028.

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,



Raymond V. Spaulding  
Chief, Office of Environmental Services  
Division of State Lands  
Department of Environmental Protection

**A Management Plan  
for  
Tenoroc Public Use and Fish Management Area**

Polk County, Florida

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



May 2018

Approved

A handwritten signature in blue ink, appearing to read "Kipp Frohlich", written over a horizontal line.

Kipp Frohlich

Director, Division of Habitat and Species Conservation,  
Florida Fish and Wildlife Conservation Commission

Approved

A handwritten signature in blue ink, appearing to read "Orlando E. Rivera", written over a horizontal line.

Orlando E. Rivera, PWS, CERP  
Administrator, Mining and Mitigation Program,  
Florida Department of Environmental Protection

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**LAND MANAGEMENT PLAN EXECUTIVE SUMMARY**

Co-Lead Agencies: Florida Fish and Wildlife Conservation Commission (FWC) and Florida Department of Environmental Protection (DEP)

Common Name of Property: Tenoroc Public Use Area

Location: Polk County, Florida

Acreage Total: 8,386 acres

Acreage Breakdown:

<u>Land Cover</u>	<u>Acres*</u>	<u>Percent of Area</u>
Successional hydric shrubland/forest	2,381.1	28.4%
Successional hardwood forest	2,070.9	24.7%
Artificial lake	1,446.1	17.2%
Spoil area	1,071.6	12.8%
Pine plantation	387.7	4.6%
Mesic flatwoods	183.1	2.2%
Basin swamp	158.8	1.9%
Bottomland forest	127.5	1.5%
Road	111.1	1.3%
Mesic hammock	100.0	1.2%
Clearing	72.6	0.9%
Wildlife food plot	58.5	0.7%
Developed	52.1	0.6%
Sandhill	22.2	0.3%
Dome swamp	22.1	0.3%
Xeric hammock	21.2	0.3%
Canal/ditch	12.7	0.2%
Depression marsh	1.3	0.0%

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

Lease/Management Agreement No.: 3977 (Appendix 12.1)

Use: Single \_\_\_\_\_ Management Responsibilities:  
 Multiple X Agency FWC&DEP Responsibilities  
LEAD, SUBLESSEE (Public Use Area, Fish Management Area, resource protection, law enforcement)

Designated Land Use: Public Use and Fish Management Area

Sublease (s): City of Lakeland (Section 1.6)

Encumbrances: Apiary contract, gas transmission pipeline, utilities corridor, access easements, water quality monitoring wells (Section 1.6).

Type Acquisition: Fish and Wildlife Habitat Program

Unique Features: Natural: None: reclaimed mine site

Archaeological/Historical: Five sites, nine surveys (Appendix 12.7).

Management Needs: Fisheries management; habitat enhancement; 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: 10,301 acres in FWC OCPB; Green Swamp (162,454 acres remaining) and Lake Wales Ridge Ecosystem (22,683 acres remaining) Florida Forever Projects (Figure 4).

Surplus Lands/Acreage: None

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

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

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ARC Approval Date \_\_\_\_\_ BTIITF Approval Date: \_\_\_\_\_

Comments: \_\_\_\_\_

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## Land Management Plan Compliance Checklist

Required for State-owned conservation lands over 160 acres

### Section A: Acquisition Information Items

Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
1	The common name of the property.	18-2.018 & 18-2.021	1
2	The land acquisition program, if any, under which the property was acquired.	18-2.018 & 18-2.021	5-7
3	Degree of title interest held by the Board, including reservations and encumbrances such as leases.	18-2.021	7
4	The legal description and acreage of the property.	18-2.018 & 18-2.021	2, 106
5	A map showing the approximate location and boundaries of the property, and the location of any structures or improvements to the property.	18-2.018 & 18-2.021	2-5
6	An <b>assessment</b> as to whether the property, or any portion, should be declared surplus. <i>Provide information regarding <b>assessment and analysis</b> in the plan, and provide <b>corresponding map</b>.</i>	18-2.021	54
7	Identification of other parcels of land within or immediately adjacent to the property that should be purchased because they are essential to management of the property. <i>Please clearly indicate parcels on a map.</i>	18-2.021	78-80
8	Identification of adjacent land uses that conflict with the planned use of the property, if any.	18-2.021	10
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)	5
10	Proximity of property to other significant State, local or federal land or water resources.	18-2.021	7-9

### Section B: Use Items

Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
11	The designated single use or multiple use management for the property, including use by other managing entities.	18-2.018 & 18-2.021	52
12	A description of past and existing uses, including any unauthorized uses of the property.	18-2.018 & 18-2.021	50-51
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	53
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	7
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	74-75

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	103
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)	53
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	53
19	Letter of compliance from the local government stating that the LMP is in compliance with the Local Government Comprehensive Plan.	BOT requirement	313
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	54
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	53
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	36-37
23	A statement regarding incompatible use in reference to Ch. 253.034(10).	253.034(10)	54

\*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	10
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)	10, 215
26	LMPs and LMP updates for parcels over 160 acres shall be developed with input from an advisory group who must conduct at least one public hearing within the county in which the parcel or project is located. <i>Include the advisory group members and their affiliations, as well as the date and location of the advisory group meeting.</i>	259.032(10)	10, 215
27	Summary of comments and concerns expressed by the advisory group for parcels over 160 acres	18-2.021	215
28	During plan development, at least one public hearing shall be held in each affected county. Notice of such public hearing shall be posted on the parcel or project designated for management, advertised in a paper of general circulation, and announced at a scheduled meeting of the local governing body before the actual public hearing. <i>Include a copy of each County's advertisements and announcements (meeting minutes will suffice to indicate an announcement) in the management plan.</i>	253.034(5) & 259.032(10)	10, 215
29	The manager shall consider the findings and recommendations of the land management review team in finalizing the required 10-year update of its management plan. <i>Include manager's replies to the team's findings and recommendations.</i>	259.036	59, 248
30	Summary of comments and concerns expressed by the management review team, if required by Section 259.036, F.S.	18-2.021	248
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	248

Section D: Natural Resources			
Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
32	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding soil types. <i>Use brief descriptions and include USDA maps when available.</i>	18-2.021	12, 255
33	Insert FNAI based natural community maps when available.	ARC consensus	19

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	30-36, 47
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	30-36
36	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding beaches and dunes.	18-2.021	48
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	48
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	37
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	45-47
40	The identification or resources on the property that are listed in the Natural Areas Inventory. <i>Include letter from FNAI or consultant where appropriate.</i>	18-2.021	30-36, 268
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)	59-97
42	<b>Habitat Restoration and Improvement</b>	259.032(10) & 253.034(5)	
42-A.	Describe management needs, problems and a desired outcome and the key management activities necessary to achieve the enhancement, protection and preservation of restored habitats and enhance the natural, historical and archeological resources and their values for which the lands were acquired.	↓	61-84
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.		84
42-C.	The associated measurable objectives to achieve the goals.		84
42-D.	The related activities that are to be performed to meet the land management objectives and their associated measures. <i>Include fire management plans - they can be in plan body or an appendix.</i>		63
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.		100, 305
43	***Quantitative data description of the land regarding an inventory of forest and other natural resources and associated acreage. <i>See footnote.</i>	253.034(5)	21, 30-36

44	Sustainable Forest Management, including implementation of prescribed fire management		
44-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).		36, 63, 74, 92
44-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).	18-2.021, 253.034(5) & 259.032(10) ↓	92
44-C.	Measurable objectives (see requirement for #42-C).		92
44-D.	Related activities (see requirement for #42-D).		63
44-E.	Budgets (see requirement for #42-E).		100, 305
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).	↓	66, 85
45-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		85
45-C.	Measurable objectives (see requirement for #42-C).		85
45-D.	Related activities (see requirement for #42-D).		63
45-E.	Budgets (see requirement for #42-E).		100, 305
46	***Quantitative data description of the land regarding an inventory of exotic and invasive plants and associated acreage. <i>See footnote.</i>	253.034(5)	21, 28
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	307
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).	↓	67, 86
48-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		86
48-C.	Measurable objectives (see requirement for #42-C).		86
48-D.	Related activities (see requirement for #42-D).		63
48-E.	Budgets (see requirement for #42-E).		100-305

### Section E: Water Resources

Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
49	A statement as to whether the property is within and/or adjacent to an aquatic preserve or a designated area of critical state concern or an area under study for such designation. <i>If yes, provide a list of the</i>		47-48

	<i>appropriate managing agencies that have been notified of the proposed plan.</i>	18-2.018 & 18-2.021	
50	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding water resources, including water classification for each water body and the identification of any such water body that is designated as an Outstanding Florida Water under Rule 62-302.700, F.A.C.	18-2.021	21, 30-36, 47, 49
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	47, 49
52	***Quantitative description of the land regarding an inventory of hydrological features and associated acreage. <i>See footnote.</i>	253.034(5)	21
53	<b>Hydrological Preservation and Restoration</b>	259.032(10) & 253.034(5)	
53-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	73, 92
53-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		92
53-C.	Measurable objectives (see requirement for #42-C).		82
53-D.	Related activities (see requirement for #42-D).		73
53-E.	Budgets (see requirement for #42-E).		100, 305

## Section F: Historical, Archeological and Cultural Resources

Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
54	**Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding archeological and historical resources. <i>Include maps of all cultural resources except Native American sites, unless such sites are major points of interest that are open to public visitation.</i>	18-2.018, 18-2.021 & per DHR's request	50
55	***Quantitative data description of the land regarding an inventory of significant land, cultural or historical features and associated acreage.	253.034(5)	50
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	50, 93
57	<b>Cultural and Historical Resources</b>	259.032(10) & 253.034(5)	
57-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	50, 93
57-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		93
57-C.	Measurable objectives (see requirement for #42-C).		93
57-D.	Related activities (see requirement for #42-D).		50
57-E.	Budgets (see requirement for #42-E).		100, 305

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

Section G: Facilities (Infrastructure, Access, Recreation)			
Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
58	***Quantitative data description of the land regarding an inventory of infrastructure and associated acreage. <i>See footnote.</i>	253.034(5)	75
59	<b>Capital Facilities and Infrastructure</b>	259.032(10) & 253.034(5)	
59-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	75, 93
59-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		93
59-C.	Measurable objectives (see requirement for #42-C).		93
59-D.	Related activities (see requirement for #42-D).		75
59-E.	Budgets (see requirement for #42-E).		100, 305
60	*** Quantitative data description of the land regarding an inventory of recreational facilities and associated acreage.	253.034(5)	30-36
61	<b>Public Access and Recreational Opportunities</b>	259.032(10) & 253.034(5)	7568, 86
61-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	86
61-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		86
61-C.	Measurable objectives (see requirement for #42-C).		75
61-D.	Related activities (see requirement for #42-D).		75
61-E.	Budgets (see requirement for #42-E).		100, 305

Section H: Other/ Managing Agency Tools			
Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
62	Place this LMP Compliance Checklist at the front of the plan.	ARC and managing agency consensus	iii
63	Place the Executive Summary at the front of the LMP. Include a physical description of the land.	ARC and 253.034(5)	i
64	If this LMP is a 10-year update, note the accomplishments since the drafting of the last LMP set forth in an organized (categories or bullets) format.	ARC consensus	55
65	Key management activities necessary to achieve the desired outcomes regarding other appropriate resource management.	259.032(10)	59-99

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)	100,305
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)	100
68	A statement of gross income generated, net income and expenses.	18-2.018	52

\*\*\* = 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

ARC	Acquisition and Restoration Council
ADA	Americans with Disabilities Act
ARM	Archaeological Resource Management
BEBR	Bureau of Economic and Business Research
CE	Commercial Enclave
CONS	Conservation
CAS	Conservation Action Strategy
CARL	Conservation and Recreation Lands Program
DACS	Department of Agriculture and Consumer Services
DEP	Department of Environmental Protection
DOF	Division of Forestry
DHR	Division of Historical Resources
DRP	Division of Recreation and Parks
DSL	Division of State Lands
FY	Fiscal Year
FWRI	Fish and Wildlife Research Institute
FAC	Florida Administrative Code
FDOT	Florida Department of Transportation
FLEPPC	Florida Exotic Pest Plant Council
FWC	Florida Fish and Wildlife Conservation Commission
FFS	Florida Forest Service
GFC	Florida Game and Freshwater Fish Commission
FIPR	Florida Industrial and Phosphate Research Institute
FNAI	Florida Natural Areas Inventory
FS	Florida Statute(s)
FTE	Full Time Employee
GIS	Geographic Information Systems
GPS	Global Positioning System
GRASI	Gulf Regional Airspace Initiative
IWHRs	Integrated Wildlife Habitat Ranking System
IPCC	Intergovernmental Panel on Climate Change
IMPP	Internal Management Policies and Procedures
LMR	Land Management Review
LAP	Landowner Assistance Program
MAG	Management Advisory Group
MSL	Mean Sea Level
NWR	National Wildlife Refuge
NRCS	Natural Resources Conservation Service
OBVM	Objective-Based Vegetation Management
ORV	Off-Road Vehicle
OCPB	Optimal Conservation Planning Boundary

## Management Plan Acronym Key

ORB	Optimal Resource Boundary
OFW	Outstanding Florida Waters
PACE	Parent and Adolescent Counseling and Education
ROS	Recreation and Open Space
RS	Residential Suburban
SWFWMD	Southwest Florida Water management District
TPUA	Tenoroc Public Use Area
TYCC	Tenoroc Youth Conservation Center
USACOE	United States Army Corps of Engineers
UPRSCR	Upper Peace River/Saddle Creek Restoration Project
YMCA	Young Mens Club of America

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# **1 Introduction and General Information**

In Polk County, two miles northeast of Lakeland, the Tenoroc Public Use (TPUA), formerly known as the Tenoroc Fish Management Area, forms a continuous linkage of lakes and marshes, open grasslands, and wooded hills between the Green Swamp and the Peace River. The TPUA habitats contribute clean water to the Peace River, create an important refuge for wildlife, and serve as a destination for anglers, birdwatchers, hikers, and horseback riders. The TPUA demonstrates the results of intensive management and restoration and nature's regenerative powers.

Pit lakes and steep-sided spoil mounds, the result of phosphate mining in the 1960s and 1970s, have been transformed into quality fishing lakes and wooded hills for hiking and horseback riding. The odds of catching a quality bass and experiencing a peaceful fishing trip are high.

Also, TPUA is one of the gateways to the Great Florida Birding and Wildlife Trail, and its diverse habitats provide productive year-round wildlife viewing opportunities. Over ten miles of hiking trails offer both easy ambles on level ground and more-challenging hikes on uneven terrain. In addition, a shooting center accommodating archery, air gun, rifle, pistol and shotgun shooters is located near the entrance to the area.

The TPUA is managed by the Florida Fish and Wildlife Conservation Commission (FWC) to enhance fish and wildlife habitat, and sustain ecological processes that contribute to the conservation of biological diversity and the extant fish and wildlife populations of the area. In conjunction with this emphasis, it is the FWC's intent to provide quality fish- and wildlife-based public outdoor recreational opportunities on the TPUA.

## **1.1 Management Plan Purpose**

This Management Plan serves as the basic statement of policy and direction for the management of TPUA. It provides information including the past usage, conservation acquisition history, and descriptions of the natural and historical resources found on TPUA. Furthermore, it identifies FWC's future management intent, goals and associated short and long-term objectives, as well as identifying challenges and solutions. This Management Plan has been developed to guide each aspect of TPUA'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 Internal Improvement Trust Fund (Board of Trustees) of the State of Florida through the Florida Department of Environmental Protection's Division of State Lands (DSL), in compliance with paragraph seven of Lease No. 3977 (Appendix 12.1) and pursuant to Chapters 253 and 259, Florida Statutes (FS), and Chapters 18-2 and 18-4, Florida Administrative Code (FAC). Format

and content were drafted in accordance with ARC requirements for management plans and the model plan outline provided by the staff of DSL. Terms used in this Management Plan (Appendix 12.2) 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**

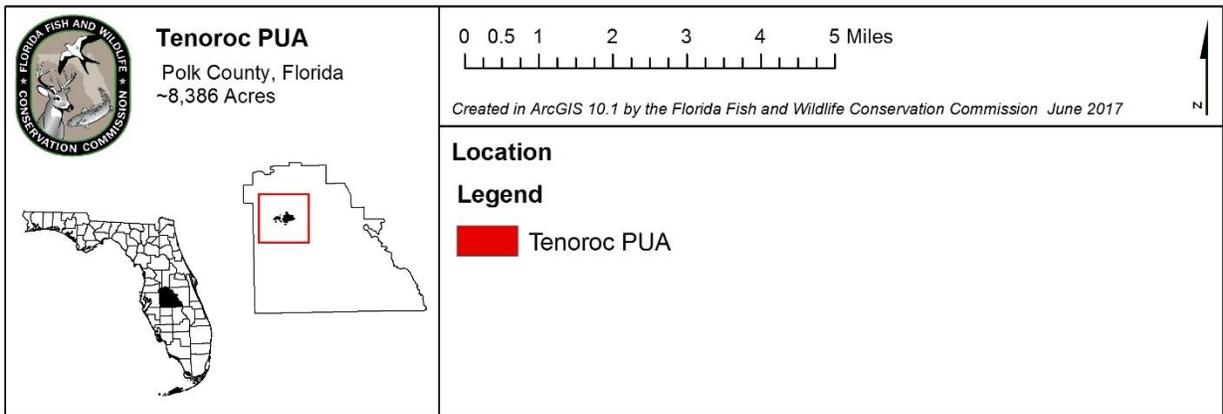
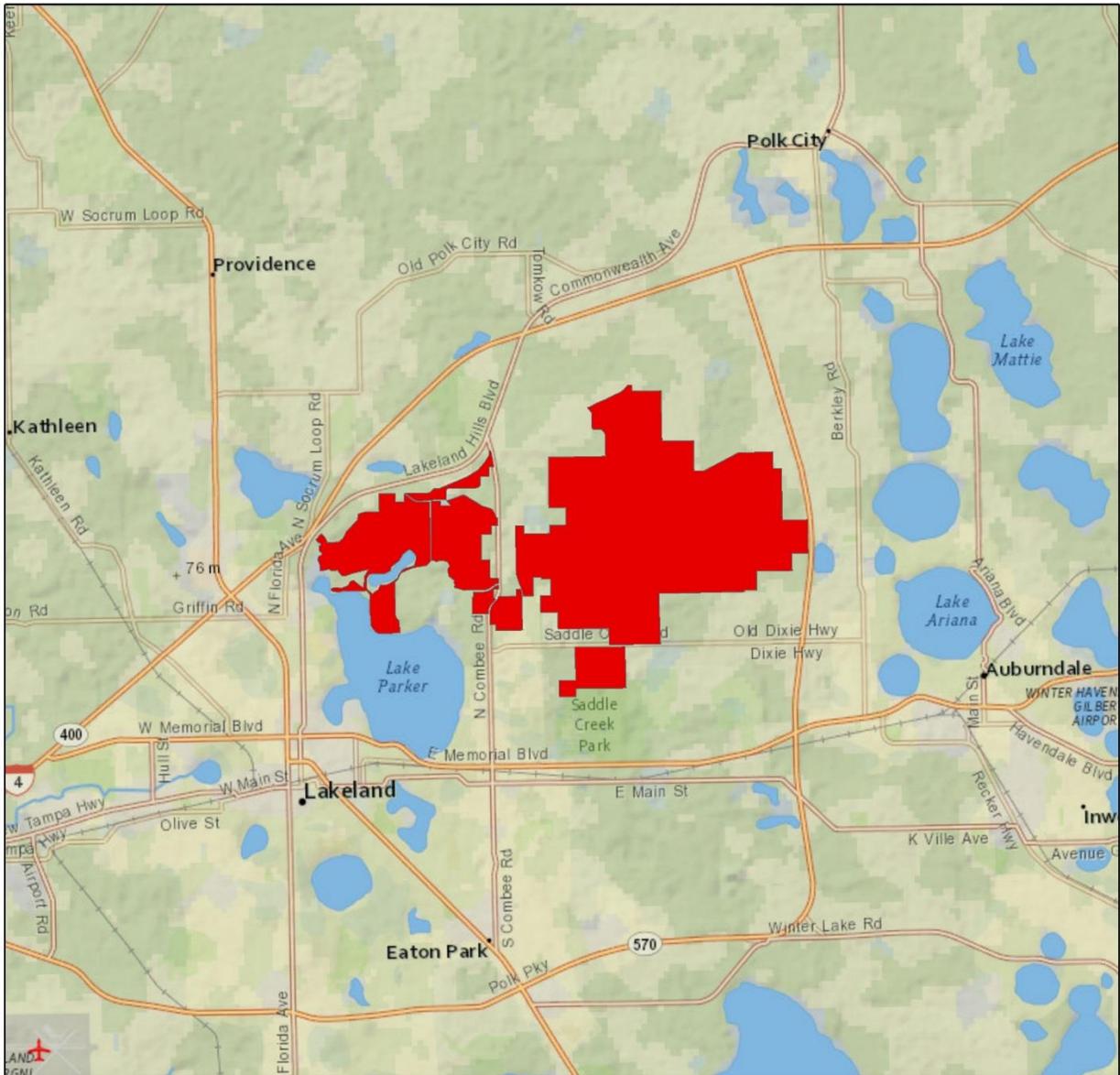
The FWC’s planning philosophy includes emphasizing management recommendation consensus-building among stakeholders and input from user groups and the general public at the beginning of the planning process. The FWC engages stakeholders by convening a Management Advisory Group and solicits additional input from user groups and the general public at a public hearing (Appendix 12.3). The FWC also engages area, district, and regional agency staff, as well as other FWC staff expertise, in developing this Management Plan, thereby facilitating area biologist and manager “ownership” of the Management Plan, and thus the development of meaningful management intent language, goals with associated measurable objectives, timelines for completion, and the identification of challenges and solution strategies for inclusion in the TPUA 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 TPUA. The LMR report (Section 5.1, Appendix 12.4) provides FWC staff with important information and guidance provided by a diverse team of land management auditors, and communicates the recommendations of the LMR team to FWC so they may be adequately addressed in this Management Plan, and thus guide the implementation of the LMR team recommendations on TPUA.

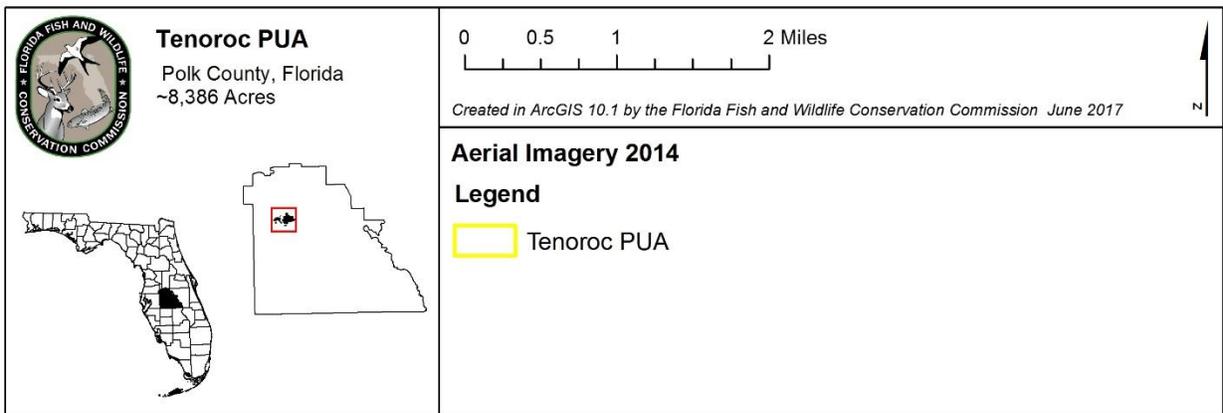
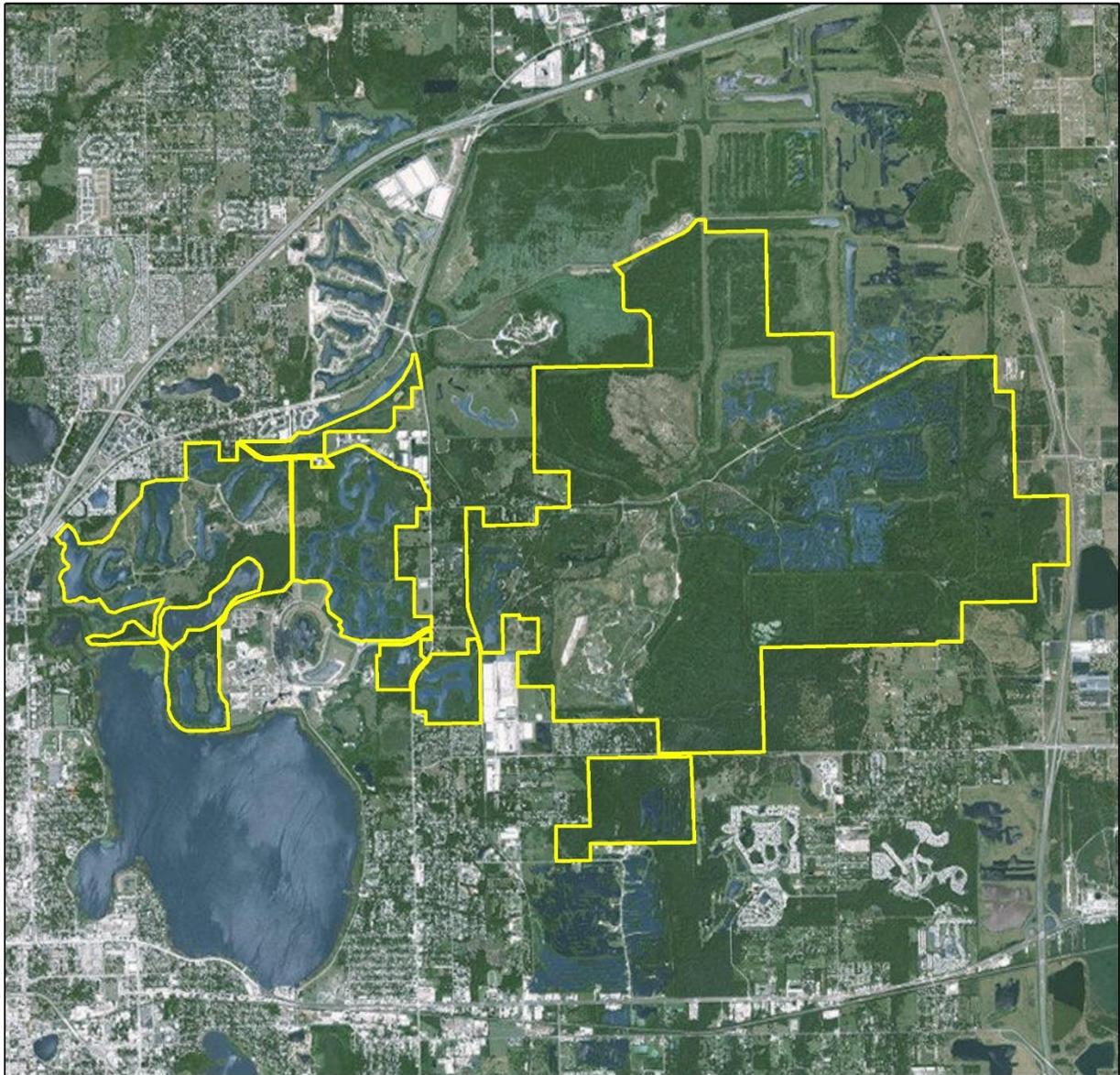
Furthermore, FWC maintains transparency and accountability throughout the development and implementation of this Management Plan. A “living document” concept, linking this updated Management Plan to the previous one, is accomplished by reporting on the objectives, management activities, and projects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

## **1.2 Location**

The TPUA occupies approximately 8,386 acres northeast of Lakeland, in Polk County, Florida (Figures 1 - 2). It is easily accessible from Tampa to the west and Orlando to the east via Interstate 4 and from nearby cities within Polk County by means of several state



**Figure 1. Location**



**Figure 2. Aerial Imagery**

highways and county roads. The TPUA is situated within: Townships 27 and 28 South, Range 24 East as follows: Section 21, Township 27 South, Range 24 East; Sections 23-36, Township 27 South, Range 25 East; Sections 29-32, Township 28 South, Range 24 East; and Sections 1-5 & 11, Township 28 South, Range 24 East (Figure 3).

The city limits of Lakeland and Auburndale are adjacent to the TPUA along its southwestern, western, northern, and eastern boundaries; portions of the TPUA property are within the Lakeland city limits. Most of the remaining property boundaries are adjacent to unincorporated areas of residential or industrial development. There are two additional designated Fish Management Areas directly adjacent to the TPUA: the Polk County-owned 321 acre Saddle Creek Park, and the meandering 2,272-acre Lake Parker.

### **1.3 Acquisition**

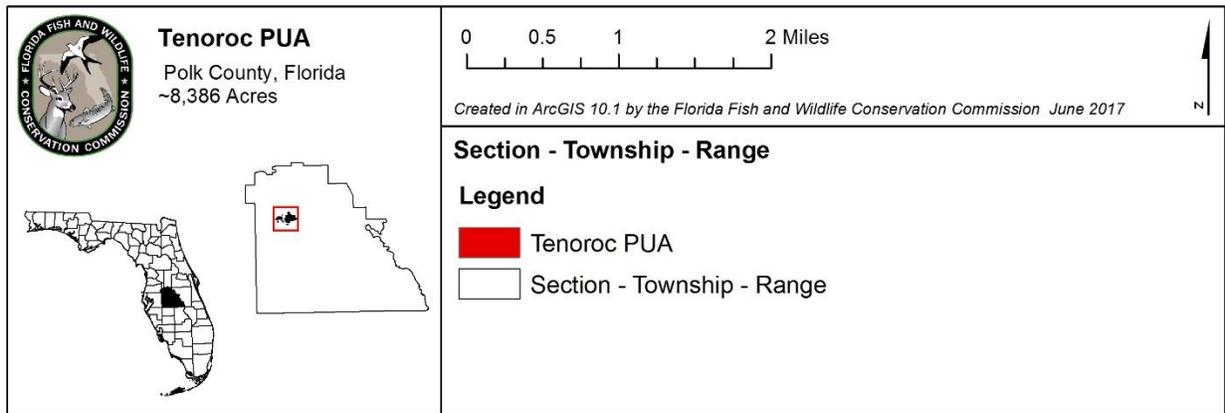
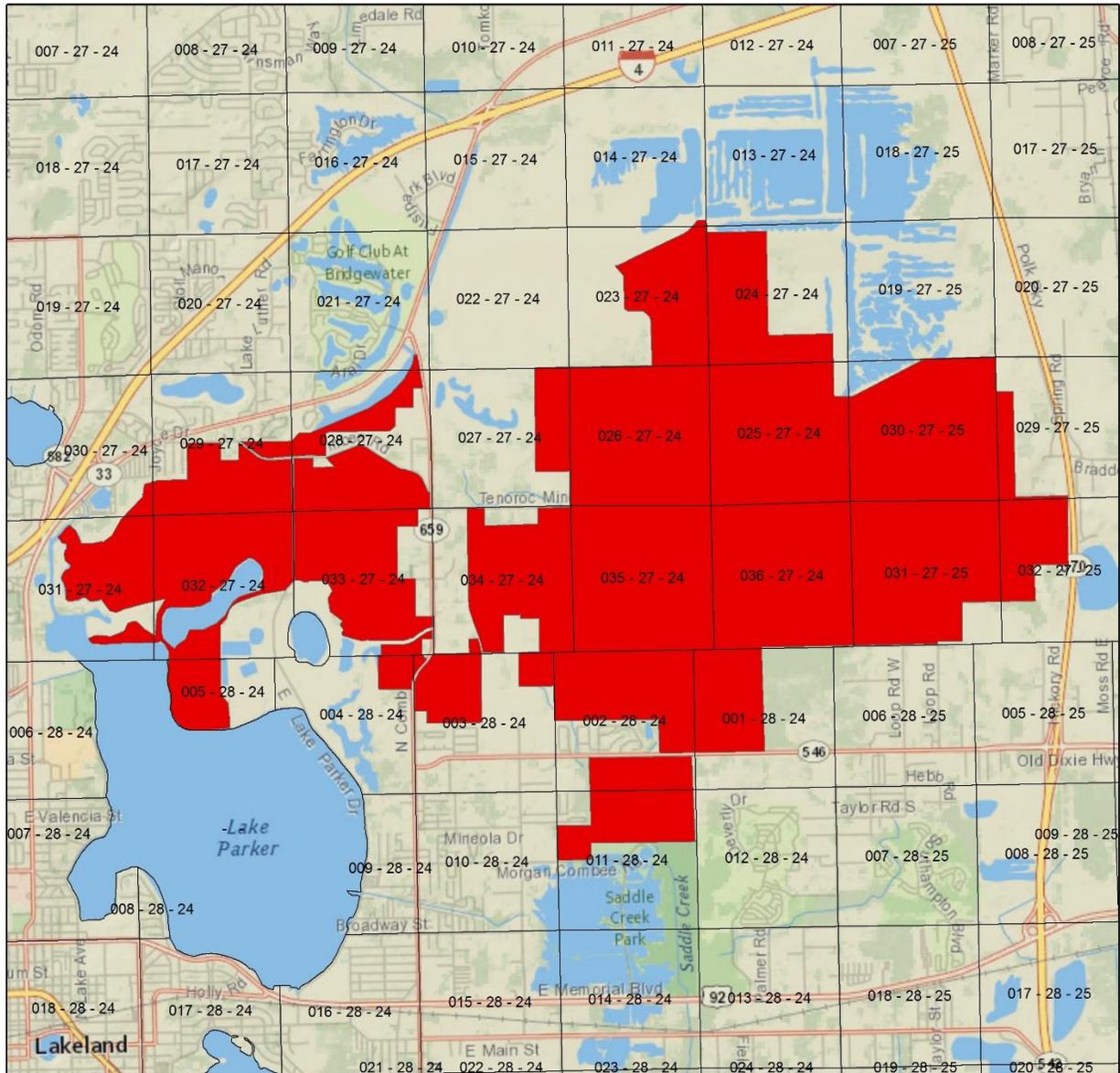
#### **1.3.1 Purpose for Acquisition of the Property**

As described in greater detail below, the original part of the TPUA was donated to the State for conservation and recreation. Additional acquisitions and donations were also acquired by the State for the purposes of conservation and fish- and wildlife-based public outdoor recreation.

Furthermore, the FWC and DEP are directed via Lease Number 3977, from the Board of Trustees, to “...manage these lands for the conservation and protection of natural and historical resources and for 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), Florida Statutes, along with other related uses necessary for the accomplishment of this purpose as designated in the Management Plan required by paragraph 10 of this lease agreement.”

#### **1.3.2 Acquisition History**

In September 1982, Borden, Inc., donated 6,065 acres of its Tenoroc Mine to the State of Florida for conservation and recreation purposes. The original Lease Number 3570 from the Board of Trustees for this land (originally called the Tenoroc Recreation Area) was co-signed on June 24, 1984, by the Division of Recreation and Parks (DRP) of the former Florida Department of Natural Resources (now DEP), the Florida Game and Fresh Water Fish Commission (now FWC), and Division of Forestry (DOF; now the Florida Forest Service [FFS]) of the Florida Department of Agriculture and Consumer Services (DACS). Due to budgetary cutbacks in 1992, the DRP obtained permission to terminate its management activities and responsibilities at the TPUA. Subsequently, both the FWC and DOF agreed to a “management release” by the DRP and the property was renamed the Tenoroc Fish Management Area. Temporary authority was given to both agencies to continue management of the property until a new lease was issued. This new lease from the Board of Trustees, number 3977, signed on May 23, 1993 for a fifty-year (50-year) term, designated the FWC the “Lead Agency” and the DOF, now FFS, as a “Cooperating Agency.”



**Figure 3. Section, Township, Range**

In 1999, the FWC acquired 976 acres referred to as the Bridgewater Tract as an addition to the TPUA through the FWC Preservation 2000 Inholdings and Additions Acquisition Program. Additional land acquisitions were made using funds from the Non-mandatory Reclamation Trust Fund, and, through a land exchange with the City of Lakeland, and via a donation from the Williams Acquisition Holding Company, Inc. Lease number 3977 has been amended five times since 1993 to add these additional land conservation properties to TPUA.

#### **1.4 Management Authority**

The FWC is a designated co-lead managing agency for TPUA under the authority granted by Lease Number 3977 from the Board of Trustees agent, DSL. Further management authority derives from Article IV, Section 9 of the Florida Constitution as well as the guidance and directives of Chapters 253, 259, 327, 370, 373, 375, 378, 379, 403, 487, 870, and 597 and of the Florida Statutes. These constitutional provisions and laws provide FWC the authority to protect, conserve, and manage the State's fish and wildlife resources.

Subsequent to Lease 3977 Amendment 4 of March, 2013, FWC shares co-lead management authority with DEP's Division of Water Resource Management for all resources within the established boundary. The FFS remains a cooperating agency.

#### **1.5 Management Directives**

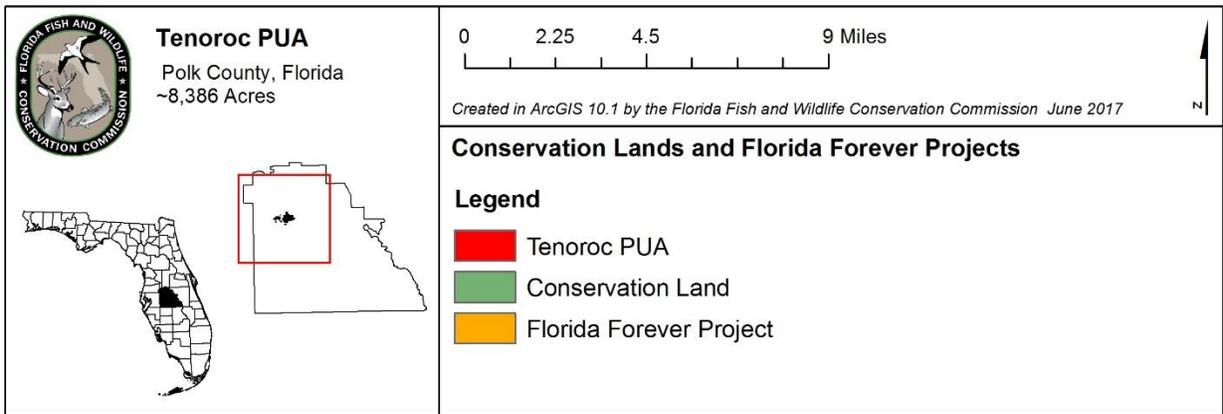
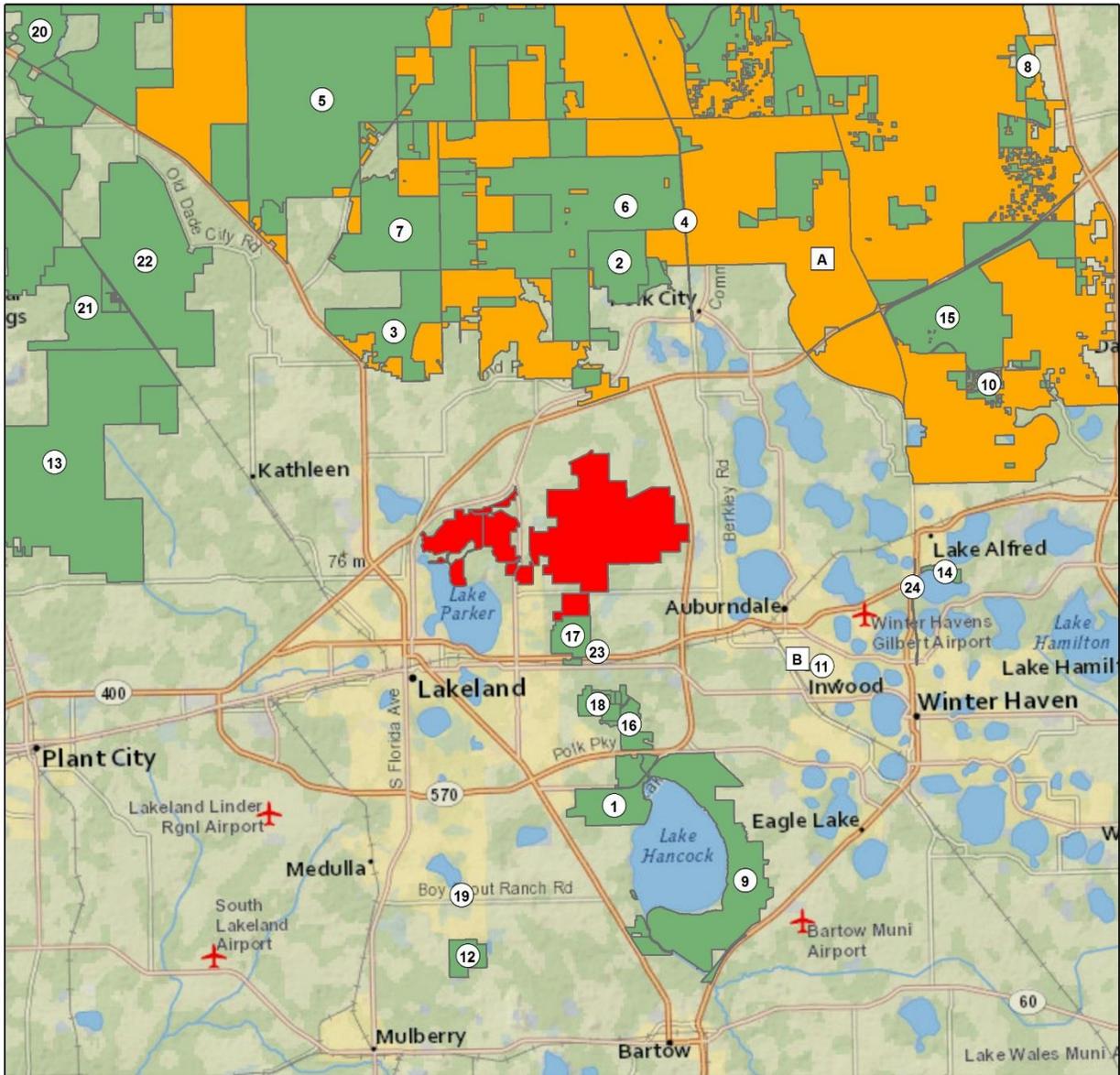
The 50-year Board of Trustees' Lease Agreement Number 3977 with FWC and DEP directs these agencies to "manage the leased premises only for the conservation and protection of natural and historical resources and resource-based, public outdoor recreation which is compatible with the conservation and protection of these public lands, as set forth in subsection 253.023(11), FS..." The lease agreement further directs 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 TPUA is vested in the Board of Trustees (Governor and Cabinet). In May, 1993, DSL, as staff to the Board of Trustees, entered into Lease Agreement Number 3977, a 50 year lease agreement, granting FWC and DEP management authority for TPUA. Encumbrances on TPUA include an apiary contract (D&J Apiary, Inc.), natural gas transmission pipeline easements (Gulfstream Natural Gas System, LLC), utility easements (City of Lakeland; powerline and waterline), and water quality monitoring wells (Southwest Florida Water Management District [SWFWMD]).

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

There are numerous State, local, and private conservation lands within a 10 mile radius of TPUA (Figure 4, Table 1), as well as two Florida Forever Projects (Figure 4, Table 2).



**Figure 4. Conservation Lands and Florida Forever Projects**

**Table 1. Conservation Lands Within 10 Miles of TPUA**

---

<u>Name</u>	<u>Map Symbol</u>
Circle B Bar Reserve	1
DEP Green Swamp Conservation Easements	2
Gator Creek Reserve	3
General James A. Van Fleet State Trail	4
Green Swamp	5
Green Swamp Land Authority Land Protection Agreements	6
Green Swamp/Bass Conservation Easement	7
Hilochee Wildlife Management Area	8
Lake Hancock	9
Lake Lowery Marsh	10
Lake Wales Ridge Wildlife and Environmental Area	11
Lakeland Highlands Scrub	12
Lower Green Swamp Preserve	13
Mackay Gardens and Lakeside Preserve	14
Osprey Unit	15
Polk County Conservation Easement	16
Saddle Creek County Park	17
Saddle Creek Sanctuary	18
Scott Lake Conservation Easement	19
SWFWMD Green Swamp Conservation Easements	20
Upper Hillsborough	21
Upper Hillsborough Conservation Easement	22
Upper Saddle Creek/Schaller Tract	23
Winter Haven to Lake Alfred Trail	24

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**Table 2. Florida Forever Projects Within 10 Miles of TPUA**

---

<u>Name</u>	<u>Map Symbol</u>
Green Swamp	A
Lake Wales Ridge Ecosystem	B

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## **1.8 Adjacent Land Use and Zoning**

The TPUA is within the jurisdictions of both the City of Lakeland and Polk County. The City of Lakeland's Comprehensive Plan designates their portion of TPUA as Conservation (CONS). The Polk County Comprehensive Plan designates the TPUA primarily as Recreation and Open Space (ROS) with a few small parcels designated as Commercial Enclave (CE) and Residential Suburban (RS). The lands surrounding TPUA represent a diverse mixture of land use classifications.

Three types of potentially conflicting land uses occur on adjacent properties; (1) industrial development, (2) residential development, and (3) waste disposal. These have been identified as having the potential to create significant challenges for the overall resource and operational management of the TPUA. Issues such as trespass, vandalism, poaching, and theft; feral pets, nuisance wildlife, and encroaching exotic vegetation; increased vehicular traffic in the area with associated increases in road kill totals, as well as stormwater runoff, erosion, land application of sewage waste, and groundwater contamination, all place additional demands on management of the area for public conservation land.

## **1.9 Public Involvement**

The FWC conducted a Management Advisory Group (MAG) meeting in Bartow, Florida, on January 20, 2016, to obtain input from both public and private stakeholders regarding management of TPUA. Results of this meeting were used by FWC to develop management goals and objectives and to identify opportunities and strategies for inclusion in this Management Plan. A summary of issues and opportunities raised by the MAG, as well as a listing of participants has been produced by FWC (Appendix 12.3).

Further, a public hearing, as required by Chapter 259.032(10), FS, was held in Eloise, Florida on February 25, 2016, to solicit input and comment from the general public regarding this Management Plan. The report of that hearing has also been produced by FWC (Appendix 12.3). The Management Prospectus for TPUA was made available 30 days prior to the public hearing. 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**

### **2.1.1 Climate**

The climate of TPUA is classified as subtropical. Annual mean high and low temperatures

are 83 and 63 degrees Fahrenheit (F) respectively. July and August are typically the warmest months with a mean high temperature of 92 degrees F, while January is typically the coolest month with a mean high temperature of 65 degrees F. Winter freezes are infrequent.

Mean annual rainfall is 52 inches. Total precipitation is highest during the month of July (8.08 inches) and the lowest during November (2.11 inches). The wet season normally extends from June through September, while the dry season normally stretches from October through May. Rainfall occurs most often during summer thunderstorms, but also occurs regularly during late fall and early winter in association with the passage of cold fronts.

### **2.1.2 Topography**

Originally the natural ground elevations within TPUA were relatively flat, ranging from about 120 feet to 140 feet Mean Sea Level (MSL). Following the cessation of phosphate mining operations, the topography of TPUA reflected the widespread impacts of the mining operations that have occurred on the site.

Today, the portion of TPUA west of Combee Road (State Road 659) is generally flat, and includes eight mined-out areas, ranging in size from 15 to 205 acres that have been reclaimed as lakes. East of Combee Road, the area includes features with minimal relief, as well as numerous spoil overburden ridges, hills of sand tailings deposits, and water-filled mined-out areas with high-ridged peninsulas and islands of ungraded overburden spoil. Most of these man-made waterbodies were enclosed with perimeter dikes constructed of cast overburden spoils to be used as containment dikes for clay wastes produced during mining operations. Nine reclaimed and seven unreclaimed lakes remain in this part of the TPUA, with the reclaimed lakes ranging from 7 to 59 acres, and the unreclaimed lakes ranging from approximately 12 to 225 acres.

### **2.1.3 Geologic Condition**

The TPUA is located primarily within the Polk Upland physiographic province, with a small easterly portion within the Winter Haven Ridge province, and a small westerly portion within the Lakeland Ridge province. The geological condition of TPUA is defined by three stratigraphic units that occur on the area. Primarily, TPUA consists of the Miocene/Pliocene and Pliocene/Pleistocene units, with a small easterly portion included within the Pliocene unit.

#### **Pliocene**

In Lake and Polk counties, this unit is composed of siliciclastics, and occurs only in the Florida peninsula and eastern Georgia. The Pliocene unit is a shallow marine, near-shore deposit consisting of reddish brown to reddish orange, unconsolidated to poorly consolidated, fine to very coarse grained, clean to clayey sands. Cross bedded sands are

common within the formation. Discoid quartzite pebbles and mica are often present. Clay beds are scattered and not extensive. Original fossil material is not present in the sediments, although poorly preserved molds and casts of mollusks and burrow structures are occasionally present. The permeable sands of the Pliocene unit form part of the surficial aquifer system. The lithology consists of sand, clay and mud.

### **Pliocene/Pleistocene**

In Lake and Polk counties, this unit consists of reworked and undifferentiated Pliocene sediments, and is the result of post depositional reworking of Pliocene siliciclastics. The sediments are fine to coarse quartz sands with scattered quartz gravel and varying percentages of clay matrix. The lithology consists of sand, gravel, clay and mud.

### **Miocene/Pliocene**

In Polk County, this unit is composed of interbedded sands, clays and carbonates. The sands are generally light gray to olive gray, poorly consolidated, clayey, variably dolomitic, very fine to medium grained, and phosphatic. The clays are yellowish gray to olive gray, poorly to moderately consolidated, sandy, silty, phosphatic and dolomitic. The carbonates are usually dolostone; light gray to yellowish gray, poorly to well indurated, variably sandy and clayey, and phosphatic. Opaline chert is often found in these sediments. Fossil mollusks occur as reworked casts, molds, and limited original shell material. Silicified corals and wood, and vertebrate fossils are also present. This unit is part of the intermediate confining unit/aquifer system. The lithology consists of sandstone, mudstone, and dolostone.

#### **2.1.4 Soils**

Soil data provided by the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) indicates 35 map units (soil series) to be present on TPUA (Figure 5; map unit descriptions Appendix 12.5), with natural drainage classifications ranging from excessively drained to very poorly drained. These data further indicate soil depth to the water table ranging from 0 to 201 centimeters (Figure 6).

#### **2.1.5 Reclamation and Enhancement**

When the State of Florida originally acquired TPUA, only 17% of the area could be classified as unmined or undisturbed lands. All mined areas within the TPUA were either reclaimed by the original phosphate mining company or were deemed eligible for State-funded reclamation through the Nonmandatory Reclamation Program. Generally, the earlier reclamation activities were conducted without a systematic approach and without consideration of fisheries and wildlife habitat optimization, future recreational uses, or drainage patterns.

In its inventory of lands disturbed by phosphate mining prior to July 1, 1975, a report produced by Zellars-Williams, Inc., and subsequently Conservation Consultants, Inc., in

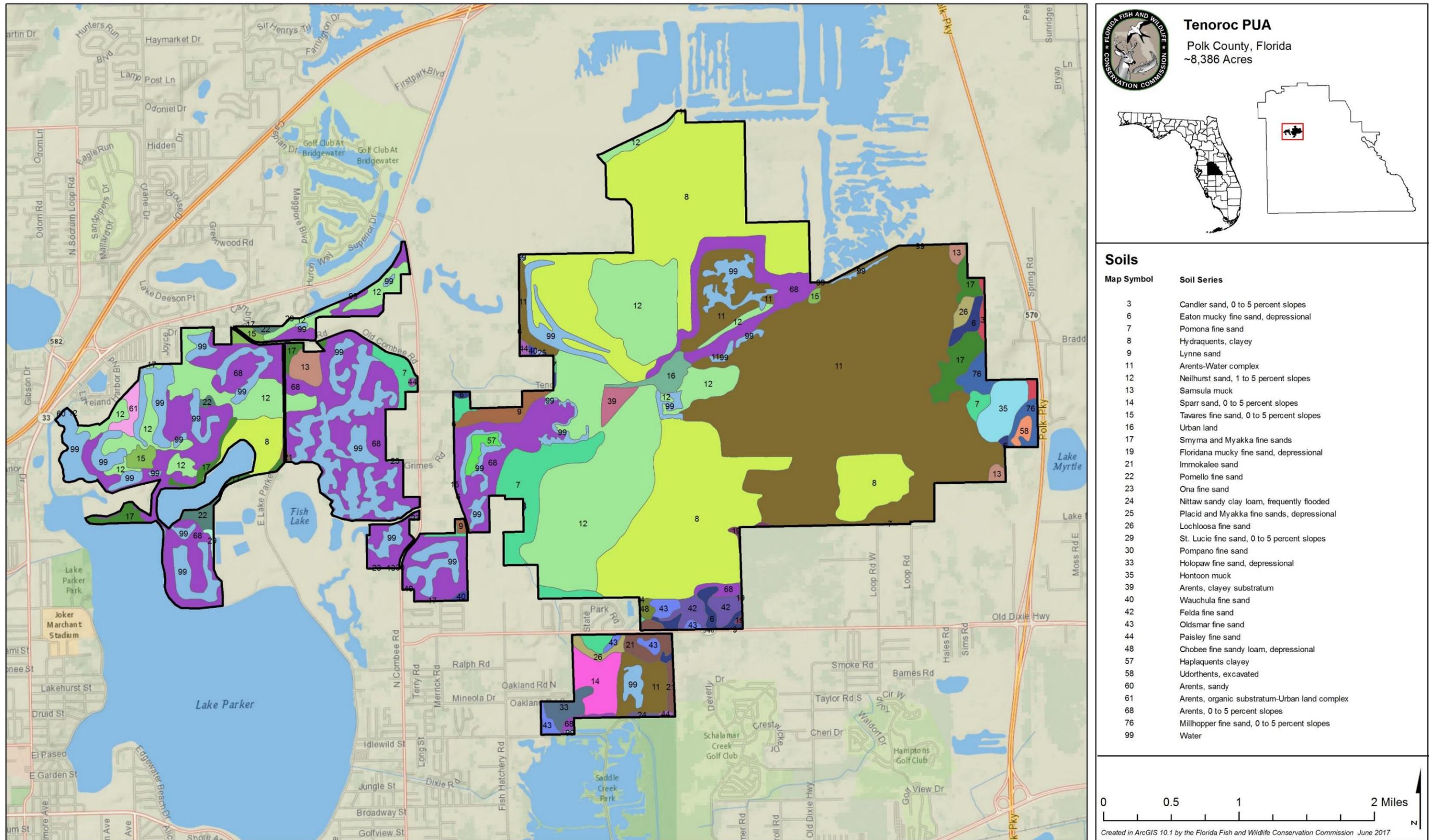


Figure 5. Soils

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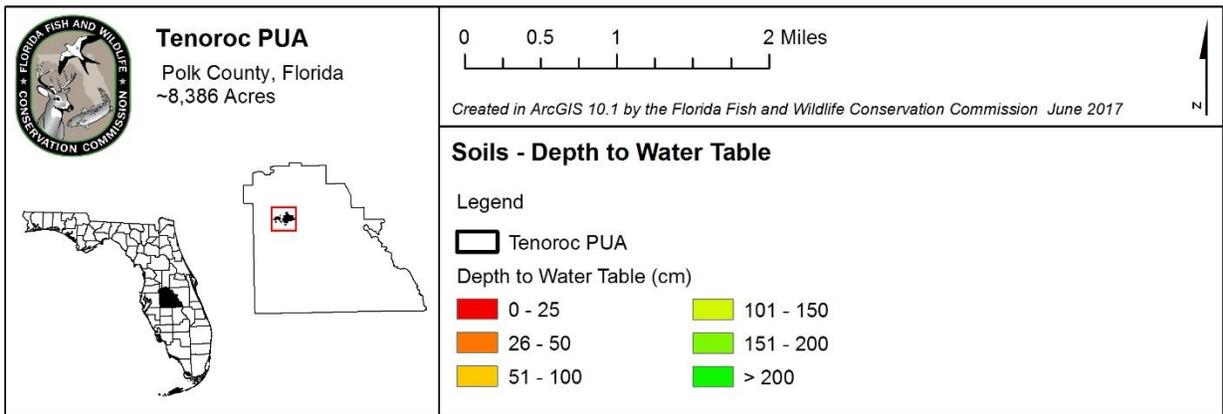
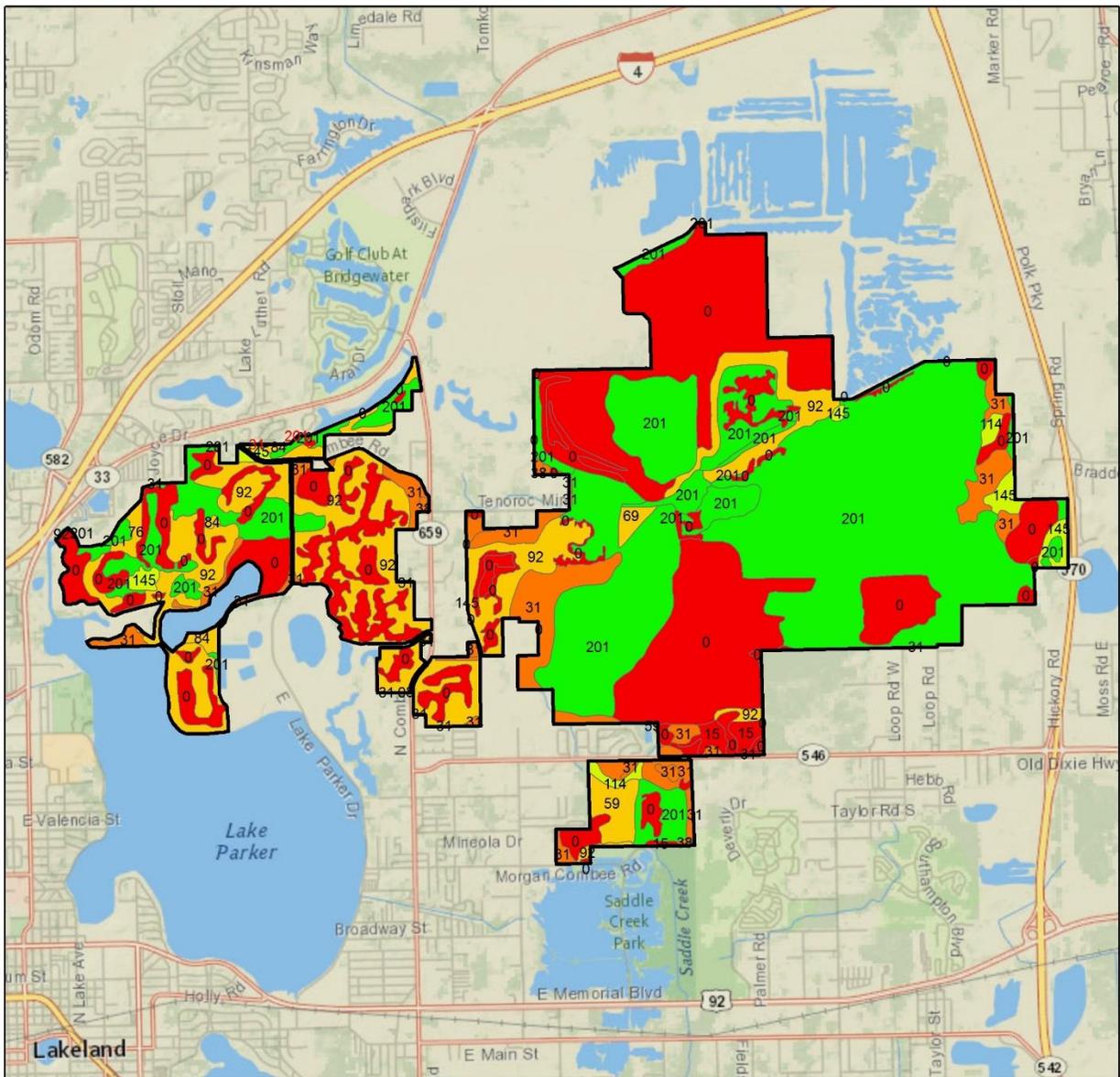


Figure 6. Soils - Depth to Water Table

1980, recommended the restoration of several sub-basins of the Peace River that had been heavily impacted by mining; agriculture, silviculture, and urbanization. Numerous initiatives to restore and enhance the ecological and hydrological functions of the Peace River watershed have been or are being undertaken by several agencies and organizations. While most of the mined and disturbed lands in northern Polk County have undergone reclamation, until 2004 only minimal reclamation had been undertaken at TPUA, and nearly all of the property remained as mined-out, unreclaimed landforms dominated by nuisance and exotic vegetation.

Since 2004, approximately 3,593 acres within TPUA have been reclaimed or enhanced as part of the Upper Peace River/Saddle Creek Restoration Project (UPRSCR). Restoring these areas to a more natural condition was expected to help FWC and DEP achieve three primary management goals for the TPUA: (1) optimize the area for public use; (2) improve existing fish and wildlife habitat; and (3) enhance environmental functions.

Funding for the UPRSCR was provided by DEP's Nonmandatory Land Reclamation Trust Fund, FWC's Aquatic Habitat Restoration and Enhancement Trust Fund, and by the Florida Department of Transportation (FDOT) for mitigation of wetland and surface water impacts resulting from construction of the Polk Parkway. Divided into three phases due to the scope and complexity of the planned effort, the UPRSCR at TPUA was developed to:

- Create new mitigation wetlands within the upper Saddle Creek sub-basin to replace wetlands that had been disturbed during the construction of the Polk Parkway;
- Restore the former habitat connection between the Peace River and the Green Swamp that was once served by Saddle Creek, a connection that joined the region's most extensive habitat system with one of its most biologically diverse systems;
- Improve water quantity and quality problems in the upper Peace River that had developed as a result of phosphate mining operations in the area;
- Reclaim all or parts of the remaining Nonmandatory Reclamation Program areas located in the upper Peace River basin within the TPUA;
- Enhance regional opportunities for a variety of outdoor recreational and educational activities; and,
- Develop collaborative efforts with adjoining property owners to restore additional wetlands in the vicinity.

Phase I of the UPRSCR began in mid-2004 on a 967-acre tract in the western portion of TPUA, and was completed in January, 2006. Along with a variety of upland habitats, two wetlands totaling 41.5 acres were created to improve water quality and increase water flow to Lake Parker, Saddle Creek, and the Peace River.

The approximately 500-acre UPRSCR Phase II, completed in 2007, resulted in the creation of a variety of herbaceous and forested wetlands, stream channels, and sloughs in addition to over 400 acres designated as upland forests. The majority of the upland forest will eventually be developed into pine flatwoods communities.

Work began on the 2,128-acre UPRSCR Phase III in mid-2010, and was completed in late-September, 2012. Two large waterfowl areas, a small vegetated channel, and extensive upland forests were created in this phase. At the end of this massive project, the majority of the severely impacted landforms on the TPUA had been restored or enhanced to landforms that produced beneficial fish and wildlife habitat, enhanced drainage flow and patterns, and improved water quality.

## **2.2 Land Cover**

Due to its history of phosphate mining, most of TPUA is a highly altered area, with very little natural community components. Virtually all of the native habitats that originally existed at TPUA were severely impacted and extensively altered by the phosphate mining and mining operations that occurred in this portion of Polk County beginning in the 1940s. For these reasons, to date, FWC and DEP have elected to not have the TPUA mapped for historic natural communities by the Florida Natural Areas Inventory (FNAI). The FWC received Geographic Information System (GIS) land cover data, as well as current natural and altered community descriptions for TPUA from FNAI for inclusion in this management plan in June 2017.

The FWC's standard comprehensive resource management approach for conservation lands generally focuses on the restoration of the form and function of Florida's natural communities and serves as the basis for overall resource management goals. The FWC and DEP will continue to evaluate and determine to what extent, if any, this approach to can be implemented for TPUA. The practicable implementation of FWC's concept on TPUA is substantially limited as a result of the extensive alteration of the area's landscape from past mining activities.

### **Historic Conditions**

In the 1940s, the lands now encompassed by the TPUA existed as a mosaic of natural upland and wetland communities at the western base of the Winter Haven Ridge. Longleaf pine flatwoods and native grasslands covered large portions of the area. A forested wetland/freshwater slough system in the east drained towards the south into a bay swamp while drainage from another forested wetland system in the center of TPUA flowed towards the southwest. Drainage from a third system in the western portion of the property flowed to Lake Parker. All drainage from TPUA eventually flows into Saddle Creek and the Peace River.

Disturbances from phosphate mining, agricultural operations, and silvicultural activities became widespread throughout the area beginning in the 1940s. Phosphate mining of the lands within the three mines that now comprise the TPUA left mined out areas (some of which were filled with water), overburden spoil piles, sand tailings disposal sites, and storage areas surrounded by constructed embankments that were partially backfilled with waste clays produced in the mining process. The waste disposal, water recirculation, and

drainage systems of these three were integrally linked to each other during mining operations and, as a result, the landforms and drainage features that existed prior to recent reclamation activities remained connected. In its pre-reclamation condition, the area contained a variety of mined and unmined soils, exhibited poor overall drainage, provided minimal wildlife habitat, and offered limited opportunity for outdoor recreation.

In the 40 to 60 years following the end of mining in this portion of Polk County, vast areas of the TPUA became heavily vegetated by native and invasive shrubs and trees. Agricultural and silvicultural activities also had severe impacts on the area's habitats and landforms, including the conversion of longleaf pine flatwoods into improved pastures and citrus groves. Large acreages were clear-cut for timber or stumped for naval stores in the past and are now dominated by undesirable nuisance and exotic vegetation. There were also areas that were not mined but which were impacted by mining operations. These impacts resulted in habitat conversion to hardwood forests and palmetto monocultures.

General community types prior to the restoration and enhancement activities of the UPRSCRIP included upland and wetland mixed forest, palmetto prairie, pine-bay gall, freshwater slough, bay swamp, herbaceous wetlands, old fields, and borrow pits. Several undisturbed areas that also exist on the property contained native habitats based on their particular soil conditions (i.e., bay swamp, cypress forest, cypress/hardwood forest, hardwood forest, hardwood/conifer forest, palmetto prairie, pine flatwoods, and xeric oak).

Although earlier reclamation had previously been completed in portions of the TPUA (primarily on the western side of the property), previous attempts to re-introduce a variety of native species achieved varying degrees of success. Generally lower survival rates of plantings occurred on arid sand tailing and reworked overburden sites, while vegetation planted in wetter areas fared much better. Previous efforts in the eastern portion of TPUA had been limited to dewatering and clearing activities, primarily to facilitate development of reclamation and enhancement plans for the UPRSCRIP. Following the completion of the reclamation and enhancements activities for this three-phased project in September, 2012, a majority of TPUA has now been reclaimed to more natural-like communities.

### **Existing Conditions**

Eighteen natural and altered land cover communities have been identified by FNAI (Figure 7, Table 3). Native and invasive exotic plant species lists have been compiled for these land cover categories (Tables 4 - 5). Two imperiled plant species are known to exist on TPUA; *Garberia* (*Garberia heterophylla*) and scrub pinweed (*Lechea cernua*) are both listed as State Threatened by the Florida Department of Agriculture and Consumer Services.

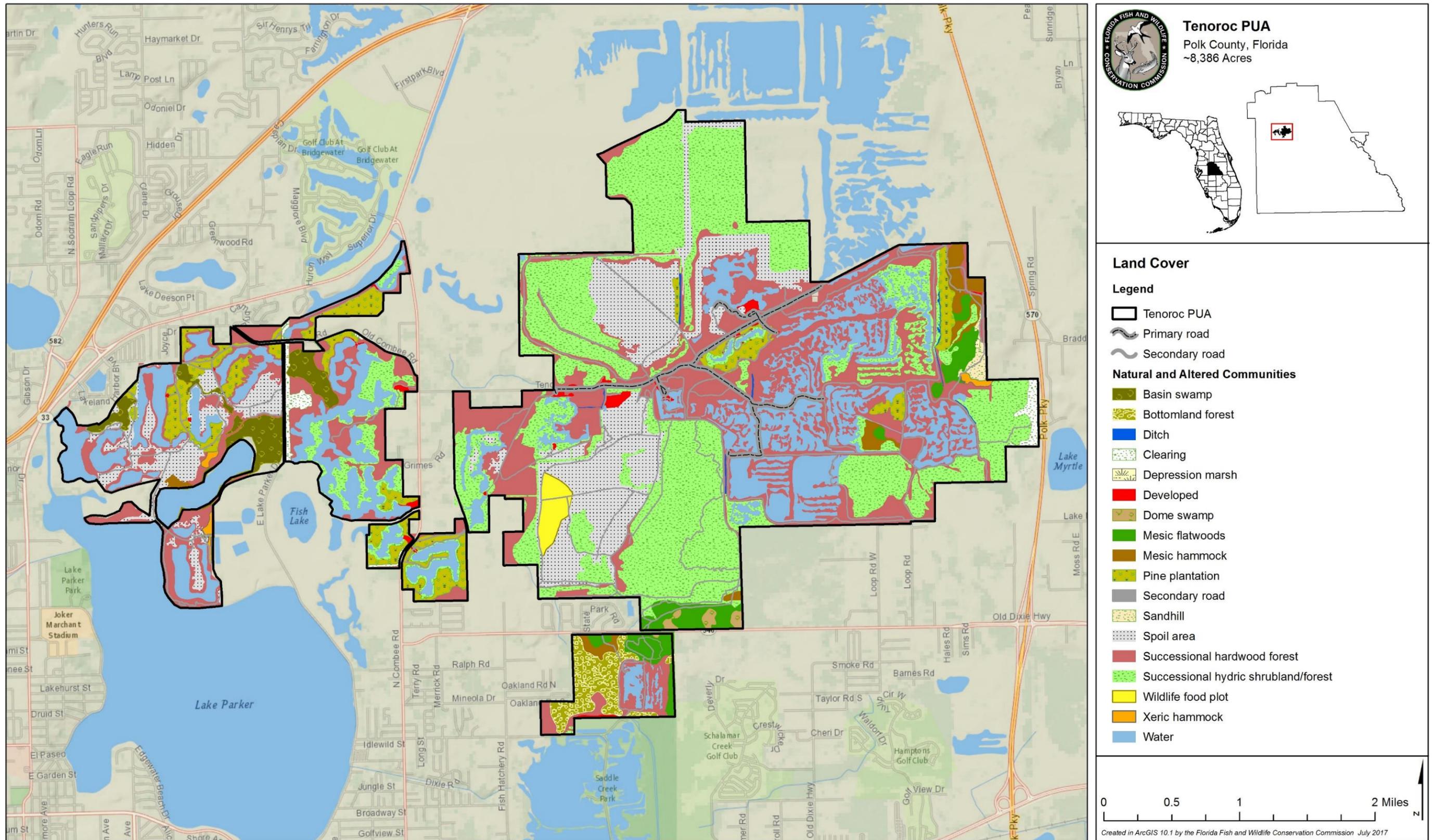


Figure 7. Land Cover

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**Table 3. Land Cover**

<u>Type</u>	<u>Acres</u>	<u>Percent of Area</u>
Artificial lake	1,446.1	17.2%
Basin swamp	158.8	1.9%
Bottomland forest	127.5	1.5%
Canal/ditch	12.7	0.2%
Clearing	72.6	0.9%
Depression marsh	1.3	0.0%
Developed	52.1	0.6%
Dome swamp	22.1	0.3%
Mesic flatwoods	183.1	2.2%
Mesic hammock	100.0	1.2%
Pine plantation	387.7	4.6%
Road	111.1	1.3%
Sandhill	22.2	0.3%
Spoil area	1,071.6	12.8%
Successional hardwood forest	2,070.9	24.7%
Successional hydric shrubland/forest	2,381.1	28.4%
Wildlife food plot	58.5	0.7%
Xeric hammock	21.2	0.3%

**Table 4. Native Plants of TPUA**

<u>Common name</u>	<u>Scientific name</u>
Adam's-needle	<i>Yucca filamentosa</i>
American beautyberry	<i>Callicarpa americana</i>
American elm	<i>Ulmus americana</i>
American holly	<i>Ilex opaca</i>
American lotus	<i>Nelumbo lutea</i>
American white waterlily	<i>Nymphaea odorata</i>
Annual saltmarsh aster	<i>Symphyotrichum subulatum</i>
Bald cypress	<i>Taxodium distichum</i>
Bartram's airplant	<i>Tillandsia bartramii</i>
Beaksedges	<i>Rhynchospora</i> spp.
Black cherry	<i>Prunus serotina</i>

**Table 4. Native Plants of TPUA**

---

<b><u>Common name</u></b>	<b><u>Scientific name</u></b>
Black gum	<i>Nyssa sylvatica</i>
Black titi	<i>Cliftonia monophylla</i>
Blackberry	<i>Rubus</i> spp.
Blackgum	<i>Nyssa sylvatica</i>
Blackroot	<i>Pterocaulon pycnostachyum</i>
Blazing star	<i>Liatris</i> spp.
Blue flag	<i>Iris virginica</i>
Blue huckleberry	<i>Gaylussacia frondosa</i>
Blue maidencane	<i>Amphicarpum muehlenbergianum</i>
Blueberries	<i>Vaccinium</i> spp.
Bluejack oak	<i>Quercus incana</i>
Bluestem grasses	<i>Andropogon</i> spp.
Bottlebrush threeawn	<i>Aristida spiciformis</i>
Bracken fern	<i>Pteridium aquilinum</i>
Broomsedge	<i>Andropogon virginicus</i>
Bulltongue arrowhead	<i>Sagittaria lancifolia</i>
Buttonbush	<i>Cephalanthus occidentalis</i>
Cabbage palm	<i>Sabal palmetto</i>
Camphorweed	<i>Heterotheca subaxillaris</i>
Candyroot	<i>Polygala nana</i>
Capeweed	<i>Phyla nodiflora</i>
Carolina ash	<i>Fraxinus caroliniana</i>
Carolina willow	<i>Salix caroliniana</i>
Carolina yelloweyed grass	<i>Xyris caroliniana</i>
Cattail	<i>Typha</i> spp.
Chain fern	<i>Woodwardia</i> spp.
Chalky bluestem	<i>Andropogon virginicus</i>
Chapman's goldenrod	<i>Solidago odora</i> var. <i>chapmanii</i>
Chapman's oak	<i>Quercus chapmanii</i>
Chickasaw plum	<i>Prunus angustifolia</i>
Ciliate redtop panicum	<i>Coleataenia longifolia</i>
Cinnamon fern	<i>Osmunda cinnamomea</i>
Coastal-plain honeycomb-head	<i>Balduina angustifolia</i>
Coastalplain staggerbush	<i>Lyonia fruticosa</i>
Coinwort	<i>Centella asiatica</i>
Coontie	<i>Zamia integrifolia</i>
Crabgrass	<i>Digitaria ciliaris</i>

**Table 4. Native Plants of TPUA**

---

<b><u>Common name</u></b>	<b><u>Scientific name</u></b>
Dahoon holly	<i>Ilex cassine</i>
Darrow's blueberry	<i>Vaccinium darrowii</i>
Deckert's pinweed	<i>Lechea deckertii</i>
Deerberry	<i>Vaccinium stamineum</i>
Devil's walking stick	<i>Aralia spinosa</i>
Dog fennel	<i>Eupatorium capillifolium</i>
Dollarleaf	<i>Rhynchosia reniformis</i>
Dotted smartweed	<i>Persicaria punctata</i>
Dropseed	<i>Sporobolus indicus</i>
Duck potato	<i>Sagittaria latifolia</i>
Duckweed	<i>Lemna</i> spp.
Dwarf live oak	<i>Quercus minima</i>
Earleaf greenbrier	<i>Smilax auriculata</i>
Elderberry	<i>Sambucus nigra</i> var. <i>canadensis</i>
Elephant's-foot	<i>Elephantopus elatus</i>
Elliott's lovegrass	<i>Eragrostis elliottii</i>
Elliott's milkpea	<i>Galactia elliottii</i>
False foxglove	<i>Agalinis purpurea</i>
Feay's palaflox	<i>Palafoxia feayi</i>
Fetterbush	<i>Lyonia lucida</i>
Fire flag	<i>Thalia geniculata</i>
Flat sedge	<i>Cyperus odoratus</i>
Flattop goldenrod	<i>Euthamia graminifolia</i>
Florida paintbrush	<i>Carphephorus corymbosus</i>
Florida scrub frostweed	<i>Helianthemum nashii</i>
Flowering dogwood	<i>Cornus florida</i>
Fourpetal St. John's-wort	<i>Hypericum tetrapetalum</i>
Free-tip star-hair fern	<i>Thelypteris tetragona</i>
Fringe tree	<i>Chionanthus virginicus</i>
Fringed yelloweyed grass	<i>Xyris fimbriata</i>
Frog's-bit	<i>Limnobiium spongia</i>
Gallberry	<i>Ilex glabra</i>
Gamagrass	<i>Tripsacum dactyloides</i>
Garberia	<i>Garberia heterophylla</i>
Giant bulrush	<i>Schoenoplectus californicus</i>
Golden hoary-pea	<i>Tephrosia chrysophylla</i>
Goldenrod	<i>Solidago fistulosa</i>

**Table 4. Native Plants of TPUA**

---

<b><u>Common name</u></b>	<b><u>Scientific name</u></b>
Gopher apple	<i>Licania michauxii</i>
Grassleaf gayfeather	<i>Liatris elegantula</i>
Green ash	<i>Fraxinus pennsylvanica</i>
Greenbriars	<i>Smilax</i> spp.
Greeneyes	<i>Berlandiera subacaulis</i>
Groundsel tree	<i>Baccharis halimifolia</i>
Hackberry	<i>Celtis laevigata</i>
Hammock snakeroot	<i>Ageratina jucunda</i>
Highbush blueberry	<i>Vaccinium corymbosum</i>
Horse sugar	<i>Symplocos tinctoria</i>
Horseweed	<i>Conyza canadensis</i>
Huckleberry	<i>Gaylussacia</i> spp.
Hypericum	<i>Hypericum tenuifolium</i>
Iris	<i>Iris</i> spp.
Jessamine	<i>Gelsemium sempervirens</i>
Knotweed	<i>Polygonum</i> spp.
Large-fruited beakrush	<i>Rhynchospora megalocarpa</i>
Laurel oak	<i>Quercus laurifolia</i>
Licoriceweed	<i>Scoparia dulcis</i>
Live oak	<i>Quercus virginiana</i>
Lizard's-tail	<i>Saururus cernuus</i>
Loblolly bay	<i>Gordonia lasianthus</i>
Loblolly pine	<i>Pinus taeda</i>
Longleaf pine	<i>Pinus palustris</i>
Lopsided Indian grass	<i>Sorghastrum secundum</i>
Low paspalum	<i>Paspalum setaceum</i>
Maidencane	<i>Panicum hemitomon</i>
Marsh pennywort	<i>Hydrocotyle umbellata</i>
Meadow-beauty	<i>Rhexia</i> spp.
Mexican primrosewillow	<i>Ludwigia octovalvis</i>
Mockernut hickory	<i>Carya tomentosa</i>
Muscadine	<i>Vitis rotundifolia</i>
Myrtle oak	<i>Quercus myrtifolia</i>
Narrowleaf silkgrass	<i>Pityopsis graminifolia</i>
Netted chain fern	<i>Woodwardia areolata</i>
Nodding pinweed	<i>Lechea cernua</i>
Noseburn	<i>Tragia urens</i>

**Table 4. Native Plants of TPUA**

---

<b><u>Common name</u></b>	<b><u>Scientific name</u></b>
Nutrushes	<i>Scleria</i> spp.
October-flower	<i>Polygonella polygama</i>
Orange milkwort	<i>Polygala lutea</i>
Paintbrush	<i>Carphephorus corymbosus</i>
Panic grasses	<i>Dichanthelium</i> spp.
Parsley hawthorn	<i>Crataegus marshallii</i>
Partridge pea	<i>Chamaecrista fasciculata</i>
Partridgeberry	<i>Mitchella repens</i>
Passion flower	<i>Passiflora incarnata</i>
Peelbark St. John's wort	<i>Hypericum fasciculatum</i>
Pencil flower	<i>Stylosanthes biflora</i>
Pepper-vine	<i>Ampelopsis arborea</i>
Persimmon	<i>Diospyros virginiana</i>
Pickernelweed	<i>Pontederia</i> spp.
Pignut hickory	<i>Carya glabra</i>
Pineywoods dropseed	<i>Sporobolus junceus</i>
Pipeworts	<i>Eriocaulon</i> spp.
Poison ivy	<i>Toxicodendron radicans</i>
Pond cypress	<i>Taxodium ascendens</i>
Poor Joe	<i>Diodia teres</i>
Pricklypear	<i>Opuntia humifusa</i>
Purple lovegrass	<i>Eragrostis spectabilis</i>
Queen's delight	<i>Stillingia sylvatica</i>
Rattlebox	<i>Crotalaria purshii</i>
Red bay	<i>Persea borbonia</i>
Red cedar	<i>Juniperus virginiana</i>
Red maple	<i>Acer rubrum</i>
Red mulberry	<i>Morus rubra</i>
Red root	<i>Lachnanthes</i> spp.
Rose-rush	<i>Lygodesmia aphylla</i>
Roundleaf thoroughwort	<i>Eupatorium rotundifolium</i>
Royal fern	<i>Osmunda regalis</i>
Runner oak	<i>Quercus pumila</i>
Rusty staggerbush	<i>Lyonia ferruginea</i>
Saltbush	<i>Baccharis halimifolia</i>
Sand cordgrass	<i>Spartina bakeri</i>
Sand live oak	<i>Quercus geminata</i>

**Table 4. Native Plants of TPUA**

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<b><u>Common name</u></b>	<b><u>Scientific name</u></b>
Sand pine	<i>Pinus clausa</i>
Sand post oak	<i>Quercus margarettae</i>
Sandpea	<i>Tephrosia spicata</i>
Saw greenbrier	<i>Smilax bona-nox</i>
Saw palmetto	<i>Serenoa repens</i>
Scrub wild olive	<i>Osmanthus americanus</i> var. <i>megacarpus</i>
Sedge	<i>Cyperus surinamensis</i>
Seven sisters	<i>Crinum americanum</i>
Shiny blueberry	<i>Vaccinium myrsinites</i>
Shyleaf	<i>Aeschynomene americana</i>
Silver croton	<i>Croton argyranthemus</i>
Simpson's stopper	<i>Myrcianthes fragrans</i>
Slash pine	<i>Pinus elliotii</i>
Soapberry	<i>Sapindus saponaria</i>
Soft rush	<i>Juncus effusus</i>
Southern crabapple	<i>Malus angustifolia</i>
Southern dewberry	<i>Rubus trivialis</i>
Southern magnolia	<i>Magnolia grandiflora</i>
Southern red oak	<i>Quercus falcata</i>
Southern shield fern	<i>Thelypteris kunthii</i>
Southern watergrass	<i>Luziola fluitans</i>
Southern waxy sedge	<i>Carex glaucescens</i>
Spanish moss	<i>Tillandsia usneoides</i>
Spanish needles	<i>Bidens bipinnata</i>
Sparkleberry	<i>Vaccinium arboreum</i>
Spatterdock	<i>Nuphar lutea</i>
Spikerush	<i>Eleocharis</i> spp.
Splitbeard bluestem	<i>Andropogon ternarius</i>
Sprawling hoarypea	<i>Tephrosia hispidula</i>
St. John's wort	<i>Hypericum</i> spp.
Staggerbush	<i>Lyonia fruticosa</i>
Strawberry bush	<i>Euonymus americanus</i>
Sugarberry	<i>Celtis laevigata</i>
Swamp bay	<i>Persea palustris</i>
Swamp chestnut oak	<i>Quercus michauxii</i>
Swamp dogwood	<i>Cornus foemina</i>
Swamp fern	<i>Blechnum serrulatum</i>

**Table 4. Native Plants of TPUA**

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<b><u>Common name</u></b>	<b><u>Scientific name</u></b>
Swamp privet	<i>Forestiera acuminata</i>
Swamp red bay	<i>Persea palustris</i>
Swamp tupelo	<i>Nyssa sylvatica</i> var. <i>biflora</i>
Sweet gallberry	<i>Ilex coriacea</i>
Sweetbay	<i>Magnolia virginiana</i>
Sweetgum	<i>Liquidambar styraciflua</i>
Switchgrass	<i>Panicum virgatum</i>
Tall threeawn	<i>Aristida purpurascens</i>
Tapegrass	<i>Vallisneria americana</i>
Tarflower	<i>Bejaria racemosa</i>
Three-sided mercury	<i>Acalypha gracilens</i>
Titi	<i>Cyrilla racemiflora</i>
Tread softly	<i>Cnidocolus stimulosus</i>
Turkey oak	<i>Quercus laevis</i>
Virginia chain fern	<i>Woodwardia virginica</i>
Virginia creeper	<i>Parthenocissus quinquefolia</i>
Virginia willow	<i>Itea virginica</i>
Walter's viburnum	<i>Viburnum obovatum</i>
Water hickory	<i>Carya aquatica</i>
Water hyssop	<i>Bacopa monnieri</i>
Water oak	<i>Quercus nigra</i>
Water primrose	<i>Ludwigia leptocarpa</i>
Wax myrtle	<i>Morella cerifera</i>
White ash	<i>Fraxinus americana</i>
White top aster	<i>Oclemena reticulata</i>
Whitehead bogbutton	<i>Lachnocaulon anceps</i>
Wild buckwheat	<i>Eriogonum tomentosum</i>
Wild coffee	<i>Psychotria nervosa</i>
Wild indigo	<i>Baptisia lecontei</i>
Wild olive	<i>Osmanthus americanus</i>
Wild pine	<i>Tillandsia setacea</i>
Winged sumac	<i>Rhus copallinum</i>
Wiregrass	<i>Aristida stricta</i>
Witchgrass	<i>Dichanthelium</i> spp.
Woodoats	<i>Chasmanthium</i> spp.
Woolgrass bulrush	<i>Scirpus cyperinus</i>
Yaupon	<i>Ilex vomitoria</i>

**Table 4. Native Plants of TPUA**


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<u>Common name</u>	<u>Scientific name</u>
Yellow canna	<i>Canna flaccida</i>
Yellow foxglove	<i>Digitalis grandiflora</i>
Yellow hatpins	<i>Syngonanthus flavidulus</i>
Yellow jessamine	<i>Gelsemium sempervirens</i>
Yellow top	<i>Flaveria linearis</i>

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**Table 5. Exotic Invasive Plants of TPUA**


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<u>Common name</u>	<u>Scientific name</u>	<u>FLEPPC Category</u>
Air-potato	<i>Dioscorea bulbifera</i>	I
Alligatorweed	<i>Alternanthera philoxeroides</i>	II
Alyceclover	<i>Alysicarpus vaginalis</i>	-
Bahia grass	<i>Paspalum notatum</i>	-
Bermudagrass	<i>Cynodon dactylon</i>	-
Brazilian pepper	<i>Schinus terebinthifolia</i>	I
Browntop millet	<i>Urochloa ramosa</i>	-
Caesarweed	<i>Urena lobata</i>	I
Camphor tree	<i>Cinnamomum camphora</i>	I
Castor bean	<i>Ricinus communis</i>	II
Chinaberry	<i>Melia azedarach</i>	II
Chinese tallow	<i>Triadica sebifera</i>	I
Chufa flatsedge	<i>Cyperus esculentus</i>	-
Cogongrass	<i>Imperata cylindrica</i>	I
Common sunflower	<i>Helianthus annuus</i>	-
Cowpea	<i>Vigna unguiculata</i>	-
Cuban bulrush	<i>Cyperus blepharoleptos</i>	-
Grain sorghum	<i>Sorghum spp.</i>	-
Guineagrass	<i>Urochloa maxima</i>	II
Hairy indigo	<i>Indigofera hirsuta</i>	-

**Table 5. Exotic Invasive Plants of TPUA**

---

<b><u>Common name</u></b>	<b><u>Scientific name</u></b>	<b><u>FLEPPC Category</u></b>
Hydrilla	<i>Hydrilla verticillata</i>	I
Indian goosegrass	<i>Eleusine indica</i>	-
Japanese climbing fern	<i>Lygodium japonicum</i>	I
Kudzu	<i>Pueraria montana</i>	I
Lantana	<i>Lantana camara</i>	I
Mexican tea	<i>Dysphania ambrosioides</i>	-
Paper mulberry	<i>Broussonetia papyrifera</i>	II
Paragrass	<i>Urochloa mutica</i>	I
Peruvian primrosewillow	<i>Ludwigia peruviana</i>	I
Rosary pea	<i>Abrus precatorius</i>	I
Rose natal grass	<i>Melinis repens</i>	I
Skunkvine	<i>Paederia foetida</i>	I
Smutgrass	<i>Sporobolus indicus</i>	-
Tongue-tree	<i>Albizia lebeck</i>	I
Torpedograss	<i>Panicum repens</i>	I
Tropical soda apple	<i>Solanum viarum</i>	I
Tuberous sword fern	<i>Nephrolepis cordifolia</i>	I
Vaseygrass	<i>Paspalum urvillei</i>	-
Water hyacinth	<i>Eichhornia crassipes</i>	I
Water lettuce	<i>Pistia stratiotes</i>	I
Water spangles	<i>Salvinia minima</i>	I
White leadtree	<i>Leucaena leucocephala</i>	II
Wild bushbean	<i>Macroptilium lathyroides</i>	II
Wild taro	<i>Colocasia esculenta</i>	I

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## **2.2.1 Land Cover Descriptions**

Land cover descriptions were supplied to FWC by FNAI in June, 2017. These descriptions have been modified by FWC for the purpose of this management plan.

### **2.2.1.1 Natural Communities**

#### **Basin swamp**

Basin swamp is a forested wetland community that occurs in large irregularly shaped depressions, and is vegetated with hydrophytic trees and shrubs that can withstand an extended hydroperiod. Basin swamps are highly variable in size, shape, and species composition. Mixed species tree canopies are common, often including both evergreen and deciduous tree species. This natural community typically occurs in any type of large landscape depression such as old lake beds, river basins, and ancient coastal swales and lagoons that existed during higher sea levels. Basin swamps typically contain standing water much of the year, and historically may have burned only during extreme dry periods.

At TPUA, basin swamps have an open to moderately dense canopy is dominated by pond cypress, red maple. The canopy of this community is often closed and formed by mature trees. As with most basin swamps, pond cypress is the dominant canopy tree. Associated canopy species include sweetbay, swamp tupelo, and laurel oak. These same species also occur in the subcanopy. Herbaceous vegetation is generally sparse, occurring in drier patches, or in areas under canopy gaps.

#### **Bottomland forest**

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

At TPUA, bottomland forest is a hydric forest community that has not receive fire, and therefore is dominated by hardwood species. This community is similar to a swamp habitat, but is less frequently inundated and lacks a dominance of cypress or tupelo in the

canopy. These areas often are positioned between swamp communities where fires have occurred infrequently and where inundation was not significant enough to support a tupelo or cypress canopy.

The canopy of this community at TPUA contains a diverse assemblage of tree species, due largely to the wide range of water depth and hydroperiods that occur within. Dominant canopy species include red maple, sweetgum, sweetbay, blackgum, loblolly pine, laurel oak, water oak, live oak, and pond cypress. Bottomland forest contains a sparse subcanopy composed of younger individuals that are also found in the canopy layer. Shrubs are often sparse as well, and are represented by American holly, sweetgum, wax myrtle, Virginia willow, and fetterbush. Herbaceous vegetation is infrequent due to canopy shading.

### **Depression marsh**

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

At TPUA, the canopy is generally absent, but may include an occasional slash pine, red maple or swamp tupelo. These marshes often dry out during periods of low rainfall, and as a result, burn more frequently and completely than basin marshes. The substrate is usually sand with deepening peat toward the center. Shrub cover may include wax myrtle, gallberry, red maple, buttonbush, and shiny lyonia. The shrub layer is typically sparse, but may reach coverage of 50% or more, depending on time since the last fire event. Infrequent burning has resulted in accumulations of dead vegetation, as well as invasion of woody shrubs. Such accumulations crowd out the smaller forbs and grasses, allow pines to become established in the depressions, and allow succession of the community to a woody-dominated type, such as baygall or dome swamp.

### **Dome swamp**

Dome swamp is an isolated, forested, depression wetland occurring within a fire-maintained community such as mesic flatwoods. These swamps are generally small, but may also be large and shallow. The characteristic dome shape is created by smaller trees that grow in the shallower waters of the outer edge, while taller trees grow in the deeper water in the interior of the swamp. Dome swamps are most often found on flat terraces,

where they develop when the overlying sand has slumped into a depression in the underlying limestone, creating a rounded depression connected to a shallow water table. In uplands with clay soils, dome swamps may occupy depressions over a perched water table. Soils in dome swamps are variable, but are most often composed of a layer of peat, which may be thin or absent at the periphery, becoming thicker toward the center of the dome.

At TPUA, dome swamps are shallow, forested depressions that sometimes present a domed profile where trees are shorter in the shallower waters of the outer edge, and gradually become taller in the deeper water of the interior. These round depressions are usually forested with pond cypress, forming a dense, closed canopy. Swamp tupelo, loblolly bay, red maple are infrequent. In the smaller, dryer dome swamps, slash pine may co-occur with cypress as a canopy dominant. Midstory and understory vegetation may be variable, depending on fire history and hydrologic changes.

A tall shrub layer is generally dominated by dahoon holly and wax myrtle, but slash pine saplings may be present; coverage ranges from 1 to 50%, depending on canopy coverage, fire frequency, and hydrology. A short shrub layer ranges from 1 to 25%, and is represented primarily by fetterbush and highbush blueberry. The “open” grassy dome swamps typically have shrub layers with < 25% cover. Conversely, dome swamps that are drier and have been long fire suppressed may have shrub layers exceeding 75% cover. Fetterbush is typically the major shrub species in these domes, forming dense “tussocks”. Vines are more abundant in shrubby dome swamps, including poison ivy, muscadine and greenbriars.

Herbaceous coverage is variable, usually represented by Virginia chain fern, bluestem grasses, pipeworts, and southern waxy sedge. The branches of pond cypress often support large numbers of Bartram’s airplant.

### **Mesic flatwoods**

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

At TPUA, mesic flatwoods are open, pine forests with little midstory, and a diverse understory of short shrubs and herbs occurring on low, flat, sandy terrain. Typically, these mesic flatwoods have pine canopies ranging from 25 to 75 percent cover. The most common pine species is slash pine, although there can be a few older longleaf pine. Mesic flatwoods

are characterized by their sparse subcanopy and tall shrub strata, and dense cover of saw palmetto in the short shrub layer. Other common shrubs include, shiny lyonia, shiny blueberry, huckleberry, wax myrtle, and dwarf live oak. Herbaceous cover within the mesic flatwoods is sparse to moderate and usually includes wiregrass, bottlebrush threeawn, bluestem grasses, blackroot, flat-top goldenrod, Carolina yelloweyed grass, orange milkwort, candyroot, yellow hatpins, and panic grasses.

### **Mesic hammock**

Mesic hammock is a well-developed evergreen hardwood and/or palm forest, typically with a closed canopy of live oak. Mesic hammock may occur as “islands” on high ground within basin or floodplain wetlands, as patches of oak/palm forest in dry prairie or flatwoods communities, on river levees, or in ecotones between wetlands and upland communities. Historically, mesic hammocks were likely restricted to fire shadows, or other naturally fire-protected areas such as islands and peninsulas of lakes. Other landscape positions that can provide protection from the spread of fire are likely places for mesic hammock development, including edges of lakes, sinkholes, other depressional or basin wetlands, and river floodplains. Although mesic hammock is not generally considered a fire-adapted community, some small patches of hammock occurring as islands within marshes or prairies may experience occasional low-intensity ground fires. Mesic hammocks occur on well-drained sands mixed with organic matter and are rarely inundated. High moisture is maintained by heavy shading of the ground layer and accumulation of litter. Where limestone is near the surface, rocky outcrops are common in mesic hammocks. Areas with limestone close to the surface can have an unusual variety of plant species such as free-tip star-hair fern and soapberry.

At TPUA, mesic hammocks are characterized by a canopy of live oak occurring in naturally fire-protected areas. Other canopy and subcanopy trees include laurel oak, pignut hickory, cabbage palm, water oak, sweet gum, southern magnolia, persimmon, and pignut hickory. Shrubs can be dense and patchy, and include yaupon, saw palmetto, and wild olive. Herbaceous species are very sparse, but include large-fruited beakrush. Vines include jessamine, saw greenbrier, and muscadine. Grasses are variable in abundance; typical are woodoats, panic grasses and witchgrasses.

### **Sandhill**

The sandhill community of TPUA is characterized by uneven-aged canopies of longleaf pine with a sparse midstory of deciduous oaks, and a moderate to dense groundcover of grasses, herbs, and low shrubs occurring over a rolling topography composed of deep sands. There is typically a dense midstory shrub layer, due to lack of fire, which includes sand pine, sand live oak, myrtle oak, water oak, turkey oak, bluejack oak, and to a lesser extent, sparkleberry and sand post oak. Short shrubs include gopher apple, saw palmetto, Darrow’s blueberry, and blue huckleberry. High plant diversity can be found in the

herbaceous layer of some sandhill. Common grasses include wiregrass, tall threeawn, various bluestem grasses, pineywoods dropseed, purple lovegrass, lopsided Indian grass and panic grasses. Other common herbs include greeneyes, grass-leaf goldenaster, paintbrush, Elliotts' milkpea, sandpea, golden hoary-pea, wild buckwheat, tread softly, grassleaf gayfeather, goldenrod, noseburn, silver croton, pencil flower, dollar weed, wild indigo. Earleaf greenbrier is an occasional vine. Weedy species in sandhills include dog fennel, poor Joe, blackberry, camphor weed, panic grasses and bluestem grasses. In severe cases sandhill can succeded to xeric hammock from lack of fire.

### **Xeric hammock**

Xeric hammock is an evergreen forest found on well-drained sandy soils. The low canopy is typically closed and usually dominated by sand live oak. Xeric hammock typically develops where fire-exclusion allows for the establishment of the oak canopy.

At TPUA, the canopy typically has sand live oak, laurel oak, and scattered longleaf pine as the dominants. Sand pine, and pignut hickory may also be present in the canopy. Southern red oak is common in some locations. The tall shrubs are mainly sparkleberry and the short shrubs, deerberry and occasional saw palmetto. Wild olive, staggerbush and rusty staggerbush are locally abundant. In historic scrub areas, Chapman's oak and myrtle oak are present in the tall shrub layer. Other shrubs include saw palmetto, yaupon, coontie, coastalplain staggerbush, sparkleberry, and American beautyberry. Herb cover is suppressed by abundant leaf litter, but includes nutrushes, beaksedges, witchgrass, and panic grass. Wiregrass is sparse to absent.

#### **2.2.1.2 Altered Communities**

##### **Artificial lake**

The artificial lakes of TPUA were primarily created during mining operations that began in the 1940s, prior to State ownership, and resulting in phosphatic clay settling areas and mine-pit waterbodies. Today, these lakes are maintained by FWC as an established Fish Management Area, offering extensive recreational opportunities. The un-reclaimed and reclaimed lakes range in size from 7 to 225 acres, with a total managed lake area of approximately 1,446 acres.

Despite extensive planting of desirable native vegetation along the shorelines of the recently reclaimed lakes, cattails, water lettuce, water hyacinth, hydrilla, sedges, and duckweed have continued to present a management challenge in these lakes. The majority of control efforts for these species in the lakes used by the public are conducted under the auspices of FWC through contracts with Polk County.

##### **Canal/ditch**

Canal/ditch areas are artificial linear drainage waterways. There are no extant natural streams on TPUA. However, linear waterways were created through previous mining activities for drainage purposes, linking many of the lakes of TPUA. Many of these linear waterways have become naturally revegetated over the past 60 years. Additionally, some planting with desirable native species has been conducted, although encroachment by invasive species (cattails, sedges, primrose, and water hyacinth) remains a management challenge.

### **Clearing**

At TPUA, clearings are areas that have significantly altered the groundcover and overstory of the original natural community.

### **Developed**

Developed areas of TPUA include check stations, archery ranges, shooting ranges, parking lots, picnic areas, and other designated recreation areas. This category also includes maintenance areas, administrative, and public buildings.

### **Pine plantation**

This community is almost exclusively composed of slash or longleaf pine forests artificially generated by machine-planting in rows large numbers of pine seedlings. Some areas of TPUA were planted in sand pine in the late 1980s and early 1990s in the eastern portion of the property, but slash pine and longleaf pine plantings have been used since in all other pine plantations established on TPUA. These plantations were established to reduce the presence of invasive plant species, particularly cogongrass, and to provide improved wildlife habitat, as well as to provide a potential revenue-generating resource. In the future, these areas will be improved and enhanced by thinning and prescribed fire. Some planting with perennial grasses, such as wiregrass, may also be conducted.

### **Road**

Roads are areas that are paved or unpaved and intended for vehicular traffic. This altered community also includes service access roads, and maintained firebreaks that are used to limit the spread of wildfire or prescribed fire applications.

### **Spoil area**

Spoil areas are where unused excavated material from past mining activities has been deposited. At TPUA, these are primarily overburden piles, sand tailings disposal sites, and storage areas surrounded by constructed embankments that were partially backfilled with waste clays produced in the mining process.

### **Successional hardwood forest**

Closed-canopied forest dominated by fast growing hardwoods such as laurel oak, water oak, and sweetgum, often with remnant pines. These forests are either invaded natural upland habitat due to lengthy fire-suppression or old fields that have succeeded to forest. The subcanopy and shrub layers of these forests are often dense and dominated by smaller individuals of the canopy species. Successional hardwood forests can contain remnant species of the former natural community such as turkey oak, saw palmetto, gallberry, and infrequently wiregrass. Additionally, species such as American beautyberry, muscadine, and sparkleberry are common. Restoration of these forests includes mechanical tree removal and reintroduction of fire. Where characteristic herbaceous species have been lost, reintroduction via seed or plants may be necessary to restore natural species composition and community function.

### **Successional hydric shrubland/forest**

Shrubland or closed-canopied forest occupying disturbed areas and dominated by fast growing hydrophilic hardwoods such as titi, black titi, sweet gallberry, sweet gum, red maple, water oak, laurel oak, wax myrtle, blackberry, and groundsel tree. Weedy vines such as smilax and muscadine, and invasive exotic plants including Peruvian primrose willow and Brazilian pepper may be common in the subcanopy and shrub layers. These shrubland/forests may invade herbaceous habitats due to lengthy fire-suppression and hydrological alterations, forested wetlands that have been cleared and are not succeeding to swamp but to highly disturbed shrubland, or forest dominated by hydrophilic hardwoods. Successional hydric shrubland/forests are often shrub thickets with few of the characteristic herbaceous or canopy species from the former community remaining. They can resemble naturally occurring shrub bogs and can be distinguished from them by occurring in areas of historically herbaceous communities, where fire suppression or hydrological alterations have taken place or in former forested swamps that have been logged or undergone severe hydroperiod disruptions. Although some shifts in community type may be better described with a natural community designation, the use of “successional hydric shrubland/forest” is suitable to label areas that are known to be highly disturbed and altered, and where restoration efforts of hydrology restoration and/or re-introduction of fire would be particularly beneficial.

### **Wildlife food plot**

Wildlife food plots are areas planted with crops to provide forage for wildlife species. These areas are planted with non-invasive agronomic crops to provide forage to a variety of wildlife species. At TPUA, this altered community is also managed as a dove field for seasonal public hunting opportunities.

### **2.2.2 Forest Resources**

Section 253.036, F.S., requires that Management Plans for areas 1,000 acres or larger in size must include a professional forester’s assessment of the resource conservation and

revenue-producing potentials of the property’s forests. The FWC and DEP consider sustainable forest management consistent with the purposes for acquisition of this property so when silvicultural practices necessary for wildlife habitat or ecosystem management objectives are deemed appropriate, personnel from the FFS or a professional forestry consulting firm should be consulted.

The last timber assessment for TPUA was conducted in 1993 by DOF (now FFS). During that assessment, only four relatively small pine timber stands were identified, but it was concluded that none had commercial value that would warrant harvesting. At that time, the DOF also identified significant acreage at TPUA in need of reforestation and offered assistance with future reforestation programs. Many reforestation activities have been conducted on the property since the last reconnaissance was conducted 20 years ago. An update to the 1993 timber assessment will be conducted at TPUA to ensure the findings of that assessment are still pertinent which will be included in the updated management plan.

### 2.3 Fish and Wildlife Resources

Though heavily altered, the area's diverse vegetative communities provide the resources necessary to sustain a diversity of wildlife assemblages (Tables 6 - 11). Common wildlife species include gray squirrel, red fox, river otter, white-tailed deer, and numerous species of both resident and migratory birds.

**Table 6. Fish of TPUA**

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<u>Common name</u>	<u>Scientific name</u>
American eel	<i>Anguilla rostrata</i>
Black crappie	<i>Pomoxis nigromaculatus</i>
Bluefin killifish	<i>Lucania goodie</i>
Bluegill	<i>Lepomis macrochirus</i>
Bluespotted sunfish	<i>Enneacanthus gloriosus</i>
Bowfin	<i>Amia calva</i>
Brook silverside	<i>Labidesthes sicculus</i>
Brown bullhead	<i>Ameiurus nebulosus</i>
Channel catfish	<i>Ictalurus punctatus</i>
Dollar sunfish	<i>Lepomis marginatus</i>
Eastern mosquitofish	<i>Gambusia holbrooki</i>
Everglades pygmy sunfish	<i>Elassoma evergladei</i>
Flagfish	<i>Jordanella floridae</i>
Florida gar	<i>Lepisosteus platyrhincus</i>

**Table 6. Fish of TPUA**

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<b><u>Common name</u></b>	<b><u>Scientific name</u></b>
Gizzard shad	<i>Dorosoma cepedianum</i>
Golden shiner	<i>Notemigonus crysoleucas</i>
Golden topminnow	<i>Fundulus chrysotus</i>
Lake chubsucker	<i>Erimyzon sucetta</i>
Largemouth bass	<i>Micropterus salmoides</i>
Least killifish	<i>Heterandria formosa</i>
Redear sunfish	<i>Lepomis microlophus</i>
Sailfin molly	<i>Poecilia latipinna</i>
Seminole killifish	<i>Fundulus seminolis</i>
Sunshine bass	<i>Morone chrysops</i>
Swamp darter	<i>Etheostoma fusiforme</i>
Taillight shiner	<i>Notropis maculatus</i>
Threadfin shad	<i>Dorosoma petenense</i>
Warmouth	<i>Lepomis gulosus</i>
White catfish	<i>Ictalurus catus</i>
Yellow bullhead	<i>Ameiurus natalis</i>

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**Table 7. Mammals of TPUA**

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<b><u>Common name</u></b>	<b><u>Scientific name</u></b>
Bobcat	<i>Lynx rufus</i>
Cotton mouse	<i>Peromyscus gossypinus</i>
Cotton rat	<i>Sigmodon hispidus</i>
Eastern cottontail	<i>Sylvilagus floridanus</i>
Eastern red bat	<i>Lasiurus borealis</i>
Florida mouse	<i>Podomys floridanus</i>
Gray fox	<i>Urocyon cinereoargenteus</i>
Gray squirrel	<i>Sciurus carolinensis</i>
Marsh rabbit	<i>Sylvilagus palustris</i>
Opossum	<i>Didelphis virginiana</i>

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Raccoon	<i>Procyon lotor</i>
Red fox	<i>Vulpes vulpes</i>
River otter	<i>Lontra canadensis</i>
Sherman's fox squirrel	<i>Sciurus niger shermani</i>
Striped skunk	<i>Mephitis mephitis</i>
White-tailed deer	<i>Odocoileus virginianus</i>

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**Table 8. Birds of TPUA**

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<u>Common name</u>	<u>Scientific name</u>
American bittern	<i>Botaurus lentiginosus</i>
American coot	<i>Fulica americana</i>
American goldfinch	<i>Spinus tristis</i>
American robin	<i>Turdus migratorius</i>
Anhinga	<i>Anhinga anhinga</i>
Barn owl	<i>Tyto alba</i>
Barred owl	<i>Strix varia</i>
Belted kingfisher	<i>Megaceryle alcyon</i>
Black duck	<i>Anas rubripes</i>
Black vulture	<i>Coragyps atratus</i>
Black-crowned night heron	<i>Nycticorax nycticorax</i>
Black-necked stilt	<i>Himantopus mexicanus</i>
Blue jay	<i>Cyanocitta cristata</i>
Blue-gray gnatcatcher	<i>Polioptila caerulea</i>
Blue-winged teal	<i>Anas discors</i>
Boat-tailed grackle	<i>Quiscalus major</i>
Brown pelican	<i>Pelecanus occidentalis</i>
Burrowing owl	<i>Athene cunicularia</i>
Carolina wren	<i>Thryothorus ludovicianus</i>
Cattle egret	<i>Bubulcus ibis</i>
Cedar waxwing	<i>Bombycilla cedrorum</i>
Chuck-will's widow	<i>Caprimulgus carolinensis</i>
Common crow	<i>Corvus brachyrhynchos</i>
Common grackle	<i>Quiscalus quiscula</i>
Common moorhen	<i>Gallinula chloropus</i>

**Table 8. Birds of TPUA**

---

<u>Common name</u>	<u>Scientific name</u>
Common nighthawk	<i>Chordeiles minor</i>
Common snipe	<i>Gallinago gallinago</i>
Common yellow throat	<i>Geothlypis trichas</i>
Coopers hawk	<i>Accipiter cooperii</i>
Double-crested cormorant	<i>Phalacrocorax auritus</i>
Downy woodpecker	<i>Picoides pubescens</i>
Eastern meadowlark	<i>Sturnella magna</i>
Eastern phoebe	<i>Sayornis phoebe</i>
Eastern whip-poor-will	<i>Caprimulgus vociferus</i>
Fish crow	<i>Corvus ossifragus</i>
Florida mottled duck	<i>Anas fulvigula</i>
Florida sandhill crane	<i>Grus canadensis pratensis</i>
Glossy ibis	<i>Plegadis falcinellus</i>
Gray catbird	<i>Dumetella carolinensis</i>
Great blue heron	<i>Ardea herodias</i>
Great egret	<i>Ardea alba</i>
Great horned owl	<i>Bubo virginianus</i>
Green-backed heron	<i>Butorides striata</i>
Green-winged teal	<i>Anas carolinensis</i>
Ground dove	<i>Columbina passerina</i>
Hermit thrush	<i>Catharus guttatus</i>
Hooded merganser	<i>Lophodytes cucullatus</i>
Killdeer	<i>Charadrius vociferus</i>
King rail	<i>Rallus elegans</i>
Laughing gull	<i>Leucophaeus atricilla</i>
Least bittern	<i>Ixobrychus exilis</i>
Lesser yellowlegs	<i>Tringa flavipes</i>
Limpkin	<i>Aramus guarauna</i>
Little blue heron	<i>Egretta caerulea</i>
Loggerhead shrike	<i>Lanius ludovicianus</i>
Mallard	<i>Anas platyrhynchos</i>
Marsh hawk	<i>Circus cyaneus</i>
Marsh wren	<i>Cistothorus palustris</i>
Mockingbird	<i>Mimus polyglottos</i>
Mourning dove	<i>Zenaida macroura</i>

**Table 8. Birds of TPUA**

---

<u>Common name</u>	<u>Scientific name</u>
Northern bobwhite	<i>Colinus virginianus</i>
Northern cardinal	<i>Cardinalis cardinalis</i>
Northern flicker	<i>Colaptes auratus</i>
Northern harrier	<i>Circus cyaneus</i>
Northern parula	<i>Setophaga americana</i>
Northern shoveler	<i>Anas carolinensis</i>
Northern waterthrush	<i>Parkesia noveboracensis</i>
Osprey	<i>Pandion haliaetus</i>
Palm warbler	<i>Setophaga palmarum</i>
Peregrine falcon	<i>Falco peregrinus</i>
Pied-billed grebe	<i>Podilymbus podiceps</i>
Pileated woodpecker	<i>Dryocopus pileatus</i>
Pine warbler	<i>Setophaga pinus</i>
Prothonotary warbler	<i>Protonotaria citrea</i>
Purple gallinule	<i>Porphyrio martinica</i>
Red-bellied woodpecker	<i>Melanerpes carolinus</i>
Red-shouldered hawk	<i>Buteo lineatus</i>
Red-tailed hawk	<i>Buteo jamaicensis</i>
Red-winged blackbird	<i>Agelaius phoeniceus</i>
Ring-billed gull	<i>Larus delawarensis</i>
Ring-necked duck	<i>Aythya collaris</i>
Roseate spoonbill	<i>Platalea ajaja</i>
Rufous-sided towhee	<i>Pipilo erythrophthalmus</i>
Savannah sparrow	<i>Passerculus sandwichensis</i>
Sharp-shinned hawk	<i>Accipiter striatus</i>
Snowy egret	<i>Egretta thula</i>
Southeastern American kestrel	<i>Falco sparverius paulus</i>
Southern bald eagle	<i>Haliaeetus leucocephalus</i>
Summer tanager	<i>Piranga rubra</i>
Swainson's warbler	<i>Limnothlypis swainsonii</i>
Swallow-tailed kite	<i>Elanoides forficatus</i>
Swamp sparrow	<i>Melospiza georgiana</i>
Tree swallow	<i>Tachycineta bicolor</i>
Tricolored heron	<i>Egretta tricolor</i>
Turkey vulture	<i>Cathartes aura</i>
Vesper sparrow	<i>Poocetes gramineus</i>

**Table 8. Birds of TPUA**


---

<u>Common name</u>	<u>Scientific name</u>
White ibis	<i>Eudocimus albus</i>
White pelican	<i>Pelecanus erythrorhynchos</i>
White-eyed vireo	<i>Vireo griseus</i>
Wild turkey	<i>Meleagris gallopavo</i>
Wood duck	<i>Aix sponsa</i>
Wood stork	<i>Mycteria americana</i>
Wood thrush	<i>Hylocichla mustelina</i>
Yellow rumped warbler	<i>Setophaga coronata</i>
Yellow-throated warbler	<i>Setophaga dominica</i>

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**Table 9. Reptiles of TPUA**


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<u>Common name</u>	<u>Scientific name</u>
American alligator	<i>Alligator mississippiensis</i>
Banded water snake	<i>Nerodia fasciata</i>
Black racer	<i>Coluber constrictor</i>
Brown snake	<i>Storeria dekayi</i>
Brown water snake	<i>Nerodia taxispilota</i>
Common garter snake	<i>Thamnophis sirtalis</i>
Coral snake	<i>Micrurus fulvius</i>
Corn snake	<i>Elaphe guttata</i>
Eastern box turtle	<i>Terrapene carolina</i>
Eastern coachwhip	<i>Masticophis flagellum flagellum</i>
Eastern cottonmouth snake	<i>Agkistrodon piscivorus</i>
Eastern diamondback rattlesnake	<i>Crotalus adamanteus</i>
Eastern indigo snake	<i>Drymarchon couperi</i>
Florida cooter	<i>Pseudemys concinna floridana</i>
Florida green water snake	<i>Nerodia floridana</i>
Florida king snake	<i>Lampropeltis getula floridana</i>

**Table 9. Reptiles of TPUA**

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<b><u>Common name</u></b>	<b><u>Scientific name</u></b>
Florida mud turtle	<i>Kinosternon subrubrum</i>
Florida red-bellied turtle	<i>Pseudemys nelsoni</i>
Florida softshell turtle	<i>Apalone ferox</i>
Florida southern black racer	<i>Coluber constrictor priapus</i>
Gopher tortoise	<i>Gopherus polyphemus</i>
Green anole	<i>Anolis carolinensis</i>
Ground skink	<i>Scincella lateralis</i>
Peninsula ribbon snake	<i>Thamnophis sauritus sackenii</i>
Pygmy rattlesnake	<i>Sistrurus miliarius</i>
Racerunner	<i>Cnemidophorus sexlineatus</i>
Rat snake	<i>Elaphe obsoleta</i>
Scarlet kingsnake	<i>Lampropeltis triangulum elapsoides</i>
Slender glass lizard	<i>Ophisaurus attenuatus</i>
Southern ringneck snake	<i>Diadophis punctatus punctatus</i>
Striped mud turtle	<i>Kinosternon baurii</i>
Yellow rat snake	<i>Elaphe obsoleta</i>

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**Table 10. Amphibian Species of TPUA**


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<u>Common name</u>	<u>Scientific name</u>
Eastern narrow-mouthed frog	<i>Gastrophryne carolinensis</i>
Eastern spadefoot toad	<i>Scaphiopus holbrookii</i>
Florida leopard frog	<i>Lithobates sphenoccephalus sphenoccephalus</i>
Green house frog	<i>Eleutherodactylus planirostris</i>
Green tree frog	<i>Hyla cinerea</i>
Lesser siren	<i>Siren intermedia</i>
Little grass frog	<i>Pseudacris ocularis</i>
Oak toad	<i>Anaxyrus quercicus</i>
Pig frog	<i>Lithobates grylio</i>
Southern toad	<i>Anaxyrus terrestris</i>
Squirrel tree frog	<i>Hyla squirella</i>

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**Table 11. Non-native Wildlife of TPUA**


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<u>Common name</u>	<u>Scientific name</u>
Blue tilapia	<i>Oreochromis aurea</i>
Coyote*	<i>Canis latrans</i>
Cuban green anole	<i>Anolis porcatius</i>
Feral hog	<i>Sus scrofa</i>
Grass carp	<i>Ctenopharyngodon idella</i>
Muscovy duck	<i>Cairina moschata</i>
Nile tilapia	<i>Oreochromis niloticus</i>
Nine-banded armadillo*	<i>Dasyus novencinctus</i>
Sailfin catfish	<i>Pterygoplichthys multiradiatus</i>
Walking catfish	<i>Clarias hatrachus</i>

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\* Native to North America

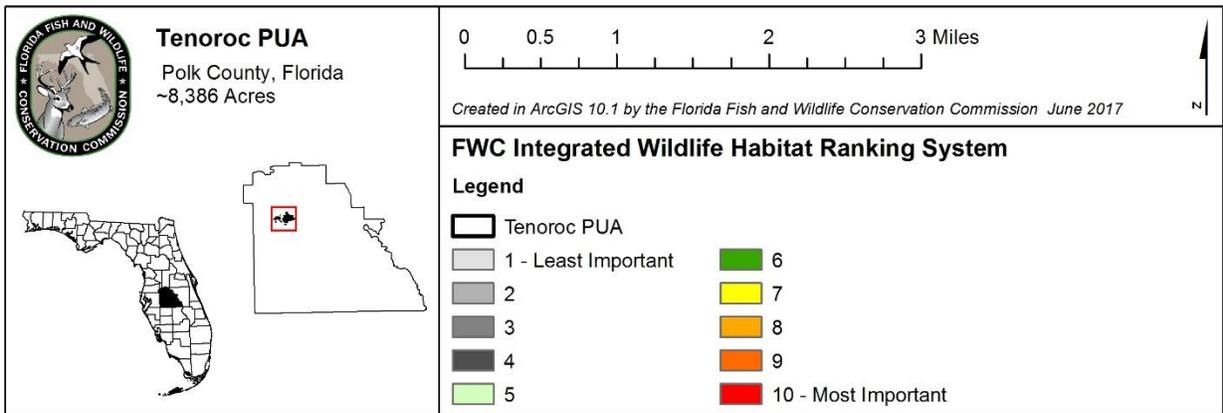
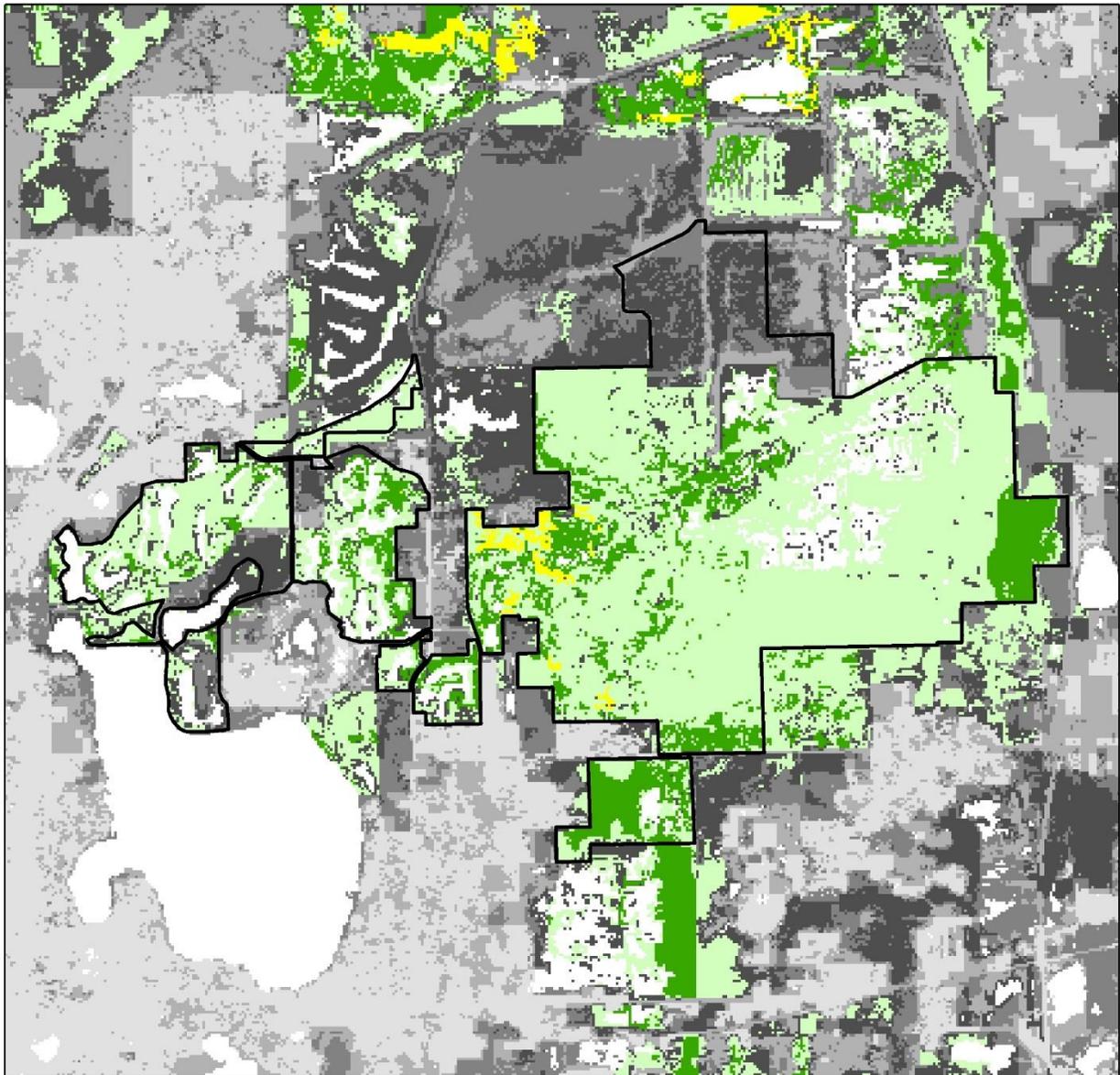
### **2.3.1 Integrated Wildlife Habitat Ranking System**

The FWC has developed the Integrated Wildlife Habitat Ranking System (IWHRS) as a 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 TPUA has a moderate mean wildlife value of 4.9 (Figure 8). This moderate value is a result of the highly altered condition of TPUA, and does not reflect the more recent and ongoing habitat improvement and reclamation efforts on the area.

### **2.3.2 Imperiled Species**

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

At its November, 2016, Commission meeting, 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 FWC as being at some level of risk of extinction, are listed as state-designated Threatened. Additionally, FWC continues to maintain a separate Species of Special Concern category. 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. There are 12 imperiled wildlife species known to occur on TPUA (Table 12).



**Figure 8. FWC Integrated Wildlife Habitat Ranking System**

**Table 12. Imperiled Wildlife of TPUA**

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<u>Common name</u>	<u>Scientific name</u>	<u>Status</u>
American alligator	<i>Alligator mississippiensis</i>	FT(S/A)
Eastern indigo snake	<i>Drymarchon corais couperi</i>	FT
Florida burrowing owl	<i>Athene cunicularia</i>	ST
Florida sandhill crane	<i>Grus canadensis pratensis</i>	ST
Gopher tortoise	<i>Gopherus polyphemus</i>	ST
Little blue heron	<i>Egretta caerulea</i>	ST
Roseate spoonbill	<i>Platalea ajaja</i>	ST
Sherman's fox squirrel	<i>Sciurus niger shermani</i>	SSC
Southeastern American kestrel	<i>Falco sparverius paulus</i>	ST
Tricolored heron	<i>Egretta tricolor</i>	ST
Wood stork	<i>Mycteria americana</i>	FT

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**Acronym Key:** Listed by the State of Florida as Federally-designated Threatened (FT), Federally-designated Threatened because of similarity of appearance [FT(S/A)], State-designated Threatened (ST), or State-designated Species of Special Concern (SSC).

### **2.3.3 FWC Wildlife Observations and FNAI Element Occurrences**

Currently, GIS data maintained by FWC (Wildlife Observations) and FNAI (Element Occurrences; data usage agreement Appendix 12.6) does not reflect the known occurrences of rare and imperiled species within the boundary of TPUA. The FWC will work to update these data sets to include both systematic and opportunistic observations of important plant and wildlife species known to occur on the area.

## **2.4 Native Landscapes and Scenic Resources**

The TPUA has virtually no native landscapes. However, the principle scenic resources of TPUA are the area's restored upland and wetland habitats, as well as the numerous reclaimed and un-reclaimed lakes of former mining operations. Complete descriptions of the land cover TPUA may be found in Section 2.2 above.

## **2.5 Water Resources**

All surface waters of the State are classified by DEP according to designated uses as described in Chapter 62-302.44 FAC. The surface waters of TPUA are designated as Class III, and classified for fish consumption, recreation, as well as propagation and maintenance of a healthy, well-balanced populations of fish and wildlife. Drainage basins of TPUA

include Lake Crago, Lake Parker, Lake Tenoroc, Saddle Creek, Saddle Creek Lakes, and Tenoroc Drain (Figure 9). The TPUA is not within or adjacent to any aquatic preserves, is not designated as an Area of Critical State Concern, nor is it under study for such designation.

## **2.6 Beaches and Dunes**

There are no beaches or dunes located on TPUA.

## **2.7 Mineral Resources**

Two potential mineral resources, sand (tailings) and phosphate (phosphate rock), are present on the TPUA. The following is a discussion of the resources and issues that FWC and DEP staffs believe could affect the recovery and ultimate value of these resources.

### **2.7.1 Sand**

In 2006, FWC contracted Parsons Brinckerhoff, a consulting firm that assists with planning, development and operation of infrastructure projects, to complete a field exploration of sand stockpiles on two areas covering 350 acres in the TPUA. The excess sand tailings in these areas were found to contain approximately 7.9 million cubic yards of high quality sand with desirable engineering properties which make this material appropriate for use in construction fill, landfill cover, drainage media, pipe bedding, or protective soil cover applications. Excess sand tailings that were created during the Phase I - Bridgewater wetland reclamation project were declared “surplus State property” and the majority of this resource was sold to Polk County as landfill cover for its North Central landfill.

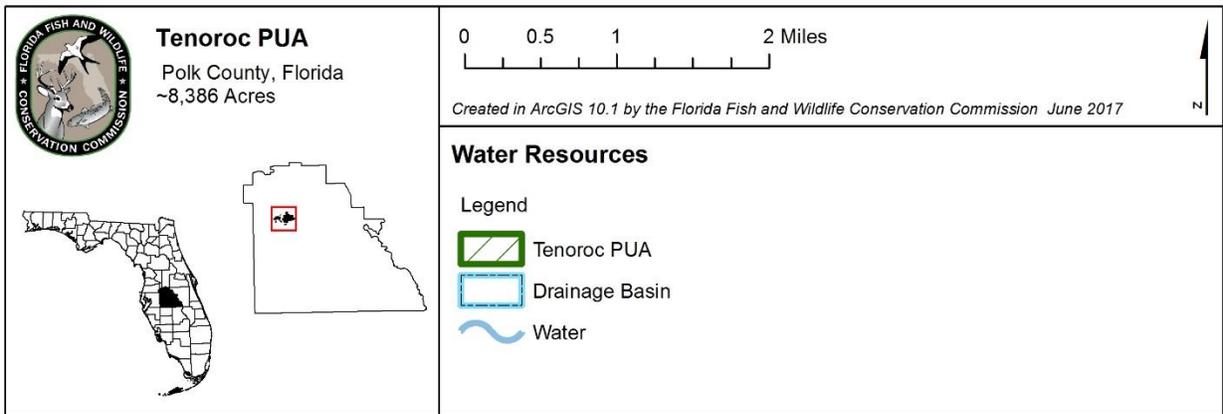
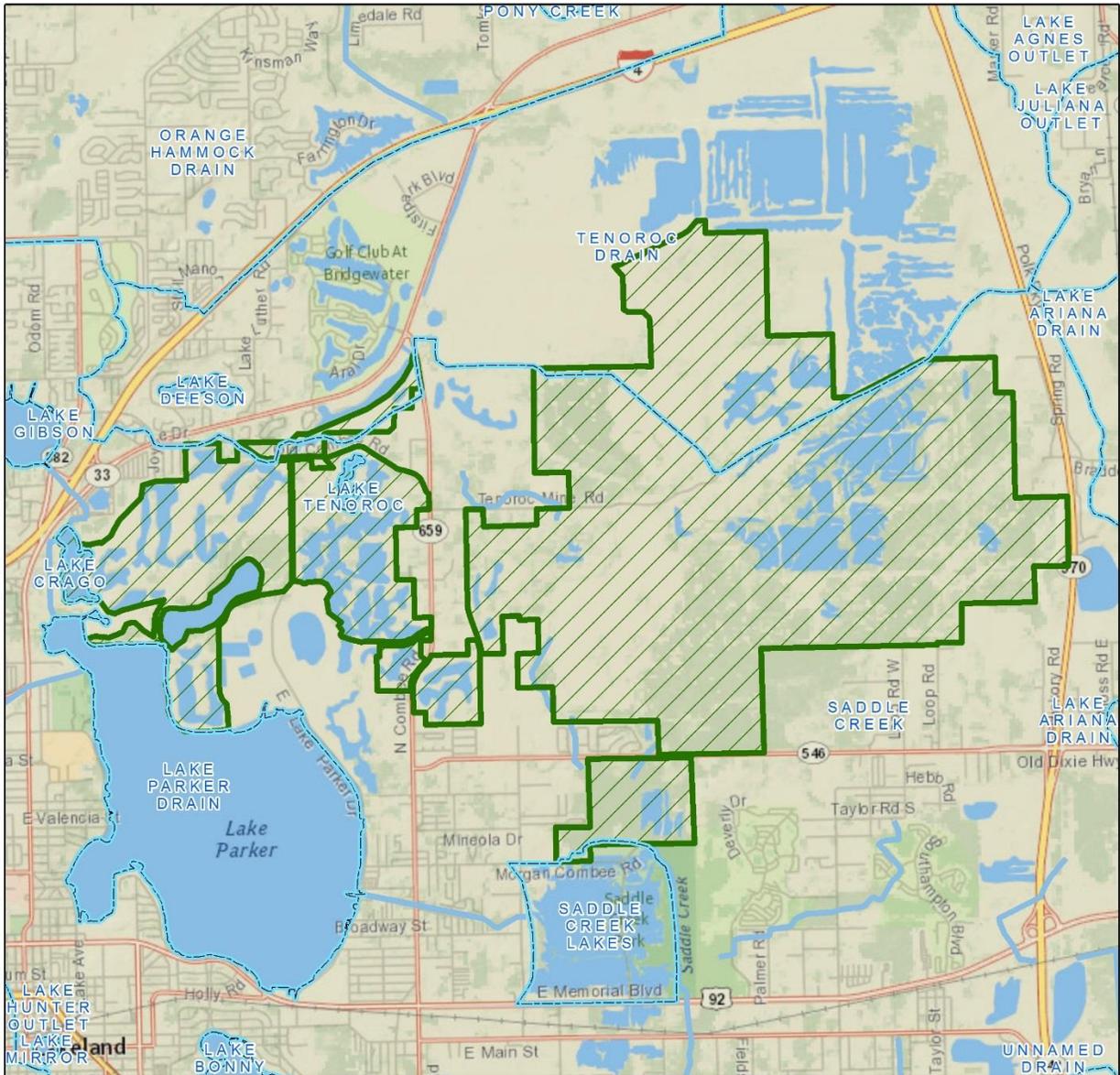
A third stockpile of sand that may be categorized as “surplus State property” is located adjacent to the TPUA Shooting Range. Some of this material has been used by TPUA staff for on-site construction fill and cover. A field exploration of this site has not yet been conducted, so the value of the stockpile remaining at the site cannot be accurately estimated for this management plan.

### **2.7.2 Phosphate**

There are three potential types of phosphate resources at TPUA. To evaluate the potential of each phosphate resource will require a comprehensive engineering survey and assessment that would address the cost effectiveness of recovering these mineral resources.

#### Unmined Phosphate

Former mine operators who worked in the region have suggested that there may be unmined, high grade phosphate on the TPUA that could be recovered with more modern or innovative mining and beneficiation techniques. While TPUA staff has not found any records to verify these accounts, it also has not conducted an exhaustive records search.



**Figure 9. Water Resources**

### Product Stockpile Remains

Phosphate produced by the TPUA beneficiation plant was stored in a stockpile adjacent to the plant and the current TPUA office. The product was shipped from TPUA by rail on freight cars loaded from a concrete tunnel located beneath the stockpile. The train tunnel remains on site, although it is now mostly filled with sand tailings. The footprint of the former stockpile is recognizable by a surface covered with phosphate product, the extent of which has not been determined.

### Unrecovered Phosphate in Sand Tailings

The beneficiation of mine phosphate ore is never completely efficient in separating the phosphate pebble and sand from the silica sand and clay portions of the flotation plant feed. Unrecovered phosphate is particularly apparent in all of TPUA's sand tailings, perhaps because older flotation plants were inherently less efficient than modern plants.

## **2.8 Historical Resources**

The Master Site File GIS data (Appendix 12.7) maintained by the Florida Department of State's Division of Historical Resources (DHR) indicates there are, five archeological sites on TPUA (PO06223, PO06446, PO06152, PO01528, and PO01529). These include prehistoric campsites and low-density artifact scatters. Nine field surveys have been conducted on TPUA. All Master Site recordings, assessments, and preservation strategies for TPUA will be coordinated with DHR.

## **3 Uses of the Property**

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

Thousands of years before Europeans arrived, Native Americans hunted, fished, and gathered wild plants throughout Florida. Evidence of Native American presence on the TPUA dates back thousands of years. The first historic descriptions of our earliest residents called their tribes the Tocobago, Timucua, and Caloosa. As early as 1527 a Spanish map depicted the *Rio de la Paz* or Peace River. Members of the Panfilio de Narvaez and Hernando de Soto campaigns may have set foot in the vicinity in 1528 and 1539. A Spanish official in 1657 noted dwindling native populations due to sickness and disease.

Along with more advanced agricultural practices, the Spanish and other settlers brought livestock, primarily cattle and hogs, as well as horses to Florida. This began an era of broad use of the landscape for agriculture. Rangeland cattle grazing and other agricultural practices began to be utilized in a more systematic way and occurred throughout much of the central Florida peninsula through most of the European settlement era from the 16th through 20th centuries. Use of these agricultural practices began an era of increased

alteration of the natural landscape. However, it wasn't until the 19th and 20th centuries that major settlement and more extensive alteration of the landscape in the area began with the widespread use of more intensive agriculture such as row cropping, citrus production, phosphate mining and associated development.

Though some land alteration occurred during this period, only minor alteration of the landscape is thought to have taken place until the advent of European settlement beginning with the Spanish occupation of Florida in the sixteenth century. Later pioneers observed wild orange trees in the area, evidence of the early trade between Native Americans and the first settlers at Saint Augustine. As native populations were reduced to almost nothing, the void was slowly filled with newcomers from the Georgia area, Creek Indians.

In pursuit of runaway Creek Indians, known as Seminoles, the U.S. Military began to cut roads and build forts crisscrossing the Florida peninsula. In 1842, the Armed Occupation Act offered incentive for pioneers to move further south into Florida. However, it prohibited settlement near the Peace River, considered home to the Seminole people. But gradually cattlemen began to push their herds east from the Tampa Bay region towards the open ranges of land within what is now Polk County. An 1848 hurricane in Hillsborough County is credited as one reason settlers moved inland. By 1849 the Brown and Raulerson families had located in the vicinity of Lake Hancock and others soon followed. With increased immigration came small farms, orange groves, and towns and cities.

Henry B. Plant brought the South Florida Railroad from Sanford, Florida, crossing Polk County, and reaching Tampa Bay by 1884. People could now travel quickly from Jacksonville to the Florida west coast. New towns like Lakeland, Lake Wales, and Winter Haven rapidly developed along the railroad. The first commercial shipment of Phosphate rock for fertilizer left the area in 1888 marking the birth of new industry.

Phosphate mining of the lands now encompassed within the TPUA began in the 1940s. Mining and mining operations significantly disrupted the natural drainage patterns in the area by eliminating former wetlands and drainage features and by impounding water in retention areas. Following the end of mining operations, a system of ditches carried water through and around the property's mined-out areas, providing little of the flow attenuation and treatment capacity afforded by the original wetlands. When the State of Florida took ownership of this property, for the most part it was a highly disturbed site with mine-pit lakes, phosphatic clay settling areas, and extensive hills of sand tailings. There were very few areas on the property that remained in a natural state.

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

The TPUA is managed by FWC and DEP as a Public Use Area, with FWC also designating the waterbodies of TPUA a Fish Management Area. Management is in conformance with

the provisions of Lease 3977 to protect and conserve water resources; conserve and enhance wildlife habitat and to provide a diversity of public outdoor recreational opportunities that are fish- and wildlife-oriented, that provide for the long-term well-being of fish and wildlife habitats. The TPUA is being managed as a multiple-use conservation land. Multiple-use management strategies incorporate uses related to fisheries, wildlife, forest management, and natural resource based public outdoor recreation. Provisions have been made for fish- and wildlife-based public outdoor educational and recreational opportunities that are compatible with the original purposes for acquiring the TPUA. Significant reclamation and enhancement projects have been completed on TPUA since its original acquisition that are described in greater detail in the Section 2.1.5 above.

### **3.2.1 Visitation and Economic Benefits**

Visitation and public use of the area for fish and wildlife based public outdoor recreational opportunities is the primary source of economic benefits from TPUA, and contribute to the overall economy for the central region of Florida. In Fiscal Year 2016-2017, an estimated 58,200 people visited TPUA. During this time about 49% the visitors to TPUA utilized the shooting ranges, while the remainder were primarily anglers. The planned expansion of recreation opportunities described in Section 6.4 below will likely attract more diverse groups of visitors.

Primarily as a result of this visitation and use of the area, FWC economic analysis estimates indicate that TPUA generated an estimated annual economic impact (benefit) of \$6,649,350 from retail sales within the central Florida region. This estimated annual economic impact has aided in the support or creation of an estimated 116 jobs.

Revenue from conservation lands such as the TPUA may 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 overall human health.

## **3.3 Single- or Multiple-use Management**

The TPUA will be managed under the multiple-use concept as a Public Use and Fish Management Area. The TPUA 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 TPUA will be managed under the guidance of ARC, the Conceptual State Lands Management Plan, and as outlined in the original purposes for acquisition.

### **3.3.1 Analysis of Multiple-use Potential**

The following actions or activities have been considered under the multiple-use concept as possible uses to be allowed on TPUA. 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 12.8). Uses classified as "Conditional" indicate that the use may be acceptable but will be allowed only if approved through a process other than the management plan development and approval process (e.g., special-use permitting, managed-area regulation and rule development). Uses classified as "Rejected" are not considered to be in accordance with the original purpose of acquisition or one or more of the various forms of guidance available for planning and management:

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

### 3.3.2 Incompatible Uses and Linear Facilities

Consideration of incompatible uses and linear facilities on TPUA 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 TPUA.

### **3.3.3 Assessment of Impact of Planned Uses of the Property**

To communicate FWC's planned uses and activities, specific management intentions, long- and short-term goals and with associated objectives, identified challenges, and solution strategies have been developed for TPUA (Sections 5 - 7). A detailed assessment of the benefits and potential impacts of planned uses and activities on natural and historical resources was an integral part of the development of the management activities and intent, goals, objectives, challenges, and strategies sections of this Management Plan.

### **3.4 Acreage Recommended for Potential Surplus Review**

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

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

## **4 Accomplished Objectives from the TPUA Management Plan 2002 - 2012**

This section is dedicated to reporting the extent to which the Objectives described in the TPUA Management Plan 2002 - 2012 were successfully completed. Accomplishments for TPUA during the previous planning timeframe are further discussed in more comprehensive detail throughout **Section 5 Management Activities and Intent** of this Management Plan. The degree to which 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: Provide High Quality Fishing Opportunities.**

Objective 1: Maintain the fishing satisfaction level of area anglers at or above 75%. (Ongoing) *Comment: Satisfaction level of 94% based on a 2014 bass angler survey taken concerning proposed regulation changes.* 100%

Objective 2: Maintain angler catch data to document fishing success rates and assess results of management strategies. (Ongoing) *Comment: Angler catch data has been collected by creel from FY 2001-02 thru FY 2014-15. Data collected has been used to assess and adjust fishery management strategies.* 100%

Objective 3: Maintain an annual average catch rate of 0.5 fish per hour (success not harvest) for largemouth bass. (Ongoing) *Comment: Annual bass angler success rate fell below 0.5 fish per hour during two years since FY 2001-02. In FY 2001-02 bass angler success was 0.46 fish per hour and in FY 2009-10 bass angler success was 0.44 fish per hour. The highest annual bass angler success rate occurred in FY 2012-13 at 0.71 fish per hour.* 86%

Objective 4: Maintain an annual average catch rate of 1.75 fish per hour (success not harvest) for sunfish. (Ongoing) *Comment: Only during three years (FY 2007-08, FY 2008-09, and FY 2009-10) did the annual bream angler success fall below 1.75 fish per hour. The lowest bream angler success rate occurred in FY 2009-10; 1.54 fish per hour. The highest bream success rate occurred in FY 2002-03 at 2.2 fish per hour.* 79%

Objective 5: Maintain an annual average catch rate of 1.25 fish per hour (success not harvest) for black crappie. (Ongoing) *Comment: The annual black crappie angler success rate was below 1.25 fish per hour one year; FY 2009-10. The documented annual success rate for this year was 1.13 fish per hour. The highest annual success rate was observed in FY 2010-11 at 2.35 fish per hour.* 93%

Objective 6: Maintain an updated database for all managed fisheries. (Ongoing) *Comment: Angler creel data has been collected every year since FY 1986-87 on lakes open to public fishing. Since 2002, largemouth bass population data was collected on each lake open on a five-year schedule.* 100%

**Goals and Objectives**

**Percent  
Accomplished**

Objective 7: Develop general access, boat ramps and bank fishing areas in additional lakes. (By 2007) *Comment: In FY 2001-02 there were 13 fishable lakes not open to public fishing at Tenoroc. Ten of the lakes were open in FY 2006-07. Two lakes were open for bank fishing opportunities. Four were open to boat access with concrete boat ramps and four were open with primitive boat launching ramps (jon boats, kayaks and canoes).* 77%

Objective 8: Provide additional access facilities to increase utilization by physically-challenged anglers, youth and senior citizens on two lakes. (By 2003) *Comment: Two lakes have been open for the physically-challenged anglers and family fishing since 2002 (Pine Lakes). These lakes included ADA fishing platforms connected by concrete walkways. In addition, eight ADA fishing platforms connected by concrete walkways have been constructed: four on Picnic Lake and four on Derby Lake.* 100%

Objective 9: Develop educational materials including displays, interpretive kiosks and informational handouts for the acquired property. (By 2007) *Comment: Two interpretive kiosks were installed and one information handout (Saddle Creek Trail Guide) was produce in association with the creation of the trails on the Saddle Creek Tract. The Saddle Creek Trail Guide was updated in 2007. Area informational materials have been periodically updated with the opening of additional fishing opportunities.* 100%

Objective 10: Provide fishing clinics for youth and other age groups to promote fishing and conservation ethics. (Ongoing) *Comment: Since FY 2001-02, Tenoroc has hosted 494 fishing events (not tournaments). Most of these events were groups from Polk County School's Exceptional Student Education, Community-Based Instruction, and Parent and Adolescent Counseling and Education (PACE) programs but also included YMCA, Boy Scouts, individual school, community, and private events. All events related to the school system, Community-Based Instruction and PACE were manned by FWC employees or volunteers there to promoted fishing and conservation ethics. Number of children taking part in these events was 8,640. In addition, FWC had thirteen Kids Fishing Only events. Total number of children participating in these Commission sponsored events was 2,704. There has also been 17 agency sponsored fish camps and one archery camp since FY 2011-12. Children participating in these camps totaled 360.* 100%

Objective 11: Maintain the commercial harvest program for blue tilapia. (Ongoing) *Comment: Commercial harvest program was terminated in December 2012 by contractor; new contract is under consideration.* 82%

**Goal 2: Provide other high quality recreational opportunities.**

**Goals and Objectives**

**Percent  
Accomplished**

Objective 1: Maintain the existing non-consumptive recreational activities (e.g., hiking, birdwatching, picnicking, and horseback riding) at Tenoroc. (Ongoing) *Comment: Since FY 2001-02, non-consumptive recreational activities have been maintained and/or expanded. Total users are estimated at 13,720 for an average of 980 per year.* 100%

Objective 2: Maintain current hunting opportunities at Tenoroc. (Ongoing) *Comment: There were two hunting opportunities at Tenoroc. The dove field was discontinued in FY 2004-05 by the Small Game Management Program; new dove hunting opportunities are under development. The special opportunity alligator hunt is ongoing.* 50%

Objective 3: Create additional non-consumptive recreational activities. (By 2007) *Comment: Tenoroc hiking trail has been expanded 10.5 miles since FY 2001-02. Approximately, 5.8 miles of the expanded trail were created before 2007. This early trail expansion included the construction of five pedestrian bridges/elevated walkways and one observation platform as well as the renovation of three existing trail bridges.* 100%

Objective 2: Complete an on-site reforestation plan. (By 2015) *Comment: Significant reforestation activities have been conducted throughout Tenoroc. During the past several years, especially in the eastern portion of the property, hundreds of acres were planted to upland and wetland forest during 2010-2012 as part of the Phase III portion of the Upper Peace River/Saddle Creek Restoration Project. Preparatory work (disking, green manuring, etc.) and reforestation activities are currently ongoing in Phase II of this project, with approximately several hundred acres of pine flatwoods and other upland forest communities scheduled to be planted during the next few years. Several years ago, the DOF (now the FFS) developed a reforestation plan for approximately 2,550 acres of the property; 600.38 acres have been planted with trees but other areas still await reforestation. Agencies' staff are currently updating this plan, and will be further considered in the updated management plan.* 55%

Objective 3: Reduce upland exotic plant species coverage by 75% through on-site reforestation or native plant community restoration. (By 2015) 35%

**Goals and Objectives**

**Percent  
Accomplished**

Objective 4: Manage existing stands of native vegetation through prescribed burning or drainage enhancement programs appropriate for each distinct community type. (Ongoing) *Comment: A Tenoroc wide burn plan was developed in 2009; a new burn plan is in development. Since 2009, approximately 32 units have received a prescribed fire. The total acreage burned is approximately 620 acres. These burns were conducted by DEP staff and/or Florida Forest Service. The Tenoroc Burn Plan is in need of a revision to reflect the new objective of burning each unit within a 1-3 year fire return interval. Since 2002, three major water enhancement projects have been completed under the Upper Saddle Creek Restoration Program. Under these programs 687 acres of wetlands and 763 acres of uplands have been restored to DEP standards.* 60%

**Goal 4: Promote Environmental Education Programs.**

Objective 1: Maintain the current environmental education programs with the Polk County School District and the Florida Institute of Phosphate Research (FIPR). (Ongoing) *Comment: Due to transportation cost, environmental classes with the Polk County School District involved at Tenoroc were discontinued. FIPR environmental education programs, while continued, have been limited.* 25%

Objective 2: Establish a multi-discipline environmental education center. (By 2005) *Comment: Numerous draft conceptual plans and designs for the Tenoroc Youth Conservation Center has been developed; design and initial development of this facility is underway. Current proposed location is at the Picnic Lake Recreational Facility.* 5%

**Goal 5: Protect Fish and Wildlife Resources through Law Enforcement Patrol.**

Objective 1: Maintain compliance with state laws and FWC regulations. (Ongoing) *Comment: Law enforcement activities are ongoing.* 100%

**5 Management Activities and Intent**

The following section provides a description of agency plans to locate, identify, protect, preserve, or otherwise use natural resources and nonrenewable cultural resources on the TPUA. In general, the FWC management intent for the TPUA is to enhance fish and wildlife habitat, and sustain ecological processes that contribute to the conservation of biological diversity and the extant fish and wildlife populations of the area. In conjunction with this emphasis, it is the FWC’s intent to provide quality fish- and wildlife-based public

outdoor recreational opportunities on the TPUA. The FWC will utilize the best available data, guidelines, natural resource management practices, and recreational management practices to achieve these outcomes in accordance with the original purposes for acquisition. Furthermore, the management activities described in this section are in compliance with those of the Conceptual State Lands Management Plan.

## **5.1 Land Management Review**

The 2018 LMR Report for TPUA (Appendix 12.4) found that FWC was managing the area in accordance with the purpose(s) of acquisition. The recommendations of the LMR were considered and addressed in the development of this Management Plan, including development of management intent language, goals and objectives, identification of management challenges and development of solution strategies (Sections 5 - 7).

## **5.2 Adaptive Management**

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

An adaptive management process produces the strongest inference and most reliable results when 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.<sup>2, 3</sup> Incorporating valid statistical analyses of results will further enhance the value of the adaptive management process. However, in some situations, rigorous experimental design procedures can be relaxed without invalidating monitoring results. In a passive format, adaptive management can involve applying a conservation action at a site, observing the results and adjusting the action in the future if warranted.<sup>2, 3</sup>

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

### **5.2.1 Monitoring**

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

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

For natural communities, monitoring protocols are established through FWC's Objective-Based Vegetation Management (OBVM, Section 5.3.1) program, which monitors how specific vegetative attributes are responding to FWC management. For imperiled and focal fish and wildlife species, monitoring protocols are established through 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 FWC's Public Access and Wildlife Viewing program, and work in conjunction with the establishment and adjustment of public access carrying capacities (Section 5.6.4). Historical resources (Section 5.9) are monitored with guidance from 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 TPUA 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 TPUA, 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**

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

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

Management (OBVM) to monitor how specific vegetative attributes are responding to FWC management. However, due to the altered condition of TPUA, FWC will evaluate the value and efficacy of implementing OBVM to guide potential restoration efforts on the area.

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

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

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

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

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

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

However, virtually all of the native habitats that originally existed at TPUA were severely impacted and extensively altered by the phosphate mining and mining operations that occurred in this portion of Polk County beginning in the 1940s. For these reasons, to date, FWC and DEP have elected to not have the TPUA be mapped for historic natural communities.

Consequently, FWC and DEP will continue to evaluate and determine to what extent, if any, FWC's standard comprehensive resource management approach, which generally focuses on the restoration of the form and function of Florida's natural communities to serve as the basis for overall resource management goals, can be implemented for TPUA. The practicable extent of implementing this concept, including the OBVM program, on TPUA is substantially limited as a result of the extensive alteration of the area's landscape from past mining activities.

### **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.

Past mining operations, 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 enhance wildlife utilization of ruderal habitats.

As guided by vegetative management objectives, FWC employs a fire management regime to increase both species and habitat diversity and will continue a prescribed burning program on the TPUA. 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 will have the characteristics of both frequently burned and infrequently burned landscapes.

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.

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 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 one to four years, preferably during the spring and early summer months.

In addition to the general prescribed fire management guidelines described above, the area-specific Prescribed Fire Plan will be updated for the TPUA. This plan will include, but not be limited to, delineation of burn management units, detailed descriptions of prescribed fire methodology, safety, and smoke management guidelines. Upon completion, the updated TPUA Prescribed Fire Plan will be implemented to facilitate habitat improvement on the area.

### **5.3.3 Habitat Restoration**

Continuing fish and wildlife habitat enhancement and mine reclamation activities on TPUA will focus on enhancing the land cover for the benefit of fish and wildlife species by maintaining recommended fire return intervals for fire adapted communities, treating and removing exotic plant species, and controlling vegetation through mowing and roller chopping as needed. Chemical and mechanical treatments may also be implemented in some select hardwood habitats to restore these areas to an earlier successional

condition. Exotic species control is more extensively discussed in Section 5.5, below. Further specific habitat management and improvement objectives planned for TPUA are described in Section 6 below.

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

### **5.4.1 Fish and Wildlife**

Due to the variety of vegetative conditions, a diversity of associated wildlife, including rare, imperiled, and common game and non-game species, can be found on the TPUA. In managing for wildlife species, an emphasis will be placed on managing areas to enhance plant diversity, productivity, and spatial heterogeneity. On TPUA, land cover important to wildlife include wetland and upland habitats.

A diversity of fish and wildlife species is found on TPUA. However, there are no known locations of FWC wildlife occurrences and FNAI element occurrences from the most recent GIS databases of the respective agencies. As defined by FNAI, an “element” is any exemplary or rare component of the natural environment, such as a species, natural community, bird rookery, spring, sinkhole, cave, or other ecological feature. An element occurrence is a single extant habitat which sustains or otherwise contributes to the survival of a population or a distinct, self-sustaining example of a particular element.

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

Wildlife management emphasis is placed on documenting the occurrence and abundance of rare and imperiled species on the 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 2.3.2 below provides further information on FWC’s comprehensive species management strategy for rare and imperiled wildlife and their respective habitats.

### Fisheries Management

The FWC maintains an active sport fish management program at TPUA that includes intensive management of existing game fish resources through public use and harvest regulations, stocking programs, construction and placement of fish attractors, control of invasive aquatic plants, and reestablishment of desirable littoral zones. In addition, FWC continues to assess existing fisheries resources through fish sampling and lake water quality monitoring. The FWC also will actively participate in future reclamation projects to re-design drainage and lake shorelines and continue to design and implement improvements to enhance fishing access and facilities.

### Wildlife Management

Areas of TPUA support numerous native wildlife species. An important management need is the collection and updating of qualitative and quantitative data on wildlife species and populations, with emphasis on endangered or threatened species. Monitoring of wildlife species can be accomplished by means of contracted services in accordance with methodologies developed and approved jointly by the FWC and DEP. The results of these surveys will be considered during the development of the management activities and schedules to be used. Plans for land management activities, such as mechanical soil disturbance, prescribed burns, and herbicide treatments, will also take into consideration wildlife needs and preferences to avoid negative impacts that may result from the implementation of these management activities.

#### **5.4.2 Imperiled and Focal Species: Wildlife Conservation Prioritization and Recovery**

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

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

The WCPR program helps FWC take a proactive, science-based approach to species management on FWC-managed lands. This approach assesses information from statewide

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

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

Due to the highly altered condition of TPUA's habitats, FWC will determine the efficacy of developing and implementing a WCPR Species Management Strategy for the area. More information regarding FWC's management of imperiled and focal species is found in Section 6.2 below.

## **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 TPUA. 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.

There are 37 exotic and invasive plant species (Table 5) known to occur on the TPUA. The FLEPPC Category I and II species treated annually by FWC include, but are not limited to, Brazilian-pepper, camphor tree, Chinese tallow, cogongrass, hydrilla, Japanese climbing fern, kudzu, tongue-tree, tropical soda apple, water hyacinth, and water lettuce.

Exotic and invasive plant species have been identified as occurring at varying densities on approximately 6,177 acres of the TPUA. 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 TPUA by inspecting any vehicles and equipment brought onto the area by contractors and requiring that they be free of vegetation and dirt. If vehicles or equipment used by contractors are found to be contaminated, they will be referred to an appropriate location to clean the equipment prior to being allowed on the area. This requirement is included in every contract for contractors who are conducting any operational or resource management work on the area. In this way, FWC implements a proactive approach to controlling the introduction of exotic pests and pathogens to the area.

Currently, control and maintenance of invasive exotic plant species continues to be a significant management challenge at TPUA. During the previous 10-year planning period, FWC has continued to implement extensive exotic and invasive species control and maintenance activities throughout TPUA. For fiscal years 2012 - 2013 and 2013 - 2014, FWC treated a cumulative total of 3,450 acres within areas classified as infested. An estimated 6,177 acres (73.7%) of TPUA remains classified in an infested condition, thus requiring continued intensive treatments. The FWC will continue to focus control and maintenance activities on areas identified as having invasive exotic plant infestations, as well as treating any new occurrences as they are identified through continued monitoring activities. Ongoing exotic plant species objectives and challenges for TPUA are further detailed in Sections 6 - 7 below.

## **5.6 Public Access and Recreational Opportunities**

### **5.6.1 General Information**

The TPUA will be managed under a multiple-use concept that includes providing opportunities for fish and wildlife-based public outdoor recreation. The recreational activities offered on the TPUA include fishing, hunting, shooting sports, wildlife viewing, hiking, bicycling, fishing, horseback riding, nature study, and photography.

Authorized recreational uses are managed consistent with the purposes for acquiring the TPUA, including ensuring the conservation and ecological integrity of the area while managing for low intensity, multiple-uses, thus providing fish and wildlife based public outdoor recreational opportunities for Florida's citizens and visitors.

### **5.6.2 Americans with Disabilities Act**

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

### **5.6.3 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 TPUA. To accomplish this, FWC will work with the City of Lakeland, recreational stakeholders and the general public to develop a Recreation Master Plan for the TPUA that will be used to further design and develop appropriate infrastructure that will support the recreational use of the area by the general public. In conjunction with development of the Recreation Master Plan, FWC will continue to coordinate trail development with the City of Lakeland to integrate the TPUA trail system with the broader SUNTrail network, providing connectivity within the Coast-to-Coast Trail Corridor.

### **5.6.4 Public Access Carrying Capacity**

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

Based on an analysis of the overall approved uses and supported public access user opportunities, and the anticipated proportional visitation levels of the various user groups,

the FWC has determined that the TPUA can currently support 1,603 visitors per day. Importantly, public access carrying capacities are not developed to serve as a goal for expanding the public use of a particular area to match the established carrying capacity. Rather, they are developed to establish maximum thresholds for public use of the respective area in order to protect the natural and cultural resources on TPUA 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.

### **5.6.5 Recreation and Public Access**

As noted earlier, the TPUA is managed under a multiple-use concept that includes providing areas for fish- and wildlife-based public outdoor recreation compatible with the protection of the area's resources.

#### **Tenoroc Youth Conservation Center**

Part of the mission of the Tenoroc Youth Conservation Center (TYCC) enhancement project is to become a conservation and education facility that develops outdoor skills and fosters an understanding of Florida's natural resources, encourages protection and preservation of Florida's conservation lands and the fish and wildlife on them, and builds responsible and environmentally conscious citizenry. TYCC staff are actively working with the Polk County Public School system to adapt the Florida Youth Conservation Centers Network curriculum and to create new programs that will enhance student learning while meeting state education goals.

The TYCC will use many of the existing facilities on site for programs. In addition, future development will include indoor and outdoor education facilities, equipment storage, a dock, boardwalk and overnight accommodation for program participants in the vicinity of PicNic Lake.

#### **Shooting and Archery Ranges**

The TPUA contains a major regional shooting sports facility, including rifle, pistol, and air gun ranges; trap and sporting clay stations; and ground level, elevated, and 3-D archery ranges. This facility is operated by the FWC's Hunter Safety and Public Shooting Range Section to accommodate participation by adults and youth in safe and responsible shooting and archery sports. Expansion of the facility will assist in accommodating visitors to the TYCC.

An important partner at the TPUA archery ranges is the Ridge Archers, a local not-for-profit organization supporting the development of archers and competitive archery. The FWC will continue to cooperate and coordinate with the Ridge Archers in maintaining the 3-D archery range, conducting archery tournaments and other archery-related events.

## **Fishing**

The fishing resources available to the public at the TPUA are abundant and diverse, with a total of 24 manageable mining-created lakes on the property. The un-reclaimed and reclaimed lakes range in size from 7 to 225 acres, with a total managed lake area of approximately 1,109 acres on the TPUA. Of these managed lakes, 14 have concrete boat launching ramps and 6 have primitive launching areas. Three lakes are open to bank fishing only.

The waterbodies of TPUA are established as a Fish Management Area by FWC. Fisheries management at the TPUA involves the use of restrictive harvest regulations on game fish species, and control of angler fishing effort. Past experimental regulations, including minimum lengths, protected length ranges, reduced bag limits, gear restrictions, trophy bass restrictions, and catch-and-release provisions have resulted in the current regulations which are effective in preventing over-harvesting of game fish and in perpetuating quality fishing opportunities (see 68A-20.005 (4)(j), F.A.C., for specific regulations).

Activities such as field trips and fishing derbies are conducted by FWC staff and volunteers for students, youth, and families. More frequent recreational fishing opportunities are anticipated at the TYCC.

## **Boating**

Visitors may use boats, canoes or kayaks on any lakes where boats are allowed. However, as part of the Fish Management Area program's efforts to provide a higher-quality fishing experience, FWC has limited the number of boats allowed per lake daily.

## **Hunting**

Although hunting on the TPUA currently is limited to dove and alligators, the continuing need for public hunting in the region may result in the development of additional opportunities at TPUA in the future. Dove, quail, small game, turkey, waterfowl, and feral hog are present on the property, and management activities are currently underway that will improve habitat conditions for these species. The FWC and DEP will continue to cooperate in the development of expanded hunting opportunities.

## **Hiking**

As noted above, hiking experiences ranging from the less strenuous "social" hikes along well-marked, well-maintained paths geared toward young and elderly hikers, to more strenuous trekking over undulating terrain through dense forest along narrow or densely-vegetated paths. Currently, the main portion of the TPUA contains two loop trails; a third trail is currently in development, while others located throughout the property are still in the planning stages. These trails include passage over both reclaimed and un-reclaimed

areas that were previously mined for phosphate. While some sections of these trails are flat, open, and dry, other segments are steep and narrow or wind through low-lying, wetter habitats. The TPUA's central trail, approximately five miles long, links these existing trails to two other loop trails on the Saddle Creek Tract portion of TPUA, which is south of the main part of the area. Access to these trails is via the trailhead and parking area at Saddle Creek Park. Other loop trails are located in the western (Bridgewater) portion of the TPUA.

### **Bicycling**

Bicycling is allowed on designated trails. Additional bicycling trail options will be considered, and if determined to be compatible with the management intent of the property, may be developed. The FWC will continue to coordinate bicycle trail development with stakeholders, including Polk County and the City of Lakeland, to establish management policies that will facilitate the integration of the TPUA trail system within regional trail networks, including the Van Fleet Trail, TECO-Auburndale Trail, and Polk County's Saddle Creek Park.

### **Horseback Riding**

Two loop trails, the 3.5-mile North Trail and the 4.4-mile South Trail, are available for horseback riding at TPUA. Access to the trails is available from near the TPUA Office, with parking and water available.

### **Wildlife Viewing**

The TPUA is the third gateway site for the East Section of the Great Florida Birding and Wildlife Trail. The area was selected for this distinction because of its wildlife viewing opportunities, as well as the numerous visitor facilities. Amenities include a binocular loan program and wildlife viewing brochures that assist visitors with exploring points of interest along the trail.

The lakes and wetlands of TPUA attract large numbers of wading birds, waterfowl, and raptors. Because the property is situated along traditional migratory routes, many songbirds stop over during spring and fall migrations. On TPUA's western side, the Bridgewater Tract has wintering sparrow plots developed by the local Audubon chapter, as well as wildlife viewing areas on the reclaimed wetlands. On the eastern side of the property, two newly created wetland areas also provide excellent opportunities for bird and wildlife viewing. With hundreds of reported species of birds and other animals on the property, not to mention a wide variety of butterflies and other invertebrates, there are abundant bird and other wildlife observation opportunities at TPUA.

### **Picnicking**

Two sizeable picnic pavilions with nearby restrooms are available for large gatherings; these facilities are also in close proximity to Derby Lake and Picnic Lake with fishing piers, boardwalks, and platforms to provide opportunities for fishing, canoeing and kayaking, and wildlife viewing.

## **Geocaching**

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

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

## **Recreation Facilities**

To facilitate wildlife viewing recreational opportunities on the area, FWC has continued to establish and maintain informational and interpretive signage, multi-use trails, boat ramps, fishing and wildlife viewing platforms, and a shooting range. During the previous 10-year planning period, FWC completed several public access, recreational, and facility improvements on TPUA, including public access improvements to the shooting range, and development of administrative and management-support facilities. Planned public access facility improvements are further detailed in Section 6 below, and 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 TPUA Recreational Master Plan upon its development and approval.

## **5.7 Hydrological Preservation and Restoration**

### **5.7.1 Hydrological Assessment, Restoration, and Management**

A hydrologic needs assessment (UPRSCR) has been completed for TPUA. As a result of this assessment, substantial watershed restoration projects have been implemented on TPUA since it was acquired by the State to enhance, to the extent practicable given its mining history, the hydrological functions, watershed and wetlands of this part of the Upper Peace River watershed. Hundreds of acres were planted to establish upland and wetland forest in the eastern portion of the property during 2010-2012 as part of the Phase

III portion of the UPRSCR. Preparatory work (disking, green manuring, etc.) and reforestation activities are currently ongoing in Phase II of this project, with approximately several hundred acres of pine flatwoods and other upland forest communities scheduled to be planted during the next few years to continue to improve the watershed and provide other fish and wildlife habitat benefits. In addition, the FWC continues to install and maintain low-water crossings, culverts, water control structures, and staff gauges to maintain and enhance hydrological functions.

### **5.7.2 Water Resource Monitoring**

Currently, the FWC cooperates with the DEP and the SWFWMD for the monitoring of surface and ground water quality and quantity. In addition, the FWC will continue to cooperate with the SWFWMD and the DEP to develop and implement any additional surface water quality and quantity monitoring protocols for the TPUA. In this capacity, the FWC will primarily rely on the expertise of the SWFWMD and the DEP to facilitate these monitoring activities. As necessary, the FWC may independently conduct or contract for water resource monitoring, as guided by the DEP and the water management districts.

## **5.8 Forest Resource Management**

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. Reforestation techniques often vary depending on the natural community characteristics and species composition of the area. One of the primary management techniques for reforestation involves harvests of off-site pine species once they reach merchantable pulpwood size and then replanting with a naturally occurring pine species for the area. Another often used technique is to conduct a series of thinning operations gradually to reduce the pine basal area to 30-40 sq. ft./acre and then under-plant sites with an appropriate pine species to increase the uneven-aged character of the stands, overstory structure, and species diversity. There is a limited amount of pine forests on TPUA in need of timber thinning activities on the area at the present time.

Significant reforestation activities have been conducted throughout TPUA. As noted above, substantial upland and wetland forest reforestation was conducted during 2010-2012 as part of the Phase III portion of the UPRSCR. Preparatory work (disking, green manuring, etc.) and reforestation activities are currently ongoing in Phase II of this project, with approximately several hundred acres of ruderal areas scheduled to be planted to pine during the next few years. Additionally, FWC has developed a reforestation plan in cooperation with FFS for approximately 2,550 acres of the area. Approximately 600 acres have been planted with trees, but other areas still await reforestation.

Currently, the reforestation plan is being updated. Upon completion of the update, it will be implemented in conjunction with the development of an overall Habitat Enhancement Strategy during the period covered by this management plan.

The FWC will continue to cooperate with FFS or contract a professional forester to update the TPUA Timber Assessment. Also, the FWC will continue to consult with the FFS or a professional forestry consultant regarding forest management activities as appropriate. In addition, as described above, FWC will prepare and begin implementation of a TPUA habitat enhancement plan which will seek to enhance altered areas. This habitat enhancement strategy may include reforestation, harvesting, and prescribed burning activities based on enhancement and maintenance needs of ruderal areas, and other goals established for management of the TPUA.

## **5.9 Historical Resources**

Procedures outlined by DHR will be followed to preserve cultural and historical resources. The FWC will continue to consult with the DHR in an attempt to locate and preserve any features on the area. As appropriate and necessary, the FWC will contact professionals from the DHR for assistance prior to any ground-disturbing activity on the area.

On TPUA, five sites (PO06223, PO06446, PO06152, PO01528 and PO01529) have been recorded, and nine field surveys have been conducted. All Master Site recordings, assessments, and preservation strategies for TPUA will be coordinated with DHR.

As a part of this management plan, the FWC will ensure that management staff will receive Archaeological Resource Management (ARM) training. Furthermore, 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.

## **5.10 Capital Facilities and Infrastructure**

The FWC will continue to maintain public access, operational, and administrative facilities (Figure 10) at TPUA. These include 59 existing facilities, over 33 miles of public access and service roads, and over 31 miles of multi-use trails. Furthermore, as further described above in Section 5.6.5 and below Sections 6.5 and 6.9, FWC intends to develop the TYCC and expansion of the shooting sports facilities at TPUA.

As described above in Section 5.6.2 of this Management Plan, when public facilities are developed on FWC-managed areas, the FWC complies with the ADA (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 (e.g., where handicap access is structurally impractical or where providing such access would change the fundamental character of the facility being provided). Planned capital facilities and infrastructure improvements are listed below in Section 6.8 of this Management Plan.

## **5.11 Land Conservation and Stewardship Partnerships**

The FWC utilizes a three-tiered approach to identifying, acquiring or otherwise protecting important conservation lands adjacent to or in proximity to existing FWC-managed areas.

This involves development of an Optimal Resource Boundary (ORB), Optimal Conservation Planning Boundary (OCPB) and associated Conservation Action Strategy (CAS).

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

#### **5.11.1 Optimal Resource Boundary**

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

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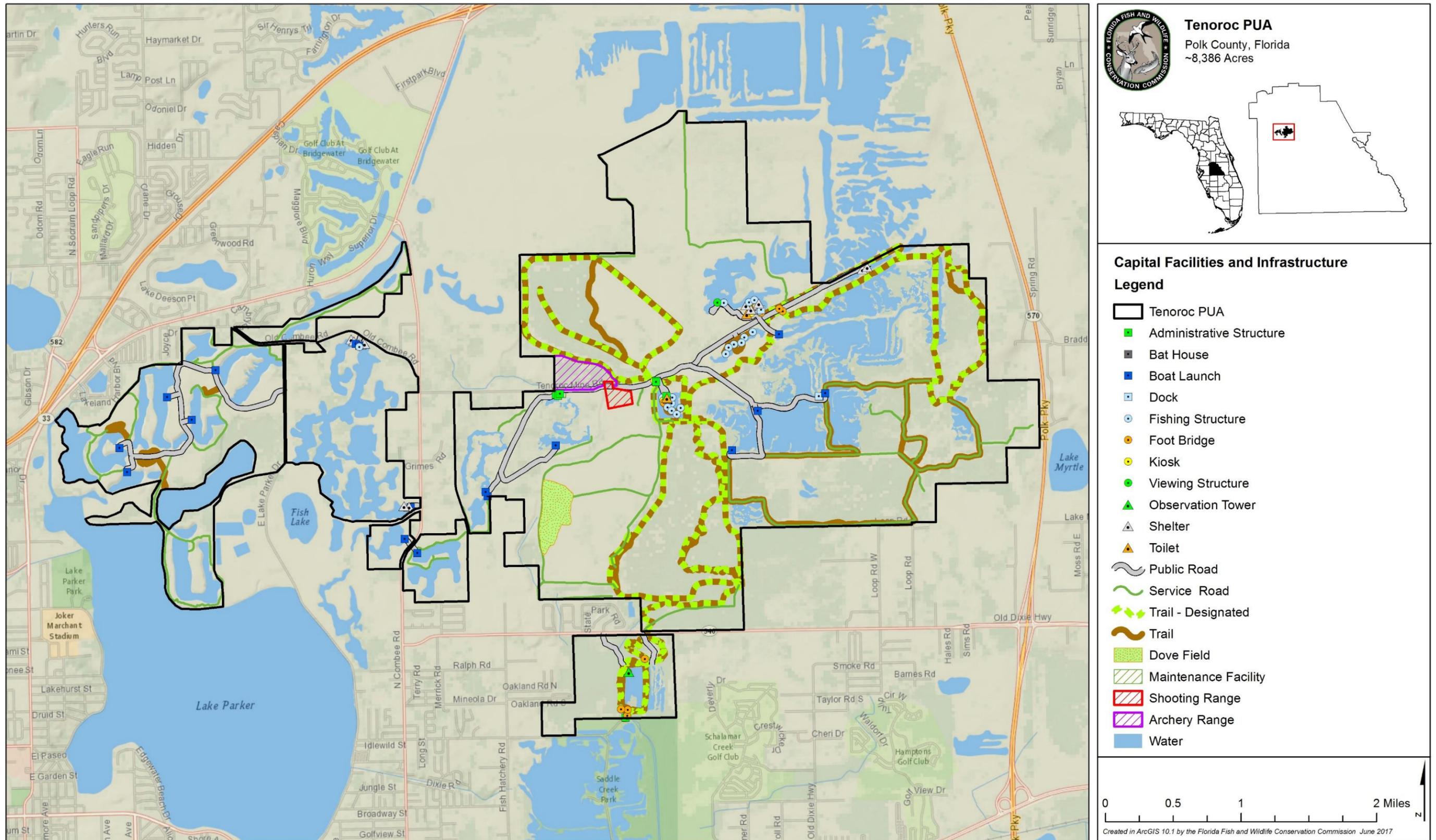


Figure 10. Capital Facilities and Infrastructure

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

The second tier is known as the OCPB (Figure 11). 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.

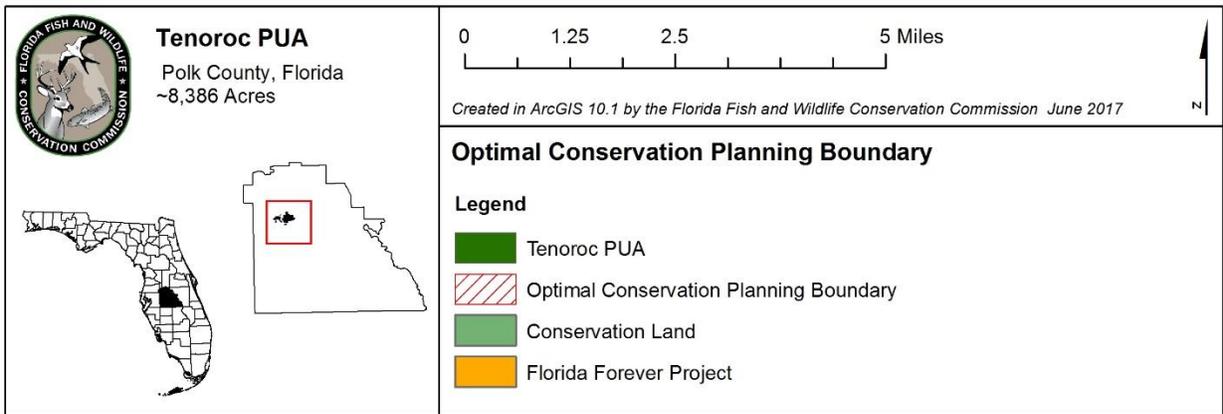
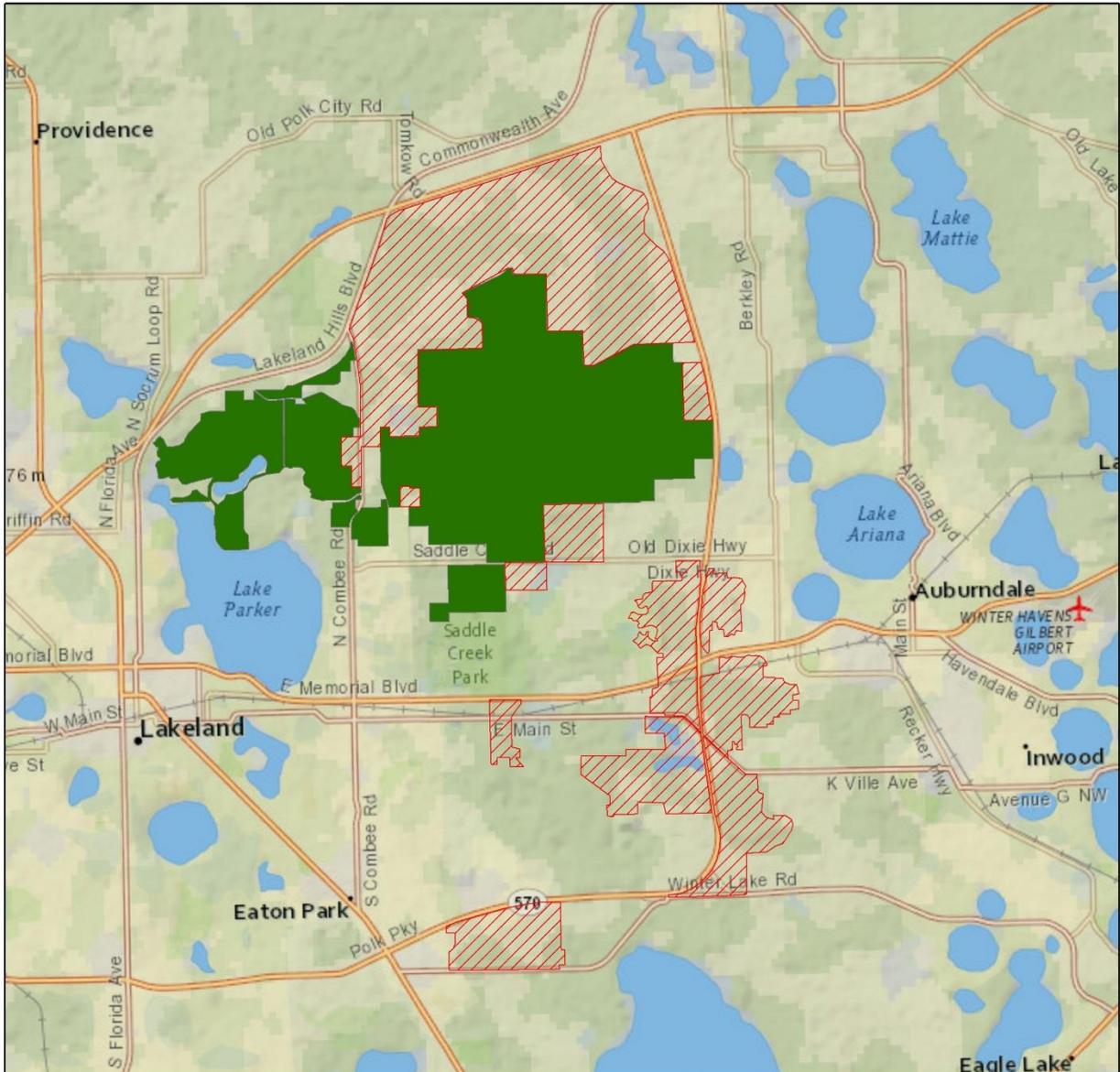
The OCPB provides the basis for development of a broader CAS for TPUA. Although the OCPB provides the basis for potential future voluntary, willing-seller conservation acquisitions, it is designed to function primarily as a conservation planning boundary. The OCPB identifies surrounding lands and natural 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



**Figure 11. Optimal Conservation Planning Boundary**

Florida Fish and Wildlife Conservation Commission | Tenoroc PUA Management Plan

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

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

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

Currently, there are no parcels included on the FWC Florida Forever Additions and Inholdings list for the TPUA. 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 TPUA, 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 TPUA must have prior approval by the FWC. In addition, FWC will continue to cooperate with the University of Florida, the Florida Institute of Phosphate Research to facilitate continued research.

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

#### **5.13.1 Cooperative Management**

The FWC and DEP are responsible for the overall management and operation of the TPUA. The provisions of FWC's and DEP's lease agreements with the Board of Trustees include cooperating with the DHR to ensure all requirements of the Management Procedures Guidelines - Management of Archaeological and Historical Resources document are followed with regard to any ground-disturbing activities. Also, the FFS assists the FWC by providing technical assistance on forest resource management. In addition, the FWC cooperates and consults with the DEP and the SWFWMD for the monitoring and management of both ground and surface water resources of the TPUA.

#### **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 TPUA. Such activities are considered allowable uses only when undertaken intermittently for short periods of time (no more than a few days) and in a manner that does not impede the management and public use of the TPUA, or cause unreasonable 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 TPUA. Any first-responder or military training that is not low-impact, intermittent and occasional would require an amendment to this management plan, and therefore will be submitted by the FWC to the DSL and the ARC for approval consideration prior to authorization.

### **5.13.3 Cattle Grazing**

Currently, no cattle grazing occurs on TPUA. The FWC and DEP will evaluate the feasibility of initiating cattle grazing leases on appropriate areas for the purposes of habitat maintenance and revenue generation.

### **5.13.4 Apiaries**

Currently, TPUA has one apiary contractor operating on the area (D&J Apiary, Inc.) The use of apiaries is conditionally approved for TPUA, 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 12.8). Location, management, and administration of apiaries on TPUA will be guided by the FWC Apiary Policy (Appendix 12.9).

## **5.14 Climate Change**

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

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

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

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

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

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

consider the need for conducting vulnerability assessments to model the potential effects of climate change, especially sea level rise and storm events, on imperiled species and their habitats on FWC managed land.

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

Elements of climate change that may potentially affect TPUA include more frequent and more potent storm events, alteration of vegetation reproductive cycles, and changes in the fire regime. To address the potential impacts of climate change on the TPUA, Goals and Objectives have been developed as a component of this Management Plan (Section 6.12). Depending on the recommendations of the adaptive management strategies described above, additional specific goals and objectives to mitigate potential climate change impacts may be developed for the TPUA 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 TPUA. The objectives listed within each management goal offer more specific management guidance and measures, and are considered the necessary steps to be completed to accomplish the management goals. Many of the objectives listed have specific end-of-the-calendar-year target dates for completion

and all of them are classified as having either short-term (less than two years) or long-term (up to ten years) timelines for completion.

## **6.1 Habitat Restoration and Improvement**

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

### Short-term

- 6.1.1 Conduct prescribed burning on 300 acres of appropriate upland communities per year.
- 6.1.2 Maintain 900 acres of appropriate upland communities (50%) within a three-year target fire return interval.
- 6.1.3 Contract for mapping of current natural and altered communities.
- 6.1.4 Develop and implement an updated prescribed burn plan.
- 6.1.5 Conduct upland habitat enhancement on 15 acres per year.
- 6.1.6 Conduct timber stand improvements on 333 acres of pine plantation.
- 6.1.7 Continue to develop and implement aquatic habitat enhancement projects.
- 6.1.8 Evaluate the need to develop a Fisheries and Aquatic Habitat Management Strategy.

### Long-term

- 6.1.9 Continue to conduct prescribed burning on 600 acres of appropriate upland communities per year.
- 6.1.10 Continue to maintain 1,800 acres of appropriate upland communities (100%) per year within target three-year fire return interval.
- 6.1.11 As part of the TPUA West-central Watershed Project, conduct wetland habitat enhancement on 277 acres.
- 6.1.12 Continue to conduct upland habitat enhancement on 15 acres per year.
- 6.1.13 If determined to be necessary, develop and implement a Fisheries and Aquatic Habitat Management Strategy.
- 6.1.14 Continue to develop and implement aquatic habitat enhancement projects.

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

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

Short-term

- 6.2.1 Determine the appropriate application of the WCPR program.
- 6.2.2 Install, maintain and monitor at least one Southeastern American kestrel nest box.
- 6.2.3 Continue to monitor the one known Southern bald eagle nest.
- 6.2.4 Continue to collect opportunistic wildlife species occurrence data.

Long-term

- 6.2.5 If applicable, develop and implement a WCPR strategy to manage specific habitats and monitor identified species.
- 6.2.6 Continue to maintain and monitor at least one Southeastern American kestrel nest box.
- 6.2.7 Continue to monitor the one known Southern bald eagle nest.
- 6.2.8 Continue to collect opportunistic wildlife species occurrence data.

## **6.3 Fisheries Management**

Short-term

- 6.3.1 Continue intensive management of existing game fish resources through public use and harvest regulations, stocking programs, commercial harvesting of non-native fishes, construction and placement of fish attractors, assessment of existing fisheries resources through fish sampling and water quality monitoring, and reestablishment of desirable and control of nuisance/invasive aquatic plants.

Long-term

- 6.3.2 Continue intensive management of existing game fish resources through public use and harvest regulations, stocking programs, commercial harvesting of non-native fishes, construction and placement of fish attractors, assessment of existing fisheries resources through fish sampling and water quality monitoring, and reestablishment of desirable and control of nuisance/invasive aquatic plants.

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

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

Short-term

- 6.4.1 Annually treat at least 590 acres of FLEPPC Category I and Category II invasive exotic plant species (250 acres of upland invasive exotic plant species and 340 acres of aquatic invasive exotic plant species).
- 6.4.2 Continue to implement control measures on one exotic and nuisance animal species (feral hog); as feasible, implement a commercial harvest control measures on one exotic fish species (blue tilapia).

Long-term

- 6.4.3 Continue to annually treat at least 590 acres of FLEPPC Category I and Category II invasive exotic plant species (250 acres of upland invasive exotic plant species and 340 acres of aquatic invasive exotic plant species).
- 6.4.4 Continue to implement control measures on one exotic and nuisance animal species (feral hog); as feasible, continue to implement a commercial harvest control measures on one exotic fish species (blue tilapia).

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

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

Short-term

- 6.5.1 Maintain public access and recreational opportunities to allow for a recreational carrying capacity of 1,603 visitors per day (boat fishing, bank fishing, trails and shooting range).
- 6.5.2 Develop additional public access and recreational opportunities, including a new public sporting clays course (Figure 12), resulting in an increase of the carrying capacity by 288 visitors per day.
- 6.5.3 Continue to provide 35 interpretive/education programs (three web sites, six kiosks, one trail brochure, one bird list, ten hunter education training events, and 20 fishing education events).
- 6.5.4 Develop two new interpretive/education programs (one Youth Hunter Education Challenge Program, one new trail guide).

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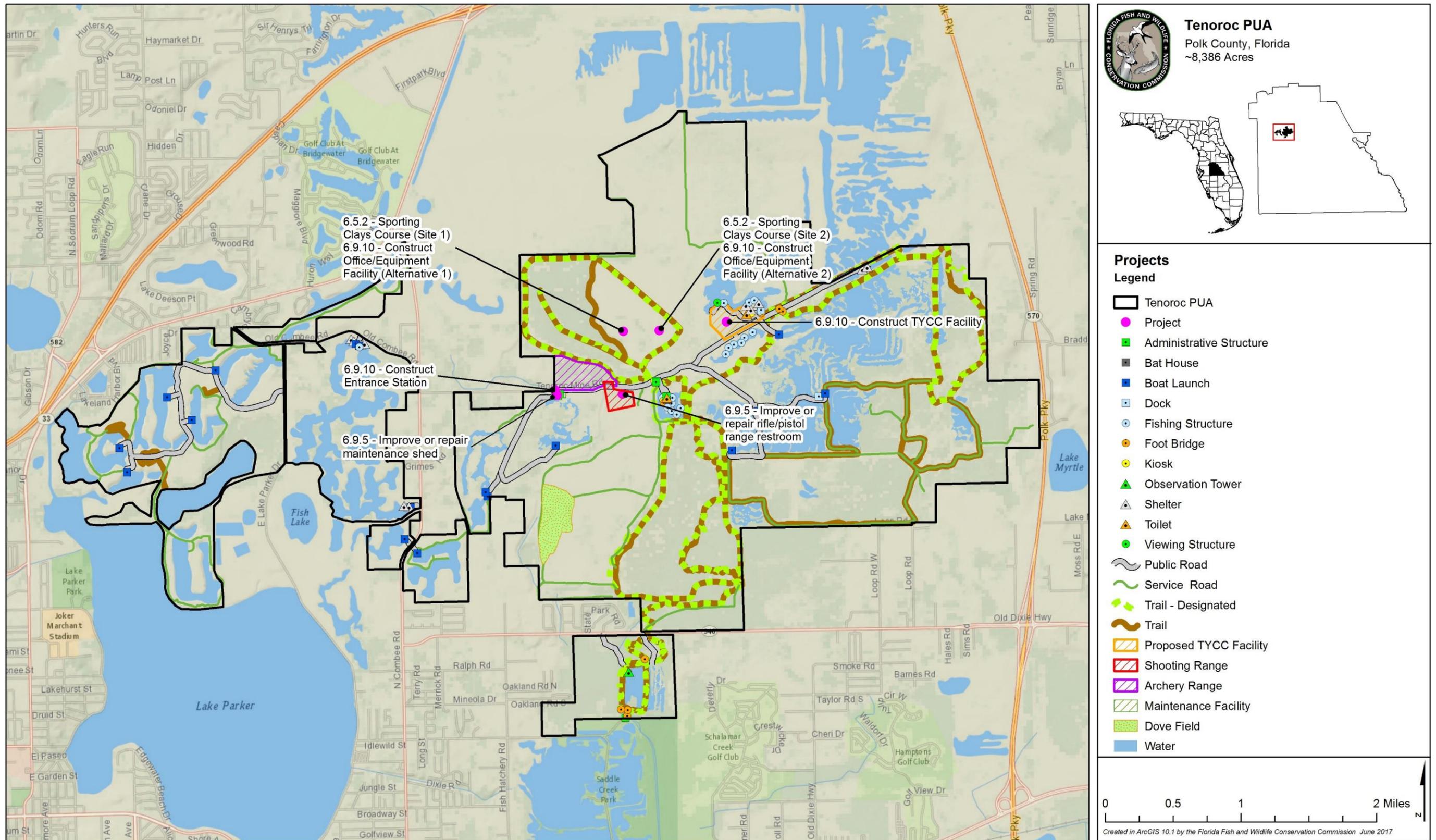


Figure 12. Facility Enhancement Projects

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- 6.5.5 Maintain 31.7 miles of trails existing on site.
- 6.5.6 Continue to maintain user participation in shotgun, rifle, pistol, and archery shooting sports.
- 6.5.7 Continue to cooperate and coordinate with the Ridge Archers organization in maintaining the 3-D archery range, conducting archery tournaments and other archery-related events.
- 6.5.8 Develop and implement a new dove hunting opportunity.
- 6.5.9 Continue to provide boat and bank fishing opportunities.
- 6.5.10 Continue to provide a Special Opportunity alligator hunt.
- 6.5.11 Continue to provide paddling opportunities on appropriate water bodies.
- 6.5.12 Continue to conduct angler use, success, and satisfaction surveys.
- 6.5.13 Develop additional public use and satisfaction surveys.
- 6.5.14 Continue to maintain an annual largemouth bass catch rate of 0.5 fish per hour on TPUA permitted fishing lakes.
- 6.5.15 Continue to maintain an annual average sunfish catch rate of 1.75 fish per hour on TPUA permitted fishing lakes.
- 6.5.16 Continue to maintain an annual average black crappie catch rate of 1.25 fish per hour on TPUA permitted fishing lakes.

#### Long-term

- 6.5.17 Continue to maintain public access and recreational opportunities to allow for a recreational carrying capacity of 1,891 visitors per day (boat fishing, bank fishing, trails and shooting range).
- 6.5.18 Develop a Recreation Master Plan.
- 6.5.19 In conjunction with development of the Recreation Master Plan, continue to coordinate trail development with the City of Lakeland to integrate the TPUA trail system with the broader SUNTrail network providing connectivity within the Coast-to-Coast Trail Corridor.
- 6.5.20 Monitor trails annually for visitor impacts.
- 6.5.21 Reassess recreational opportunities periodically.

- 6.5.22 Continue to provide paddling opportunities and supporting wayfinding on appropriate water bodies.
- 6.5.23 Continue to provide boat and bank fishing opportunities.
- 6.5.24 Continue to provide a Special Opportunity alligator hunt and dove hunting.
- 6.5.25 Continue to maintain user participation in shotgun, rifle, pistol, and archery shooting sports.
- 6.5.26 Continue to cooperate and coordinate with the Ridge Archers organization in maintaining the 3-D archery range, conducting archery tournaments and other archery-related events.
- 6.5.27 Evaluate the potential for additional hunting opportunities such as waterfowl and feral hog.
- 6.5.28 Develop site-based conservation education programs at the TYCC.
- 6.5.29 Develop additional youth and family recreational opportunities.
- 6.5.30 Develop new boat and bank fishing opportunities.
- 6.5.31 Continue to conduct angler use, success, and satisfaction surveys.
- 6.5.32 Continue to maintain an annual largemouth bass catch rate of 0.5 fish per hour on TPUA permitted fishing lakes.
- 6.5.33 Continue to maintain an annual average sunfish catch rate of 1.75 fish per hour on TPUA permitted fishing lakes.
- 6.5.34 Continue to maintain an annual average black crappie catch rate of 1.25 fish per hour on TPUA permitted fishing lakes.
- 6.5.35 Continue to identify partnerships that could provide for conservation educational programs and outreach.
- 6.5.36 Continue to cooperate with other agencies, Polk County, the City of Lakeland, stakeholders, and regional landowners to investigate regional recreational opportunities including linking hiking, and multi-use trail systems between adjacent public areas.
- 6.5.37 Continue to maintain and enhance 35.9 miles of trails existing on site.
- 6.5.38 Reassess recreational opportunities periodically.
- 6.5.39 Continue to maintain dove hunting opportunities.

## **6.6 Hydrological Preservation and Restoration**

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

Short-term

- 6.6.1 Continue to manage and maintain hydrological systems water levels and flows.
- 6.6.2 Continue to cooperate with the SWFWMD, DEP, Polk County, and the City of Lakeland for the monitoring of surface and ground water quality and quantity.
- 6.6.3 As recommended by the Upper Peace River/Saddle Creek Restoration Plan, continue to install and maintain low-water crossings, culverts, water control structures, and staff gauges to maintain and enhance hydrological functions.

Long-term

- 6.6.4 Continue to manage and maintain hydrological systems water levels and flows.
- 6.6.5 Continue to cooperate with the SWFWMD, DEP, Polk County, and the City of Lakeland for the monitoring of surface and ground water quality and quantity.
- 6.6.6 As recommended by the Upper Peace River/Saddle Creek Restoration Plan, continue to install and maintain low-water crossings, culverts, water control structures, and staff gauges to maintain and enhance hydrological functions.

## **6.7 Forest Resource Management**

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

Short-term

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

Long-term

- 6.7.3 Continue to consult with the FFS or a professional forestry consultant regarding forest management activities as appropriate.
- 6.7.4 Reevaluate the existing reforestation plan in conjunction with development of the Habitat Enhancement Strategy.

## **6.8 Historical Resources**

**Goal: Protect, preserve and maintain historical resources.**

Short-term

- 6.8.1 Continue to annually monitor, protect, and preserve five identified sites (PO06223, PO06446, PO06152, PO01528 and PO01529).
- 6.8.2 Ensure all known sites are recorded in the Florida Division of Historical Resources Master Site file.
- 6.8.3 Coordinate with DHR to assess the need for conducting additional cultural resource surveys.
- 6.8.4 Cooperate with DHR in designing site plans for development of infrastructure.
- 6.8.5 Cooperate with DHR to manage and maintain known historical resources.
- 6.8.6 Coordinate with DHR for Archaeological Resource Management guidelines staff training.
- 6.8.7 Continue to follow DHR's Management Procedures for Archaeological and Historical Sites and Properties on State-Owned or Controlled Properties for the management of historical resources.

Long-term

- 6.8.8 Continue to annually monitor, protect, and preserve five identified sites (PO06223, PO06446, PO06152, PO01528 and PO01529)
- 6.8.9 Cooperate with DHR in designing site plans for development of infrastructure.
- 6.8.10 Cooperate with DHR to manage and maintain known historical resources.
- 6.8.11 Coordinate with DHR for Archaeological Resource Management guidelines staff training.
- 6.8.12 Continue to follow DHR's Management Procedures for Archaeological and Historical Sites and Properties on State-Owned or Controlled Properties for the management of historical resources.

## **6.9 Capital Facilities and Infrastructure**

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

#### Short-term

- 6.9.1 Continue to maintain 59 facilities.
- 6.9.2 Maintain 33.4 miles of roads.
- 6.9.3 Maintain 31.7 miles of trails existing on site.
- 6.9.4 Construct 1 facility (sporting clays course; Figure 12), 4.5 miles of roads, and 4.2 miles of trails.
- 6.9.5 Improve or repair three facilities (maintenance shed, Picnic Lake restroom, rifle/pistol range restroom; Figure 12); improve or repair four miles of roads, and two miles of trails existing on site.

#### Long-term

- 6.9.6 Monitor trails and infrastructure biannually for visitor impacts.
- 6.9.7 Continue to maintain 59 facilities.
- 6.9.8 Continue to maintain 33.4 miles of roads.
- 6.9.9 Continue to maintain 31.7 miles of trails existing on site.
- 6.9.10 Construct 12 new facilities (TYCC, Entrance Station, Picnic Lake Trailhead, three boat ramps, four fishing facilities, Legs Lake Picnic Pavilion, Office/Equipment Facility; Figure 12).

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

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

#### Short-term

- 6.10.1 Complete the remaining portions of the TPUA boundary survey.
- 6.10.2 Identify potential important wildlife habitat, landscape-scale linkages, wildlife corridors, and operational/resource management needs.
- 6.10.3 Identify and develop conservation stewardship partnerships.
- 6.10.4 Identify and pursue conservation acquisition needs.

- 6.10.5 Develop and maintain a GIS shapefile and other necessary data to facilitate nominations from the FWC OCPB and for FWC's LAP and Land Acquisition Programs.
- 6.10.6 Develop a Conservation Action Strategy.
- 6.10.7 Contact and inform adjoining landowners about the FWC Landowners Assistance Program to pursue non-acquisition conservation stewardship, partnerships, and potential conservation easements.
- 6.10.8 Determine which parcels should be added to the FWC acquisition list.
- 6.10.9 Identify potential non-governmental organization partnerships and grant program opportunities.
- 6.10.10 Determine efficacy of conducting an adjacent landowner's assistance/conservation stewardship partnership workshop.
- 6.10.11 Identify potential conservation easements donations.
- 6.10.12 Evaluate and determine if any portions of TPUA are no longer needed for conservation purposes, and therefore may be designated as surplus lands.
- 6.10.13 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 TPUA.

#### Long-term

- 6.10.14 To minimize fragmentation of the area, continue to identify strategic parcels to revise the completed OCPB for TPUA as appropriate and necessary.
- 6.10.15 Continue to identify and develop conservation stewardship partnerships.
- 6.10.16 Continue to identify and pursue conservation acquisition needs.
- 6.10.17 Continue to propose nominations of selected properties as additions to the FWC acquisition list.
- 6.10.18 Continue to maintain a GIS shapefile and other necessary data to facilitate nominations from the FWC OCPB and for the FWC LAP and Land Acquisition Program.
- 6.10.19 Continue to pursue acquisition of parcels added to the FWC acquisition list as acquisition work plan priorities and funding allow.

- 6.10.20 As feasible, continue to periodically contact and meet with adjacent landowners for willingness to participate in the Conservation Action Strategy, and coordinate landowner assistance/conservation stewardship partnership workshops as deemed appropriate.
- 6.10.21 Coordinate and conduct landowner assistance/conservation stewardship partnership workshop(s) as necessary and appropriate.
- 6.10.22 Continue to identify potential conservation easements donations.
- 6.10.23 Continue to evaluate and determine if any portions of TPUA are no longer needed for conservation purposes, and therefore may be designated as surplus lands.
- 6.10.24 Continue to 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 TPUA.

## **6.11 Cooperative Management and Special Uses**

### Short-term

- 6.11.1 Coordinate and cooperate with Department of Defense military branches and first-responders to allow for training opportunities for military personnel and other initiatives as appropriate and compatible with the management and conservation of TPUA.
- 6.11.2 Continue to cooperate with adjacent private landowners for road access, prescribed burning, exotic species control, and other management issues as needed.
- 6.11.3 Continue to cooperate with the SWFWMD, DEP, Polk County, City of Lakeland, and USACOE on hydrological restoration efforts on TPUA.

### Long-term

- 6.11.4 Coordinate and cooperate with Department of Defense military branches and first-responders to allow for training opportunities for military personnel and other initiatives as appropriate and compatible with the management and conservation of TPUA.
- 6.11.5 Continue to cooperate with adjacent private landowners for road access, prescribed burning, exotic species control, and other management issues as needed.

6.11.6 Continue to cooperate with the SWFWMD, DEP, Polk County, City of Lakeland, and United States Army Corps of Engineers (USACOE) on hydrological restoration efforts on TPUA.

## **6.12 Climate Change Adaptation**

**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 TPUA.**

Long-term

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

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

6.12.3 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; assess the need to incorporate public education about climate change into the update of the TPUA Recreation Master Plan.

6.12.4 If applicable, incorporate appropriate climate change adaptation strategies into the WCPR Strategy for TPUA.

## **6.13 Research Opportunities**

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

Long-term

6.13.1 To facilitate continued research, continue to cooperate with the University of Florida and Florida Polytechnic University's Florida Industrial and Phosphate Research (FIPR) Institute.

6.13.2 Explore and pursue additional cooperative research opportunities through universities, institutes and others as appropriate.

## **7 Resource Management Challenges and Strategies**

The following section identifies problems, further describes management needs and challenges associated with the TPUA, and provides solution strategies that will address these issues. These specific challenges are provided to supplement the broader management intent, and goals and objectives sections of this management plan found above (Sections 5 - 6).

### **7.1 Challenge: Two small parcels within TPUA have zoning designations (Commercial Enclave and Residential Suburban) within the Comprehensive Plans for Polk County and the City of Lakeland that do not allow for the full suite of uses contemplated on TPUA.**

7.1.1 Strategy: Consult with DSL to determine the efficacy of applying for a zoning variance for these parcels.

7.1.2 Strategy: If determined to be necessary, work with Polk County and the City of Lakeland to process a zoning variance for these parcels.

### **7.2 Challenge: Currently there are ongoing boundary delineation and management issues at TPUA.**

7.2.1 Strategy: Address property boundary issues by working with individual landowners to resolve boundary issues with adjacent land owners.

7.2.2 Strategy: Complete fencing along the boundary of the area.

### **7.3 Challenge: Currently there are conflicting land uses on adjacent properties.**

7.3.1 Strategy: Establish and maintain positive relationships with adjoining landowners and provide adequate notice of major activities occurring on the TPUA.

7.3.2 Strategy: Actively pursue acquisition of in-holdings and additions.

7.3.3 Strategy: Offer technical assistance and advice to help ensure compatible off-site development and methods to maintain or enhance existing natural habitats.

7.3.4 Strategy: Maintain active working relationships with regulatory agencies, including Polk County, SWFWMD, and DEP.

### **7.4 Challenge: Currently there are ongoing problems of illegal entry and illegal activities (such as illegal taking of fish, dumping, vandalism, poaching of non-game species, etc.) being conducted on the area.**

- 7.4.1 Strategy: Work cooperatively with FWC, Division of Law Enforcement to target specific areas of known illegal activity to reduce violations and maintain compliance with existing laws and regulations.
- 7.5 Challenge: Currently the area has insufficient staff and resources to optimally manage the increasing needs of the area with current staff, equipment, and funding.**
- 7.5.1 Strategy: Seek funding and approval for additional FWC and DEP staff positions at TPUA to assist in dealing with increasing maintenance and management activities.
- 7.6 Challenge: Currently there are insufficient levels of ongoing communication with stakeholders and adjacent property owners.**
- 7.6.1 Strategy: Develop a communication network utilizing e-mail, telephone, and staff public outreach.
- 7.6.2 Strategy: Maintain communication with the Florida Trail Association and other volunteer groups.
- 7.6.3 Strategy: Conduct quarterly/bi-annual meetings to discuss ongoing and proposed management activities on the property.
- 7.6.4 Strategy: Utilize the new FWC GovDelivery System for TPUA to increase and maintain better communication with interested stakeholders.
- 7.7 Challenge: Currently there are insufficient levels of public awareness about TPUA.**
- 7.7.1 Strategy: Maintain an updated website for the TPUA.
- 7.7.2 Strategy: Implement marketing efforts to inform the public of the recreation opportunities available at TPUA.
- 7.7.3 Strategy: Conduct workshops, events, and public meetings to present information describing ongoing management, as well as promoting existing and planned activities available to the public.
- 7.7.4 Strategy: Develop interpretive kiosks that convey the purpose of the property as put forth in the lease agreement.
- 7.8 Challenge: Developing additional recreational opportunities for the public, including resources for the disabled.**

- 7.8.1 Strategy: Maintain communication with stakeholder and other volunteer groups interested in working with DEP and FWC staff on the maintenance of existing and the planning and development of new recreational opportunities.
  - 7.8.2 Strategy: Include representatives from groups involved in hiking, biking, horseback riding, and bird/wildlife viewing to avoid conflicts of common use areas.
  - 7.8.3 Strategy: Begin discussions with Wounded Warriors to determine interest and feasibility of developing appropriate programs at TPUA.
- 7.9 Challenge: Improving coordination and cooperation between the FWC, DEP, and FFS on resource management activities (prescribed burns, mowing, nuisance/exotic species control, etc.).**
- 7.9.1 Strategy: Schedule frequent/regular meetings for representatives to attend to discuss current and future management and maintenance activities.

## 8 Cost Estimates and Funding Sources

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

The cost estimate below, although exceeding what FWC typically receives through the appropriations process, is estimated to be what is necessary for optimal management, and is consistent with the current and planned resource management and operation of TPUA. Cost estimate categories are those currently recognized by FWC and the Land Management Uniform Accounting Council. More information on these categories, as well as the Fiscal Year 2016 - 2017 operational plan showing detailed cost estimates by activity and categories of expenditures, may be found in Appendix 12.10.

## Tenoroc PUA Management Plan Cost Estimate

### *Maximum expected one year expenditure*

<u>Resource Management</u>	<u>Expenditure</u>	<u>Priority</u>
Exotic Species Control	\$160,350	(1)
Prescribed Burning	\$15,891	(1)
Cultural Resource Management	\$324	(1)
Timber Management	\$7,171	(1)
Hydrological Management	\$95,864	(1)
Other (Restoration, Enhancement, Surveys, Monitoring, etc.)	\$181,353	(1)
<b>Subtotal</b>	<b>\$460,953</b>	
<u>Administration</u>		
General administration	\$76,089	(1)
<u>Support</u>		
Land Management Planning	\$36,901	(1)
Land Management Reviews	\$10,062	(3)
Training/Staff Development	\$4,853	(1)
Vehicle Purchase	\$404,893	(2)
Vehicle Operation and Maintenance	\$39,637	(1)
Other (Technical Reports, Data Management, etc.)	\$86,043	(1)
<b>Subtotal</b>	<b>\$582,390</b>	
<u>Capital Improvements</u>		
New Facility Construction	\$7,120,248	(2)
Facility Maintenance	\$176,428	(1)
<b>Subtotal</b>	<b>\$7,296,675</b>	
<u>Visitor Services/Recreation</u>		
Info./Education/Operations	\$1,005,452	(1)
<u>Law Enforcement</u>		
Resource protection	\$7,659	(1)
<b>Total</b>	<b>\$9,429,219</b>	*

#### **Priority schedule:**

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

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

**Tenoroc PUA Management Plan Cost Estimate**  
***Ten-year projection***

	<b><u>Expenditure</u></b>	<b><u>Priorit</u></b>
	<b><u>Y</u></b>	
<b><u>Resource Management</u></b>		
Exotic Species Control	\$1,408,853	(1)
Prescribed Burning	\$139,622	(1)
Cultural Resource Management	\$2,843	(1)
Timber Management	\$63,005	(1)
Hydrological Management	\$842,271	(1)
Other (Restoration, Enhancement, Surveys, Monitoring, etc.)	\$1,593,387	(1)
<b>Subtotal</b>	<b>\$4,049,981</b>	
<b><u>Administration</u></b>		
General administration	<b>\$668,524</b>	(1)
<b><u>Support</u></b>		
Land Management Planning	\$324,220	(1)
<b>Land Management Reviews</b>	\$28,803	(3)
Training/Staff Development	\$42,642	(1)
<i>Vehicle Purchase</i>	\$1,424,836	(2)
Vehicle Operation and Maintenance	\$348,259	(1)
Other (Technical Reports, Data Management, etc.)	\$755,985	(1)
<b>Subtotal</b>	<b>\$2,924,745</b>	
<b><u>Capital Improvements</u></b>		
<i>New Facility Construction</i>	\$6,326,248	(2)
Facility Maintenance	\$1,550,114	(1)
<b>Subtotal</b>	<b>\$7,876,361</b>	
<b><u>Visitor Services/Recreation</u></b>		
Info./Education/Operations	<b>\$8,834,012</b>	(1)
<b><u>Law Enforcement</u></b>		
Resource protection	<b>\$67,295</b>	(1)
<b><u>Total</u></b>	<b>\$24,420,919</b>	<b>*</b>

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

\* Based on the characteristics and requirements of this area, two 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 FWC either does not have in-house expertise to accomplish or which can be done at less cost by an outside provider of services. Those items selected as “conditional” items are those that could be done either by an outside provider or by the agency at virtually the same cost or with the same level of competence. Items selected as “rejected” represent those for which FWC has in-house expertise and/or which the agency has found it can accomplish at less expense than through contracting with outside sources:

	<b>Approved</b>	<b>Conditional</b>	<b>Rejected</b>
• 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 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 TPUA are in compliance with the Conceptual State Lands Management Plan and its requirement for “balanced public utilization,” and are in compliance with the mission of FWC as described in its Agency Strategic Plan (Appendix 12.8). 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 TPUA in compliance with Chapter 388.4111 F.S. (Appendix 12.11). This plan was developed in cooperation with the local Polk County arthropod control agency. This plan is also in conformance with the Local Government Comprehensive Plan as approved and adopted for Polk County, Florida, (Appendix 12).

## 11 Endnotes

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- <sup>4</sup> Regulatory Negotiation Committee on Accessibility Guidelines for Outdoor Developed Areas, Final Report (1999).
- <sup>5</sup> Karl, T. R., J. M. Melillo, and T. C. Peterson (Eds.). 2009. *Global Climate Change Impacts in the United States*. Cambridge University Press. New York, NY.
- <sup>6</sup> McCarty, J. P. 2001. Ecological consequences of recent climate change. *Conservation Biology* 15:320-331.
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- <sup>8</sup> Parmesan, C. 2006. Ecological and evolutionary responses to recent climate change. *Annual Review of Ecology, Evolution, and Systematics* 37:637-669.
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- <sup>10</sup> Stevenson, J. C., M. S. Kearney, and E. W. Koch. 2002. Impacts of sea level rise on tidal wetlands and shallow water habitats: A case study from Chesapeake Bay. *American Fisheries Society Symposium* 32:23-36.
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- <sup>12</sup> Emanuel, K.A. 1987. The Dependence of Hurricane Intensity on Climate. *Nature* 326: 483-485.
- <sup>13</sup> Emanuel, K.A. 2005. Increasing Destructiveness of Tropical Cyclones Over the Past 30 Years.
- <sup>14</sup> Webster et al. 2005; Webster, P. J., et al. 2005. Changes in Tropical Cyclone Number, Duration, and Intensity, in a Warming Environment. *Science* 309: 1844–1846.
- <sup>15</sup> Mann, M.E. and K.A. Emanuel. 2006. Atlantic Hurricane Trends Linked to Climate Change. *Eos Trans. AGU* 87: 233-244.
- <sup>16</sup> Stanton, E.A. and F. Ackerman. 2007. *Florida and Climate Change: The Costs of Inaction*. Tufts University Global Development and Environment Institute and Stockholm Environment Institute–US Center, Tufts University, Medford, MA.
- <sup>17</sup> Clough, J.S. 2008. *Application of the Sea-Level Affecting Marshes Model (SLAMM 5.0) to Crystal River NWR*. Warren Pinnacle Consulting, Inc. for U.S. Fish and Wildlife Service. 46 pp.