A Management Plan for

Guana River

Wildlife Management Area

2015 - 2025

St. Johns County, Florida

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

Volume 1 of 2

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FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
MARJORY STONEMAN DOUGLAS BUILDING
3900 COMMONWEALTH BOULEVARD
TALLAHASSEE, FLORIDA 32399-3000

RICK SCOTT
GOVERNOR

CARLOS LOPEZ-CANTERA
LT. GOVERNOR

JONATHAN P. STEVERSON
SECRETARY

February 16, 2015

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

RE: Guana River Wildlife Management Area Management Plan - Lease No. 3585

Dear Mr. Cochran:

The Division of State Lands, Office of Environmental Services, acting as agent for the Board of Trustees of the Internal Improvement Trust Fund, hereby approves the Guana River Wildlife Management Area management plan. The next management plan update is due February 16, 2025.

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

Sincerely,

Paula L. Allen for Marianne Gengenbach

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

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A Management Plan
for
Guana River Wildlife Management Area

St. Johns County, Florida

Owned by the Board of Trustees of the Internal Improvement Trust Fund

Managed by the Florida Fish and Wildlife Conservation Commission

October 2014

Thomas H. Eason

Thomas Eason, Division Director
Division of Habitat and Species Conservation

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LAND MANAGEMENT PLAN EXECUTIVE SUMMARY

Lead Agency: Florida Fish and Wildlife Conservation Commission (FWC)
Common Name of Property: Guana River WMA
Location: St. Johns County, Florida
Acreage Total: 9,815 acres
Acreage Breakdown:

Land Cover Classification	Acres	Percent of Total Area
Impoundment/Artificial pond	2442.3	26.7%
Salt marsh	2218.3	24.3%
Mesic flatwoods	1708.6	18.7%
Maritime hammock	809.7	8.9%
Scrub	356.9	3.9%
Scrubby flatwoods	352.9	3.9%
Xeric hammock	291.7	3.2%
Mesic hammock	240.4	2.6%
Depression marsh	218.6	2.4%
Basin swamp	142.7	1.6%
Basin marsh	104.9	1.1%
Pine plantation	87.5	1.0%
Spoil area	38.9	0.4%
Wet flatwoods	35.7	0.4%
Baygall	32.6	0.4%
Clearing	24.4	0.3%
Marsh lake	22.7	0.2%
Dome swamp	8.0	0.1%
Hydric hammock	1.5	0.0%
Developed	0.9	0.0%

*GIS-calculated acreage for land cover classification varies slightly from actual total acreage.
Lease/Management Agreement No.: 3585 (Appendix 13.1)
Use: Single _____ Management Responsibilities:
Multiple X Agency FWC Responsibilities
LEAD, SUBLESSEE (Wildlife Management Area, resource protection, law enforcement)
Designated Land Use: Wildlife Management Area
Sublease (s): None
Encumbrances: List: Cooperative agreement for enhancement of waterfowl habitat, Memorandum of Understanding concerning emergency control of the Guana Dam, lease agreement for Six Mile Landing Boat Ramp, Memorandum of Agreement and Project Cooperation Agreement regarding wetland restoration mitigation project, Memorandum of Agreement for cooperative management of the Guana Tolomato Matanzas National Estuarine Research Reserve, agreement for construction and operation of rain gauge, apiary agreement (Section 1.6).
Type Acquisition: CARL
Unique Features: Natural: Lake Ponte Vedra, wood stork and other wading bird colonies, and a variety of natural communities.
Archaeological/Historical: 26 documented within GRWMA.

Management Needs: Habitat restoration and improvement; public access and recreational opportunities; hydrological preservation and restoration; exotic and invasive species maintenance and control; imperiled species habitat maintenance, enhancement, and restoration.
Acquisition Needs/Acreage: 100-acre parcel and 10-acre parcel FWC Additions and Inholdings list.
Surplus Lands/Acreage: None
Public Involvement: Management Advisory Group consensus building meeting and Public Hearing (Appendix 13.4)

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

ARC Approval Date _____ BTIITF Approval Date: _____
Comments: _____

Land Management Plan Compliance Checklist

Required for State-owned conservation lands over 160 acres

Section A: Acquisition Information Items			
Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
1	The common name of the property.	18-2.018 & 18-2.021	1
2	The land acquisition program, if any, under which the property was acquired.	18-2.018 & 18-2.021	i, 6
3	Degree of title interest held by the Board, including reservations and encumbrances such as leases.	18-2.021	7-8
4	The legal description and acreage of the property.	18-2.018 & 18-2.021	i, 1, 127-162
5	A map showing the approximate location and boundaries of the property, and the location of any structures or improvements to the property.	18-2.018 & 18-2.021	4, 5, 9, 79
6	An **assessment** as to whether the property, or any portion, should be declared surplus. *Provide Information regarding assessment and analysis in the plan, and provide corresponding map.*	18-2.021	57
7	Identification of other parcels of land within or immediately adjacent to the property that should be purchased because they are essential to management of the property. *Please clearly indicate parcels on a map.*	18-2.021	81-83, 117
8	Identification of adjacent land uses that conflict with the planned use of the property, if any.	18-2.021	7-8
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)	6-7
10	Proximity of property to other significant State, local or federal land or water resources.	18-2.021	8-13, 51

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	54-56, 7-8
12	A description of past and existing uses, including any unauthorized uses of the property.	18-2.018 & 18-2.021	53-55
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	55-56
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	6-8, 85-86
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	77-78, 431-435

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	85-86
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)	72-75, 54-55
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	123
19	Letter of compliance from the local government stating that the LMP is in compliance with the Local Government Comprehensive Plan.	BOT requirement	806
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	56, 75-76, 88
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	54-56
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	77, 547-731
23	A statement regarding incompatible use in reference to Ch. 253.034(10).	253.034(10)	55-56

*The following taken from 253.034(10) is not a land management plan requirement; however, it should be considered when developing a land management plan: The following additional uses of conservation lands acquired pursuant to the Florida Forever program and other state-funded conservation land purchase programs shall be authorized, upon a finding by the Board of Trustees, if they meet the criteria specified in paragraphs (a)-(e): water resource development projects, water supply development projects, storm-water management projects, linear facilities and sustainable agriculture and forestry. Such additional uses are authorized where: (a) Not inconsistent with the management plan for such lands; (b) Compatible with the natural ecosystem and resource values of such lands; (c) The proposed use is appropriately located on such lands and where due consideration is given to the use of other available lands; (d) The using entity reasonably compensates the titleholder for such use based upon an appropriate measure of value; and (e) The use is consistent with the public interest.

Section C: Public Involvement Items			
Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
24	A statement concerning the extent of public involvement and local government participation in the development of the plan, if any.	18-2.021	14-15
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)	320-363
26	LMPs and LMP updates for parcels over 160 acres shall be developed with input from an advisory group who must conduct at least one public hearing within the county in which the parcel or project is located. *Include the advisory group members and their affiliations, as well as the date and location of the advisory group meeting.*	259.032(10)	299-309
27	Summary of comments and concerns expressed by the advisory group for parcels over 160 acres	18-2.021	299-307
28	During plan development, at least one public hearing shall be held in each affected county. Notice of such public hearing shall be posted on the parcel or project designated for management, advertised in a paper of general circulation, and announced at a scheduled meeting of the local governing body before the actual public hearing. *Include a copy of each County's advertisements and announcements (meeting minutes will suffice to indicate an announcement) in the management plan.*	253.034(5) & 259.032(10)	310-319
29	The manager shall consider the findings and recommendations of the land management review team in finalizing the required 10-year update of its management plan. *Include manager's replies to the team's findings and recommendations.*	259.036	61, 364-379
30	Summary of comments and concerns expressed by the management review team, if required by Section 259.036, F.S.	18-2.021	364-379
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	364-379

Section D: Natural Resources			
Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
32	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding soil types. *Use brief descriptions and include USDA maps when available.*	18-2.021	16-18, 380-397
33	Insert FNAI based natural community maps when available.	ARC consensus	20
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	15-16, 27-36, 51-52

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	15-16, 27-36, 51-52
36	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding beaches and dunes.	18-2.021	504
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	52
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	36-50
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	48-50
40	The identification or resources on the property that are listed in the Natural Areas Inventory. *Include letter from FNAI or consultant where appropriate.*	18-2.021	49-50, 399
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)	61-121
42	Habitat Restoration and Improvement	259.032(10) & 253.034(5)	
42-A.	Describe management needs, problems and a desired outcome and the key management activities necessary to achieve the enhancement, protection and preservation of restored habitats and enhance the natural, historical and archeological resources and their values for which the lands were acquired.	↓	61-121
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.		90-116
42-C.	The associated measurable objectives to achieve the goals.		90-104
42-D.	The related activities that are to be performed to meet the land management objectives and their associated measures. *Include fire management plans - they can be in plan body or an appendix.*		61-121, 436-450
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.		119-121, 788-799
43	***Quantitative data description of the land regarding an inventory of forest and other natural resources and associated acreage. *See footnote.*	253.034(5)	19
44	Sustainable Forest Management, including implementation of prescribed fire management	18-2.021, 253.034(5) & 259.032(10) ↓	
44-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).		61-121

44-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		90-116
44-C.	Measurable objectives (see requirement for #42-C).		90-104
44-D.	Related activities (see requirement for #42-D).		61-121, 436-450
44-E.	Budgets (see requirement for #42-E).		119-121, 788-799
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).	↓	61-121
45-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		90-116
45-C.	Measurable objectives (see requirement for #42-C).		90-104
45-D.	Related activities (see requirement for #42-D).		61-121
45-E.	Budgets (see requirement for #42-E).		119-121, 788-799
46	***Quantitative data description of the land regarding an inventory of exotic and invasive plants and associated acreage. *See footnote.*	253.034(5)	70-71
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	799-804
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).	↓	61-121
48-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		90-116
48-C.	Measurable objectives (see requirement for #42-C).		90-104
48-D.	Related activities (see requirement for #42-D).		61-121
48-E.	Budgets (see requirement for #42-E).		119-121, 788-799

Section E: Water Resources

Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
49	A statement as to whether the property is within and/or adjacent to an aquatic preserve or a designated area of critical state concern or an area under study for such designation. *If yes, provide a list of the appropriate managing agencies that have been notified of the proposed plan.*	18-2.018 & 18-2.021	1-3, 8-14, 51, 85

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	51
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	15-35, 51
52	***Quantitative description of the land regarding an inventory of hydrological features and associated acreage. *See footnote.*	253.034(5)	15-35, 51, 75-77
53	Hydrological Preservation and Restoration	259.032(10) & 253.034(5)	
53-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	61-121
53-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		90-116
53-C.	Measurable objectives (see requirement for #42-C).		90-104
53-D.	Related activities (see requirement for #42-D).		61-121
53-E.	Budgets (see requirement for #42-E).		119-121, 788-799

Section F: Historical, Archeological and Cultural Resources

Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
54	**Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding archeological and historical resources. *Include maps of all cultural resources except Native American sites, unless such sites are major points of interest that are open to public visitation.*	18-2.018, 18-2.021 & per DHR's request	52, 77-78, 431-433
55	***Quantitative data description of the land regarding an inventory of significant land, cultural or historical features and associated acreage.	253.034(5)	52, 77-78, 431-433
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	52, 77-78
57	Cultural and Historical Resources	259.032(10) & 253.034(5)	
57-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	61-121
57-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		90-116
57-C.	Measurable objectives (see requirement for #42-C).		90-104
57-D.	Related activities (see requirement for #42-D).		61-121
57-E.	Budgets (see requirement for #42-E).		119-121, 788-799

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

Section G: Facilities (Infrastructure, Access, Recreation)			
Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
58	***Quantitative data description of the land regarding an inventory of infrastructure and associated acreage. *See footnote.*	253.034(5)	78-79
59	Capital Facilities and Infrastructure	259.032(10) & 253.034(5)	
59-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	61-121
59-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		90-116
59-C.	Measurable objectives (see requirement for #42-C).		90-104
59-D.	Related activities (see requirement for #42-D).		61-121
59-E.	Budgets (see requirement for #42-E).		119-121, 788-799
60	*** Quantitative data description of the land regarding an inventory of recreational facilities and associated acreage.	253.034(5)	78-79, 72-75
61	Public Access and Recreational Opportunities	259.032(10) & 253.034(5)	
61-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	↓	61-121
61-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		90-116
61-C.	Measurable objectives (see requirement for #42-C).		90-104
61-D.	Related activities (see requirement for #42-D).		61-121
61-E.	Budgets (see requirement for #42-E).		119-121, 788-799

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-x
63	Place the Executive Summary at the front of the LMP. Include a physical description of the land.	ARC and 253.034(5)	i-ii
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	57-60
65	Key management activities necessary to achieve the desired outcomes regarding other appropriate resource management.	259.032(10)	61-121

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)	119-121, 788-799
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)	119-121, 788-799
68	A statement of gross income generated, net income and expenses.	18-2.018	54-55, 119-121, 788-799

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

Management Plan Compliance Checklist - Conservation Lands.xlsx

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1 Introduction and General Information

Positioned between the Tolomato River and A1A in northeast St. Johns County, immediately inland from the Atlantic Ocean along Florida's east coast, the Guana River Wildlife Management Area (GRWMA) conserves and protects a unique maritime ecosystem and harbors an array of imperiled, rare and more common fish and wildlife among its lakes, marshes, hammocks and flatwoods habitats. Prominent imperiled wildlife species that reside or migrate on the area include the wood stork, peregrine falcon, gopher tortoise, brown pelican, and eastern indigo snake.

The GRWMA contains a rich diversity of unique natural features that includes Lake Ponte Vedra, tidal salt marshes, aquatic impoundments, and interior uplands. The 2,000-acre Lake Ponte Vedra was impounded in the late 1950s and early 1960s to increase habitat for migratory wetland wildlife and is a popular destination for anglers, bird watchers, paddlers, and waterfowl hunters. Due to the high quality of the aquatic habitats within the Guana River tract, which encompasses the GRWMA, the Guana River tract was designated as the Guana River Marsh Aquatic Preserve in 1985.

The GRWMA is composed of 9,815 acres of the approximately 12,000 acre Guana River tract that was acquired by the State of Florida in 1984 and is adjacent to the 2,652-acre Guana-Tolomato-Matanzas National Estuarine Research Reserve – Guana River site, a Department of Environmental Protection (DEP) Florida Coastal Office (FCO) managed area. Additionally, the GRWMA is part of the Guana-Tolomato-Matanzas National Estuarine Research Reserve (GTMNERR), a 73,352-acre expanse of public conservation and recreation lands located midway between Jacksonville and St. Augustine.

Set within a mosaic of public conservation lands and in close proximity to large population centers, the GRWMA provides important water quality and flood plain protection for the region's rivers and wetlands. Simultaneously, the area also provides exceptional fish and wildlife-based public outdoor recreational opportunities including hunting, fishing, wildlife viewing, hiking, paddling and horseback riding among its outstanding public benefits.

The GRWMA is managed by the Florida Fish and Wildlife Conservation Commission (FWC) to conserve the natural and historic resources of the area, including habitat for an

assortment of imperiled and other native wildlife and to provide opportunities for fish and wildlife-based public outdoor recreation that is compatible with the conservation and protection of the area.

1.1 Management Plan Purpose

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

This Management Plan is submitted for review to the Acquisition and Restoration Council (ARC) acting on behalf of the Board of Trustees of the Internal Improvement Trust Fund (Board of Trustees) of the State of Florida through the DEP's Division of State Lands (DSL), in compliance with paragraph seven of Lease No. 3585 (Appendix 13.1) 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 (Appendix 13.3) used in this Management Plan describing management activities and associated measurable goals and objectives conform to those developed for the Land Management Uniform Accounting Council Biennial Land Management Operational Report.

1.1.1 FWC Planning Philosophy

FWC's planning philosophy includes emphasizing management recommendation consensus-building among stakeholders and input from user groups and the general public at the beginning of the planning process. FWC engages stakeholders by convening a Management Advisory Group (MAG) and solicits additional input from user groups and the general public at a public hearing (Appendix 13.4). 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 GRWMA Management Plan (Sections 5 – 8).

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

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 GRWMA is composed of 9,815 acres in the FWC's Northeast Region and is adjacent to the 2,652-acre Guana-Tolomato-Matanzas National Estuarine Research Reserve – Guana River Site, a DEP-FCO managed area. Additionally, the GRWMA is part of the GTMNERR, a 73,352-acre expanse of public conservation and recreation lands located midway between Jacksonville and St. Augustine. The GRWMA itself is situated in St. Johns County approximately 15 miles east of the St. Johns River, 15 miles south of the Jacksonville metropolitan area and 13 miles north of St. Augustine. As shown in Figure 2, the GRWMA is roughly bounded on the east by A1A and on the west by the Tolomato River and the Intracoastal Waterway (ICW). The property is located within parts of Sections 14, 15, 22, 23, 25, 26, 36, 38, 46, 47, 52-54, 56 and 72-74, Township 4 South and Range 29 East, as well as within the Sections 1, 2, 6, 11-14, 24, 25, 37, 38, 46-48, 50-52, 67, 68 and 30-31 in Township 5 South and Ranges 29 and 30 East.

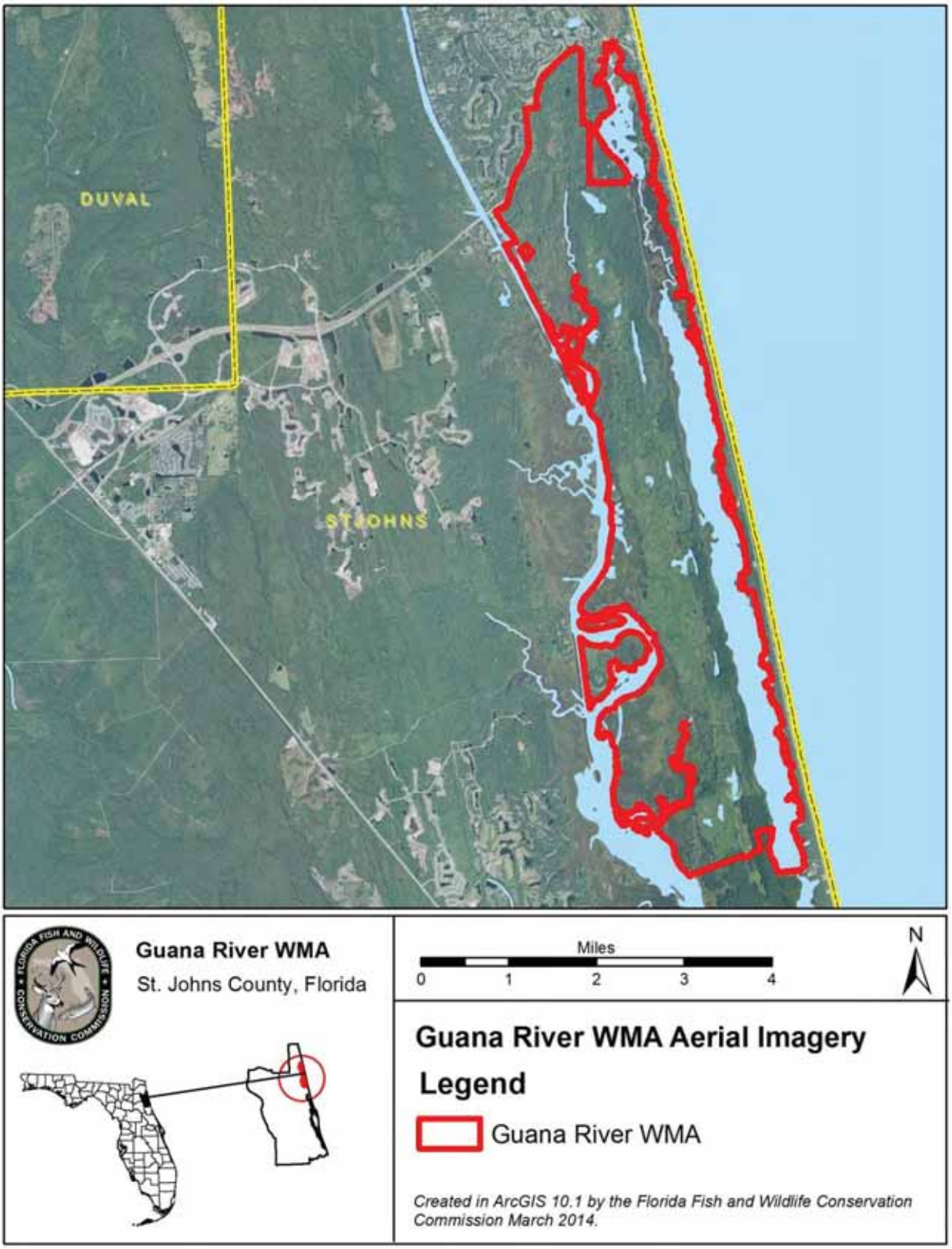

Figure 1. Aerial Imagery of GRWMA

Figure 2. GRWMA – Section, Township, and Range

1.3 Acquisition

1.3.1 Purpose for Acquisition of the Property

The GRWMA was acquired through the Conservation and Recreation Lands Acquisition Program (CARL Program). In its initial assessment, the CARL committee indicated that the Guana River Tract Project lands, which are now within the GRWMA and the GTMNERR, were approved for acquisition as a multiple-use property, intended to conserve and protect the stellar natural and cultural resources of the area as well as to provide opportunities for resource-based public recreation. For these reasons, the CARL Committee determined that lands within what is now the GRWMA are ideally suited to these purposes given the abundance and excellent condition of the myriad natural and cultural resources that exist on the property. The CARL committee, in its project assessment prepared for the Board of Trustees, further described the unique character of the Guana River Tract Project as follows:

"It is unusual for a single proposed project area to combine such a diversity of valuable natural, cultural and recreational resources. These include: (1) excellent ocean-front beach with high dunes stabilized by natural vegetation; (2) an unusually extensive natural area of undisturbed Atlantic coastal strand (scrub) vegetation; (3) extensive maritime hammock containing an unusual natural association of mature trees; (4) extensive estuarine wetlands (marsh); (5) extensive areas of pine flatwoods; (6) bird rookeries, including a sizable population of the endangered wood stork; and (7) extensive aboriginal middens, aboriginal burial mounds and artifacts of aboriginal and Spanish colonial (origin)."

1.3.2 Acquisition History

The GRWMA was recommended for purchase by the CARL committee in September 1983. The CARL Trust Fund was approved in 1979 and relies on funds generated principally from the documentary stamp tax and severance taxes on phosphate rock. The CARL program was established for the purpose of purchasing environmentally endangered lands and other lands such as those which have potential for public recreation. The Guana River tract, which encompasses GRWMA property, was acquired through the CARL program by the Florida Department of Natural Resources (now DEP) on behalf of the Board of Trustees in four increments: (1) July 1984, (2) January 1985, (3) January 1986, and (4) January 1987.

1.4 Management Authority

FWC is the designated lead managing agency for the GRWMA under the authority granted by Lease Number 3585 from the Board of Trustees agent, DSL. Further management authority derives from Article IV, Section 9 of the Florida Constitution as well as the guidance and directives of Chapters 253, 259, 327, 370, 372, 373, 375, 378, 403, 487, 870, and 597, FS. These constitutional provisions and laws provide FWC the authority to protect, conserve, and manage the State's fish and wildlife resources.

1.5 Management Directives

Executed on April 1, 1988, the 50-year Board of Trustees' Lease Agreement Number 3585 with FWC directs FWC to manage the leased premises only for the conservation and protection of natural and historical resources and resource-based, public outdoor recreation which is compatible with the conservation and protection of these public lands, as set forth in subsection 253.023(11), 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. The original lease was amended in 2002 to add approximately one-half acre of submerged lands to the original boundary of the GRWMA (Contract #87002A, Appendix 13.1.1).

1.6 Title Interest and Encumbrances

As State-owned lands, title to the GRWMA is vested in the Board of Trustees (Governor and Cabinet). On April 1, 1988, the DSL, as staff to the Board of Trustees, entered into Lease Agreement Number 3585, a 50 year lease agreement, granting FWC management authority for the GRWMA.

In 1987, the FWC and Ducks Unlimited entered into a site specific agreement (Lease W195, Appendix 13.2.1) for the purpose of cooperatively enhancing waterfowl habitat on the GRWMA through the construction and maintenance of ten water control structures. This agreement expires February 3, 2027.

In 1988, the FWC entered into a 20-year agreement (#88031, Appendix 13.2.2) with the DSL, acting as agent for the Board of Trustees, and the DEP Division of Recreation and Parks (DRP) for the construction and maintenance of the Six Mile Landing Boat Ramp. The original agreement expired in 2008 and was renewed in 2011 for thirty years through agreement #11060.

In December 1990, the FWC, DEP, and St. Johns County entered into an indefinite Memorandum of Understanding (#90050, Appendix 13.2.3) concerning the emergency operation of the Guana Dam water control structure. This Memorandum of Understanding is designed to provide a priority and protocol of response to emergency conditions that could potentially result in loss of life, flooding

of buildings and homes, or failure of the water control structure itself.

The FWC entered into a Memorandum of Agreement (#99098, Appendix 13.2.4) with St. Johns County in 1999 and a Project Cooperation Agreement (#99235, Appendix 13.2.5) with the U.S. Army Corps of Engineers in 2000 regarding funding for wetland restoration projects on the GRWMA as mitigation for the Palm Valley Bridge replacement project.

On December 30, 1998, the Executive Director of the FWC signed a Memorandum of Agreement (#98046, Appendix 13.2.6) with the DEP for the cooperative management of the GTMNERR, which includes and encompasses the GRWMA. This Memorandum of Agreement took effect on April 30, 1999, and is indefinite. See Section 5.13 and Appendix 13.2.6 for more detail on this arrangement.

On August 11, 2011, the FWC entered into a 20-year agreement (#11162, Appendix 13.2.7) with the SJRWMD which allows the SJRWMD to construct, maintain, and operate a rain gauge within the boundary of the GRWMA.

Currently, there is one apiary agreement (Appendix 13.2.8) on the GRWMA that was executed in 2012 and expires in 2015. However, as of yet, no apiaries have been placed on the GRWMA under this agreement.

1.7 Proximity to Other Public Conservation Lands

As shown in Figure 3, the GRWMA is located in the vicinity of a large number of publicly owned conservation areas and Florida Forever projects. Tables 1 and 2 list the Florida Forever projects and conservation lands within a 20-mile radius of the GRWMA, including lands managed by public and private entities, that conserve cultural and natural resources within this region of Florida.

Most of the public conservation lands listed in Table 2 are owned in fee-simple by a public entity. Though some fall within less-than-fee simple ownership classification where the land is owned and being managed by a private landowner while a public agency or not-for-profit organization holds a conservation easement on the land.

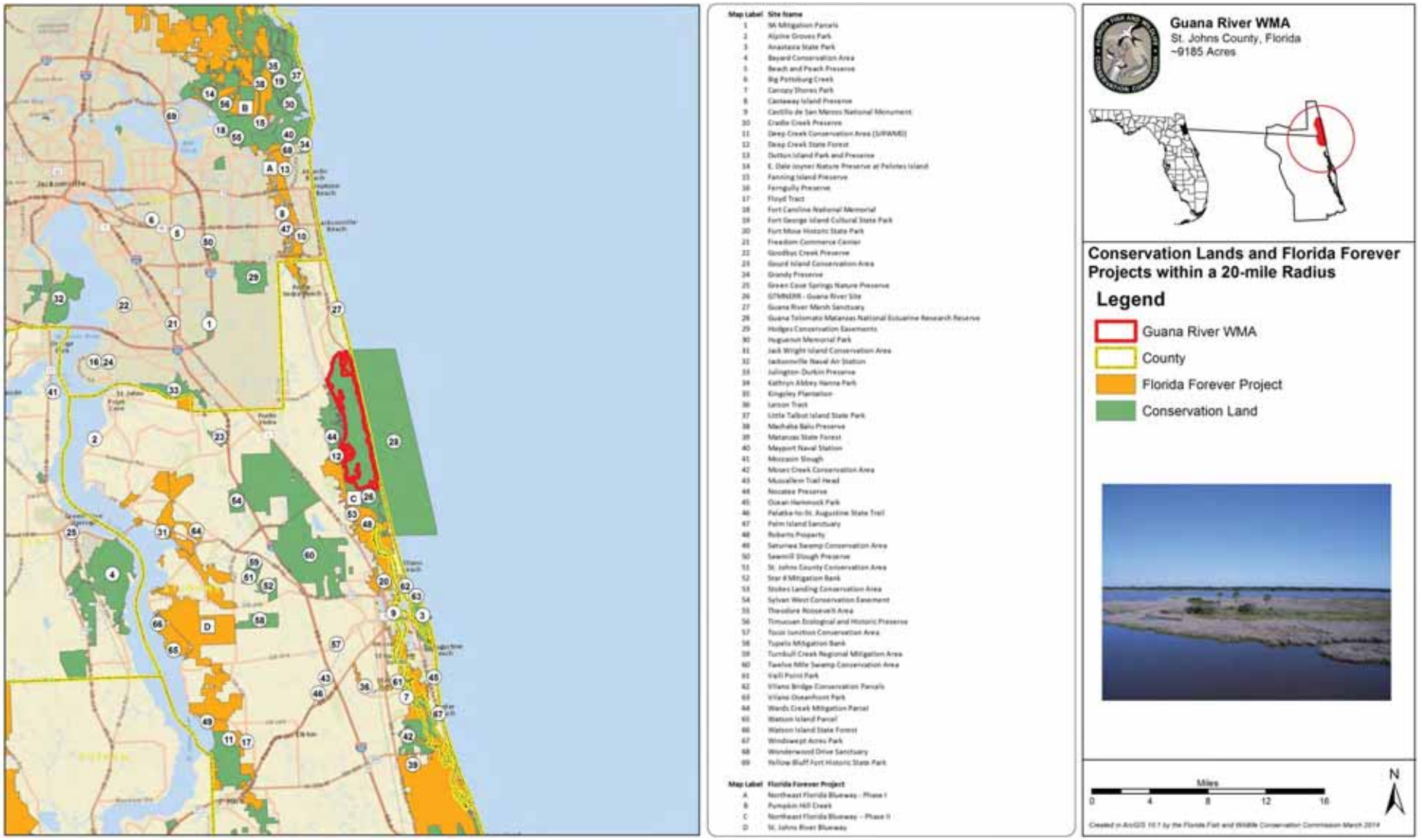

Figure 3. Conservation Lands and Florida Forever Projects within a 20-mile Radius of GRWMA

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Table 1. Conservation Lands within a 20-mile Radius of GRWMA

United States	Managing Agency
Castillo de San Marcos National Monument	DOI-NPS
Fort Caroline National Memorial	DOI-NPS
Jacksonville Naval Air Station	DOD-Navy
Kingsley Plantation	DOI-NPS
Mayport Naval Station	DOD-Navy
Theodore Roosevelt Area	DOI-NPS
Timucuan Ecological and Historic Preserve	DOI-NPS

State of Florida	Managing Agency
Anastasia State Park	DEP-DRP
Deep Creek State Forest	DACS-FFS
Fort George Island Cultural State Park	DEP-DRP
Fort Mose Historic State Park	DEP-DRP
GTMNERR - Guana River Site	DEP-FCO
Guana Tolomato Matanzas National Estuarine Research Reserve	DEP-FCO
Little Talbot Island State Park	DEP-DRP
Matanzas State Forest	DACS-FFS
Palatka-to-St. Augustine State Trail	DEP-DRP
Roberts Property	DEP-FCO
Sawmill Slough Preserve	University of North Florida
Watson Island State Forest	DACS-FFS
Yellow Bluff Fort Historic State Park	DEP-DRP

Water Management District	Managing Agency
9A Mitigation Parcels	SJRWMD
Bayard Conservation Area	SJRWMD
Deep Creek Conservation Area (SJRWMD)	SJRWMD
Gourd Island Conservation Area	SJRWMD
Hodges Conservation Easements	SJRWMD
Julington-Durbin Preserve	SJRWMD
Moses Creek Conservation Area	SJRWMD
Stokes Landing Conservation Area	SJRWMD
Sylvan West Conservation Easement	SJRWMD
Twelve Mile Swamp Conservation Area	SJRWMD

Local Government	Managing Agency
Alpine Groves Park	St. Johns County

Table 1. Conservation Lands within a 20-mile Radius of GRWMA

Beach and Peach Preserve	City of Jacksonville
Canopy Shores Park	St. Johns County
Castaway Island Preserve	City of Jacksonville
Cradle Creek Preserve	City of Jacksonville Beach
Dutton Island Park and Preserve	City of Jacksonville
Fanning Island Preserve	City of Jacksonville
Ferngully Preserve	City of Jacksonville
Floyd Tract	St. Johns County
Freedom Commerce Center	City of Jacksonville
Goodbys Creek Preserve	City of Jacksonville
Green Cove Springs Nature Preserve	City of Green Cove Springs
Huguenot Memorial Park	City of Jacksonville
Jack Wright Island Conservation Area	St. Johns County
Kathryn Abbey Hanna Park	City of Jacksonville
Larson Tract	St. Johns County
Moccasin Slough	Clay County
Mussallem Trail Head	St. Johns County
Nocatee Preserve	St. Johns County
Ocean Hammock Park	City of St. Augustine Beach
St. Johns County Conservation Area	St. Johns County
Tocoi Junction Conservation Area	St. Johns County
Turnbull Creek Regional Mitigation Area	St. Johns County
Vaill Point Park	St. Johns County
Vilano Bridge Conservation Parcels	St. Johns County
Vilano Oceanfront Park	St. Johns County
Wards Creek Mitigation Parcel	St. Johns County
Watson Island Parcel	St. Johns County
Windswept Acres Park	St. Johns County

Private	**Manager**
Big Pottsburg Creek	Timucuan Trails Parks Foundation
E. Dale Joyner Nature Preserve at Pelotes Island	Jacksonville Electric Authority
Grandy Preserve	Duval Audubon Society, Inc.
Guana River Marsh Sanctuary	Florida Audubon Society, Inc.
Machaba Balu Preserve	The Nature Conservancy
Palm Island Sanctuary	Duval Audubon Society, Inc.
Saturiwa Swamp Conservation Area	Private Individual(s)
Star 4 Mitigation Bank	Star 4 Mitigation, LLC
Tupelo Mitigation Bank	Florida Mitigation Providers, LLC
Wonderwood Drive Sanctuary	Duval Audubon Society, Inc.

Table 1 Acronym Key:

DOI-NPS: U.S. Department of the Interior, National Parks Service

DOD-Navy: U.S. Department of Defense, Navy

DEP-DRP: Florida Department of Environmental Protection, Division of Recreation and Parks

DACS-FFS: Florida Department of Agriculture and Consumer Services, Florida Forest Service

DEP-FCO: Florida Department of Environmental Protection, Florida Coastal Office

SJRWMD: St. Johns River Water Management District

Table 2. Florida Forever Projects within a 20-mile Radius of GRWMA

Project Name	Acres
Northeast Florida Blueway - Phase I	5,053
Northeast Florida Blueway - Phase II	27,538
Pumpkin Hill Creek	25,706
St. Johns River Blueway	26,357

1.8 Adjacent Land Uses

As listed in the St. Johns County Comprehensive Land Use Plan, the lands within GRWMA are currently zoned Open Rural with a Future Land Use Designation of Parks and Open Space. Parks and Open Space when zoned Open Rural primarily allows for recreational and conservation uses.

The majority of lands to the north and west are zoned Planned Unit Development with a Future Land Use Designation of Residential-B. This allows for up to two dwelling units per acre of uplands. A small pocket of land to the west of GRWMA is currently zoned Planned Rural Development with a Future Land Use Designation of Rural/Silviculture and Conservation. This allows for up to one dwelling unit per five acres.

The area directly east of the GRWMA is currently zoned Open Rural with a Future Land Use Designation of Parks and Open Space. Additionally, the DEP operates 19 state parks or other areas comprising more than 15,000 acres within a seven-county area surrounding the GRWMA.

More intensive development has occurred on much of the privately owned lands in the vicinity of the GRWMA since the area

was acquired. This includes residential communities, golf courses, resorts and commercial facilities such as supermarkets, stores, gas stations and shopping centers. More recently, Nocatee, a residential and commercial development complex, has been constructed immediately west of the GRWMA on land lying between the western boundary of the ICW and U.S. Highway 1.

The construction of private docks by landowners owning upland property adjacent to the north end of Lake Ponte Vedra has been an issue of concern for the FWC. The construction of such docks can result in impacts to aquatic vegetation and associated disturbance to wildlife and can inhibit the FWC's ability to conduct management activities on the GRWMA, including prescribed burning in the wetlands and the control of exotic and invasive species. However, in November 2005 the BOT granted an easement to a private landowner to allow the construction of a private dock on Lake Ponte Vedra. Since that time, private landowners may only construct docks on Lake Ponte Vedra if they are granted authorization and a permit to do so by the DEP District Office in Jacksonville prior to any dock construction on the lake.

Generally, the continuing development of land and the influx of greater residential and commercial densities in the immediate vicinity of the GRWMA may present increased challenges for the ongoing management of the area. In particular, nearby development and a likely increase in overall public use may increase challenges to operational management of the area and inhibit the ongoing implementation of resource management activities such as prescribed burning and the protection of the area's notable archaeological resources.

1.9 Public Involvement

FWC conducted a MAG meeting in Ponte Vedra Beach, Florida, on August 28, 2012, to obtain input from both public and private stakeholders regarding management of the GRWMA. Results of this meeting were used by FWC to develop management goals and objectives and to identify opportunities and strategies for inclusion in this Management Plan. A summary of issues and opportunities raised by the MAG, as well as a listing of participants, is included as Appendix 13.4.1. Further, a public hearing, as required by Chapter 259.032(10), FS, was held in St. Augustine, Florida, on September 27, 2012. The report of that hearing is also contained in Appendix 13.4.3. A website is also maintained for receipt of public input at http://myfwc.com/conservation/terrestrial/management-plans/develop-mps/ . Further

testimony and input is received at a public hearing held by ARC. Input received from all public involvement efforts has been considered in the development of this Management Plan.

2 Natural and Cultural Resources

2.1 Physiography

Florida is divided into three geomorphic zones and the GRWMA is located within the northern or proximal zone. The northern or proximal geomorphic zone is further subdivided into a number of physiographic divisions and subdivisions, with the GRWMA being located within the eastern valley subdivision of the coastal lowlands physiographic division. The eastern valley is a broad, flat valley that extends approximately 40 to 60 miles inland from the Atlantic Ocean.

2.1.1 Climate

The climate of northeast Florida is classified as sub-tropical marine, characterized by long, warm, humid summers and mild winters. The average annual precipitation for St. Augustine during the period from 1973 to 2012 was 48.5 inches. The average annual maximum temperature for the same period was 79.3º Fahrenheit (F) and the average annual minimum temperature was 61º F. Historically, the lowest average temperatures have occurred in January and the highest average temperatures have occurred in July and August. Temperatures in this area are moderated by close proximity to the Atlantic Ocean. Prevailing winds are easterly, but northwest or southwest winds are common; summer westerly winds can last for several days, particularly during the early morning hours.

2.1.2 Topography and Geologic Conditions

The GRWMA is comprised of a diverse topography characteristic of the coastal maritime ecosystems that at one time occurred extensively along the eastern coast of Florida. The topography of St. Johns County is predominately a series of marine terraces that run parallel to the coast. Formed when the sea was at higher levels, the terraces on the GRWMA are comprised of a basal unit of Pleistocene material (Silver Bluff Terrace) capped with undifferentiated aeolian deposits of recent (Holocene) age. The coastal terraces are believed to have formed during the high level of the interglacial period when the Atlantic Ocean was receding. Thus, the underlying Pleistocene topography resulted from both erosional and depositional processes.

The Holocene topographic features, formed during the past 10,000 years, are comprised of recent remnant beach and dune ridges, swamps, marshes, tidal flats, creeks, rivers and estuarine bottoms. The Holocene sediments occur at elevations generally less than five feet above mean sea level (MSL) and include quartz sands, carbonate sands and muds, and organics.

The GRWMA (including Lake Ponte Vedra) is very likely a piece of the mainland consisting of elongated, coastal, sandy ridges and low troughs that are being inundated as the sea level rises. Hammocks and pine flatwoods presently occupy the sand ridges. Numerous large, elongated, central marsh basins occupy the low troughs and have a north-south orientation. A drainage basin appears to run from the Diego Plain of Ponte Vedra across the northeast portion of the area and into Lake Ponte Vedra.

The GRWMA contains a number of low, nearly level salt marshes that are inundated during tidal fluctuation twice daily. Tidal marshes along the western boundary are Holocene features deposited over older, eroded or drowned Pleistocene layers. Within the tidal marsh system there are numerous marsh islands. Some of the islands are probably the result of remnant, isolated portions of the sand ridges. Others may have formed as a result of estuarine marsh and river depositional processes. Still others are the result of man-made spoil islands created during construction of the Atlantic Intracoastal Waterway.

The upland portion of the area is a peninsula of the mainland that is isolated to the east by a drowned back-barrier (Lake Ponte Vedra) and to the west by the Tolomato River. Similarly, the southern GTMNERR portion is also surrounded by the Guana and Tolomato rivers. Thus the topography is characteristic of many coastal Sea Islands with Pleistocene features that were isolated by the Holocene rise in sea level.

2.1.3 Soils

U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) data were used to identify the GRWMA's soil series and soil depth to water table. Twenty-nine soil map units described in the soil survey of the GRWMA are distributed as shown in Figure 4. Analyses of depth to water table for map units occurring within the GRWMA are also provided in Figure 5. The NRCS defines a soil map unit as: "a collection of soil areas or non-soil areas (miscellaneous areas) delineated in a soil survey." Soil map units may contain multiple soil components, which are given names that are unique identifiers. Figure 4 provides aggregation data for GRWMA soil map units. Soils series descriptions may be found in Appendix 13.6.

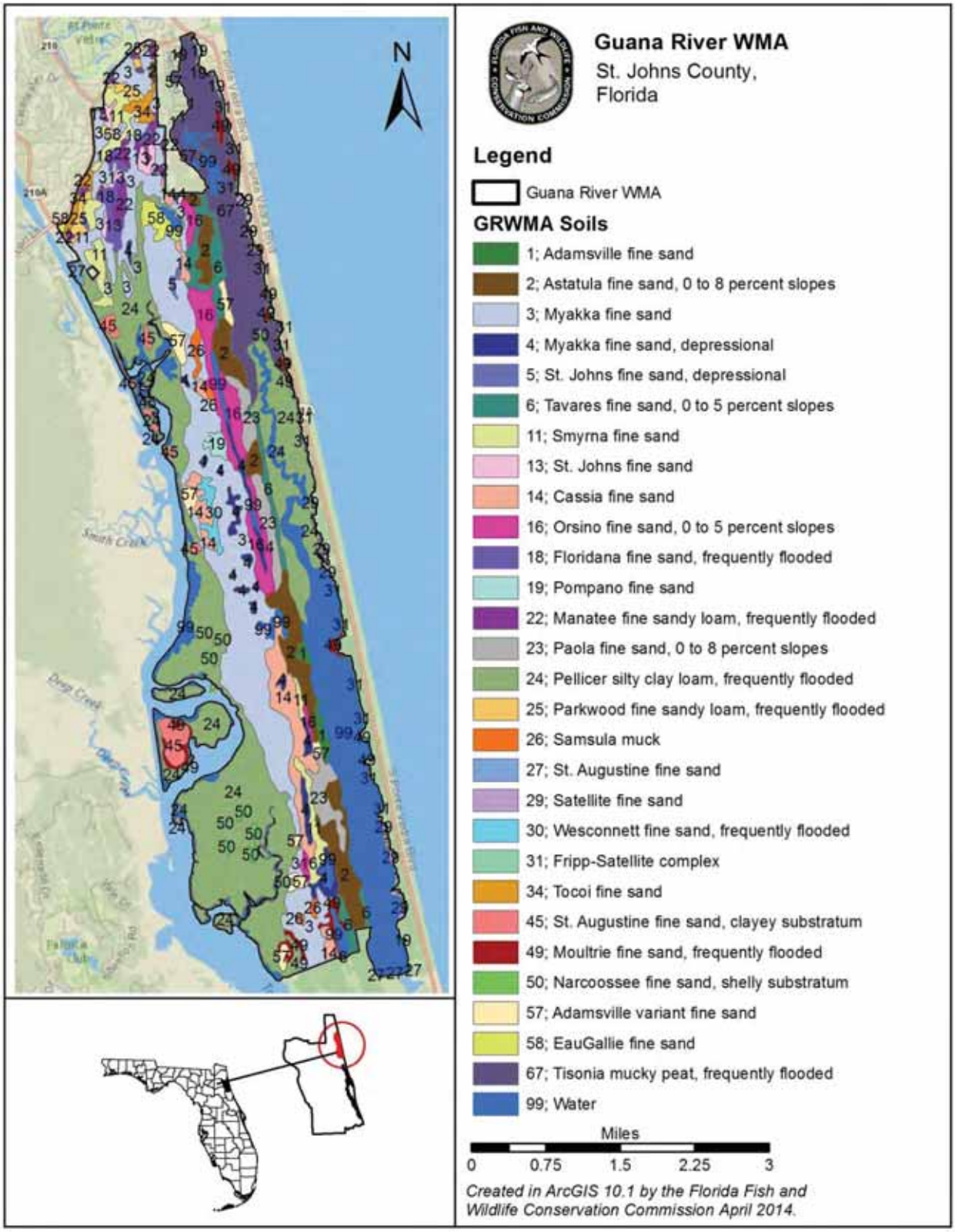

Figure 4. GRWMA Soils Type

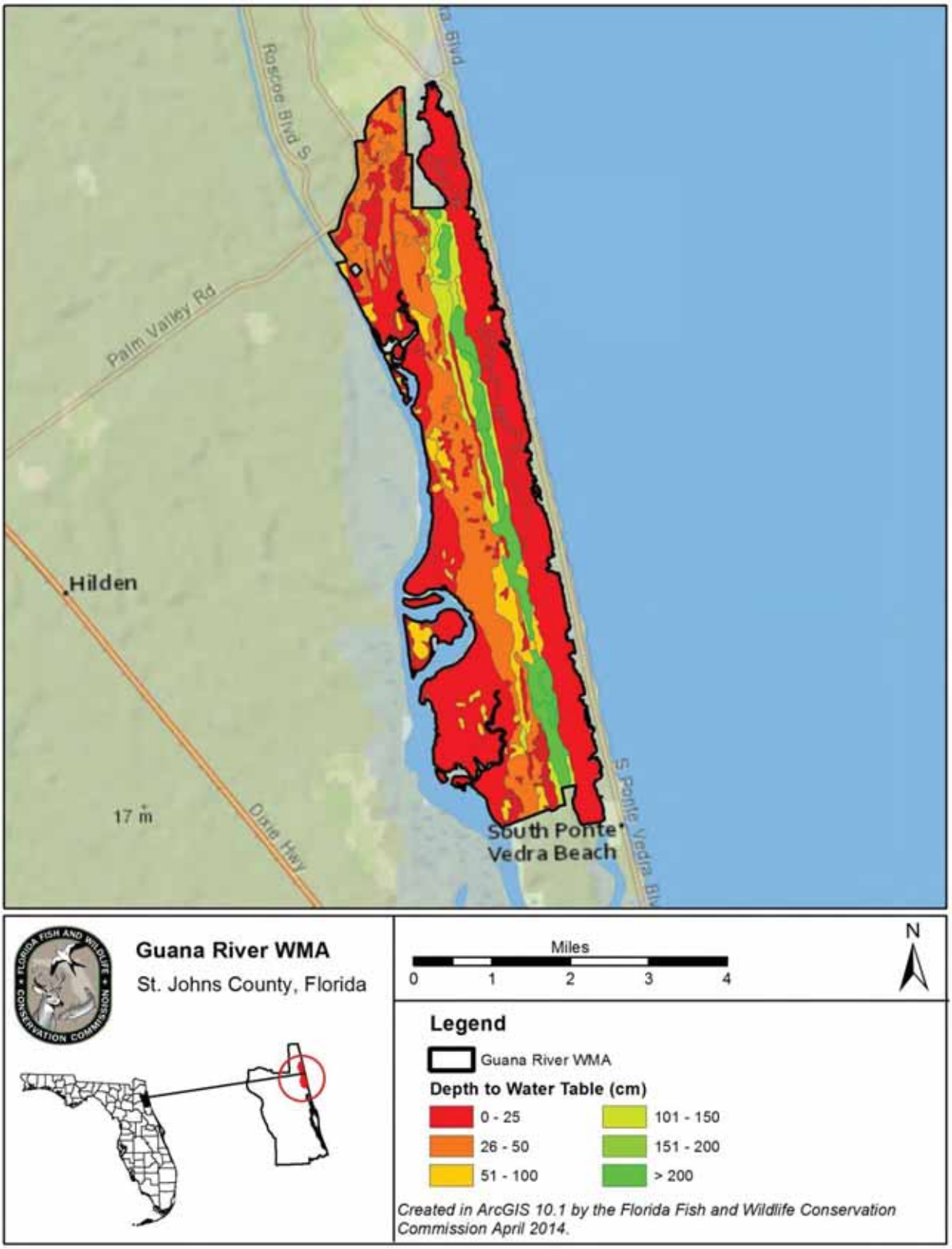

Figure 5. GRWMA Soil Depth to Water Table

2.2 Vegetation

The GRWMA is a mosaic of uplands and wetlands and, as such, contains a variety of vegetative cover types. The FWC completed natural community mapping of the GRWMA in 2011 through the services of the Florida Natural Areas Inventory (FNAI). The FWC did not have FNAI map historic natural communities on the GRWMA. Through this work FNAI has identified and mapped a total of sixteen natural communities and four ruderal or anthropogenic communities on the GRWMA (Table 3, Figure 6). The majority of the ruderal acreage on the GRWMA consists of impoundments or artificial ponds, a category that accounts for over 26% of the total area including the entirety of Lake Ponte Vedra. Additionally, FNAI found two rare plant species and two invasive exotic plant species on the area. The rare species that were documented during natural community mapping of the GRWMA are pond-spice and angle pod. The invasive exotics that were found on the area are torpedo-grass and Chinese tallow tree.

Table 3. GRWMA FNAI Natural and Anthropogenic Communities

Natural Community	Acreage*	Percentage
Impoundment/Artificial pond	2442.3	26.7%
Salt marsh	2218.3	24.3%
Mesic flatwoods	1708.6	18.7%
Maritime hammock	809.7	8.9%
Scrub	356.9	3.9%
Scrubby flatwoods	352.9	3.9%
Xeric hammock	291.7	3.2%
Mesic hammock	240.4	2.6%
Depression marsh	218.6	2.4%
Basin swamp	142.7	1.6%
Basin marsh	104.9	1.1%
Pine plantation	87.5	1.0%
Spoil area	38.9	0.4%
Wet flatwoods	35.7	0.4%
Baygall	32.6	0.4%
Clearing	24.4	0.3%
Marsh lake	22.7	0.2%
Dome swamp	8.0	0.1%
Hydric hammock	1.5	<0.1%
Developed	0.9	<0.1%

*Total GIS-calculated acreage for natural community classifications varies slightly from the actual total acreage of GRWMA.

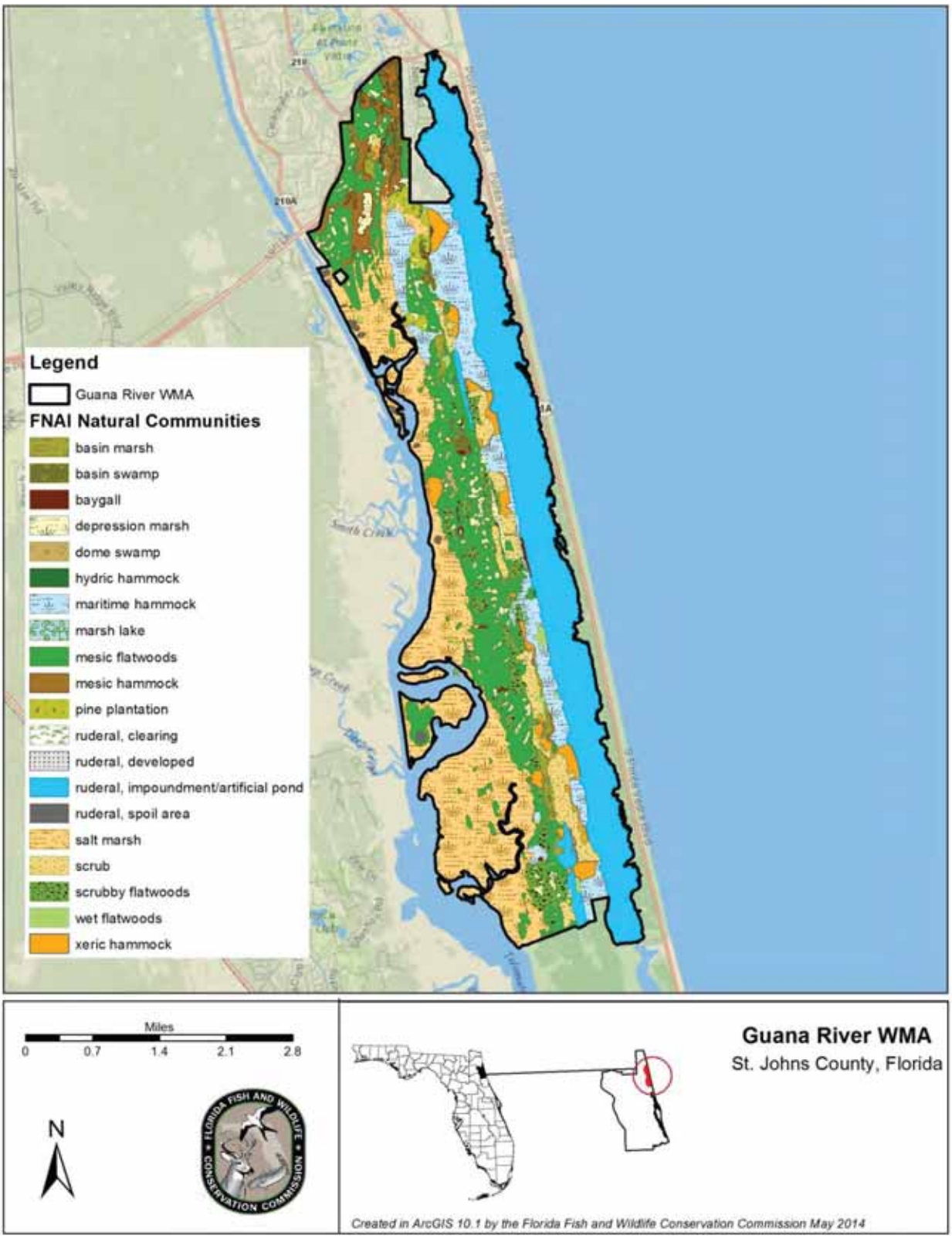

Figure 6. FNAI Natural and Anthropogenic Communities

Table 4. Native Plant Species of the GRWMA

Common Name	Scientific Name
American beautyberry	*Callicarpa americana*
American cupscale	*Sacciolepis striata*
American elm	*Ulmus americana*
American holly	*Ilex opaca*
Angle pod	*Gonolobus suberosus*
Arrowgrass	*Triglochin striata*
Atlantic St. John's-wort	*Hypericum tenuifolium*
Bachelor's button	*Centaurea cyanus*
Baldwin's spikerush	*Eleocharis baldwinii*
Bartram's rosegentian	*Sabatia decandra*
Bastard indigo	*Amorpha fruticosa*
Beakrushes	*Rhynchospora* spp.
Bedstraw St. John's-wort	*Hypericum galioides*
Bigseed alfalfa dodder	*Cuscuta indecora*
Black cherry	*Prunus serotina*
Black gum	*Nyssa sylvatica*
Black mangrove	*Avicennia germinans*
Black needlerush	*Juncus roemerianus*
Bladderworts	*Utricularia* spp.
Blue maidencane	*Amphicarpum muhlenbergianum*
Blue waterhyssop	*Bacopa caroliniana*
Bluestem grass	*Andropogon* spp.
Blunt spikerush	*Eleocharis obtuse*
Bog buttons	*Lachnocaulon spp.*
Bog white violet	*Viola lanceolata*
Bottlebrush threeawn	*Aristida spiciformis*
Bracken fern	*Pteridium aquilinum*
Branched hedgehyssop	*Gratiola ramose*
Broadleaf cattail	*Typha latifolia*
Broomsedge bluestem	*Andropogon virginicus*
Buckthorn	*Sideroxylon tenax*
Bulrushes	*Scirpus spp.*
Butterwort	*Pinguicula spp.*
Buttonbush	*Cephalanthus occidentalis*
Cabbage palm	*Sabal palmetto*
Canada toadflax	*Linaria canadensis*
Candyroot	*Polygala nana*
Carolina horsenettle	*Solanum carolinense*
Carolina laurelcherry	*Prunus caroliniana*
Carolina sealavender	*Limonium carolinianum*
Carolina wild petunia	*Ruellia caroliniensis*

Table 4. Native Plant Species of the GRWMA

Common Name	Scientific Name
Carolina yelloweyed grass	*Xyris caroliniana*
Chapman's oak	*Quercus chapmanii*
Christmasberry	*Lycium carolinianum*
Cinnamon fern	*Osmunda cinnamomea*
Coast cockspur grass	*Echinochloa walteri*
Coastal plain willow	*Salix caroliniana*
Coastal waterhyssop	*Bacopa monnieri*
Common duckweed	*Spirodela polyrhiza*
Compact dodder	*Cuscuta compacta*
Coralbean	*Erythrina herbacea*
Corkwood	*Leitneria floridana*
Creeping beggarweed	*Desmodium incanum*
Crossvine	*Bignonia capreolata*
Deerberry	*Vaccinium stamineum*
Devil's walkingstick	*Aralia spinosa*
Dixie ticktrefoil	*Desmodium tortuosum*
Dog fennel	*Eupatorium capillifolium*
Dotted smartweed	*Polygonum punctatum*
Duck potato	*Sagittaria lancifolia*
Dwarf huckleberry	*Gaylussacia dumosa*
Dwarf live oak	*Quercus minima*
Dwarf spikerush	*Eleocharis parvula*
Earleaf greenbrier	*Smilax auriculata*
Eastern milkpea	*Galactia volubilis*
Eastern red cedar	*Juniperus virginiana*
Fall panicgrass	*Panicum dichotomiflorum*
Fireweed	*Erechtites hieraciifolius*
Firewheel	*Gaillardia pulchella*
Florida maple	*Acer floridanum*
Florida mudmidget	*Wolffiella gladiate*
Flypoison	*Amianthium muscaetoxicum*
Forked rush	*Juncus dichotomus*
Fringed yellow stargrass	*Hypoxis juncea*
Gallberry	*Ilex glabra*
Giant bristlegrass	*Setaria magna*
Giant sedge	*Carex gigantea*
Grassy arrowhead	*Sagittaria graminea*
Greenvein ladies'-tresses	*Spiranthes praecox*
Groundsel tree	*Baccharis halimifolia*
Hackberry	*Celtis spp.*
Hairawn muhly	*Muhlenbergia capillaris*

Table 4. Native Plant Species of the GRWMA

Common Name	Scientific Name
Hairy smartweed	*Polygonum hirsutum*
Heartwing dock	*Rumex hastatulus*
Helmet skullcap	*Scutellaria integrifolia*
Hibiscus	*Hibiscus spp.*
Highbush blueberry	*Vaccinium corymbosum*
Hog plum	*Prunus umbellate*
Hooded pitcherplant	*Sarracenia minor*
Hop clover	*Trifolium dubium*
Horned beaksedge	*Rhynchospora inundata*
Huckleberry	*Gaylussacia frondosa*
Indianpipe	*Monotropa uniflora*
Large gallberry	*Ilex coriacea*
Lateflowering thoroughwort	*Eupatorium serotinum*
Laurel oak	*Quercus laurifolia*
Live oak	*Quercus virginiana*
Lizard's tail	*Saururus cernuus*
Loblolly bay	*Gordonia lasianthus*
Longleaf pine	*Pinus palustris*
Low panicgrass	*Dichanthelium* spp.
Lyreleaf sage	*Salvia lyrata*
Maidencane	*Panicum hemitomon*
Marshay cordgrass	*Spartina patens*
Mermaidweed	*Proserpinaca pectinata*
Mexican primrosewillow	*Ludwigia octovalvis*
Milk pea	*Galactia elliottii*
Millet beaksedge	*Rhynchospora miliacea*
Mock bishopweed	*Ptilimnium capillaceum*
Mohr's thoroughwort	*Eupatorium mohrii*
Muscadine	*Vitis rotundifolia*
Muskgrass	*Chara spp.*
Myrtle oak	*Quercus myrtifolia*
Myrtle-leaved holly	*Ilex myrtifolia*
Naked St. John's-wort	*Hypericum nudiflorum*
Narrowleaf blue-eyed grass	*Sisyrinchium angustifolium*
Narrowleaf cattail	*Typha angustifolia*
Nutrushes	*Scleria* spp.
Nuttall's lobelia	*Lobelia nuttallii*
Oak mistletoe	*Phoradendron serotinum*
Orange milkwort	*Polygala lutea*
Pacific mosquitofern	*Azolla filiculoides*
Pale meadowbeauty	*Rhexia mariana*

Table 4. Native Plant Species of the GRWMA

Common Name	Scientific Name
Panicled ticktrefoil	*Desmodium paniculatum*
Partridge pea	*Chamaecrista nictitans*
Pennywort	*Hydrocotyle spp.*
Peppervine	*Ampelopsis arborea*
Perennial glasswort	*Sarcocornia ambigua*
Persimmon	*Diospyros virginiana*
Pickerelweed	*Pontederia cordata*
Pignut hickory	*Carya glabra*
Pigweeds	*Amaranthus spp.*
Pink sundew	*Drosera capillaries*
Pink woodsorrel	*Oxalis debilis*
Pipeworts	*Eriocaulon* spp.
Plumegrass	*Saccharum giganteum*
Pond cypress	*Taxodium ascendens*
Pond pine	*Pinus serotina*
Pond spice	*Litsea aestivalis*
Poor Joe	*Diodia teres*
Priarie wedgescale	*Sphenopholis obtusata*
Pricklypear	*Opuntia humifusa var. humifusa*
Rabbit tobacco	*Pseudognaphalium obtusifolium*
Red bay	*Persea borbonia*
Red maple	*Acer rubrum*
Red mulberry	*Morus rubra*
Redroot	*Lachnanthes caroliniana*
Resurrection fern	*Pleopeltis polypodioides var. polypodioides*
Rosy camphorweed	*Pluchea baccharis*
Roundleaf thoroughwort	*Eupatorium rotundifolium*
Rusty lyonia	*Lyonia ferruginea*
Sago pondweed	*Stuckenia pectinata*
Saltgrass	*Distichlis spicata*
Saltwort	*Batis maritima*
Sand blackberry	*Rubus cuneifolius*
Sand cordgrass	*Spartina bakeri*
Sand live oak	*Quercus geminata*
Sand pine	*Pinus clausa*
Saw palmetto	*Serenoa repens*
Sawgrass	*Cladium jamaicense*
Sawtooth blackberry	*Rubus argutus*
Sea oxeye	*Borrichia frutescens*
Sensitive brier	*Mimosa quadrivalvis*
Shiny blueberry	*Vaccinium myrsinites*

Table 4. Native Plant Species of the GRWMA

Common Name	Scientific Name
Shiny lyonia	*Lyonia lucida*
Shoreline seapurslane	*Sesuvium portulacastrum*
Slash pine	*Pinus elliottii*
Slender seapurslane	*Sesuvium maritimum*
Slender woodoats	*Chasmanthium laxum*
Smooth cordgrass	*Spartina alterniflora*
Soft rush	*Juncus effusus*
Southern cattail	*Typha domingensis*
Southern cutgrass	*Leersia hexandra*
Southern dewberry	*Rubus trivialis*
Southern magnolia	*Magnolia grandiflora*
Southern naiad	*Najas guadalupensis*
Southern waxy sedge	*Carex glaucescens*
Spanish bayonet	*Yucca aloifolia*
Spanish moss	*Tillandsia usneoides*
Spanish needles	*Bidens pilosa*
Spiderwort	*Tradescantia spp.*
Spiny waternymph	*Najas marina*
Spring coralroot	*Corallorhiza wisteriana*
Spring ladies'-tresses	*Spiranthes vernalis*
Spurred butterfly pea	*Centrosema virginianum*
St. Peter's-wort	*Hypericum crux-andreae*
Staggerbush	*Lyonia fruticosa*
Stream bogmoss	*Mayaca fluviatilis*
Summer grape	*Vitis aestivalis*
Swamp bay	*Persea palustris*
Swamp dogwood	*Cornus foemina*
Swamp smartweed	*Polygonum hydropiperoides*
Swamp titi	*Cyrilla racemiflora*
Swamp tupelo	*Nyssa biflora*
Sweetbay	*Magnolia virginiana*
Sweetgum	*Liquidambar styraciflua*
Sweetscent	*Pluchea odorata*
Switchcane	*Arundinaria gigantea*
Tall nutgrass	*Scleria triglomerata*
Tall pinebarren milkwort	*Polygala cymosa*
Tarflower	*Bejaria racemosa*
Thistle	*Carduus spp.*
Threeflower ticktrefoil	*Desmodium triflorum*
Tread-softly	*Cnidoscolus urens var. stimulosus*
Tree sparkleberry	*Vaccinium arboreum*

Table 4. Native Plant Species of the GRWMA

Common Name	Scientific Name
Trumpet creeper	*Campsis radicans*
Vanillaleaf	*Carphephorus odoratissimus*
Virginia chain fern	*Woodwardia virginica*
Virginia creeper	*Parthenocissus quinquefolia*
Virginia iris	*Iris virginica*
Virginia pepperweed	*Lepidium virginicum*
Virginia plantain	*Plantago virginica*
Viviparous spikerush	*Eleocharis vivipara*
Walter's aster	*Symphyotrichum walteri*
Water lily	*Nymphaea odorata*
Water oak	*Quercus nigra*
Water spangles	*Salvinia minima*
Wax myrtle	*Myrica cerifera*
White spikerush	*Eleocharis albida*
White water lily	*Nymphaea alba*
Widgeongrass	*Ruppia maritima*
Winged sumac	*Rhus copallinum*
Wiregrass	*Aristida stricta*
Wood sage	*Teucrium canadense*
Woodland ladies'-tresses	*Spiranthes sylvatica*
Yankeeweed	*Eupatorium compositifolium*
Yaupon holly	*Ilex vomitoria*
Yellow hatpins	*Syngonanthus flavidulus*
Yellow jessamine	*Gelsemium sempervirens*
Yellow woodsorrel	*Oxalis dillenii*
Yellow-eyed grasses	*Xyris* spp.

Table 5. Rare and Imperiled Plant Species of the GRWMA

Common Name	Scientific Name	Status
Angle pod	*Gonolobus suberosus*	ST
Hooded pitcher plant	*Sarracenia minor*	ST
Pondspice	*Litsea aestivalis*	SE

Abbreviation	Status
ST	State Threatened
SE	State Endangered

Table 6. Invasive Exotic Plant Species of GRWMA

Common Name	Scientific Name
Bahiagrass	*Paspalum notatum*
Bermudagrass	*Cynodon dactylon*
Brazilian pepper	*Schinus terebinthifolia*
Chinese tallowtree	*Sapium sebiferum*
Cogongrass	*Imperata cylindrica*
Dallisgrass	*Paspalum dilatatum*
Japanese climbing fern	*Lygodium japonicum*
Mimosa	*Albizia julibrissin*
Natalgrass	*Melinis repens*
Torpedograss	*Panicum repens*
Tropical soda apple	*Solanum viarum*
Vaseygrass	*Paspalum urvillei*
Water hyacinth	*Eichhornia crassipes*

2.2.1 FNAI Natural and Anthropogenic Community Descriptions

The following are descriptions of the twenty FNAI natural and anthropogenic communities found on the GRWMA (Table 3). These natural community descriptions were prepared by FNAI and modified by the FWC.

2.2.1.1 Natural Communities

Basin marsh is an herb-dominated community that occurs in large, often irregularly shaped depressions. Basin marshes are regularly inundated freshwater herbaceous wetlands that may occur in a variety of situations, but in contrast to depression marshes, are not small or shallow inclusions within a fire-maintained natural community. Plant species composition is heterogeneous, both within and between marshes, but can generally be divided into submersed, floating-leaved, emergent, and grassy zones from deepest to shallowest portions; shrub patches may be present within any of these zones.

On the GRWMA these depressions are generally elongate, oriented north-south in ancient interdunal swales or inlets. Sand cordgrass is the dominant plant in this community, often occupying the entire marsh. Some basin marshes, however, have multiple zones of vegetation. Outer edges of marshes may have a sparse to moderately dense cover of wax myrtle and persimmon over sand cord grass, blue maidencane, redroot, and various sedges. Moderately deep portions of basin marshes may support a dense cover of maidencane. Deepest portions of basin marshes support white water lily, duck potato and pickerel weed. Slash pine, water oak, and red maple may invade basin marshes that are hydrologically altered or fire suppressed. Dog fennel, fireweed, low panic grass and other weedy species may invade portions of basin marshes where the soil has been disturbed.

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 swamp areas on the GRWMA with a canopy cover above 50% were generally described as basin swamp rather than basin marsh. Aggressive use of prescribed fire in these communities could result in a vegetative structure and composition more characteristic of basin marshes.

On the GRWMA, this community is generally distributed toward the northern half of the area. The open to moderately dense canopy (30 - 80% coverage) generally is dominated by red maple, slash pine, swamp tupelo, American elm, or pond cypress. Tall shrub cover is generally sparse to moderate (5 - 50%) coverage, and is usually dominated by red maple, wax myrtle, and buttonbush. Shiny lyonia replaces maple and buttonbush in some basin swamp. Highbush blueberry is common in the tall and short shrub layer, particularly along the outer edge of the basin. Herbaceous cover generally is sparse to moderate (5 - 75 % coverage), dominated by sawgrass, Virginia chain fern, lizard's tail, and sedges.

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

On the GRWMA, baygall communities generally support a moderately dense (40 - 60% coverage) canopy and midstory of loblolly bay. Pond pine also may be present in the canopy. Sweet bay and swamp bay are present in the midstory and tall shrub layer. There is generally a dense (50 - 100% cover) of shiny lyonia. Saw palmetto, huckleberry, and highbush blueberry also may be present in the shrub layer. Herbaceous cover is generally sparse to absent, but may include cinnamon fern and sedges.

Depression marsh, an herbaceous wetland community found in low flatlands, forms the characteristic pockmarked landscape seen on aerial photographs of the flat landscapes of the Florida peninsula. Depression marsh is usually characterized as a shallow, rounded depression in sand substrate with herbaceous vegetation and shrubs, often in concentric

bands. These marshes also frequently form an outer rim around swamp communities such as dome swamps. They form when the overlying sands slump into depressions dissolved in underlying limestone. Depression marshes often burn with the surrounding landscape, and are seasonally inundated. Depression marshes typically occur in landscapes occupied by fire-maintained natural communities such as mesic flatwoods, dry prairie, or sandhill.

On the GRWMA, the herbaceous cover of depression marshes is generally 75 - 100%, principally represented by sand cordgrass, Virginia chain fern, and maidencane. Other herbaceous present in depression marshes are bluestem grass, blue maidencane, yellow-eyed grasses, plume grass, yellow hatpins, bladderworts, mermaid weed, grassy arrowhead, blue water-hyssop, horned beaksedge, and southern cutgrass.

Pond spice (state listed as endangered) was found at two locations in depression marshes in the central portion of the GRWMA.

Dome swamps are isolated and forested depression wetlands 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.

On the GRWMA, dome swamps are smaller than basin swamps and generally occur in circular depressions and lack red maple, elm and buttonbush. Fire tends to burn through dome swamps, which inhibits development of a shrub layer.

Hydric hammock is an evergreen hardwood and/or palm forest with a variable understory typically dominated by palms and ferns occurring on moist soils, often with limestone very near the surface. While species composition varies, the community generally has a closed canopy of oaks and palms, an open understory, and a sparse to a moderate groundcover of grasses and ferns. Hydric hammock occurs on low, flat, wet sites where limestone may be near the surface, and soil moisture is kept high mainly by rainfall accumulation on poorly drained soils. Periodic flooding from rivers, seepage, and spring discharge may also contribute to hydric conditions.

The GRWMA contains less than two acres of hydric hammock in an area directly adjacent to Guana Lake that is surrounded by mesic flatwoods and maritime hammock.

Maritime hammock is a predominantly evergreen hardwood forest growing on stabilized coastal dunes lying at varying distances from the shore. Species composition changes from north to south with temperate species dominating from the Georgia border to Cape Canaveral and tropical species increasingly prevalent south of Cape Canaveral. From the Georgia border to north of Cape Canaveral, live oak, cabbage palm, and red bay combine to form a dense canopy. The low, streamlined profile deflects winds and generally prevents hurricanes from uprooting the trees. Maritime hammock occurs on deep well-drained acid quartz sands, or well-drained, moderately alkaline quartz sands mixed with shell fragments. Due to their coastal location, with water bodies on at least one side, fire was probably naturally rare and very spotty in maritime hammock.

On the GRWMA, maritime hammock occupies extensive acreage on the ancient dune ridge along the Guana River impoundment. There is a nearly closed canopy of live oak with pockets of hickory. There is a subcanopy of cabbage palm, laurel oak and eastern red cedar. The tall shrub cover is sparse to moderate (5 - 25% cover), composed of yaupon holly, tree sparkleberry, Carolina laurel cherry, red bay, and buckthorn. The short shrub layer is dominated by saw palmetto which covers 5 - 50 percent of the strata. Herbaceous cover is sparse to moderate (1 - 25%), represented by bastard indigo, tall nutgrass, slender woodoats, and panic grasses Leaf litter covers nearly 100 % of the ground.

Marsh Lakes are generally shallow, open water areas within wide expanses of freshwater marsh. These water bodies typically have variable water chemistry, but are characteristically composed of highly colored, acidic, soft water with moderate mineral content.

On the GRWMA, the approximately 23-acre Little Savannah Pond accounts for the entirety of the marsh lake natural community type on the area. The Little Savannah Pond was originally designated open water by FNAI until the area was re-mapped in 2010 and that designation was changed to marsh lake.

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

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

Mesic flatwoods are distributed in the western half of the GRWMA in association with wet and scrubby flatwoods. Typically there is a sparse canopy of slash pine or pond pine. The tall shrub layer may be represented by a few scattered red bay or encroaching oak. The short shrub layer is generally a dense cover of saw palmetto and gallberry. Other common shrubs include shiny lyonia, shiny blueberry, huckleberry, and wax myrtle. Tarflower and dwarf live oak are occasional. Herbaceous cover within the mesic flatwoods is sparse to moderate (1 - 25%) and usually includes wiregrass, bottlebrush threeawn, bluestem grass, St. John's-wort, yellow-eyed grass, wild bachelor's button, yellow-hatpins, and low panic grasses.

Several marsh islands were identified as mesic flatwoods. These communities have cabbage palm, yaupon holy, and red cedar in the tall shrub layer. Less well drained islands with a sparse palmetto cover and high sedge cover were identified as wet flatwoods.

Mesic flatwoods grade into wet flatwoods and scrubby flatwoods, often with broad transition zones. Wet flatwoods typically have less saw palmetto and a higher coverage (25 - 75 %) of shiny lyonia and huckleberry, and frequently support cinnamon fern or Virginia chain fern. Flatwoods with a scrub oak component greater than 25 % were identified as scrubby flatwoods. Small inclusions of wet and scrubby flatwoods were not delineated on the map for the GRWMA.

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

On the GRWMA, mesic hammock is similar in structure to maritime hammock; however, the soils are less well drained with more of an organic component and less sand and shell material. There is generally a canopy of live oak, cabbage palm, slash pine, and laurel oak. Sabal palmetto and laurel oak are common in the tall shrub layer. Red bay is occasional. Cabbage palm also is dominant in the short shrub layer along with saw palmetto. Herbaceous coverage is sparse to moderate (5 - 50%) dominated by slender woodoats, panic grasses, and various sedges.

Salt marsh, sometimes referred to as tidal marsh, is a largely herbaceous community that occurs in the portion of the coastal zone affected by tides and seawater and protected from large waves, either by the broad, gently sloping topography of the shore, by a barrier island, or by location along a bay or estuary. The width of the intertidal zone depends on the slope of the shore and the tidal range. Salt marsh may have distinct zones of vegetation, each dominated by a single species of grass or rush. Salt marsh soils range from deep mucks with high clay and organic content in the deeper portions to silts and fine sands in higher areas.

On the GRWMA, salt marsh is present along the Tolomato River. Structure and composition are variable along a hydrologic and salinity gradient. Marsh edges have a moderate cover of shrubs including Christmasberry, yaupon holly, cabbage palm, and red cedar. Inland portions of the marsh with little tidal influence are dominated by sand cordgrass. Deeper areas with muck soils and some tidal influence are dominated by black needle rush. The upper marsh along the main river channel is dominated by salt grass and glasswort with patches of sea oxeye. Closer to the river are large expanses of smooth cordgrass and black needlerush each in nearly uniform stands creating bands of bright green cordgrass and grey needlerush along the river and tidal creeks.

Scrub is a community composed of evergreen, xerophytic shrubs, with or without a canopy of pines, and is found on dry, infertile, sandy ridges. Scrub communities dominated by a canopy of sand pine are usually found on the highest sandy ridgelines. The pine canopy may range from widely scattered trees with a short, spreading growth form, to tall thin

trees forming a dense canopy of uniform height. Scrub is located on dry, infertile, sandy ridges which often mark the location of former shorelines.

Scrub occurs as a broad discontinuous band extending along the eastern half of the GRWMA. Sand pine may be present in the canopy, but is generally not a major component of the scrub community on the WMA. Height and cover percentages are variable. The shrub cover is generally dense (75 - 100%). Sand live oak is the dominant oak, generally covering 25 - 50 percent of the shrub strata. Chapman's oak myrtle oak, saw palmetto, and rusty lyonia are frequent, each generally covering 5 - 50 percent of the shrub strata. Winged sumac, huckleberry, and shiny blueberry also may be present in the shrub layer. Herbaceous cover is generally sparse except in recently chopped and burned areas. Such areas support a moderately dense cover of weedy forbs and grasses, including dog fennel, fireweed, low panic grasses, and broomsedge. Milk pea is common in the scrub regardless of successional stage, generally covering 1 - 5 percent of the ground or twining in the shrub layer. Wiregrass is either absent or very sparse (<1% cover).

Scrubby flatwoods have an open canopy of widely spaced pine trees and a low, shrubby understory dominated by scrub oaks and saw palmetto, often interspersed with areas of barren white sand. Principal canopy species are longleaf pine and slash pine in northern and Central Florida. The shrub layer consists of oak species and shrubs typical of mesic flatwoods, as well as grasses and dwarf varieties of other shrubs. Scrubby flatwoods occur on slight rises within mesic flatwoods and in transitional areas between scrub and mesic flatwoods. Soils of scrubby flatwoods are moderately well-drained sands with or without an organic layer (spodic horizon).

On the GRWMA, the vegetation within scrubby flatwoods is a combination of scrub and mesic flatwoods species. There is typically a sparse canopy of slash pine or pond pine. The tall shrub layer may be represented by sand live oak and Chapman's oak. The short shrub layer is generally a dense cover of sand live oak, Chapman's oak, myrtle oak, saw palmetto, gallberry, rusty lyonia, staggerbush, and tarflower. Other common shrubs include shiny lyonia, shiny blueberry, huckleberry, and wax myrtle. Herbaceous cover within the scrubby flatwoods is sparse to moderate (1 - 25%) and usually includes wiregrass, bluestem grass, St. John's-wort, and low panic grasses.

Wet flatwoods often occur in the ecotones between mesic flatwoods and shrub bogs, wet prairies, dome swamps, or strand swamps. They are generally found in broad, low

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

Wet flatwoods are distributed in the western half of the GRWMA in association with mesic flatwoods. There is typically a sparse to moderately dense canopy of pond pine in wet flatwoods. The tall shrub layer may be represented by a few scattered wax myrtles, red bay, and sweet bay. The short shrub layer is generally a dense cover of shiny lyonia, gallberry, and huckleberry. Other common shrubs include saw palmetto and shiny blueberry. Herbaceous cover within the wet flatwoods is sparse to moderate (1 - 25%) and usually includes wiregrass, bottlebrush threeawn, bluestem grass, yellow-eyed grass, and wild bachelor's button, yellow hatpins, cinnamon fern, and Virginia chain fern.

Several marsh islands were identified as wet flatwoods. These communities have cabbage palm, yaupon holy, and red cedar in the tall shrub layer. Saw palmetto is sparse to absent. Herbaceous cover is moderate to abundant (25 - 75%), dominated by sedges.

Wet flatwoods grade into mesic flatwoods and scrubby flatwoods, often with broad transition zones. Wet flatwoods typically have less saw palmetto and high coverage (25 - 75 %) of shiny lyonia and huckleberry and frequently support cinnamon fern or Virginia chain fern. Small inclusions of wet flatwoods in a mesic flatwoods matrix were not delineated on the map for the GRWMA.

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. An emergent canopy of pine may be present. Xeric hammock typically develops where fire-exclusion allows for the establishment of the oak canopy. This may occur naturally when the area has significant barriers to fire, or more commonly, as the result of human intervention. In these areas, xeric hammock can form extensive stands or can occur as small patches within or near sandhill or scrub. Xeric hammock can also occur on high islands within flatwoods, or on a high, well-drained ridge within a floodplain. Xeric hammock also can occur on barrier islands and in other coastal environs as an advanced successional stage of scrub.

On the GRWMA, xeric hammock is present where former scrub has not burned for many years and also in transition areas from scrub to maritime hammock. Typically, there is a nearly closed canopy of sand live oak. Chapman's oak, myrtle oak and rusty lyonia are

common in the subcanopy and tall shrub layer. Saw palmetto dominates the short shrub layer, covering 25 - 50 percent of the strata. Shiny blueberry is infrequent. Herbaceous cover is suppressed by abundant leaf litter, and generally comprises nutrushes, beakrushes, and low panic grass.

2.2.1.2 Anthropogenic Communities

Pine plantations are areas altered by silvicultural activities. These include lands where either planted pines are having or will have an ongoing detrimental effect on native groundcover, the history of planted pines has damaged ground cover to the point where further restoration beyond thinning and burning is required, or the method of planting has severely impacted groundcover. Such pine plantations are often dominated by slash pine and typically have sparse to absent herbaceous vegetation.

On the GRWMA, none of the pine plantations were bedded and restoration to mesic flatwoods requires only thinning and burning. When the GRWMA was originally mapped in 2004, FNAI classified 775 acres as pine plantation. Upon re-mapping the area in 2010 and 2011, the total area classified as pine plantation was drastically reduced to just over 87 acres. The vast majority of the acreage that was originally classified as pine plantation was re-classified as mesic flatwoods due to the management activities, including thinning and prescribed fire application, that were implemented during the intervening period.

Impoundment/Artificial Pond is an anthropogenic community type that can include stream or watershed impoundments, water retention ponds, cattle ponds, and borrow pits.

This community type composes nearly 27% of the GRWMA, including both the 2,342-acre area encompassing Lake Ponte Vedra as well as the 27-acre area encompassing McNeils Pond. The areas classified as impoundment/artificial pond on the GRWMA include open water as well as wet flatwoods and basin marsh. Although classified as an anthropogenic community, this land cover type provides vital habitat for a wide number of animal species, including several species of imperiled wading birds.

Spoil areas include places where dredge or spoil material is deposited. A total of 39 acres of the GRWMA are classified as spoil areas, with individual spoil areas ranging in size from less than an acre to more than seven acres. Most of these spoil areas are located along the western border of the GRWMA, adjacent to the Tolomato River. The largest spoil area is located within the mesic flatwoods community on Pine Island.

Clearings account for over 24 acres of the GRWMA and consist entirely of wildlife food plots planted by area management. The food plots that are classified as clearings are generally located within the mesic flatwoods throughout the area and often consist of plantings of iron clay peas, buckwheat, millet, black-oily sunflower, sorghum, purple-top turnips, and Austrian winter pea.

Developed areas can include check stations, ORV use areas, parking lots, buildings, campgrounds, and other altered areas. The single developed area on the GRWMA totals less than one acre and consists of the large parking area, restrooms, and informational kiosk at the Roscoe Boulevard Entrance on the northwest side of the property.

2.2.2 Forest Resources

Forest resources include the pine plantations and natural pine stands found within the pine-dominant scrubby flatwoods and mesic flatwoods communities. A timber assessment was completed by the FFS for the GRWMA in 2008 (Appendix 13.14.1). FWC has requested an update of that assessment which will be incorporated into the Appendix once it is completed by FFS.

Additionally, The Forestry Company completed a Forest Management Plan for the area on November 10, 2012 (Appendix 13.14.2). Subsequently, a pine thinning operation began on the GRWMA in February of 2013 in an effort to reduce the density of slash pine stands found throughout the area. Though rain patterns slowed the rate of pine thinning due to the risk of excessive rutting, 193 acres were thinned between 2012 and 2013.

2.3 Fish and Wildlife Resources

The GRWMA has a diverse assortment of plant and animal species (Tables 4-13). In addition to the three imperiled plant species noted in Table 5, there are eighteen imperiled or protected animal species documented as occurring on the GRWMA. Table 13 lists the rare and imperiled wildlife species documented or reported to occur on the GRWMA. Additionally, a wading bird colony is present on the area and hosts nests of the federally threatened wood stork and other wading bird species.

An inventory of bird species occurring on the GRWMA is listed below in Table 7. Much of the area is composed of suitable habitat for breeding populations of a wide variety of bird species. Additionally, the variety of fish and invertebrate species that can be found in Lake Ponte Vedra and the other water bodies located within the GRWMA are listed in Tables 10 and 11.

Table 7. Avian Species of GRWMA

Common name	Scientific name
Acadian flycatcher	*Empidonax virescens*
American bittern	*Botaurus lentiginosus*
American black duck	*Anas rubripes*
American coot	*Fulica americana*
American crow	*Corvus brachyrhynchos*
American golden-plover	*Pluvialis dominica*
American goldfinch	*Carduelis tristis*
American kestrel	*Falco sparverius paulus*
American oystercatcher	*Haematopus palliatus*
American redstart	*Setophaga ruticilla*
American robin	*Turdus migratorius*
American white pelican	*Pelecanus erythrorhynchos*
American wigeon	*Anas americana*
American woodcock	*Scolopax minor*
Anhinga	*Anhinga anhinga*
Bachman's sparrow	*Aimophila aestivalis*
Barn owl	*Tyto alba*
Barn swallow	*Hirundo rustica*
Barred owl	*Strix varia*
Bay-breasted warbler	*Setophaga castanea*
Belted kingfisher	*Megaceryle alcyon*
Black and white warbler	*Mniotilta varia*
Black scoter	*Melanitta nigra*
Black skimmer	*Rynchops niger*
Black vulture	*Coragyps atratus*
Black-bellied plover	*Pluvialis squatarola*
Black-bellied whistling duck	*Dendrocygna autumnalis*
Black-crowned night-heron	*Nycticorax nycticorax*
Black-necked stilt	*Himantopus mexicanus*
Black-throated blue warbler	*Setophaga caerulescens*
Black-throated green warbler	*Setophaga virens*
Blue grosbreak	*Passerina caerulea*
Blue jay	*Cyanocitta cristata*
Blue-gray gnatcatcher	*Polioptila caerulea*
Blue-headed vireo	*Vireo solitarius*
Blue-winged teal	*Anas discors*
Boat-tailed grackle	*Quiscalus major*
Bobolink	*Dolichonyx oryzivorus*
Bonaparte's gull	*Chroiocephalus philadelphia*

Table 7. Avian Species of GRWMA

Common name	Scientific name
Brant	*Branta bernicla*
Brown noddy	*Anous stolidus*
Brown thrasher	*Toxostoma rufum*
Brown-headed cowbird	*Molothrus ater*
Brown-headed nuthatch	*Sitta pusilla*
Bufflehead	*Bucephala albeola*
Canada goose	*Branta canadensis*
Canvasback	*Aythya valisineria*
Cape May warbler	*Setophaga tigrina*
Carolina chickadee	*Poecile carolinensis*
Carolina wren	*Thryothorus ludovicianus*
Caspian tern	*Hydroprogne caspia*
Cattle egret	*Bubulcus ibis*
Cedar waxwing	*Bombycilla cedrorum*
Chestnut-sided warbler	*Setophaga pensylvanica*
Chimney swift	*Chaetura pelagica*
Chipping sparrow	*Spizella passerina*
Chuck-will's-widow	*Caprimulgus carolinensis*
Clapper rail	*Rallus longirostris*
Common eider	*Somateria mollissima*
Common goldeneye	*Bucephala clangula*
Common grackle	*Quiscalus quiscula*
Common ground-dove	*Columbina passerina*
Common loon	*Gavia immer*
Common moorhen	*Gallinula chloropus*
Common nighthawk	*Chordeiles minor*
Common snipe	*Gallinago gallinago*
Common tern	*Sterna hirundo*
Common yellowthroat	*Geothlypis trichas*
Dark-eyed junco	*Junco hyemalis*
Double-crested cormorant	*Phalacrocorax auritus*
Downy woodpecker	*Picoides pubescens*
Dunlin	*Calidris alpina*
Eastern bluebird	*Sialia sialis*
Eastern brown pelican	*Pelecanus occidentalis carolinensis*
Eastern kingbird	*Tyrannus tyrannus*
Eastern meadowlark	*Sturnella magna*
Eastern phoebe	*Sayornis phoebe*
Eastern screech-owl	*Megascops asio*

Table 7. Avian Species of GRWMA

Common name	Scientific name
Eastern towhee	*Pipilo erythrophthalmus*
Eastern wood-pewee	*Contopus virens*
European starling	*Sturnus vulgaris*
Field sparrow	*Spizella pusilla*
Fish crow	*Corvus ossifragus*
Forster's tern	*Sterna forsteri*
Fox sparrow	*Passerella iliaca*
Fulvous whistling-duck	*Dendrocygna bicolor*
Gadwall	*Anas strepera*
Glossy ibis	*Plegadis falcinellus*
Gray catbird	*Dumetella carolinensis*
Great black-backed gull	*Larus marinus*
Great blue heron	*Ardea herodias*
Great egret	*Ardea alba*
Great horned owl	*Bubo virginianus*
Great-crested flycatcher	*Myiarchus crinitus*
Greater scaup	*Aythya marila*
Greater yellowlegs	*Tringa melanoleuca*
Green heron	*Butorides virescens*
Green-winged teal	*Anas crecca*
Gull-billed tern	*Gelochelidon nilotica*
Hairy woodpecker	*Picoides villosus*
Hermit thrush	*Catharus guttatus*
Herring gull	*Larus argentatus*
Hooded merganser	*Lophodytes cucullatus*
Hooded warbler	*Setophaga citrina*
Horned grebe	*Podiceps auritus*
House wren	*Troglodytes aedon*
Indigo bunting	*Passerina cyanea*
Killdeer	*Charadrius vociferus*
King rail	*Rallus elegans*
Laughing gull	*Leucophaeus atricilla*
Least bittern	*Ixobrychus exilis*
Least sandpiper	*Calidris minutilla*
Least tern	*Sternula antillarum*
Lesser black-backed gull	*Larus fuscus*
Lesser scaup	*Aythya affinis*
Lesser yellowlegs	*Tringa flavipes*
Limpkin	*Aramus guarauna*

Table 7. Avian Species of GRWMA

Common name	Scientific name
Little blue heron	*Egretta caerulea*
Loggerhead shrike	*Lanius ludovicianus*
Long-billed dowitcher	*Limnodromus scolopaceus*
Long-tailed duck	*Clangula hyemalis*
Magnificent frigatebird	*Fregata magnificens*
Magnolia warbler	*Setophaga magnolia*
Mallard duck	*Anas platyrhynchos*
Marbled godwit	*Limosa fedoa*
Marsh wren	*Cistothorus palustris*
Merlin	*Falco columbarius*
Mottled duck	*Anas fulvigula*
Mourning dove	*Zenaida macroura*
Northern bobwhite	*Colinus virginianus*
Northern cardinal	*Cardinalis cardinalis*
Northern flicker	*Colaptes auratus*
Northern gannet	*Morus bassanus*
Northern harrier	*Circus cyaneus*
Northern mockingbird	*Mimus polyglottos*
Northern parula	*Setophaga americana*
Northern pintail	*Anas acuta*
Northern rough-winged swallow	*Stelgidopteryx serripennis*
Northern shoveler	*Anas clypeata*
Orange-crowned warbler	*Oreothlypis celata*
Orchard oriole	*Icterus spurius*
Osprey	*Pandion haliaetus*
Ovenbird	*Seiurus aurocapilla*
Painted bunting	*Passerina ciris*
Palm warbler	*Setophaga palmarum*
Peregrine falcon	*Falco peregrinus*
Pied-billed grebe	*Podilymbus podiceps*
Pileated woodpecker	*Dryocopus pileatus*
Pine warbler	*Setophaga pinus*
Piping plover	*Charadrius melodus*
Prairie warbler	*Setophaga discolor*
Purple finch	*Carpodacus purpureus*
Purple gallinule	*Porphyrio martinicus*
Purple martin	*Progne subis*
Red knot	*Calidris canutus*
Red-bellied woodpecker	*Melanerpes carolinus*

Table 7. Avian Species of GRWMA

Common name	Scientific name
Red-breasted merganser	*Mergus serrator*
Red-breasted nuthatch	*Sitta canadensis*
Reddish egret	*Egretta rufescens*
Red-eyed vireo	*Vireo olivaceus*
Redhead	*Aythya americana*
Red-headed woodpecker	*Melanerpes erythrocephalus*
Red-shouldered hawk	*Buteo lineatus*
Red-tailed hawk	*Buteo jamaicensis*
Red-throated loon	*Gavia stellata*
Red-winged blackbird	*Agelaius phoeniceus*
Ring-billed gull	*Larus delawarensis*
Ring-necked duck	*Aythya collaris*
Rock dove	*Columba livia*
Roseate spoonbill	*Platalea ajaja*
Rose-breasted grosbeak	*Pheucticus ludovicianus*
Royal tern	*Thalasseus maximus*
Ruby-crowned kinglet	*Regulus calendula*
Ruby-throated hummingbird	*Archilochus colubris*
Ruddy duck	*Oxyura jamaicensis*
Ruddy turnstone	*Arenaria interpres*
Saltmarsh sharp-tailed sparrow	*Ammodramus caudacutus*
Sanderling	*Calidris alba*
Sandwich tern	*Thalasseus sandvicensis*
Savannah sparrow	*Passerculus sandwichensis*
Seaside sparrow	*Ammodramus maritimus*
Sedge wren	*Cistothorus platensis*
Semipalmated plover	*Charadrius semipalmatus*
Sharp-shinned hawk	*Accipiter striatus*
Short-billed dowitcher	*Limnodromus griseus*
Short-tailed hawk	*Buteo brachyurus*
Snow goose	*Chen caerulescens*
Snowy egret	*Egretta thula*
Solitary sandpiper	*Tringa solitaria*
Song sparrow	*Melospiza melodia*
Sora rail	*Porzana carolina*
Southern bald eagle	*Haliaeetus leucocephalus leucocephalus*
Spotted sandpiper	*Actitis macularius*
Summer tanager	*Piranga rubra*
Surf scoter	*Melanitta perspicillata*

Table 7. Avian Species of GRWMA

Common name	Scientific name
Swainson's thrush	*Catharus ustulatus*
Swallow-tailed kite	*Elanoides forficatus*
Swamp sparrow	*Melospiza georgiana*
Tree swallow	*Tachycineta bicolor*
Tricolored heron	*Egretta tricolor*
Tufted titmouse	*Baeolophus bicolor*
Tundra swan	*Cygnus columbianus*
Turkey vulture	*Cathartes aura*
Veery	*Catharus fuscescens*
Vesper sparrow	*Pooecetes gramineus*
Virginia rail	*Rallus limicola*
Water pipit	*Anthus spinoletta*
Western kingbird	*Tyrannus verticalis*
Western sandpiper	*Calidris mauri*
Whip-poor-will	*Caprimulgus vociferus*
White ibis	*Eudocimus albus*
White-eyed vireo	*Vireo griseus*
White-throated sparrow	*Zonotrichia albicollis*
White-winged scoter	*Melanitta fusca*
Wild turkey	*Meleagris gallopavo*
Willet	*Tringa semipalmata*
Wilson's plover	*Charadrius wilsonia*
Wilson's snipe	*Gallinago delicata*
Wood duck	*Aix sponsa*
Wood stork	*Mycteria americana*
Wood thrush	*Hylocichla mustelina*
Yellow warbler	*Setophaga petechia*
Yellow-bellied sapsucker	*Sphyrapicus varius*
Yellow-billed cuckoo	*Coccyzus americanus*
Yellow-crowned night heron	*Nyctanassa violacea*
Yellow-rumped warbler	*Setophaga coronata*
Yellow-throated vireo	*Vireo flavifrons*
Yellow-throated warbler	*Setophaga dominica*

Table 8. Mammalian Species of GRWMA

Common name	Scientific name
Bobcat	*Lynx rufus*
Cotton mouse	*Peromyscus gossypinus*
Cotton mouse	*Peromyscus gossypinus*

Table 8. Mammalian Species of GRWMA

Common name	Scientific name
Coyote	*Canis latrans*
Eastern woodrat	*Neotoma floridana*
Florida black bear	*Ursus americanus floridanus*
Florida manatee	*Trichechus manatus latirostris*
Florida mouse	*Podomys floridanus*
Golden mouse	*Ochrotomys nuttalli*
Gray fox	*Urocyon cinereoargenteus*
Gray squirrel	*Sciurus carolinensis*
Hispid cotton rat	*Sigmodon hispidus*
Marsh rabbit	*Sylvilagus palustris*
Opossum	*Didelphis virginiana*
Raccoon	*Procyon lotor*
River otter	*Lontra canadensis*
Short-tail shrew	*Blarina carolinensis*
Southern flying squirrel	*Glaucomys volans*
Striped skunk	*Mephitis mephitis*
White-tailed deer	*Odocoileus virginianus*

Table 9. Reptilian and Amphibian Species of GRWMA

Common name	Scientific name
American alligator	*Alligator mississippiensis*
Broad-headed skink	*Plestiodon laticeps*
Coastal dunes crowned snake	*Tantilla relicta pamlica*
Dusky pygmy rattlesnake	*Sistrurus miliarius barbouri*
Eastern coral snake	*Micrurus fulvius*
Eastern diamondback rattlesnake	*Crotalus adamanteus*
Eastern garter snake	*Thamnophis sirtalis*
Eastern glass lizard	*Ophisaurus ventralis*
Eastern indigo snake	*Drymarchon corais couperi*
Eastern narrow-mouthed toad	*Gastrophryne carolinensis*
Eastern rat snake	*Pantherophis alleghaniensis*
Eastern spadefoot	*Scaphiopus holbrookii*
Florida cottonmouth	*Agkistrodon piscivorus conanti*
Florida snapping turtle	*Chelydra serpentina osceola*
Florida softshell turtle	*Apalone ferox*
Gopher tortoise	*Gopherus polyphemus*
Greater siren	*Siren lacertina*
Green anole	*Anolis carolinensis*
Green treefrog	*Hyla cinerea*

Table 9. Reptilian and Amphibian Species of GRWMA

Common name	Scientific name
Ground skink	*Scincella lateralis*
Little grass frog	*Pseudacris ocularis*
Mole salamander	*Ambystoma talpoideum*
Mud turtle	*Kinosternon spp.*
Oak toad	*Anaxyrus quercicus*
Peninsula ribbon snake	*Thamnophis sauritus sackenii*
Pig frog	*Lithobates grylio*
Pine woods snake	*Rahdinaea flavilata*
Pinewoods treefrog	*Hyla femoralis*
Scarlet snake	*Cemophora coccinea*
Six-lined racerunner	*Cnemidophorus sexlineatus*
Skinks	*Plestiodon spp.*
Southern black racer	*Coluber constrictor priapus*
Southern leopard frog	*Lithobates sphenocephalus*
Southern ringneck snake	*Diadophis punctatus punctatus*
Southern toad	*Anaxyrus terrestris*
Squirrel treefrog	*Hyla squirella*
Striped crayfish snake	*Regina alleni*
Striped newt	*Notophthalmus perstriatus*

Table 10. Invertebrate Species of GRWMA

Common name	Scientific name
American oyster	*Crassostrea virginica*
Barnacles	*Balanus spp.*
Blue crab	*Callinectes sapidus*
Brown shrimp	*Farfantepenaeus aztecus*
Fiddler crab	*Uca pugnax*
Grass shrimp	*Palaemonetes spp.*
Horseshoe crab	*Limulus polyphemus*
Pink shrimp	*Farfantepenaeus duorarum*
Sand fiddler crab	*Uca pugilator*
Stone crab	*Menippe spp.*
White shrimp	*Litopenaeus setiferus*

Table 11. Fish Species of GRWMA

Common name	Scientific name
American eel	*Anguilla rostrata*
Anchovy	*Anchoa spp.*
Atlantic croaker	*Micropogonias undulatus*
Atlantic stingray	*Dasyatis sabina*
Black drum	*Pogonias cromis*
Bluefish	*Pomatomus saltatrix*
Bluegill	*Lepomis macrochirus*
Bowfin	*Amia calva*
Brown bullhead	*Ameiurus nebulosus*
Eastern mosquitofish	*Gambusia affinis*
Florida gar	*Lepisosteus osseus*
Flounders	*Paralichthys spp.*
Gizzard shad	*Dorosoma cepedianum*
Golden shiner	*Notemigonus crysoleucas*
Hardhead catfish	*Ariopsis felis*
Hickory shad	*Alosa mediocris*
Jack crevalle	*Caranx hippos*
Ladyfish	*Elops saurus*
Lake chubsucker	*Erimyzon sucetta*
Largemouth bass	*Micropterus salmoides floridanus*
Menhaden	*Brevoortia spp.*
Mojarra	*Eucinostomus spp.*
Mollies	*Poecilia spp.*
Needlefish	*Strongylura spp.*
Pinfish	*Lagodon rhomboides*
Red drum	*Sciaenops ocellatus*
Redear sunfish	*Lepomis microlophus*
Seminole killifish	*Fundulus seminolis*
Sheepshead	*Archosargus probatocephalus*
Sheepshead minnow	*Cyprinodon variegatus*
Silver perch	*Bairdiella chrysoura*
Snook	*Centropomus spp.*
Spot	*Leiostomus xanthurus*
Spotted seatrout	*Cynoscion nebulosus*
Striped mullet	*Mugil cephalus*
Tarpon	*Megalops atlanticus*
Threadfin shad	*Dorosoma petenense*
Warmouth	*Lepomis gulosus*

Table 12. Exotic Animal Species of GRWMA

Common name	Scientific name
Australian spotted jellyfish	*Phyllorhiza punctata*
Blue tilapia	*Oreochromis aureus*
Brown anole	*Anolis sagrei*
Cuban treefrog	*Osteopilus septentrionalis*
Eurasian collared-dove	*Streptopelia decaocto*
Feral hog	*Sus scrofa*
House sparrow	*Passer domesticus*
Mediterranean gecko	*Hemidactylus turcicus*
Mute swan	*Cygnus olor*
Nine-banded armadillo*	*Dasypus novemcinctus*
Rock pigeon	*Columba livia*

*Native to North America

2.3.1 Integrated Wildlife Habitat Ranking System

The FWC has developed the Integrated Wildlife Habitat Ranking System (IWHRS) as a Geographic Information Systems (GIS)-based assessment tool that incorporates a wide variety of land cover and wildlife species data. The IWHRS evaluates the Florida landscape based upon the habitat needs of wildlife as a way to identify ecologically significant lands in the state, and to assess the potential impacts of management and land-use changes. The IWHRS was developed to provide technical assistance to various local, regional, state, and federal agencies, and entities interested in wildlife needs and conservation in order to: (1) determine ways to avoid or minimize project impacts by evaluating alternative placements, alignments, and transportation corridors during early planning stages, (2) assess direct, secondary, and cumulative impacts to habitat and wildlife resources, and (3) identify appropriate parcels for public land acquisition for wetland and upland habitat mitigation purposes. The IWHRS (2009) indicates that the upland areas of the GRWMA have a mean wildlife value of 5.8 (Figure 7).

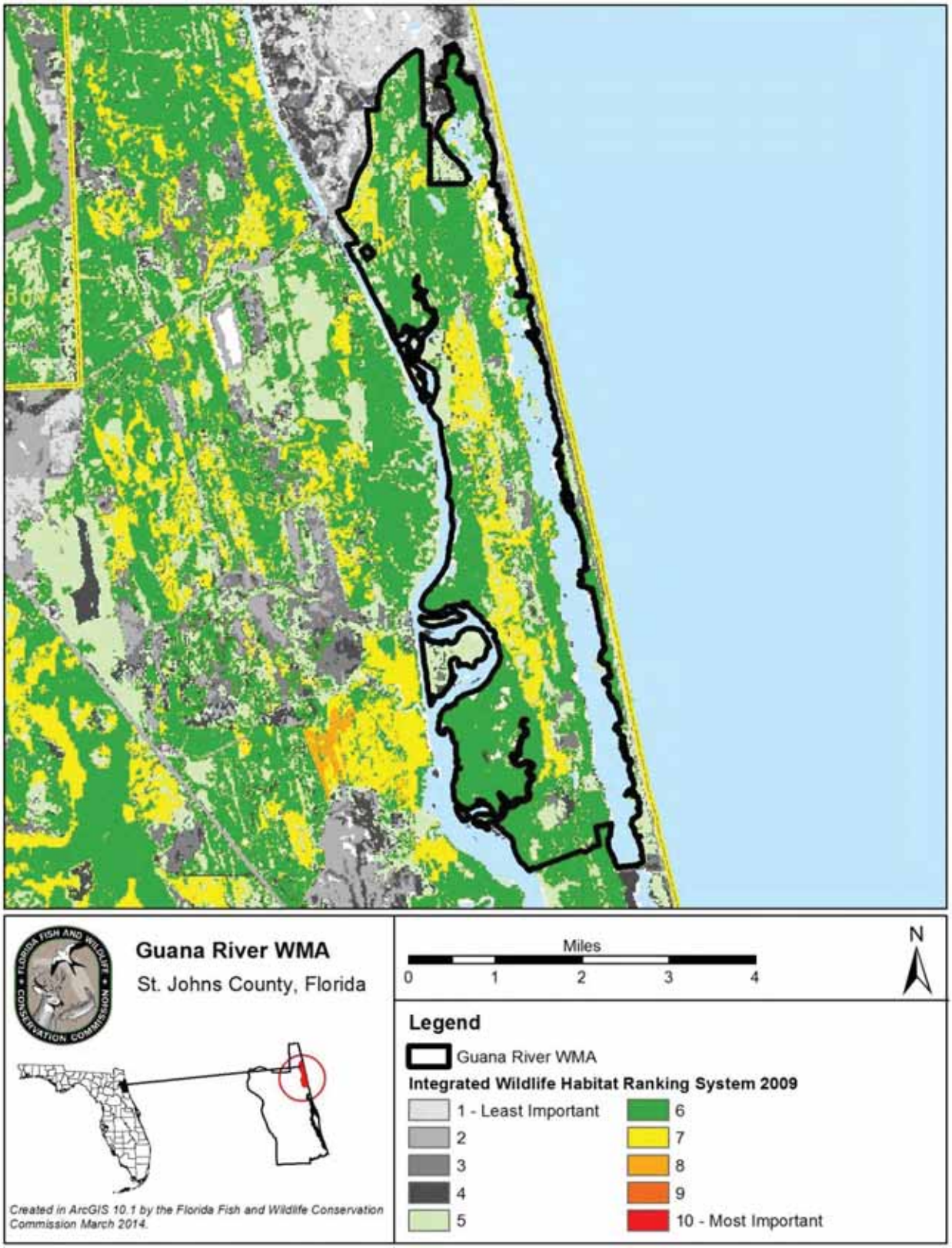

Figure 7. FWC Integrated Wildlife Habitat Ranking System 2009

2.3.2 Imperiled Species

For the purposes of this Management Plan, the term "imperiled species" refers to plant and animal species that are designated as endangered, threatened or species of special concern by FWC or the Florida Department of Agriculture and Consumer Services (FDACS), or that are designated as endangered or threatened by the U.S. Fish and Wildlife Service. This designation is also commonly known as "listed species."

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

Table 13. Imperiled Animal Species of GRWMA

Common name	Scientific name	Status
American alligator	*Alligator mississippiensis*	FT (S/A)
American oystercatcher	*Haematopus palliatus*	SSC
Black skimmer	*Rynchops niger*	SSC
Brown pelican	*Pelecanus occidentalis*	SSC
Eastern indigo snake	*Drymarchon corais couperi*	FT
Florida manatee	*Trichechus manatus latirostris*	FE
Florida mouse	*Podomys floridanus*	SSC
Gopher tortoise	*Gopherus polyphemus*	ST
Least tern	*Sternula antillarum*	ST
Limpkin	*Aramus guarauna*	SSC
Little blue heron	*Egretta caerulea*	SSC
Piping plover	*Charadrius melodus*	FT
Reddish egret	*Egretta rufescens*	SSC
Roseate spoonbill	*Platalea ajaja*	SSC
Snowy egret	*Egretta thula*	SSC

Table 13. Imperiled Animal Species of GRWMA

Common name	Scientific name	Status
Tricolored heron	*Egretta tricolor*	SSC
White ibis	*Eudocimus albus*	SSC
Wood stork	*Mycteria americana*	FT

Abbreviation	Status
FT	Federal Threatened
FT (S/A)	Federally Threatened due to Similarity of Appearance
FE	Federal Endangered
ST	State Threatened
SSC	Species of Special Concern

2.3.3 FWC Wildlife Observations and FNAI Element Occurrences

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

Known locations of FWC wildlife occurrences and FNAI element occurrences from the most recent GIS databases of the respective agencies are displayed in Figure 8. Appendix 13.7 contains a letter from FNAI authorizing the FWC to utilize their database for the purpose of displaying known plant and animal resources.

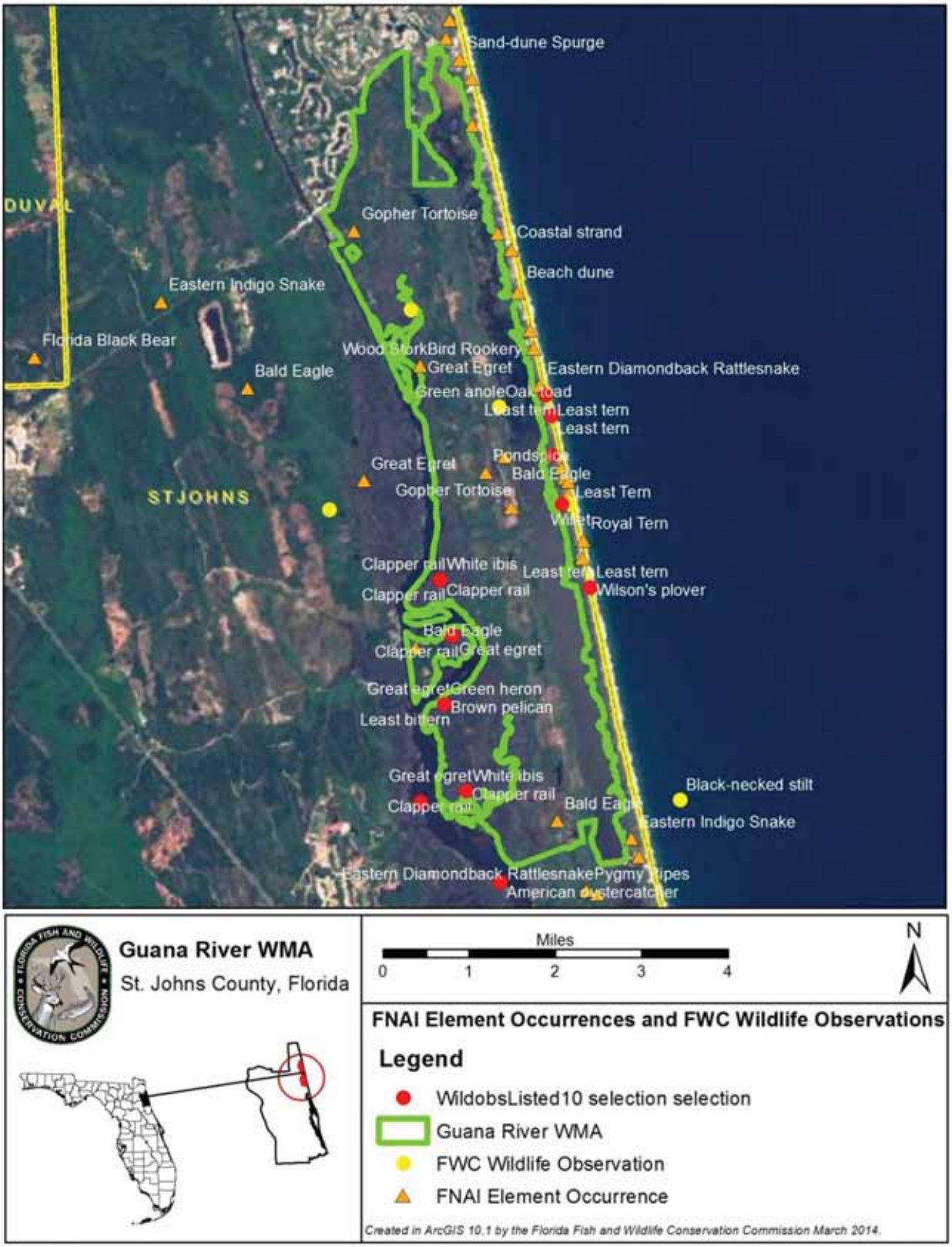

Figure 8. FWC Wildlife Observations and FNAI Element Occurrences

2.4 Native Landscapes

The predominant native landscapes on the GRWMA include salt marsh, mesic flatwoods, and maritime hammock. Other significant native landscapes present on the area include maritime hammock, scrub, scrubby flatwoods, xeric hammock, mesic hammock, and depression marsh. Complete descriptions of the natural communities found on the GRWMA can be found in Section 2.2.1 of this Management Plan.

2.5 Water Resources

Water resources on the GRWMA are among the most prominent features on the area and include estuarine (tidal) waters of the Tolomato River, interior impoundments, marshes, swamps and nine artesian wells. The GRWMA lies in close proximity to the Atlantic Ocean and is further affected by a number of significant waterways and water bodies including the Tolomato River, Lake Ponte Vedra, Guana River, and Capo Creek. The Guana River and the Guana River Marsh Aquatic Preserve are both designated Outstanding Florida Waters, with 8,098 acres of the GRWMA falling within the Guana River watershed and 4,567 acres falling within the Guana River Marsh Aquatic Preserve. Additionally, National Wetlands Inventory Data indicates that wetlands, ponds and lakes are present on over 63% of the area.

The low, nearly level salt marshes of the GRWMA are inundated during tidal fluctuation twice daily. The upper, inland reaches of the estuarine tidal marshes, flats and creeks receive a limited amount of fresh water through drainage and may thus be classified within a range from saline to brackish or freshwater swamps and marsh basins.

Limited water quality data have been collected on the area. However, runoff containing nutrient and chemical residues from adjacent residential and resort developments may negatively affect water quality in tidal waters and Lake Ponte Vedra. This concern is being investigated on an ongoing basis. Residential and golf course development north of the GRWMA and a drainage canal to the Intracoastal Waterway may also potentially affect the water quality and the water resources of the area.

2.6 Beaches and Dunes

There are no significant beach or dune resources on the GRWMA. However, both beach and dune resources do occur on the GTMNERR property directly adjacent to the eastern border of the GRWMA.

2.7 Mineral Resources

There are no known commercial mineral deposits on the area.

2.8 Cultural Resources

Division of Historical Resources (DHR) observations and recorded site files are broken down into five categories. These five categories include archeological sites, resource groups, historical structures, historic bridges and historic cemeteries. There are 24 archaeological sites, one historic cemetery site and one resource group site presently mapped or recorded by DHR for the GRWMA. There are no historic structures or bridges GRWMA.

With the exception of one site (SJ72), believed to have been occupied by a Spanish settler, no significant sites were recorded, or expected to occur within, pine flatwoods or basin swamp habitats on GRWMA. One archaeological site that is a burial mound (SJ37), one historical cemetery (SJ3240) and one resource group (SJ5270) are located within the GRWMA boundary; the remaining sites are shell middens.

Among the recorded sites, the Guana River Shell Ring (SJ2554) is a significant Archaic (ca. 2500-1000 B.C.) shell ring and may be eligible for listing in the National Register of Historic Places.

Moreover, the DHR indicates that the discovery of additional sites is probable upon completion of any further archaeological research investigations, primarily in hammock habitats, on the area. All Master Site recordings, assessments and preservation strategies will be coordinated with DHR.

2.9 Scenic Resources

Scenic views of pristine salt marsh and the Tolomato River, including its abundant tributaries, characterize the western boundary of the GRWMA. Additionally, Lake Ponte Vedra offers scenic views of open water, marshes and ecotones of upland maritime hammocks and coastal strand. Other wetland scenes include a view of inland freshwater impoundments and marshes, with several sites offering excellent wildlife viewing opportunities and scenic vistas. Some of these sites have been developed as scenic areas with boardwalks, viewing platforms and interpretive signage.

Scenic features within the GRWMA's upland vegetation include the area's mature maritime hammocks. To provide visitors an opportunity to experience them, miles of scenic roads through maritime hammock are located on the area. Also, the coastal xeric scrub and flatwoods on the GRWMA are available for hiking, biking and horseback riding.

3 Uses of the Property

3.1 Previous Use and Development

Prior to European settlement, the landscape of Florida, including this area of the peninsula, was settled and used by a variety of aboriginal peoples whose culture relied mainly on hunting, fishing and subsistence agriculture. According to the DHR, aboriginal people began to inhabit the land in Florida approximately 12,000 years ago. The DHR indicates that between 6,000 and 4,000 years ago, aboriginal people began to inhabit the land between the Tolomato River and the Atlantic Ocean.

These early inhabitants hunted deer and other animals, fished and collected shellfish and deposited shells in middens. As described above, a large shell ring (SJ2554), 100 meters in diameter and a meter in elevation, consists of oyster, clam, conch and coquina and is believed by some archeologists to be the remains of a circular village. The elevated area was used as house sites and the center was used for ceremonies.

Though some land alteration occurred during the aboriginal era, 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. When Europeans arrived in the sixteenth century, they found the descendants of these earlier people living in villages surrounded by fields of corn, beans, peas and pumpkins. Known to Europeans as Timucuans, these Native Americans were immortalized in the drawings of Jacques Le Moyne de Morgues who accompanied the Frenchman Rene de Laudonniere to Florida in 1564.

Over 35 land grants were recorded for the land now within the GRWMA. Beginning in the 1770s, British Governor James Grant operated an indigo plantation on the southern tip of the peninsula. In 1781, another plantation was established to grow rice. Cattle and hogs were also raised on the land and sugarcane was grown. A network of dikes, levees and ditches were constructed as well as a rice and sugar mill. When Florida was returned to Spain at the end of the Revolutionary War, the Guana tract was largely abandoned until immigrants began purchasing small tracts for farming.

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

However, in the 19th and 20th centuries, even more extensive alteration of the landscape in the vicinity of the GRWMA began with the widespread use of agriculture and associated development in the area.

In the early 1900s, canals were dug along the northern portion of the Tolomato River for the northern expansion of the Atlantic Intracoastal Waterway. In the 1920s, real estate investors and developers began to consolidate these tracts in the hope of developing a residential community. Their plans ended with the Depression. A small herd of Spanish ponies inhabited the area until they were destroyed during efforts to eradicate Texas tick fever. An intense pine harvest began in the late 1930s and continued through the 1970s. Between 1931 and 1980, impoundments were constructed for waterfowl hunting and mosquito control. Lake Ponte Vedra was created between 1957 and 1962 to increase and to enhance habitat for waterfowl by damming the Guana River and installing water control structures.

3.2 Current Use of the Property

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

Currently, the public fish and wildlife based recreational uses of the property are diverse. Hunting and fishing continue to be popular recreational activities on the GRWMA. The area also offers excellent opportunities for bird watching, especially for peregrine falcons, waterfowl and wading birds. The diversity of vegetation not only harbors a variety of bird species but also provides good opportunities for mammalian wildlife viewing. Other uses include hiking, photography, biking, sightseeing, paddling and horseback riding.

3.2.1 Visitation and Economic Benefits

Due to the proximity of large population centers near the GRWMA, including Jacksonville and St. Augustine, public use can be expected to increase as public awareness of opportunities increases. FWC administers hunts in the fall through spring for various game species including small game, deer, turkey, waterfowl, and feral hogs, which account for a significant portion of the user-days.

Visitation and public use of the area for fish and wildlife based public outdoor recreational opportunities is the primary source of economic benefits from the GRWMA, and contribute to the overall economy for the northeast region of Florida.

In Fiscal Year 2012-13, an estimated 50,080 people visited the GRWMA. Primarily, as a result of this visitation and use of the area, FWC economic analysis estimates indicate that the GRWMA generated an estimated annual economic impact of $9,785,131 for the State and the northeast Florida region. This estimated annual economic impact has aided in the support or creation of an estimated 99 jobs.

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

3.3 Single- or Multiple-use Management

The GRWMA will be managed under the multiple-use concept as a wildlife management area. The GRWMA will provide fish and wildlife resource based public outdoor recreation and educational opportunities, while protecting the natural and cultural resources found on the area. Any natural and cultural resources of the GRWMA 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 actions or activities listed below have been considered under the multiple-use concept as possible uses to be allowed on the GRWMA. Uses classified as “Approved” are considered to be in accordance with the purposes for acquisition, as well as with the Conceptual State Lands Management Plan, and with the FWC agency mission, goals and objectives as expressed in the Agency Strategic Plan (Appendix 13.8). 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.

3.3.2 Incompatible Uses and Linear Facilities

Consideration of incompatible uses and linear facilities on the GRWMA are made in accordance with the requirements of Section 253.034(10) FS, and other applicable Florida constitution, statute, rule, and policy requirements, as well as other provisions governing applications for proposed incompatible uses or linear facilities on state-owned conservation lands. Upon approval and implementation of this management plan, any proposed future uses that have been classified herein as “Rejected,” or other proposed future uses that are

determined to be incompatible with the purposes of acquisition or other management authorizations and guidance, will be forwarded for review and approval to the DEP-DSL, the ARC and the BOT prior to any incompatible use or linear facility being authorized on the GRWMA.

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

3.3.3 Assessment of Impact of Planned Uses of the Property

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

3.4 Acreage That Should Be Declared Surplus

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

The evaluation of the GRWMA 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 GRWMA should be considered or declared surplus.

4 Accomplished Objectives from the GRWMA Management Plan 2002 – 2012

This section is dedicated to reporting the extent to which the Objectives described in the GRWMA Management Plan 2002 – 2012 (pages 51 – 54) were successfully completed. Accomplishments for the GRWMA during the previous planning timeframe are further discussed in more comprehensive detail throughout Section 5 (Management Activities and Intent) of this Management Plan.

The following Resource Management Goals and Objectives from the 2002 – 2012 GRWMA Management Plan describe the planned activities for the GRWMA during this period. The degree to which FWC was able to accomplish the planned activities during this period is reflected as Percent Accomplished with each associated Objective.

Goals and Objectives	**Percent Accomplished**
Goal 1: Maintain and protect the integrity of GRWMA's native wildlife and plant communities.	
Objective 1: Following the guidelines of the GRWMA Scrub Ecosystem Management Plan, manage 700 acres of existing scrub habitat using prescribed fire and mechanical techniques.	100%

Objective 2: Continue to utilize prescribed fire, mechanical and chemical treatments to provide quality wildlife habitat.	100%
Objective 3: Continue to protect rookeries and other critical habitats for the benefit of listed species.	100%
Objective 4: Continue to locate and eradicate exotic plant species using most appropriate means.	100%
Objective 5: Continue to monitor mammalian, reptilian, amphibian, and avian populations by conducting annual surveys.	100%
Objective 6: To maintain fire-dependent vegetative communities, continue to follow the guidelines of the GRWMA Prescribed Burn Plan.	100%
Objective 7: Using prescribed fire, mechanical, and chemical treatments, rejuvenate and maintain 530 acres of existing scrub habitat at an early successional stage **by 2007**. *Comment: Initially completed in March 2005, but is ongoing.*	100%
Objective 8: Delineate management units and develop quantifiable vegetation management objectives for these management units by **2007.** *Comment: Completed in July 2005.*	100%
Goal 2: Manage modified habitats and impoundments to provide high quality wildlife and fish habitat.	
Objective 1: Adjust and control the water levels of Lake Ponte Vedra to promote the growth of aquatic plants that benefit waterfowl species.	100%
Objective 2: To improve water level management capabilities, clean one mile of drainage ditches annually. *Comment: Ongoing.*	50%
Objective 3: To better facilitate the use of prescribed fire within interior impoundments, re-establish 4 miles of perimeter fire lines **by 2002**. *Comment: Completed in November 2001.*	100%
Objective 4: Add 6-inch diameter wells to the existing 4-inch wells, and sink a new 6- inch diameter well at Diego Pond **by 2005**. *Comment: Completed in April 2002.*	100%
Objective 5: To improve wildlife habitat (especially for waterfowl) and fisheries habitat, as well as water quality, conduct at least one complete drawdown of Lake Ponte Vedra **by 2006.** *Comment: Completed in June 2009.*	100%
Objective 6: To improve water level management capabilities of the Little Savanna impoundment, extend the existing drainage ditch in Big Savanna impoundment to the water control structure of Little Savanna impoundment **by 2006**. *Comment: Staff determined that ditching was not needed to accomplish resource management goals at this time.*	0%
Objective 7: De-muck or consolidate sediments in McNeils and Booths Ponds **by 2006**. *Comment: Completed in May 2008.*	100%

Objective 8: Plant up to 50 acres of food plots on uplands and impoundments **by 2006**. *Comment: Completed in May 2004.*	100%
Objective 9: Thin 300 acres of planted pine plantation **by 2003**, with an additional 600 acres to be thinned by **2007**. *Comment: Initially completed in May 2003, but is ongoing.*	100%
Goal 3: Facilitate and conduct scientific research to optimally manage and protect native upland and wetland communities of the WMA.	
Objective 1: Annually sample vegetative treatment plots within scrub habitat.	100%
Objective 2: To monitor scrub succession rates, establish and annually sample photo-plots.	100%
Objective 3: Continue to monitor mammalian, reptilian, amphibian, and avian populations by conducting annual surveys.	100%
Objective 4: Continue to monitor water quality at three locations on Lake Ponte Vedra (Guana dam, Six Mile landing, and Mickler Rd.).	100%
Objective 5: Utilize the bait station transect method to evaluate the wild turkey population **by 2003.** *Comment: Initially completed in March 2003, but is ongoing.*	100%
Objective 6: To monitor the long-term effects of management strategies, establish photo-plots on wetland and upland habitat types **by 2003**. *Comment: Initially completed in 2002, but is ongoing.*	100%
Objective 7: Contract with FNAI to conduct a rare plant survey, and develop a plant community type map **by 2003**. *Comment: Initially completed in 2002, updated and re-mapped in 2011.*	100%
Goal 4: Maintain sustainable game populations through monitoring and management activities.	
Objective 1: Conduct annual game wildlife inventories to monitor changes in population trends.	100%
Objective 2: Continue to collect biological data from harvested game to evaluate the general physiological condition of the populations.	100%
Objective 3: Annually monitor alligator populations in order to set harvest levels on Lake Ponte Vedra.	100%
Objective 4: If necessary, based on the results of the wild turkey survey, seek approval to supplement the existing wild turkey population by translocating birds to Guana River WMA **by 2004**. *Comment: Completed in December 2002.*	100%
Objective 5: Plant up to 50 acres of food plots on uplands and impoundments by 2006. *Comment: Initially completed in May 2004, but is ongoing.*	100%

Goal 5: Provide nature-based recreation and educational opportunities.	
Objective 1: Establish three miles of self-guided interpretive trails **by 2003**.	100%
Goal 6: Protect Cultural Resources	
Objective 1: Request a comprehensive inventory by the DHR to identify additional cultural resources **by 2002**.	100%
Objective 2: **By 2002,** post signs advising the public of protections provided to cultural resources by Chapter 267, F. S.	100%
Goal 7: Assure an optimum boundary by continuing to identify and pursue acquisition needs.	
Objective 1: Continue to maintain a GIS shapefile, acreage, and other necessary data to facilitate nominations for the Inholdings and Additions Program.	100%
Objective 2: **By 2005**, survey and fence 2 miles of the Northeast boundary to improve management and security. *Comment: Completed in June 2005.*	100%
Objective 3: Recommend parcels for inclusion in the GTMNERR Land Acquisition Plan for potential funding by NOAA.	100%
Goal 8: Coordinate GRWMA natural resource protection and management issues with other agencies and groups.	
Objective 1: Cooperate with the Anastasia Mosquito Control District to minimize mosquito production.	100%
Objective 2: Provide technical assistance to St. Johns County regarding water quality (including nutrient enrichment from sewage and fertilizer runoff) of Lake Ponte Vedra.	100%
Objective 3: Continue to cooperate with other area landowners and managers, including the Department of Environmental Protection's Division of Recreation and Parks, and the Guana Tolomato Matanzas National Estuarine Research Reserve.	100%

5 Management Activities and Intent

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

5.1 Land Management Review

The 2014 Land Management Review of the GRWMA (Appendix 13.5) found that the FWC was managing the area in accordance with the purpose(s) for acquisition. The recommendations of the LMR were considered and addressed in the development of this Management Plan, including the development of management intent language, goals and objectives, and the identification of management challenges and the development of solution strategies (Sections 5 – 8).

5.2 Adaptive Management

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

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

Proposed adaptive management, monitoring and performance measures are developed through literature reviews and FWC staff meetings. Overall, a results-based approach is incorporated into this Management Plan, for which effective monitoring is an integral

component. FWC will monitor conservation actions, species, habitats, and major threats to the conservation of the natural and cultural resources of the GRWMA.

5.2.1 Monitoring

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

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

For natural communities, monitoring protocols are established through FWC's Objective-Based Vegetation Management (OBVM, Section 5.3.1) 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 5.6.3). Cultural and historical resources (Section 5.9) are monitored with guidance from the DHR.

5.2.2 Performance Measures

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

5.2.3 Implementation

The GRWMA Management Plan serves as the guiding framework to implement this adaptive management process. It serves as the underpinning for the integration of management programs (OBVM, WCPR, Public Access and Wildlife Viewing, Recreation Master Plans, etc.) underway to accomplish needed conservation actions that are planned to manage the natural resources of the GRWMA, and resolve conservation threats to fish

and wildlife and the habitats they occupy. Based on evaluations of project results, the conservation actions are revised as necessary, and the adaptive management process is repeated.

5.3 Habitat Restoration and Improvement

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

FNAI has conducted surveys and mapped the current vegetative communities on the GRWMA (Table 3, Section 2.2). This information will be used to guide and prioritize management and restoration efforts on the area.

5.3.1 Objective-Based Vegetation Management

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

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

After natural communities have been mapped, management units are delineated. Delineating management units takes into account the distribution and extent of the current and/or historic mapped communities, existing and proposed infrastructure, and other management considerations. FWC land managers then identify the predominant current

or historic community within each management unit that guides the type and frequency of management activities that should be applied.

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

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

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

5.3.2 Prescribed Fire and Fire Management

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

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

The FWC employs a fire management regime to increase both species and habitat diversity and will continue a prescribed burning program on the GRWMA in accordance with vegetative management objectives. Prescribed burning on the GRWMA also produces other benefits, including reducing the likelihood of wildfires through the reduction of fuel loads, enhancing area aesthetics, controlling exotic and invasive plant species, and improving public access.

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

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

Single drum (with standard, not offset blades), one-pass roller chopping can be a valuable management tool, enabling the use of prescribed fires in areas heavily invaded by dense woody vegetation. However, roller chopping may damage the herbaceous ground cover, especially wiregrass. Therefore, its application will be limited to situations where burning can only be accomplished by first reducing woody vegetation by mechanical means.

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

The transitional areas between two adjacent but different vegetative cover types, such as forests and wetlands, are known as ecotones. With the possible exception of wildfire suppression, mechanical soil disturbance in ecotones will be avoided in order to protect

habitats for important rare species that often occur between flatwoods and riparian drainages. Silvicultural site preparation and creation of firebreaks are avoided when possible in these zones. Additionally, fires are allowed to burn into the edges of marshes, swamps and other wetlands in order to maintain these habitats. Once fuel loads have been reduced and a more open appearance has returned, vegetative management objectives will likely dictate a fire return interval that averages 1-4 years, preferably during the spring and early summer months.

On the GRWMA, the marshes surrounding the area's interior waterfowl impoundments are burned when they are dewatered and dry and either in the fall prior to waterfowl arrival or in the winter or early spring prior to the growing season. In addition to the general prescribed fire management guidelines described above, the area-specific Prescribed Fire Plan for the GRWMA was updated by FWC staff in 2014 and has been implemented for the GRWMA (Appendix 13.11). This plan includes, but is not be limited to, delineation of burn management units, detailed descriptions of prescribed fire methodology, safety, and smoke management guidelines. As described in the Prescribed Fire Plan, the preferred prescribed burn intervals on the GRWMA are approximately two to three years for flatwoods, three to five years for wetlands, and four to seven years for scrub. The four to seven year prescribed burn interval for scrub communities on the GRWMA is much shorter than the 5-20 year prescribed burn interval recommended by the FNAI for scrub communities in general. However, due to the nature and composition of the scrub communities present on the GRWMA, a prescribed burn interval of four to seven years has been deemed appropriate and suitable for the area. As described below in Section 5.3.3, scrub management techniques on the GRWMA will continue to be the subject of research and evaluation and will be adjusted as necessary in order to achieve optimal management of scrub habitat on the area.

5.3.3 Habitat Restoration

Significant habitat restoration activities have taken place within the flatwoods, pine plantation and scrub communities of the GRWMA over the course of the previous planning period beginning in 2002. The thinning of 900 acres of planted slash pine on the GRWMA was initiated in 2002. This third row thinning reduced the average basal area (BA) from 120 square feet per acre to 80. Aggressive prescribed fire and mechanical treatments followed. Within ten years, 90% of the planted pine stands were within a three to four year fire return interval. After the implementation of OBVM, desired future conditions for the mesic pine flatwoods were set. The average BA of 80 square feet per acre was still too highly stocked. A second thinning was initiated in 2012. This thinning is an operator select with the goal of a residual stands having an average BA of 30-40.

Intensive management of natural pine flatwoods with fire and mechanical treatments was initiated in 2002. Roller chopping and mowing were used to reduce fuel heights to allow the safe application of prescribed fire. These stands are currently in maintenance condition

with an intact ground cover and an average BA within the desired future condition. These stands are managed almost exclusively with prescribed fire with a fire return interval of two to three years. Limited mechanical treatments are needed in areas that have had wildfires and fire shadows around wetlands.

Beginning in 1999, approximately 660 acres of scrub habitat were identified as needing restoration. Research plots we setup to determine the best and most cost effective method to manage the scrub. Initial treatments of the scrub were 100% roller chopped or mowed followed by fire. Once the scrub habitat had received an initial treatment, another research project looked at ongoing management of scrub and reducing the amount that was mechanically treated. Currently, scrub is mechanically treated about 50% followed by application of prescribed fire. Ongoing research into scrub management will continue to adjust management techniques.

Additionally, habitat restoration and maintenance of Lake Ponte Vedra and the interior wetland impoundments are important management activities on the GRWMA. These activities are described in more detail in Section 5.7.

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

5.4.1 Fish and Wildlife

The size and natural community diversity of the GRWMA create a habitat mosaic for a wide variety of wildlife species. As a result of this range of natural communities, an array of associated wildlife, including rare, imperiled, common game, and non-game species, can be found on the GRWMA. In managing for wildlife species, an emphasis will be placed on conservation, protection and management of natural communities. As noted above, natural communities important to wildlife include salt marsh, mesic flatwoods, maritime hammock, scrub, and scrubby flatwoods. Additionally, a significant portion of the GRWMA is composed of impoundments and artificial ponds, which are considered an anthropogenic community type but are nonetheless critically important to wildlife on the area. Natural communities that are also present on the GRWMA, although lesser in size than those discussed above, such as xeric hammock, mesic hammock, depression marsh, basin swamp, and basin marsh, also provide important fish and wildlife habitat.

Resident wildlife will be managed for optimum richness, diversity and abundance. In addition to resident wildlife, the GRWMA provides resources critical to many migratory

birds including waterfowl, passerines, raptors, shorebirds and others. Habitats important to migratory species will be protected, maintained or enhanced.

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

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 accomplished by following approved Federal and FWC species recovery plans, guidelines, and other scientific recommendations for these species. Guided by these recommendations, land management activities including prescribed burning and timber stand improvements will address rare and imperiled species requirements and habitat needs. Section 5.4.2 below provides further information on FWC's comprehensive species management strategy for rare and imperiled wildlife and their respective habitats.

5.4.2 Imperiled Species - Wildlife Conservation Prioritization and Recovery

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

In summary, for FWC-managed areas, the WCPR program helps assess imperiled and focal wildlife species needs and opportunities, prioritize what FWC does for imperiled and focal species, prescribe management actions to aid in species recovery, prescribe monitoring protocols to allow evaluation of the species' response to management, and ensure the information is shared with others. Through the actions of this program, FWC will facilitate fulfilling the needs of focal and imperiled wildlife species on the GRWMA. 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.

A FWC WCPR Species Management Strategy (WCPR Strategy) was completed for the GRWMA in January 2010 (see Appendix 13.12 for more detailed information). Using statewide landcover-based habitat models, the WCPR Strategy identifies 17 focal species and one group of species (wading birds) as having potential habitat on the GRWMA (Table 14).

Not all of the focal species modeled to have potential habitat on the GRWMA occur on the area or are in need of specific management actions. Therefore, of the focal species

identified, Bachman's sparrow, brown-headed nuthatch, Florida mouse, gopher frog, gopher tortoise, northern bobwhite, painted bunting, striped newt, and wading birds (multiple species) are recommended for some level of monitoring. The WCPR Strategy includes measurable objectives for brown-headed nuthatch, Florida mouse, gopher frog, gopher tortoise, northern bobwhite, painted bunting, striped newt, and wading birds (multiple species).

Table 14. Focal Species Identified as having Potential Habitat on GRWMA

Common Name	Scientific Name	Status
Anastasia Island beach mouse	*Peromyscus polionotus phasma*	FE
Bachman's sparrow	*Aimophila aestivalis*	NL
Brown-headed nuthatch	*Sitta pusilla*	NL
Cooper's hawk	*Accipiter cooperii*	NL
Florida black bear	*Ursus americanus floridanus*	NL
Florida mouse	*Podomys floridanus*	SSC
Florida pine snake	*Pituophis melanoleucus mugitus*	SSC
Gopher frog	*Lithobates capito*	SSC
Gopher tortoise	*Gopherus polyphemus*	ST
Limpkin	*Aramus guarauna*	SSC
Northern bobwhite	*Colinus virginianus*	NL
Painted bunting	*Passerina ciris*	NL
Red-cockaded woodpecker	*Picoides borealis*	FE
Sherman's fox squirrel	*Sciurus niger shermani*	SSC
Southern bald eagle	*Haliaeetus leucocephalus*	NL
Striped newt	*Notophthalmus perstriatus*	NL
Swallow-tailed kite	*Elanoides forficatus*	NL
Wading birds	*Multiple spp.*	

Abbreviation	Status
FE	Federally Endangered
NL	Not Listed
ST	State Threatened
SSC	Species of Special Concern

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 GRWMA. 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.

Additionally, the FWC will continue efforts to control the introduction of exotic and invasive species, as well as pests and pathogens, on the GRWMA 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 area to clean the equipment prior to being allowed on the area. This requirement is also included in every contract for contractors who are conducting any operational or resource management work on the area. In this way, the FWC implements a proactive approach to controlling the introduction of exotic pests and pathogens on the GRWMA.

Exotic and invasive plant species known to occur on the GRWMA and treated annually by the FWC include Chinese tallow, cogongrass, bahiagrass, Brazilian pepper, water hyacinth, mimosa, and torpedograss. Exotic and invasive plant species have been identified as occurring at varying densities on approximately 143 acres of the GRWMA. 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 indentified 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.

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

Other exotic animal species known to occur on the GRWMA include brown anole, Cuban treefrog, Australian spotted jellyfish, and Mediterranean gecko. A full list of exotic species known to occur on the GRWMA can be found in Tables 6 and 12. The FWC will continue to monitor and control as necessary these exotic animal species.

5.6 Public Access and Recreational Opportunities

5.6.1 Americans with Disabilities Act

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

1. Compliance will cause harm to cultural or historic sites, or significant natural features and their characteristics.

2. Compliance will substantially alter the nature of the setting and therefore the purpose of the facility.

3. Compliance would not be feasible due to terrain or prevailing construction practices.

4. Compliance would require construction methods or materials prohibited by federal or state statutes, or local regulations.

5.6.2 Recreation Master Plan

The FWC has adopted a comprehensive approach to the planning and administration of fish and wildlife resource based public outdoor recreational opportunities for the GRWMA. To accomplish this, the FWC worked with recreational stakeholders and the general public to develop a Recreation Master Plan for the GRWMA (Appendix 13.13) that is used to further guide design and development of appropriate infrastructure that will support the recreational use of the area by the general public. The GRWMA Recreation Master Plan includes planning for parking, trail design, and area resource interpretation.

5.6.3 Public Access Carrying Capacity

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

Based on an analysis of the overall approved uses and supported public access user opportunities, and the anticipated proportional visitation levels of the various user groups, FWC has determined that the GRWMA can currently support 592 visitors per day. It is important to note that public access carrying capacities are not developed to serve as a goal for expanding the public use of a particular area to match the established carrying capacity. Rather, they are developed to establish maximum thresholds for public use of the respective area in order to protect the natural and cultural resources on the GRWMA and to ensure that visitors will have a high-quality visitor experience. The public access carrying capacity will be periodically reevaluated, and additional capacity may be contemplated as part of the Recreation Master Plan development and implementation process.

5.6.4 Wildlife Viewing

As described earlier, the GRWMA is one of the premier spots on the Great Florida Birding Trail with a wide variety of native wildlife species, both resident and seasonally migratory, that are available for visitors' enjoyment for observation and photography. The quality of habitat found on GRWMA attracts a suite of species including various birds, mammals, reptiles and amphibians. During April and October, especially with a west wind or after a cold front, this is an exceptional place in northeast Florida to see peregrine falcons. Approximately 3,000 – 4,000 migratory ducks, American coots, common moorhens, common gallinules and pied-billed grebes winter at Lake Ponte Vedra.

5.6.5 Hunting

Hunting opportunities on the GRWMA include archery, muzzleloading gun, and general gun for white-tailed deer, migratory bird, small game, alligator and spring turkey hunting seasons. A re-evaluation of the potential for hunting opportunities, including the need to control feral hogs, will be performed periodically by the FWC.

5.6.6 Fishing

Fishing at the GRWMA is often excellent for redfish, seatrout, Atlantic croaker, black drum, and spot. Fishing is popular at the dam and along the banks of Lake Ponte Vedra and the interior ponds and impoundments located throughout the area. Lake Ponte Vedra is also a popular spot for crabbing.

5.6.7 Boating

Boating is permitted on Lake Ponte Vedra, but vessels with outboard motors larger than 10 horsepower are prohibited, with the exception that alligator hunt participants may use airboats and outboard motors larger than 10 horsepower when hunting alligators. The use of boats within 50 yards of the Guana Dam water control structure is prohibited. Boat ramps are located at the Guana Dam at the south end of the property and off A1A at Six Mile Landing.

5.6.8 Paddling

Paddling opportunities exist on Lake Ponte Vedra and kayaking is a very popular activity on the lake. Boat ramps are located at the Guana Dam and off A1A at Six Mile Landing.

5.6.9 Trails

Currently, 29.65 miles of multi-use trails are available for public recreation on the GRWMA. The FWC will continue to periodically reevaluate the potential for additional trails, as well as trail connectivity opportunities to other conservation areas, and will monitor new trails biannually for user impacts to natural communities.

5.6.9.1 Hiking

Hiking is a very popular activity on the designated trails, roads, and firelines throughout the GRWMA, many of which lead to viewing facilities with magnificent marsh views. The FWC will continue to maintain trails for recreational use by hikers.

5.6.9.2 Bicycling

Bicycling is permitted on most named and numbered roads and trails on the GRWMA. Off road bicycles are most appropriate on the unpaved roads and trails.

5.6.9.3 Equestrian

Horseback riding continues to be a popular activity on the GRWMA and is permitted on named and numbered roads and trails. However, horses are prohibited during archery, muzzleloading gun, general gun, small game and spring turkey hunting seasons.

5.6.10 Camping

Camping is prohibited on the GRWMA. Due to the proximity to several State Parks and privately operated RV sites and campgrounds that provide camping opportunities, FWC has not identified a need to provide camping facilities on the GRWMA. The FWC will periodically reassess the need and feasibility of providing camping facilities on GRWMA.

5.6.11 Geocaching

Geocaching, also known as Global Positioning System (GPS) Stash Hunt and GeoStash, is a contemporary combination of orienteering and scavenger hunting generally utilizing a GPS receiver unit. Geocache websites routinely promote good stewardship. However, the potential exists for resource damage, user conflicts, or safety issues caused by

inappropriately placed caches and/or links that do not provide adequate information about the area.

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

5.6.12 Environmental Education

The FWC will assess the need for and pursue research and environmental education partnership opportunities as appropriate. The FWC will develop and conduct periodic environmental education and outreach programs and will continue to coordinate with the GTMNERR to identify opportunities to provide and/or expand as feasible interpretive and educational programs and continue management support and assistance. In addition to the GTMNERR, the FWC will continue to identify partnerships that could provide for environmental educational programs and outreach opportunities.

Environmental education and outreach programs will address a variety of topics including invasive species and their management, habitat management, and wildlife conservation activities. Outreach events have be given to the University of Florida wildlife ecology class field trip, Boy Scouts of American, Northeast Florida Scrub Working Group, Northeast Florida Invasive Working Group, National Estuaries Day, and Society for Ecological Restoration.

5.6.12.1 Interpretation

Interpretive facilities on the GRWMA include ten kiosks that provide information on the wildlife, natural communities, and natural and cultural resources of the area. These kiosks are located at entrances, viewing platforms, and other strategic locations throughout the GRWMA. The FWC also provides a bird list, recreation guide, rack card, website, and trail maps for the GRWMA.

5.7 Hydrological Preservation and Restoration

Hydrological preservation and restoration is an important aspect of the ongoing management of the GRWMA. Beginning 2001 a mitigation project was initiated to restore the functionality of the seven interior wetland impoundments on the GRWMA. Each of these impoundments had been modified by the previous land owner for waterfowl hunting and mosquito control. By adjusting the hydro-period, desirable wetland vegetation can be

grown to provide food resources for wetland wildlife. A total of eight wells were drilled to augment water levels in the impoundments. Water control structures were repaired or replaced and ditches were cleaned and restored. Invasive hardwood trees were removed from the wetlands by mechanical and chemical treatments and prescribed fire. Two deep water wetlands were de-mucked and restocked with fish.

Lake Ponte Vedra is mainly managed by adjusting the water level and salinity. The original seven flash board culverts were replaced the 1990s with the current water control structure that allows much more finite control of the water level. Ongoing maintenance of the water control structure, flap gates, revetment, and earthen dam ensure its functionality and integrity of the impoundment. Undesirable cattails are managed by herbicide and prescribed fire. Desirable vegetation such as rushes and sedges are planted or transplanted to areas void of emergent vegetation. Submerged aquatic vegetation is managed with water level and salinity.

5.7.1 Hydrological Assessment

A hydrological assessment for the GRWMA was completed in 2008 (Appendix 13.5). Pursuant to recommendations of the hydrological assessment, the FWC will implement hydrological restoration as feasible and appropriate. In addition, to enhance natural hydrological functions, the FWC will continue to install, repair, and maintain low-water crossings and culverts as appropriate.

Water management, manipulation and control on Lake Ponte Vedra and the interior impoundments of the GRWMA, achieved through the use of water control structures and artisan wells located throughout the site, helps maintain a mosaic of natural, desirable plant communities, which provide habitat for a wide range of animal species. Maintenance of mosquito ditches on the GRWMA is coordinated with the Anastasia Mosquito Control District. The 2008 hydrological assessment found that such mosquito ditches help maintain the wetland hydroperiod of the GRWMA and have little adverse impact on the wetlands of the area.

5.7.2 Water Resource Monitoring

The FWC will cooperate with the St. Johns River Water Management District (SJRWMD), DEP, and GTMNERR staff to develop and implement any additional necessary surface water quality and quantity monitoring protocols

for GRWMA. In this capacity, FWC will primarily rely on the expertise of the SJRWMD and DEP to facilitate these monitoring activities. The FWC also cooperates with the GTMNERR to maintain the Guana dam.

5.8 Forest Resource Management

As noted above, the FWC will work with the FFS to update a Timber Assessment of the timber resources of the GRWMA that was conducted in 2008 (Appendix 13.14.1). Additionally, a Forest Management Plan was produced for the GRWMA by The Forestry Company in 2012 (Appendix 13.14.2). The management of timber resources will be considered in the context of both of these timber assessments and the overall land management goals and activities of the area.

As described earlier, timber resources on the GRWMA include some pine plantations in need of thinning for habitat improvement. To this end, a pine thinning operation was initiated in February 2013 to thin approximately 753 acres of slash pine within the pine plantations on the area. Thinning of the forest over-story, hydrological restoration and reintroduction of prescribed burning are the most important factors in re-establishment of natural communities and the enhancement of wildlife habitats in these areas. Upland pine forest planted with off-site pines will be reforested with slash and longleaf pine or other on-site species as appropriate. Degraded or disturbed bottomland hardwood sites will be encouraged to reforest naturally with native wetland oaks, hardwoods, and other appropriate native plant species.

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

5.9 Cultural and Historical Resources

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

As discussed in Section 2.8, the DHR Master Site File indicates 26 known cultural sites on the GRWMA. These sites include 24 archaeological sites, one historical cemetery (Booth Cemetery, SJ3240) and one resource group (County Road 210, SJ5270). In cooperation with the DHR, five of the overall known cultural sites on the GRWMA have been identified as meeting the DHR's special criteria for annual monitoring and reporting and the FWC will continue to monitor and report on these sites annually. These sites are the Palm Valley prehistoric burial mound (SJ37), the Booth Cemetery, the Guana River Shell Ring (SJ2554), an unnamed prehistoric shell midden with human remains (SJ2555), and the Hunter's Field shell midden (SJ3485). Additionally, the FWC will also continue to monitor the remaining 21 recorded sites that are located on the area on a rotating, regular basis.

The FWC will submit subsequently located cultural sites on the GRWMA to DHR for inclusion in their Master Site file. In addition, the FWC will ensure management staff has completed DHR Archaeological Resources Monitoring 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

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

Current capital facilities and infrastructure on the GRWMA include over 32 miles of roads and trails, two wildlife viewing towers, one wildlife viewing platform, one viewing blind, one shooting blind, ten kiosks, the Six Mile Landing boat ramp, an office facility, eight water control structures, and the Big Savannah interpretive center. Figure 9, below, displays the capital facilities and infrastructure that can be found on the GRWMA.

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

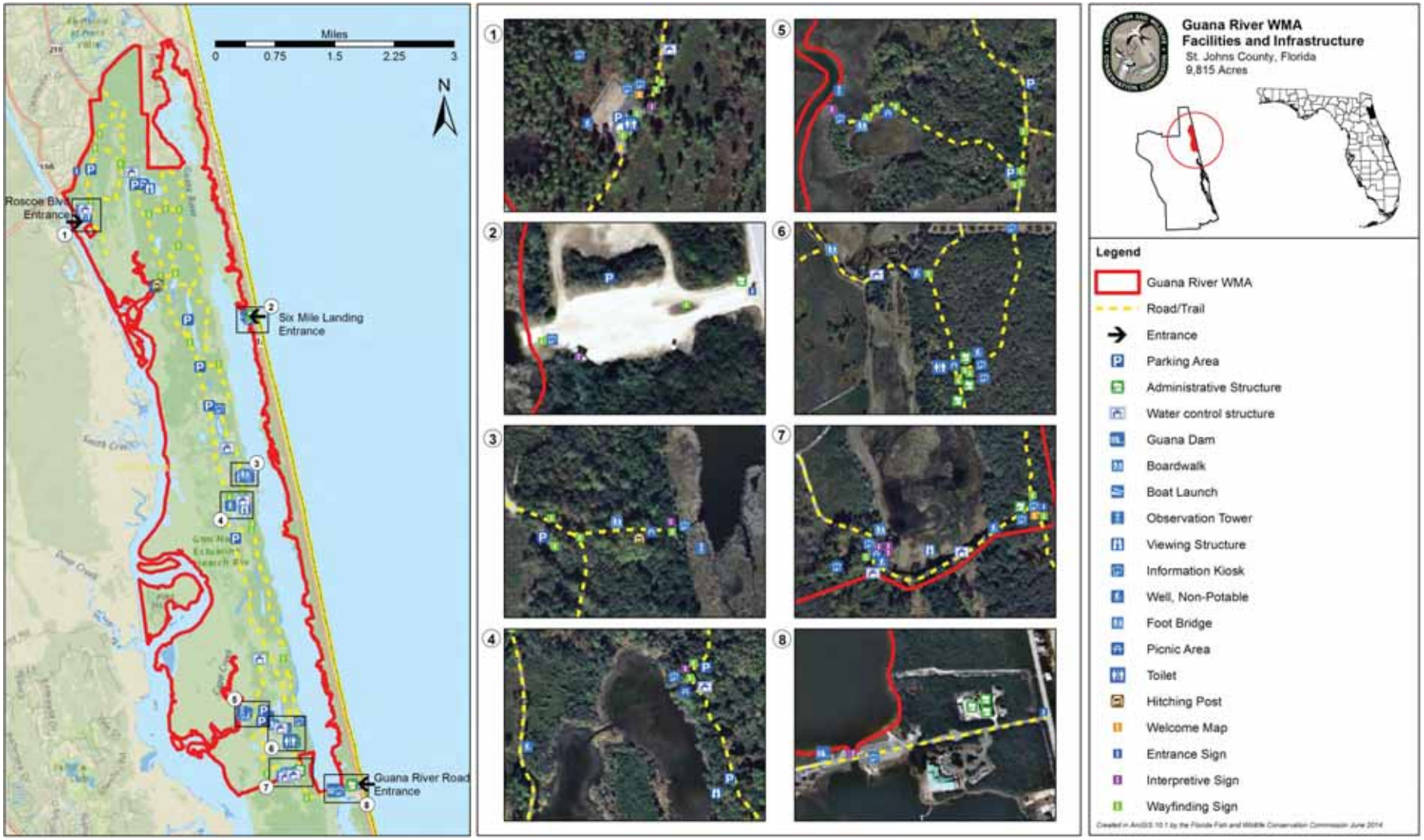

Figure 9. GRWMA Facilities and Infrastructure

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5.11 Land Conservation and Stewardship Partnerships

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

5.11.1 Optimal Resource Boundary

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

5.11.2 Optimal Conservation Planning Boundary

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

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

managed, these lands appear to contribute to regional conservation and may support conservation landscape linkages.

5.11.3 Conservation Action Strategy

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

Primary components of the CAS may include:

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

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

Private landowners seeking assistance with habitat management will likely find it offered within 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, FWC has identified a 100-acre parcel and a 7-acre parcel of potential additions or privately held inholdings for the GRWMA. The 100-acre parcel is located along the western border of Lake Ponte Vedra on the northern end of the GRWMA and the 7-acre parcel is located near the northwestern boundary of the GRWMA along the Tolomato River.

Upon completion of the CAS, additions to the FWC Florida Forever Additions and Inholdings Acquisition List may be recommended.

Recently, the 70 upland acres of the 100-acre inholding property has been proposed for development. Community stakeholders have proposed for the State to acquire the parcel given the potential impacts that its development may pose for the area. However, although the property is already listed on the FWC Florida Forever Additions and Inholdings Acquisition List, FWC does not currently have funding available to pursue acquisition of the site. FWC will continue to monitor this site and work with partners to pursue potential acquisition if funding becomes available and if the owners are willing to consider a sale of the property.

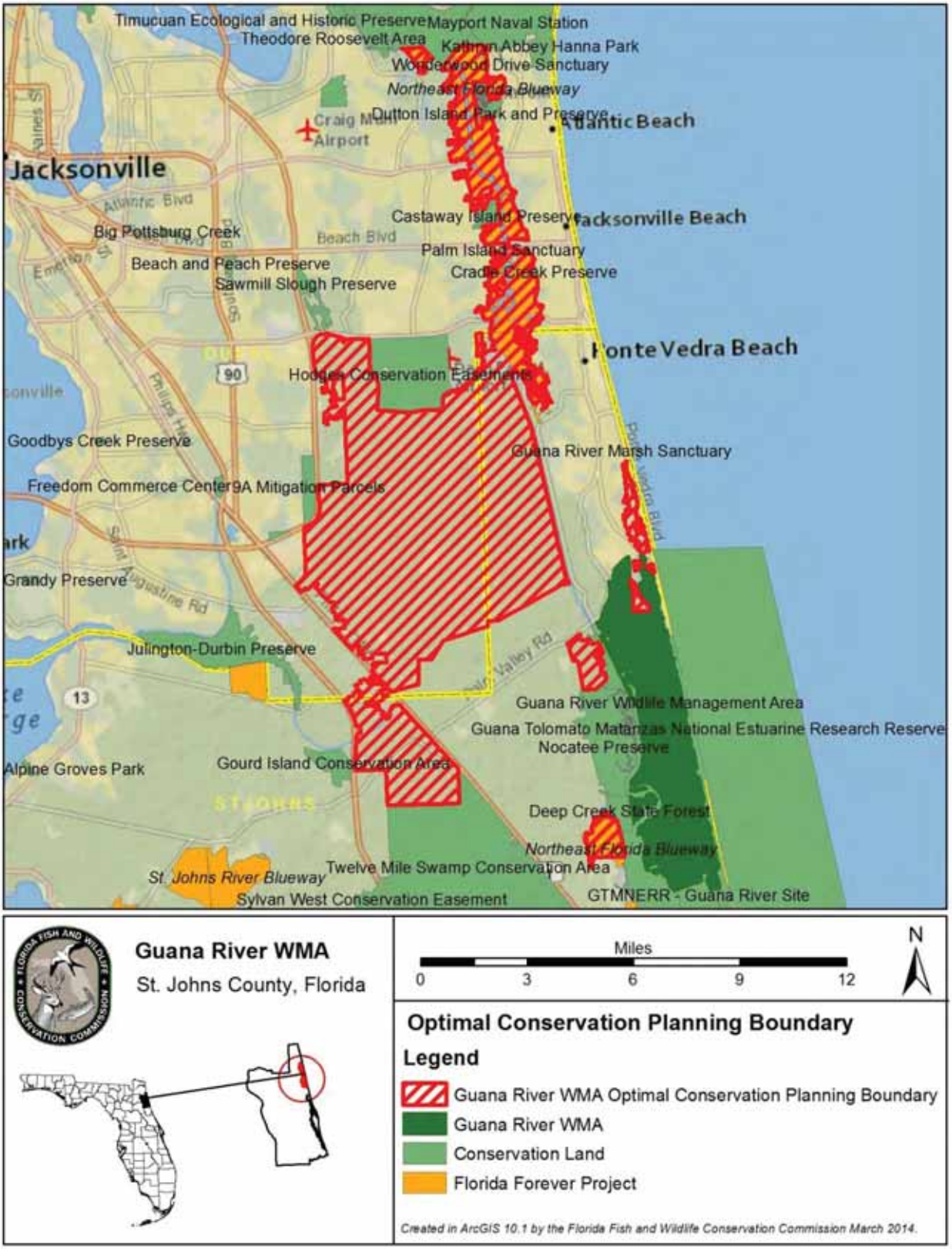


Figure 10. GRWMA Optimal Conservation Planning Boundary

5.12 Research Opportunities

The FWC intends to cooperate with researchers, universities and others as feasible and appropriate. For the GRWMA, 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 GRWMA must have prior approval by FWC.

5.13 Cooperative Management and Special Uses

5.13.1 Cooperative Management

The FWC is responsible for the overall management and operation of the GRWMA as set forth in the lease agreement with the Board of Trustees. In keeping with the lease agreement, and in order to conduct its management operations in the most effective and efficient manner, the FWC cooperates with other agencies to achieve management goals and objectives described in this management plan. These include cooperating with the DHR to ensure the requirements of the Management Procedures Guidelines - Management of Archaeological and Historical Resources document (Appendix 13.10) are followed with regard to any ground-disturbing activities. In addition, the FFS assists FWC by providing technical assistance on forest resource management. Also, FWC cooperates and consults with the SJRWMD and the DEP for the monitoring and management of both ground and surface water resources and the overall management of the GRWMA.

On December 30, 1998, the Executive Director of the FWC signed a Memorandum of Agreement (Appendix 13.2.6) with the DEP for the cooperative management of the GTMNERR, which includes and encompasses the GRWMA. On August 19, 1999, at the request of the Governor of Florida, the United States Department of Commerce, National Oceanic and Atmospheric Administration (NOAA) designated the GTMNERR as the nation's 25th National Estuarine Research Reserve. The GTMNERR is administered by the DEP FCO. FWC is a voting member of the GTMNERR MAG and cooperates with the GTMNERR and its staff on scientific research, environmental education, land acquisitions, and resource management issues.

Other organizations that provide input and assistance include St. Johns County, the Florida Chapter of Ducks Unlimited, the Florida Chapter of the National Wildlife Federation, and the Duval Audubon Society. The FWC will continue to cooperate extensively with the environmental resource agencies listed above to facilitate management of the GRWMA and adjacent public conservation lands.

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

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

5.13.3 Apiaries

The use of apiaries is conditionally approved for the GRWMA, and is deemed to be consistent with purposes for acquisition, is in compliance with the Conceptual State Lands Management Plan, and is consistent with the FWC agency mission, goals, and objectives as expressed in the agency Strategic Plan and priorities document (Appendix 13.8). Location, management, and administration of apiaries on the GRWMA are guided by the FWC Apiary Policy (Appendix 13.9).

Currently, two potential apiary sites have been identified on the GRWMA and the FWC entered into a three-year contract (Contract #12174, Appendix 13.2.8) in 2012 with Archangel Michael Apiary allowing hives to be placed at those apiary sites. However, to date, no hives have been placed at the apiary sites on the GRWMA.

5.14 Climate Change

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

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

This apparent change in global climate has the potential to disrupt natural processes; in some areas, climate change may cause significant degradation of ecosystems that provide

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

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

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

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

climate change; especially sea level rise and storm events, on imperiled species and their habitats on FWC managed land.

Elements of climate change that may potentially affect the GRWMA include inundation and saltwater intrusion from sea level rise (Figure 11), more frequent and more potent storm events, alteration of vegetation reproductive cycles, and changes in the fire regime. The results of a Sea Level Affecting Marsh Model for the GRWMA show habitats that may potentially be impacted. The low-lying coastal habitats, such as salt marsh communities are projected to face the most direct and dramatic impacts of climate change, particularly from a projected rising sea level and from the projected increased frequency and intensity of coastal storms.[12, 13, 14, 15] The potential loss of habitat may result in the loss of species using that habitat, including migrating and nesting birds. Storm events also cause considerable physical damage to native vegetation along vulnerable shorelines, impacting nesting habitat for sea life and shorebirds. The projected rise in sea levels may decrease the availability and abundance of prey for wading birds that forage in shallow waters on the expansive tidal flats of the Atlantic Coast. Climate change may amplify and hasten these effects, potentially at rates that exceed the normal resiliency of plant communities to recover, shift or adapt accordingly.[16, 17] Projected salt water intrusion into the subsurface freshwater lens from potential sea level rise and saltwater inundation of surface freshwaters from storm surges may alter coastal ecosystems and freshwater marshes, possibly resulting in more salt-tolerant aquatic plant communities.

To address the potential impacts of climate change on the GRWMA, Goals and Objectives have been developed as a component of this Management Plan (Section 6.11). Depending on the recommendations of the adaptive management strategies described above, additional specific goals and objectives to mitigate potential climate change impacts may be developed for the GRWMA 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.

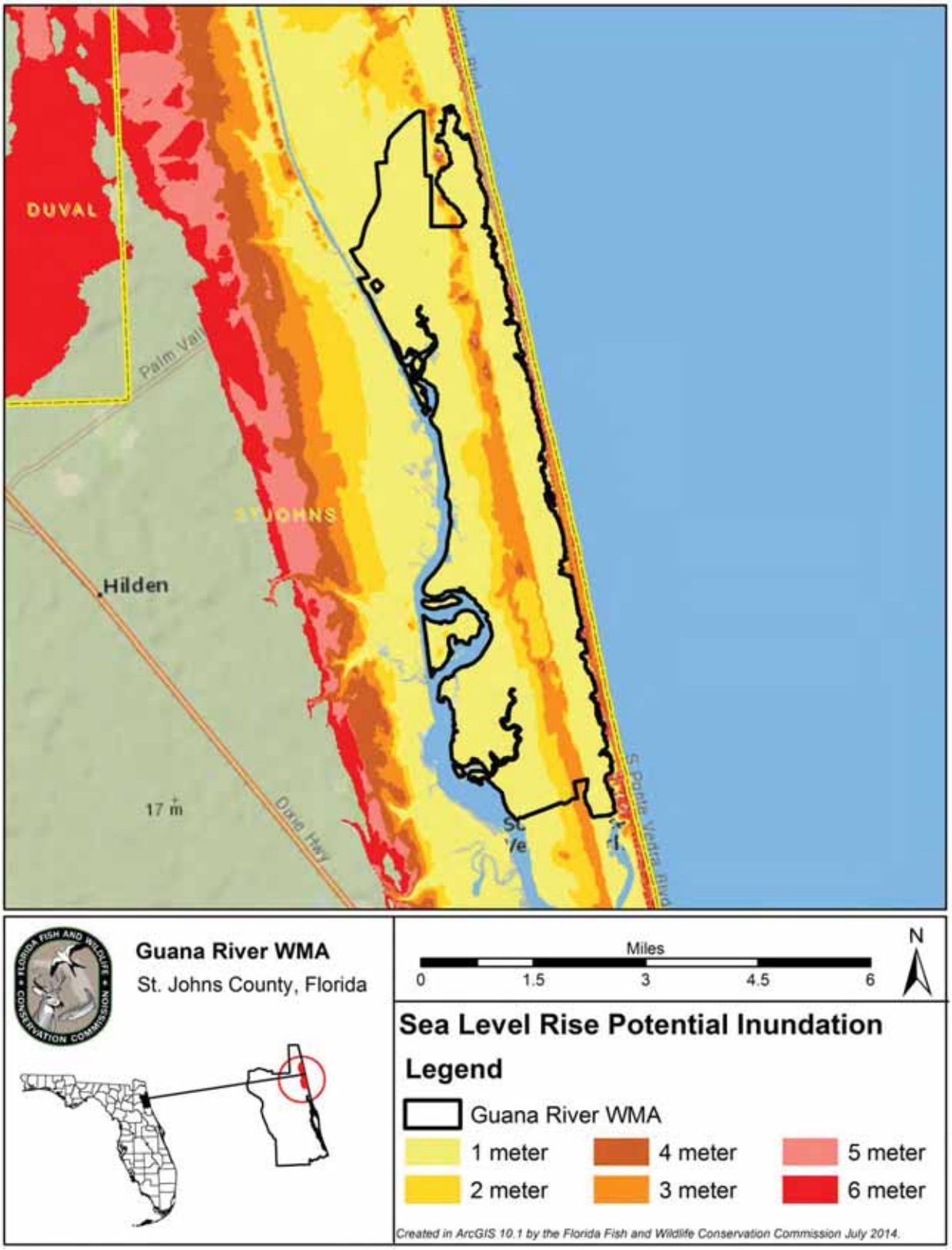


Figure 11. Sea Level Rise Potential Inundation

6 Resource Management Goals and Objectives

The management goals described in this section are considered broad, enduring statements designed to guide the general direction of management actions to be conducted in order to achieve an overall desired future outcome for the GRWMA. 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 450 acres of mesic flatwood natural communities and pine plantation annually.

6.1.2 Conduct prescribed burning on 60 acres of scrub natural community annually.

6.1.3 Conduct prescribed burning on 70 acres of scrubby flatwoods natural community annually.

6.1.4 Conduct prescribed burning on 1,170 acres of wetland habitat in Lake Ponte Vedra and other interior impoundments on the area as appropriate and as conditions permit.

6.1.5 Update the area's prescribed burning plan.

6.1.6 Conduct habitat/natural community improvement on approximately 250 acres of scrub, scrubby flatwoods and mesic flatwoods per year by continuing mechanical treatments.

6.1.7 Continue to implement OBVM on the area.

6.1.8 Evaluate and expand aquatic habitat improvements on the area by planting ~20 acres of native wetland plant species on Lake Ponte Vedra. (Figures 12 and 13)

6.1.9 Continue to maintain 2,375 acres per year of aquatic habitat through dewatering and flooding through seasonal water level management.

Long-term

6.1.10 Continue to maintain 1,796 acres of mesic flatwoods natural communities and pine plantation on the area within a 2 – 4 year fire return interval.

6.1.11 Continue to maintain 357 acres of scrub natural community on the area within a 5 – 6 year fire return interval.

6.1.12 Continue to maintain 353 acres of scrubby flatwoods natural community on the area within a 3 – 5 year fire return interval.

6.1.13 Continue to conduct prescribed burning on 1,170 acres of wetland habitat in Lake Ponte Vedra and other interior impoundments on the area as appropriate and as conditions permit.

6.1.14 Continue to implement OBVM.

6.1.15 Reevaluate the area's natural communities every five years and revise the natural communities map as necessary.

6.1.16 Continue to conduct habitat/natural community improvement on approximately 250 acres per year of scrub, scrubby flatwoods and mesic flatwoods by continuing mechanical treatments.

6.1.17 Continue to conduct timber harvests for the purposes of habitat restoration on 753 acres on the area. (Figures 12 and 13)

6.1.18 Continue aquatic habitat improvements on the area by planting ~20 acres per year of native wetland plant species on Lake Ponte Vedra. (Figures 12 and 13)

6.1.19 Continue to maintain 2,375 acres per year of aquatic habitat through dewatering and flooding through seasonal water level management.

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

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

Short-term

6.2.1 Continue to implement the WCPR strategy on the area.

6.2.2 As described in the WCPR strategy, monitor gopher frog, striped newt, gopher tortoise, brown-headed nuthatch, northern bobwhite, painted bunting, wading birds, and Florida mouse on the area.

6.2.3 Continue to collect opportunistic wildlife species occurrence data on the area.

6.2.4 Continue periodic aerial surveys for bald eagle nesting activity on the area.

6.2.5 Continue to periodically survey and monitor for imperiled plant species on the area.

Long-term

6.2.6 Continue to implement the area's WCPR strategy by managing identified natural communities for focal wildlife species.

6.2.7 As described in the WCPR strategy, monitor gopher frog [if detected within 5 years], striped newt, gopher tortoise, brown-headed nuthatch, northern bobwhite, painted bunting, wading birds, and Florida mouse [if detected within 5 years] on the area.

6.2.8 Continue to collect opportunistic wildlife species occurrence data on the area.

6.2.9 Repeat periodic (five-year) gopher tortoise burrow and Florida mouse surveys on the area.

6.2.10 Continue periodic aerial surveys for bald eagle nesting activity.

6.2.11 By 2021, revise and update the area's WCPR strategy.

6.2.12 Continue to periodically survey and monitor for imperiled plant species on the area.

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

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

Short-term

6.3.1 Continue to maintain 50 acres of food plots on the area.

6.3.2 Continue to maintain 25 bluebird boxes on the area.

6.3.3 Continue to maintain 20 wood duck boxes on the area.

6.3.4 Continue to maintain five bat houses on the area.

6.3.5 Continue to conduct annual spotlight monitoring surveys on the area for white-tailed deer.

6.3.6 Continue annual turkey camera surveys on the area.

6.3.7 Continue to survey eel populations on the area each year.

6.3.8 Continue to survey alligator populations on the area each year.

6.3.9 Continue to collect biological harvest data at check stations on the area.

6.3.10 Continue to collect opportunistic wildlife occurrence data on the area.

Long-term

6.3.11 Continue to maintain 50 acres of food plots on the area.

6.3.12 Continue to maintain 25 bluebird boxes on the area.

6.3.13 Continue to maintain 20 wood duck boxes on the area.

6.3.14 Continue to maintain five bat houses on the area.

6.3.15 Continue to conduct annual spotlight monitoring surveys on the area for white-tailed deer.

6.3.16 Continue annual turkey camera surveys on the area.

6.3.17 Continue to survey eel populations on the area each year.

6.3.18 Continue to survey alligator populations on the area each year.

6.3.19 Continue to survey fish populations on the area as appropriate and feasible.

6.3.20 Continue to collect biological harvest data at check stations on the area.

6.3.21 Continue to collect opportunistic wildlife occurrence data on the area.

6.4 Exotic and Invasive Species Maintenance and Control

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

Short-term

6.4.1 Annually treat at least 20 acres, if needed, of EPPC Category I and Category II invasive exotic plant species including Chinese tallow, cogongrass, Brazilian pepper, water hyacinth, mimosa, and torpedograss on the area.

6.4.2 Continue eradication efforts on Bermudagrass on the area.

6.4.3 Monitor the area for exotic animal species and control as necessary including brown anole, Cuban treefrog, Australian spotted jellyfish, and Mediterranean geckos.

6.4.4 As necessary, implement control measures, including increased hunting opportunities and trapping, as feasible for feral hogs on the area.

Long-term

6.4.5 Continue to annually treat at least 20 acres if needed of EPPC Category I and Category II invasive exotic plant species including Chinese tallow, cogongrass, Brazilian pepper, hyacinth, mimosa, and torpedograss.

6.4.6 Continue eradication efforts on Bermudagrass.

6.4.7 Continue to monitor for exotic animal species and control as necessary including brown anole, Cuban treefrog, Australian spotted jellyfish, and Mediterranean geckos.

6.4.8 As necessary, continue to implement control measures for feral hogs.

6.5 Public Access and Recreational Opportunities

Goal: Provide public access and recreational opportunities.

Short-term

6.5.1 Monitor the area's trails annually for visitor impacts.

6.5.2 Maintain public access and recreational opportunities to allow for a recreational carrying capacity of 592 visitors per day on the area.

6.5.3 Continue to implement the area's Recreation Master Plan.

6.5.4 Continue to provide a bird list, recreation guide, rack card, website, ten kiosks, and trail maps for interpretation and education.

6.5.5 Continue to cooperate with GTMNERR to provide and expand as feasible interpretive and educational programs.

6.5.6 Continue to conduct interpretive and educational programs as feasible.

6.5.7 Maintain 29.65 miles of trails on the area.

6.5.8 Continue to provide hunting opportunities including archery, muzzleloading gun, general gun, and spring turkey hunting seasons.

6.5.9 Continue to investigate the feasibility of enhancing quality hunting opportunities.

6.5.10 Continue to provide feral hog hunting opportunities and evaluate the need for additional hunting opportunities on the area.

6.5.11 Continue to provide quality fishing opportunities on the area.

6.5.12 Continue to provide paddling opportunities on Lake Ponte Vedra.

6.5.13 Assess current trails, modify and improve signage and way-finding as necessary.

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

6.5.15 Cooperate with St. Johns County Convention and Tourism Bureau to promote GRWMA as a recreation destination.

Long-term

6.5.16 Continue to monitor the area's trails annually for visitor impacts.

6.5.17 Reassess the area's recreational opportunities every three years.

6.5.18 Maintain public access and recreational opportunities to allow for a recreational carrying capacity of 592 visitors per day on the area.

6.5.19 Continue to implement the area's Recreation Master Plan.

6.5.20 Continue to provide a bird list, recreation guide, rack card, website, ten kiosks, and trail maps for interpretation and education.

6.5.21 Continue to cooperate with the GTMNERR to provide and expand as feasible interpretive and educational programs.

6.5.22 Continue to conduct interpretive and educational programs as feasible.

6.5.23 Maintain 29.65 miles of trails on the area.

6.5.24 Continue to provide hunting opportunities including archery, muzzleloading gun, general gun, and spring turkey hunting seasons on the area.

6.5.25 Continue to provide feral hog hunting opportunities and evaluate the need for additional hunting opportunities.

6.5.26 Continue to provide quality fishing opportunities on the area.

6.5.27 Continue to provide paddling opportunities on Lake Ponte Vedra.

6.5.28 Continue to cooperate with other agencies, St. Johns County, stakeholders, and regional landowners to investigate regional recreational opportunities including linking hiking, and multi-use trail systems between adjacent public areas.

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

6.5.30 Provide interpretive signage pertaining to the GRWMA cultural resources.

6.5.31 Update the area's Recreation Master Plan.

6.5.32 Continue to cooperate with St. Johns County Convention and Tourism Bureau to promote GRWMA as a recreation destination.

6.5.33 Explore the need and feasibility of expanding the Roscoe Boulevard entrance to improve access.

6.5.34 Continue to investigate the feasibility of enhancing quality hunting opportunities on the area.

6.6 Hydrological Preservation and Restoration

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

Short-term

6.6.1 Coordinate with GTMNERR to maintain the Guana Dam.

6.6.2 Continue to maintain water control structures and artesian wells to enhance aquatic habitat management on the area.

6.6.3 To maintain and enhance hydrological functions, install and maintain culverts as appropriate on the area.

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

Long-term

6.6.5 Coordinate with GTMNERR to maintain the Guana Dam.

6.6.6 Conduct or obtain a site hydrological assessment of the area to identify potential hydrology restoration needs.

6.6.7 Continue to maintain water control structures and artesian wells to enhance aquatic habitat management on the area.

6.6.8 To enhance natural hydrological functions, continue to install and maintain culverts as appropriate on the area.

6.6.9 Conduct a professional inspection of the integrity of the Guana Dam and water control structure.

6.6.10 As feasible, implement a hydrological restoration plan.

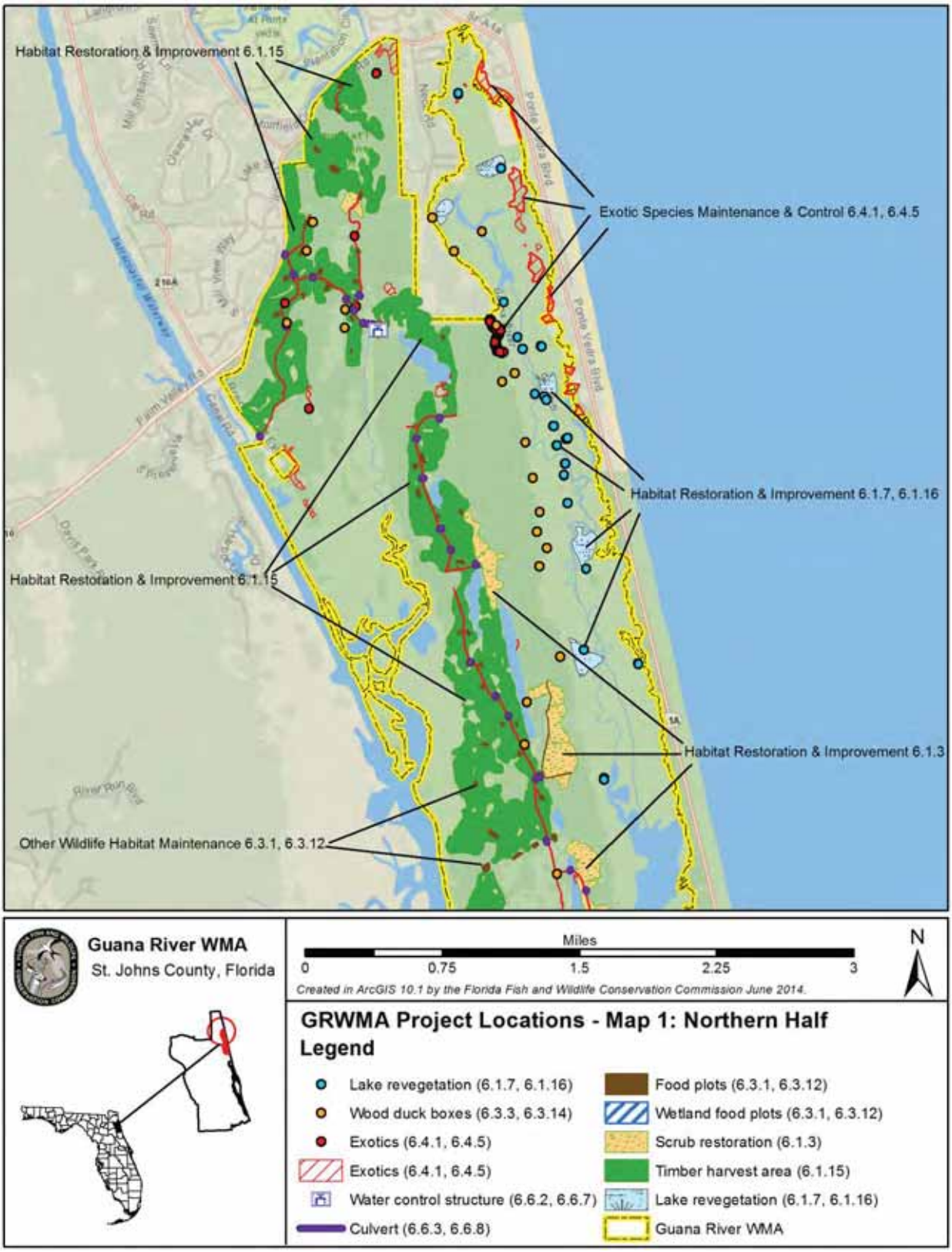


Figure 12. GRWMA Project Locations Map 1: Northern Half

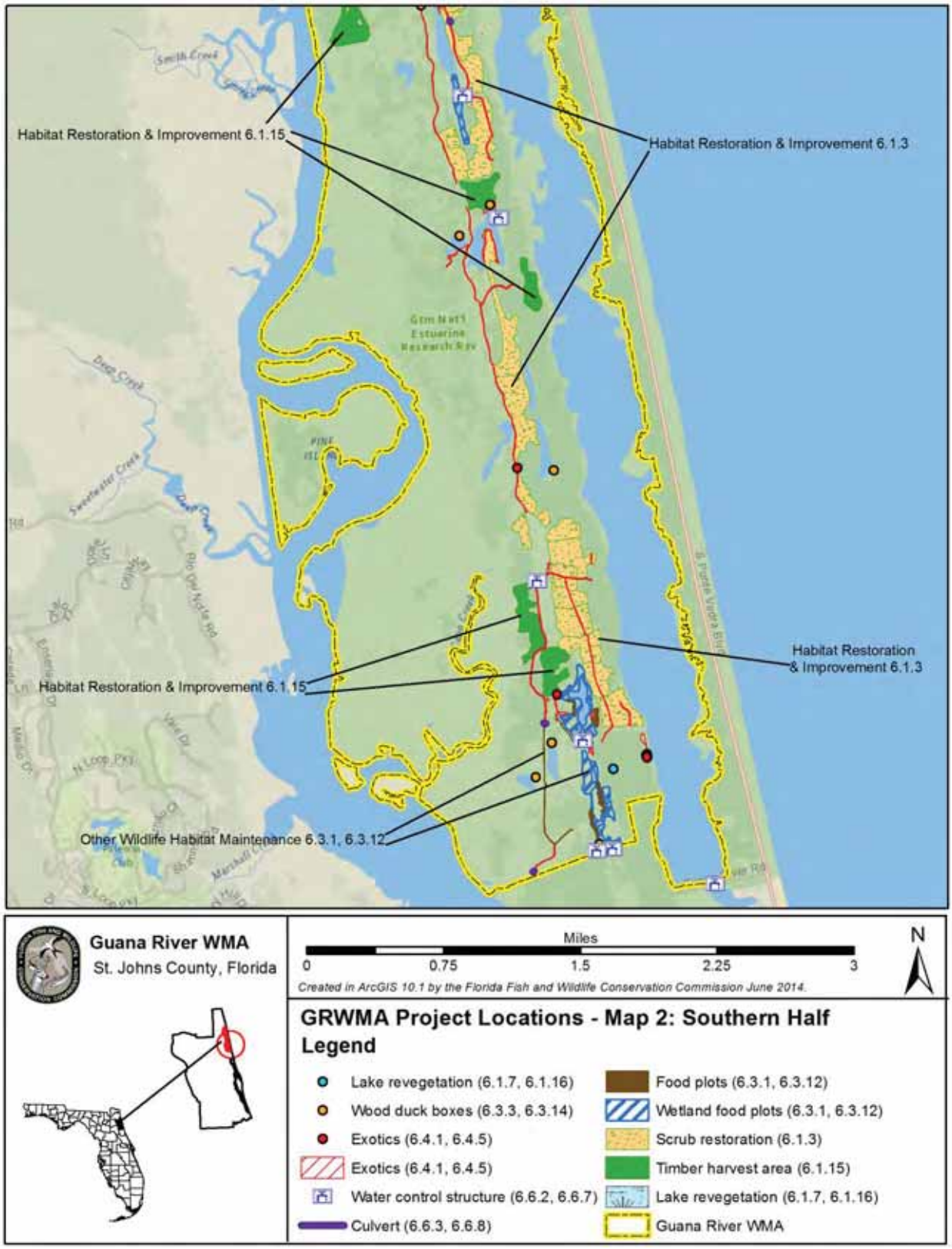


Figure 13. GRWMA Project Locations Map 2: Southern Half

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 Coordinate with the FFS to update the area's Timber Assessment.

6.7.2 Consult with the FFS or a professional forestry consultant regarding forest management activities as appropriate.

6.7.3 Prepare a Forest Management Plan including reforestation, harvesting, and prescribed burning activities based on restoration and maintenance needs of the natural communities and other goals established for management of GRWMA.

Long-term

6.7.4 Implement the Forest Management Plan including reforestation, harvesting, and prescribed burning activities based on restoration and maintenance needs of the natural communities and other goals established for management of GRWMA.

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

6.8 Cultural and Historical Resources

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

Short-term

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

6.8.2 Annually monitor per DHR specifications five identified cultural resource sites on the area.

6.8.3 Continue to monitor, protect, and preserve an additional 21 identified cultural resource sites on the area.

Long-term

6.8.4 Cooperate with DHR, or trained FWC Staff, in designing site plans for development of infrastructure.

6.8.5 Cooperate with DHR to manage and maintain known existing cultural resources on the area.

6.8.6 Annually monitor per DHR specifications five identified cultural resource sites on the area.

6.8.7 Continue to monitor, protect, and preserve an additional 21 identified cultural resource sites on the area.

6.8.8 As necessary, coordinate with DHR for Archaeological Resource Management training for FWC staff.

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 29.65 miles of designated trails on the area.

6.9.2 Continue to maintain 31.4 miles of roads located on the area.

6.9.3 Continue to maintain two wildlife viewing towers on the area.

6.9.4 Continue to maintain one wildlife viewing platform on the area.

6.9.5 Continue to maintain one viewing blind on the area.

6.9.6 Continue to maintain one shooting blind on the area.

6.9.7 Continue to maintain equestrian facilities on the area.

6.9.8 Continue to maintain 22 facilities including Six Mile Landing (boat ramp and kiosk), Diego Pond viewing blind, Booths Pond ADA blind, check station, Big Savannah interpretive center, water control structures, office, Capo and Lake Ponte Vedra Towers, and wells on the area.

Long-term

6.9.9 Design and develop kiosk interpreting the GRWMA cultural resources.

6.9.10 Construct and maintain check station and pole barn on the area.

6.9.11 Continue to maintain 29.65 miles of designated trails on the area.

6.9.12 Continue to maintain 31.4 miles of roads on the area.

6.9.13 Continue to maintain two wildlife viewing towers on the area.

6.9.14 Continue to maintain one wildlife viewing platform on the area.

6.9.15 Continue to maintain one viewing blind on the area.

6.9.16 Continue to maintain one shooting blind on the area.

6.9.17 Continue to maintain equestrian facilities on the area.

6.9.18 Continue to maintain 22 facilities including Six Mile Landing (boat ramp and kiosk), Diego Pond viewing blind, Booths Pond ADA blind, check station, Big Savannah interpretive center, water control structures, office, Capo and Lake Ponte Vedra Towers, and wells on the area.

6.9.19 Monitor the area's trails and infrastructure biannually for visitor impacts.

6.10 Land Conservation and Stewardship Partnerships

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

Short-term

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

6.10.2 Identify and develop conservation stewardship partnerships.

6.10.3 Identify and pursue conservation acquisition needs.

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

6.10.5 Develop a CAS.

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

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

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

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

6.10.10 Identify potential conservation easements donations.

6.10.11 Evaluate and determine if any portions of the GRWMA are no longer needed for conservation purposes, and therefore may be designated as surplus lands.

Long-term

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

6.10.13 Continue to identify and develop conservation stewardship partnerships.

6.10.14 Continue to identify and pursue conservation acquisition needs.

6.10.15 Continue to maintain a GIS shapefile and other necessary data to facilitate nominations from the FWC OCPB and for the FWC LAP and Land Acquisition Program.

6.10.16 Continue to propose nominations of selected properties as additions to the FWC acquisition list.

6.10.17 Continue to pursue acquisition of parcels added to the FWC acquisition list as acquisition work plan priorities and funding allow.

6.10.18 As feasible, continue to periodically contact and meet with adjacent landowners for willingness to participate in the CAS, and coordinate landowner assistance/conservation stewardship partnership workshops as deemed appropriate.

6.10.19 Coordinate and conduct landowner assistance/conservation stewardship partnership workshop(s) as necessary and appropriate.

6.10.20 Continue to identify potential conservation easements donations.

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

6.11 Climate Change

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

Long-term

6.11.1 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 GRWMA.

6.11.2 Consider participating in Peninsular Florida Land Conservation Cooperative so that FWC continues to gain understanding and share knowledge of the key issues related to potential climate change.

6.11.3 Work with natural resource management partners to consider the feasibility of conducting cooperative studies to model and monitor the immediate and/or long-term effects of sea level rise on low-lying coastal habitats.

6.11.4 Assess the need for conducting a vulnerability assessment to model the potential effects of climate change, especially sea level rise and storm events, on imperiled species and their habitats present with the GRWMA.

6.11.5 Assess the need to prioritize research and monitoring to ascertain the potential impacts of climate change on the hydrologic regime and water quality of the GRWMA, such as increased nutrient and sediment loads, reduced surface and groundwater recharge, and increases in water temperatures.

6.11.6 Assess the need to prioritize research and monitoring to determine the potential impacts of climate change on native vegetation, and the possible spread of exotic and invasive species; incorporate appropriate monitoring protocols and management strategies into the OBVM program for the GRWMA.

6.11.7 Assess the need for prioritized research and monitoring to determine the potential impacts of climate change on the imperiled species on the GRWMA; incorporate appropriate adaptation strategies into the WCPR for GRWMA.

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

6.11.9 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 Recreation Master Plan.

6.12 Research Opportunities

Goal: Explore and pursue cooperative research opportunities.

Short-term

6.12.1 Continue cooperation with the GTMNERR on research opportunities.

6.12.2 Continue eel sampling research and monitoring on the area.

6.12.3 Continue alligator research on the area.

6.12.4 Continue scrub research on the area.

6.12.5 Explore and pursue cooperative research opportunities through universities and the Fish and Wildlife Research Institute.

6.12.6 Continue to coordinate and cooperate with the Anastasia Mosquito Control District on mosquito control activities and related research opportunities.

Long-term

6.12.7 Continue cooperation with the GTMNERR on research opportunities.

6.12.8 Continue eel sampling research and monitoring on the area.

6.12.9 Continue alligator research on the area.

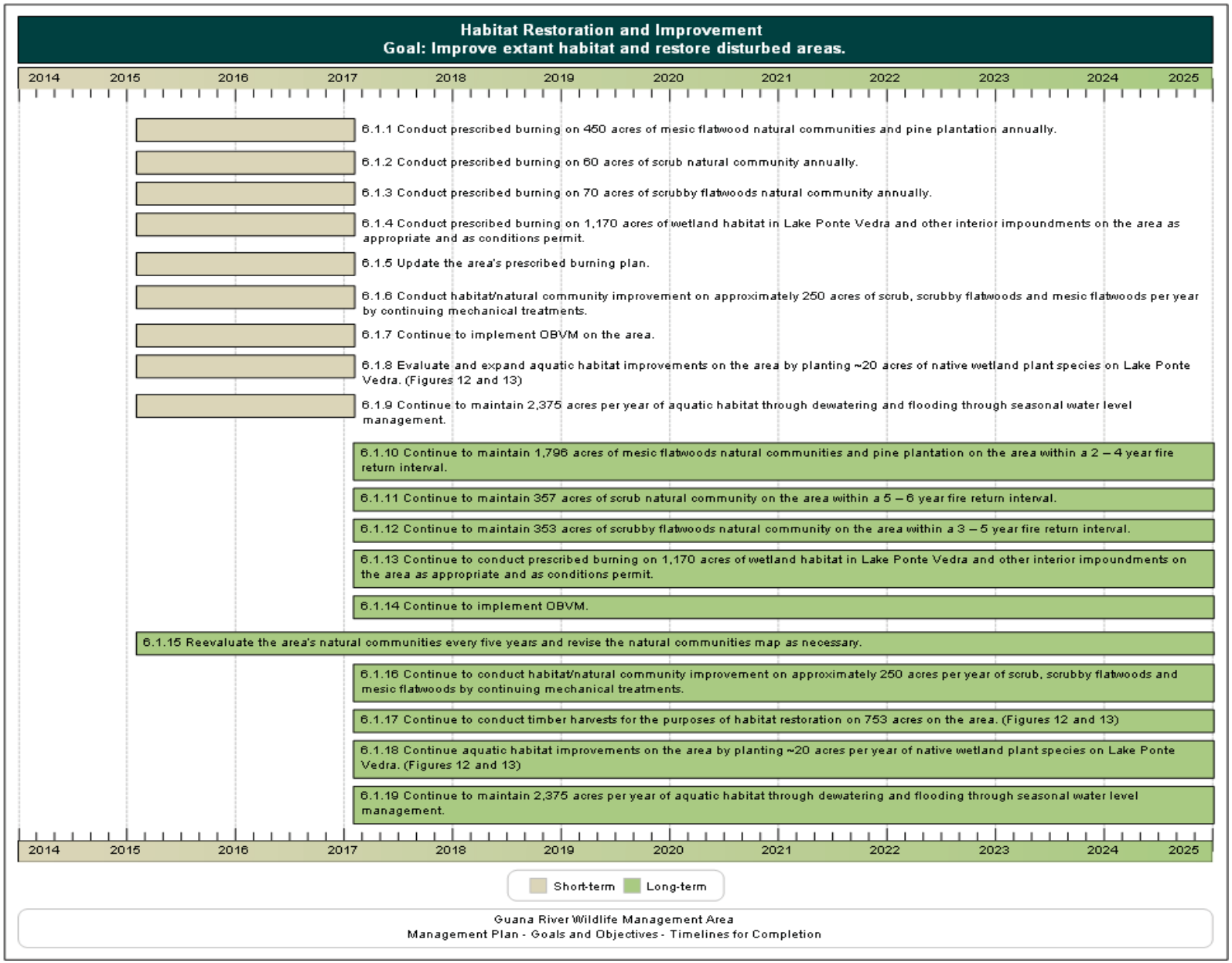
6.12.10 Continue scrub research on the area.

6.12.11 Explore and pursue cooperative research opportunities through universities and the Fish and Wildlife Research Institute.

6.12.12 Continue to coordinate and cooperate with the Anastasia Mosquito Control District on mosquito control activities and related research opportunities.

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

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


Habitat Restoration and Improvement
Goal: Improve extant habitat and restore disturbed areas.
2014
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2016
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6.1.1 Conduct prescribed burning on 450 acres of mesic flatwood natural communities and pine plantation annually.
6.1.2 Conduct prescribed burning on 60 acres of scrub natural community annually.
6.1.3 Conduct prescribed burning on 70 acres of scrubby flatwoods natural community annually.
6.1.4 Conduct prescribed burning on 1,170 acres of wetland habitat in Lake Ponte Vedra and other interior impoundments on the area as appropriate and as conditions permit.
6.1.5 Update the area's prescribed burning plan.
6.1.6 Conduct habitat/natural community improvement on approximately 250 acres of scrub, scrubby flatwoods and mesic flatwoods per year by continuing mechanical treatments.
6.1.7 Continue to implement OBVM on the area.
6.1.8 Evaluate and expand aquatic habitat improvements on the area by planting ~20 acres of native wetland plant species on Lake Ponte Vedra. (Figures 12 and 13)
6.1.9 Continue to maintain 2,375 acres per year of aquatic habitat through dewatering and flooding through seasonal water level management.
6.1.10 Continue to maintain 1,796 acres of mesic flatwoods natural communities and pine plantation on the area within a 2 – 4 year fire return interval.
6.1.11 Continue to maintain 357 acres of scrub natural community on the area within a 5 – 6 year fire return interval.
6.1.12 Continue to maintain 353 acres of scrubby flatwoods natural community on the area within a 3 – 5 year fire return interval.
6.1.13 Continue to conduct prescribed burning on 1,170 acres of wetland habitat in Lake Ponte Vedra and other interior impoundments on the area as appropriate and as conditions permit.
6.1.14 Continue to implement OBVM.
6.1.15 Reevaluate the area's natural communities every five years and revise the natural communities map as necessary.
6.1.16 Continue to conduct habitat/natural community improvement on approximately 250 acres per year of scrub, scrubby flatwoods and mesic flatwoods by continuing mechanical treatments.
6.1.17 Continue to conduct timber harvests for the purposes of habitat restoration on 753 acres on the area. (Figures 12 and 13)
6.1.18 Continue aquatic habitat improvements on the area by planting ~20 acres per year of native wetland plant species on Lake Ponte Vedra. (Figures 12 and 13)
6.1.19 Continue to maintain 2,375 acres per year of aquatic habitat through dewatering and flooding through seasonal water level management.
2014
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2023
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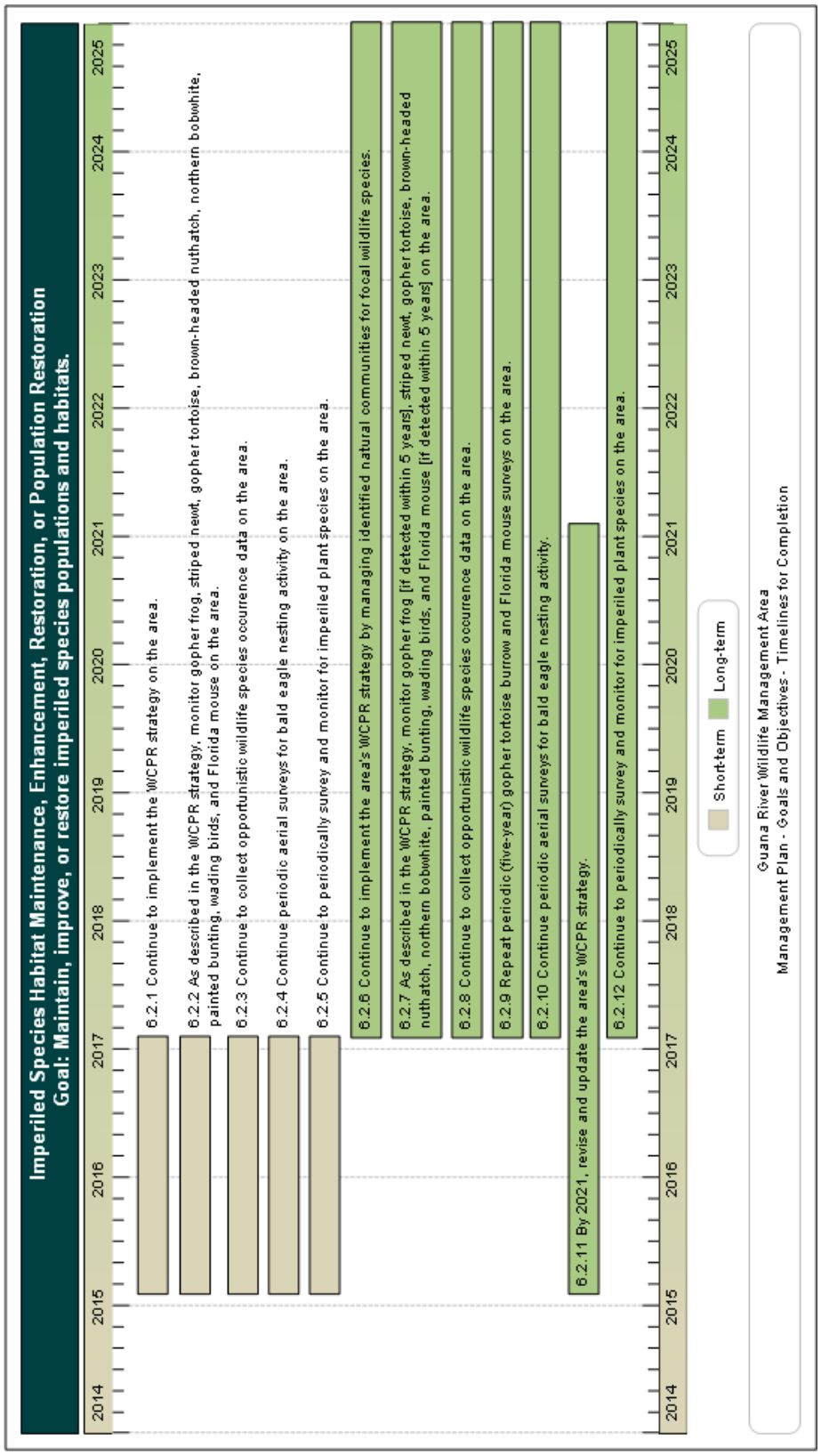
2025
Short-term
Long-term
Guana River Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion


Imperiled Species Habitat Maintenance, Enhancement, Restoration, or Population Restoration
Goal: Maintain, improve, or restore imperiled species populations and habitats.
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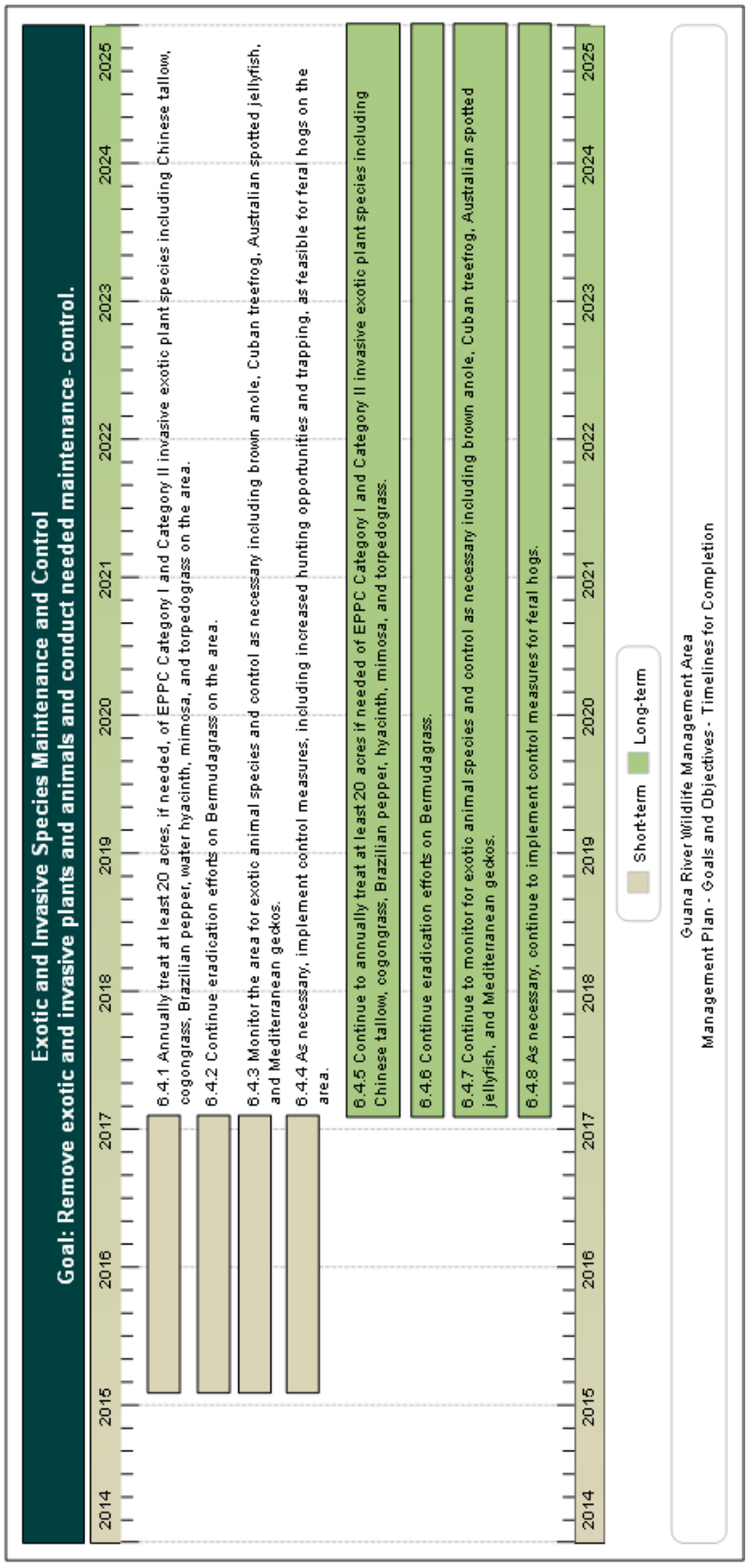
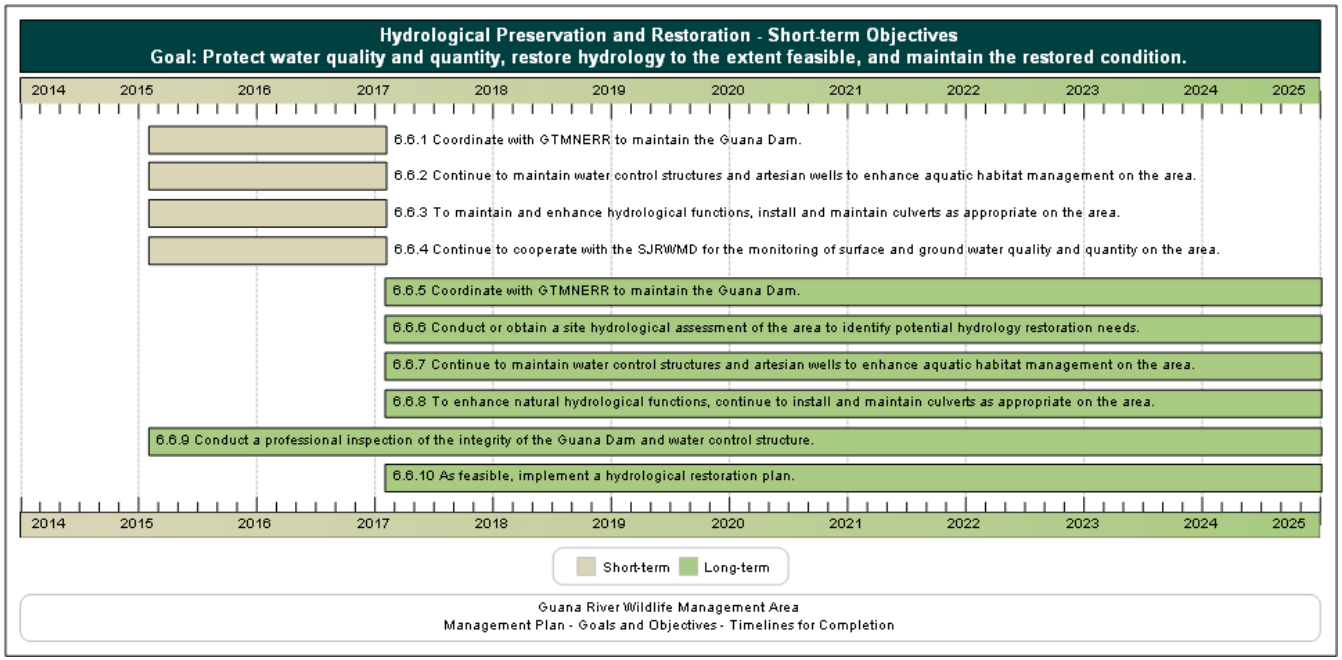
2024
2025
6.2.1 Continue to implement the WCPR strategy on the area.
6.2.2 As described in the WCPR strategy, monitor gopher frog, striped newt, gopher tortoise, brown-headed nuthatch, northern bobwhite, painted bunting, wading birds, and Florida mouse on the area.
6.2.3 Continue to collect opportunistic wildlife species occurrence data on the area.
6.2.4 Continue periodic aerial surveys for bald eagle nesting activity on the area.
6.2.5 Continue to periodically survey and monitor for imperiled plant species on the area.
6.2.6 Continue to implement the area's WCPR strategy by managing identified natural communities for focal wildlife species.
6.2.7 As described in the WCPR strategy, monitor gopher frog [if detected within 5 years], striped newt, gopher tortoise, brown-headed nuthatch, northern bobwhite, painted bunting, wading birds, and Florida mouse [if detected within 5 years] on the area.
6.2.8 Continue to collect opportunistic wildlife species occurrence data on the area.
6.2.9 Repeat periodic (five-year) gopher tortoise burrow and Florida mouse surveys on the area.
6.2.10 Continue periodic aerial surveys for bald eagle nesting activity.
6.2.11 By 2021, revise and update the area's WCPR strategy.
6.2.12 Continue to periodically survey and monitor for imperiled plant species on the area.
Short-term
Long-term
Guana River Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion

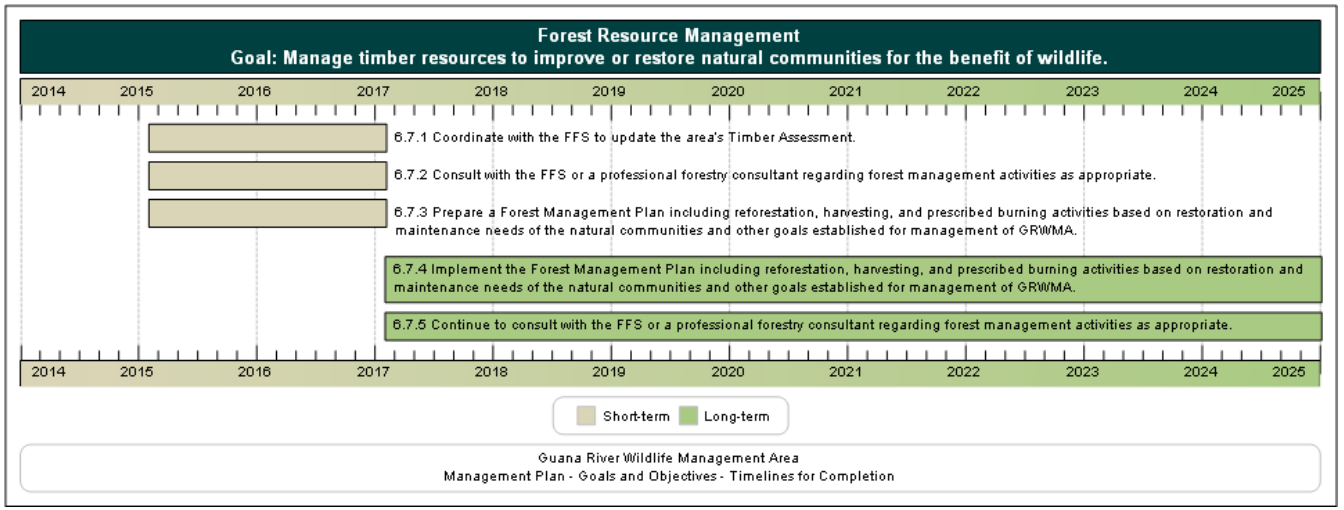
Other Wildlife (Game and Nongame) Habitat Maintenance, Enhancement, Restoration, or Population Restoration
Goal: Maintain, improve, or restore game and non-game populations and habitats.
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
6.3.1 Continue to maintain 50 acres of food plots on the area.
6.3.2 Continue to maintain 25 bluebird boxes on the area.
6.3.3 Continue to maintain 20 wood duck boxes on the area.
6.3.4 Continue to maintain five bat houses on the area.
6.3.5 Continue to conduct annual spotlight monitoring surveys on the area for white-tailed deer.
6.3.6 Continue annual turkey camera surveys on the area.
6.3.7 Continue to survey eel populations on the area each year.
6.3.8 Continue to survey alligator populations on the area each year.
6.3.9 Continue to collect biological harvest data at check stations on the area.
6.3.10 Continue to collect opportunistic wildlife occurrence data on the area.
6.3.11 Continue to maintain 50 acres of food plots on the area.
6.3.12 Continue to maintain 25 bluebird boxes on the area.
6.3.13 Continue to maintain 20 wood duck boxes on the area.
6.3.14 Continue to maintain five bat houses on the area.
6.3.15 Continue to conduct annual spotlight monitoring surveys on the area for white-tailed deer.
6.3.16 Continue annual turkey camera surveys on the area.
6.3.17 Continue to survey eel populations on the area each year.
6.3.18 Continue to survey alligator populations on the area each year.
6.3.19 Continue to survey fish populations on the area as appropriate and feasible.
6.3.20 Continue to collect biological harvest data at check stations on the area.
6.3.21 Continue to collect opportunistic wildlife occurrence data on the area.
Short-term
Long-term
Guana River Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion

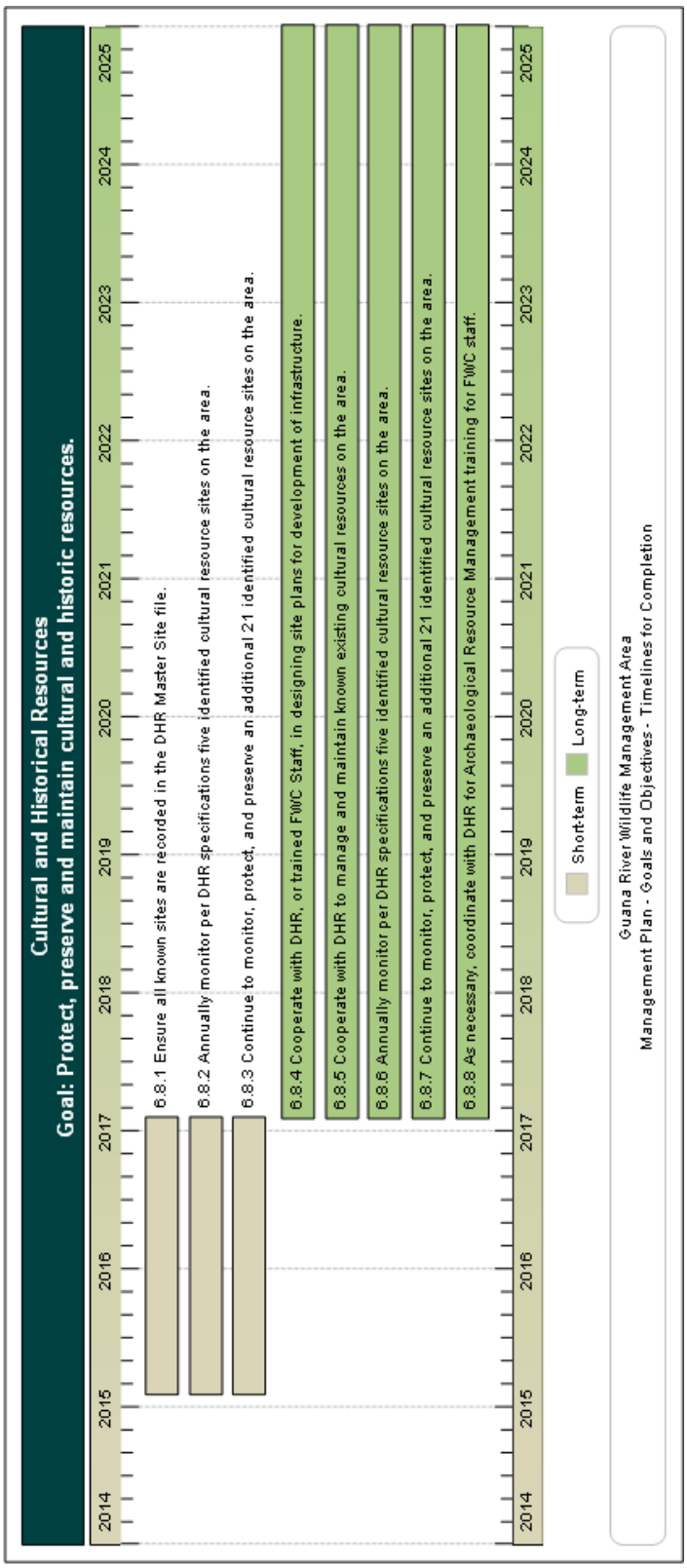

Exotic and Invasive Species Maintenance and Control
Goal: Remove exotic and invasive plants and animals and conduct needed maintenance- control.
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
6.4.1 Annually treat at least 20 acres, if needed, of EPPC Category I and Category II invasive exotic plant species including Chinese tallow, cogongrass, Brazilian pepper, water hyacinth, mimosa, and torpedograss on the area.
6.4.2 Continue eradication efforts on Bermudagrass on the area.
6.4.3 Monitor the area for exotic animal species and control as necessary including brown anole, Cuban treefrog, Australian spotted jellyfish, and Mediterranean geckos.
6.4.4 As necessary, implement control measures, including increased hunting opportunities and trapping, as feasible for feral hogs on the area.
6.4.5 Continue to annually treat at least 20 acres if needed of EPPC Category I and Category II invasive exotic plant species including Chinese tallow, cogongrass, Brazilian pepper, hyacinth, mimosa, and torpedograss.
6.4.6 Continue eradication efforts on Bermudagrass.
6.4.7 Continue to monitor for exotic animal species and control as necessary including brown anole, Cuban treefrog, Australian spotted jellyfish, and Mediterranean geckos.
6.4.8 As necessary, continue to implement control measures for feral hogs.
Short-term
Long-term
Guana River Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion

Public Access and Recreational Opportunities - Short-term Objectives
Goal: Provide public access and recreational opportunities.
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
6.5.1 Monitor the area's trails annually for visitor impacts.
6.5.2 Maintain public access and recreational opportunities to allow for a recreational carrying capacity of 592 visitors per day on the area.
6.5.3 Continue to implement the area's Recreation Master Plan.
6.5.4 Continue to provide a bird list, recreation guide, rack card, website, ten kiosks, and trail maps for interpretation and education.
6.5.5 Continue to cooperate with GTMNERR to provide and expand as feasible interpretive and educational programs.
6.5.6 Continue to conduct interpretive and educational programs as feasible.
6.5.7 Maintain 29.65 miles of trails on the area.
6.5.8 Continue to provide hunting opportunities including archery, muzzleloading gun, general gun, and spring turkey hunting seasons.
6.5.9 Continue to investigate the feasibility of enhancing quality hunting opportunities.
6.5.10 Continue to provide feral hog hunting opportunities and evaluate the need for additional hunting opportunities on the area.
6.5.11 Continue to provide quality fishing opportunities on the area.
6.5.12 Continue to provide paddling opportunities on Lake Ponte Vedra.
6.5.13 Assess current trails, modify and improve signage and way-finding as necessary.
6.5.14 Cooperate with other agencies, St. Johns County, stakeholders, and regional landowners to investigate regional recreational opportunities including linking hiking, and multi-use trail systems between adjacent public areas.
6.5.15 Cooperate with St. Johns County Convention and Tourism Bureau to promote GRWMA as a recreation destination.
Short-term
Guana River Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion

Public Access and Recreational Opportunities - Long-term Objectives
Goal: Provide public access and recreational opportunities.
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
6.5.16 Continue to monitor the area's trails annually for visitor impacts.
6.5.17 Reassess the area's recreational opportunities every three years.
6.5.18 Maintain public access and recreational opportunities to allow for a recreational carrying capacity of 592 visitors per day on the area.
6.5.19 Continue to implement the area's Recreation Master Plan.
6.5.20 Continue to provide a bird list, recreation guide, rack card, website, ten kiosks, and trail maps for interpretation and education.
6.5.21 Continue to cooperate with the GTMNERR to provide and expand as feasible interpretive and educational programs.
6.5.22 Continue to conduct interpretive and educational programs as feasible.
6.5.23 Maintain 29.65 miles of trails on the area.
6.5.24 Continue to provide hunting opportunities including archery, muzzleloading gun, general gun, and spring turkey hunting seasons on the area.
6.5.25 Continue to provide feral hog hunting opportunities and evaluate the need for additional hunting opportunities.
6.5.26 Continue to provide quality fishing opportunities on the area.
6.5.27 Continue to provide paddling opportunities on Lake Ponte Vedra.
6.5.28 Continue to cooperate with other agencies, St. Johns County, stakeholders, and regional landowners to investigate regional recreational opportunities including linking hiking, and multi-use trail systems between adjacent public areas.
6.5.29 Continue to identify partnerships that could provide for environmental educational programs and outreach.
6.5.30 Provide interpretive signage pertaining to the GRWMA cultural resources.
6.5.31 Update the area's Recreation Master Plan.
6.5.32 Continue to cooperate with St. Johns County Convention and Tourism Bureau to promote GRWMA as a recreation destination.
6.5.34 Continue to investigate the feasibility of enhancing quality hunting opportunities on the area.
Long-term
Guana River Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion


Hydrological Preservation and Restoration - Short-term Objectives
Goal: Protect water quality and quantity, restore hydrology to the extent feasible, and maintain the restored condition.
2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025
6.6.1 Coordinate with GTMNERR to maintain the Guana Dam.
6.6.2 Continue to maintain water control structures and artesian wells to enhance aquatic habitat management on the area.
6.6.3 To maintain and enhance hydrological functions, install and maintain culverts as appropriate on the area.
6.6.4 Continue to cooperate with the SJRWMD for the monitoring of surface and ground water quality and quantity on the area.
6.6.5 Coordinate with GTMNERR to maintain the Guana Dam.
6.6.6 Conduct or obtain a site hydrological assessment of the area to identify potential hydrology restoration needs.
6.6.7 Continue to maintain water control structures and artesian wells to enhance aquatic habitat management on the area.
6.6.8 To enhance natural hydrological functions, continue to install and maintain culverts as appropriate on the area.
6.6.9 Conduct a professional inspection of the integrity of the Guana Dam and water control structure.
6.6.10 As feasible, implement a hydrological restoration plan.
2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025
Short-term Long-term
Guana River Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion


Forest Resource Management
Goal: Manage timber resources to improve or restore natural communities for the benefit of wildlife.
2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025
6.7.1 Coordinate with the FFS to update the area's Timber Assessment.
6.7.2 Consult with the FFS or a professional forestry consultant regarding forest management activities as appropriate.
6.7.3 Prepare a Forest Management Plan including reforestation, harvesting, and prescribed burning activities based on restoration and maintenance needs of the natural communities and other goals established for management of GRWMA.
6.7.4 Implement the Forest Management Plan including reforestation, harvesting, and prescribed burning activities based on restoration and maintenance needs of the natural communities and other goals established for management of GRWMA.
6.7.5 Continue to consult with the FFS or a professional forestry consultant regarding forest management activities as appropriate.
2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025
Short-term Long-term
Guana River Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion


Cultural and Historical Resources
Goal: Protect, preserve and maintain cultural and historic resources.
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
6.8.1 Ensure all known sites are recorded in the DHR Master Site file.
6.8.2 Annually monitor per DHR specifications five identified cultural resource sites on the area.
6.8.3 Continue to monitor, protect, and preserve an additional 21 identified cultural resource sites on the area.
6.8.4 Cooperate with DHR, or trained FWC Staff, in designing site plans for development of infrastructure.
6.8.5 Cooperate with DHR to manage and maintain known existing cultural resources on the area.
6.8.6 Annually monitor per DHR specifications five identified cultural resource sites on the area.
6.8.7 Continue to monitor, protect, and preserve an additional 21 identified cultural resource sites on the area.
6.8.8 As necessary, coordinate with DHR for Archaeological Resource Management training for FWC staff.
Short-term
Long-term
Guana River Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion

Capital Facilities and Infrastructure
Goal: Develop the capital facilities and infrastructure necessary to meet the goals and objectives of this Management Plan.
2014
2015
2016
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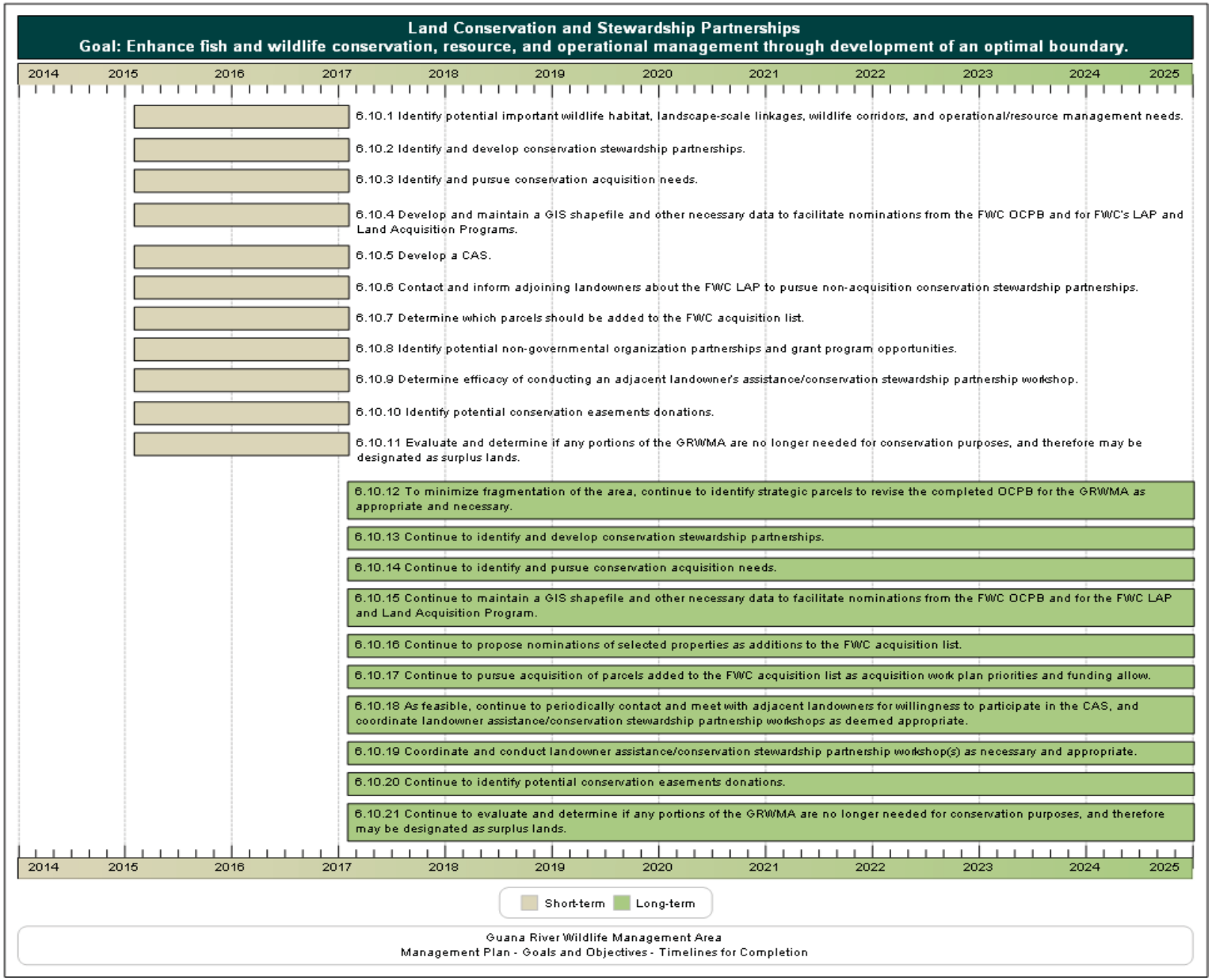
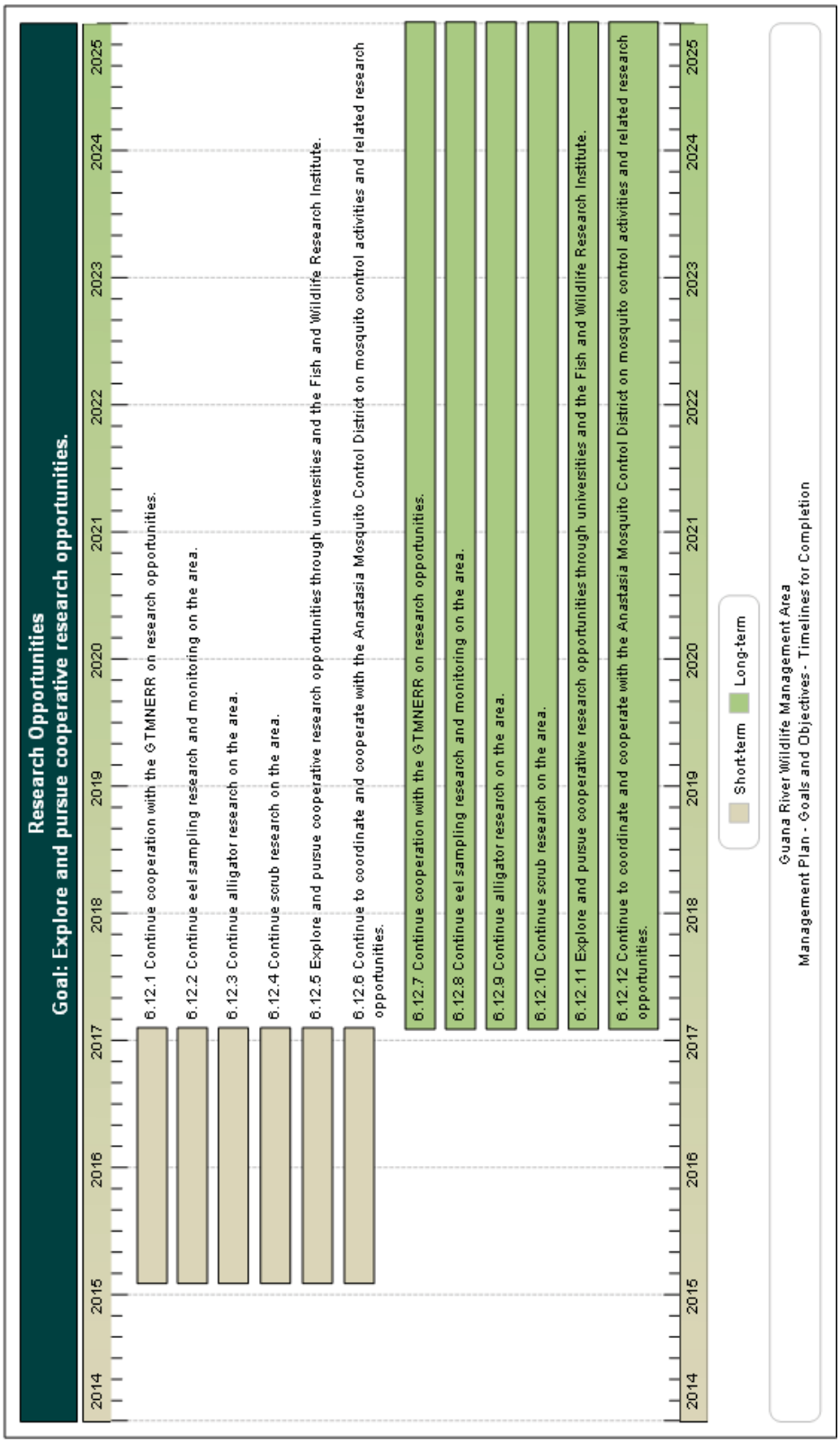
2018
2019
2020
2021
2022
2023
2024
2025
6.9.1 Continue to maintain 29.65 miles of designated trails on the area.
6.9.2 Continue to maintain 31.4 miles of roads located on the area.
6.9.3 Continue to maintain two wildlife viewing towers on the area.
6.9.4 Continue to maintain one wildlife viewing platform on the area.
6.9.5 Continue to maintain one viewing blind on the area.
6.9.6 Continue to maintain one shooting blind on the area.
6.9.7 Continue to maintain equestrian facilities on the area.
6.9.8 Continue to maintain 22 facilities including Six Mile Landing (boat ramp and kiosk), Diego Pond viewing blind, Booths Pond ADA blind, check station, Big Savannah interpretive center, water control structures, office, Capo and Lake Ponte Vedra Towers, and wells on the area.
6.9.9 Design and develop kiosk interpreting the GRWMA cultural resources.
6.9.10 Construct and maintain check station and pole barn on the area.
6.9.11 Continue to maintain 29.65 miles of designated trails on the area.
6.9.12 Continue to maintain 31.4 miles of roads on the area.
6.9.13 Continue to maintain two wildlife viewing towers on the area.
6.9.14 Continue to maintain one wildlife viewing platform on the area.
6.9.15 Continue to maintain one viewing blind on the area.
6.9.16 Continue to maintain one shooting blind on the area.
6.9.17 Continue to maintain equestrian facilities on the area.
6.9.18 Continue to maintain 22 facilities on the area.
6.9.19 Monitor the area's trails and infrastructure biannually for visitor impacts.
Short-term
Long-term
Guana River Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion


Land Conservation and Stewardship Partnerships
Goal: Enhance fish and wildlife conservation, resource, and operational management through development of an optimal boundary.
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
6.10.1 Identify potential important wildlife habitat, landscape-scale linkages, wildlife corridors, and operational/resource management needs.
6.10.2 Identify and develop conservation stewardship partnerships.
6.10.3 Identify and pursue conservation acquisition needs.
6.10.4 Develop and maintain a GIS shapefile and other necessary data to facilitate nominations from the FWC OCPB and for FWC's LAP and Land Acquisition Programs.
6.10.5 Develop a CAS.
6.10.6 Contact and inform adjoining landowners about the FWC LAP to pursue non-acquisition conservation stewardship partnerships.
6.10.7 Determine which parcels should be added to the FWC acquisition list.
6.10.8 Identify potential non-governmental organization partnerships and grant program opportunities.
6.10.9 Determine efficacy of conducting an adjacent landowner's assistance/conservation stewardship partnership workshop.
6.10.10 Identify potential conservation easements donations.
6.10.11 Evaluate and determine if any portions of the GRWMA are no longer needed for conservation purposes, and therefore may be designated as surplus lands.
6.10.12 To minimize fragmentation of the area, continue to identify strategic parcels to revise the completed OCPB for the GRWMA as appropriate and necessary.
6.10.13 Continue to identify and develop conservation stewardship partnerships.
6.10.14 Continue to identify and pursue conservation acquisition needs.
6.10.15 Continue to maintain a GIS shapefile and other necessary data to facilitate nominations from the FWC OCPB and for the FWC LAP and Land Acquisition Program.
6.10.16 Continue to propose nominations of selected properties as additions to the FWC acquisition list.
6.10.17 Continue to pursue acquisition of parcels added to the FWC acquisition list as acquisition work plan priorities and funding allow.
6.10.18 As feasible, continue to periodically contact and meet with adjacent landowners for willingness to participate in the CAS, and coordinate landowner assistance/conservation stewardship partnership workshops as deemed appropriate.
6.10.19 Coordinate and conduct landowner assistance/conservation stewardship partnership workshop(s) as necessary and appropriate.
6.10.20 Continue to identify potential conservation easements donations.
6.10.21 Continue to evaluate and determine if any portions of the GRWMA are no longer needed for conservation purposes, and therefore may be designated as surplus lands.
Short-term
Long-term
Guana River Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion

Climate Change
Goal: Develop appropriate adaptation strategies in response to projected climate change effects.
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
6.11.1 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 GRWMA.
6.11.2 Consider participating in Peninsular Florida Land Conservation Cooperative so that FWC continues to gain understanding and share knowledge of the key issues related to potential climate change.
6.11.3 Work with natural resource management partners to consider the feasibility of conducting cooperative studies to model and monitor the immediate and/or long-term effects of sea level rise on low-lying coastal habitats.
6.11.4 Assess the need for conducting a vulnerability assessment to model the potential effects of climate change, especially sea level rise and storm events, on imperiled species and their habitats present with the GRWMA.
6.11.5 Assess the need to prioritize research and monitoring to ascertain the potential impacts of climate change on the hydrologic regime and water quality of the GRWMA, such as increased nutrient and sediment loads, reduced surface and groundwater recharge, and increases in water temperatures.
6.11.6 Assess the need to prioritize research and monitoring to determine the potential impacts of climate change on native vegetation, and the possible spread of exotic and invasive species; incorporate appropriate monitoring protocols and management strategies into the CBVM program for the GRWMA.
6.11.7 Assess the need for prioritized research and monitoring to determine the potential impacts of climate change on the imperiled species on the GRWMA; incorporate appropriate adaptation strategies into the WCPR for GRWMA.
6.11.8 As appropriate, update the GRWMA Prescribed Fire Plan to incorporate new scientific information regarding projected climate change, such as increased frequency of drought, on the fire regime of GRWMA's fire-adapted habitats.
6.11.9 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 Recreation Master Plan.
Long-term
Guana River Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion


Research Opportunities
Goal: Explore and pursue cooperative research opportunities.
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
6.12.1 Continue cooperation with the GTMNERR on research opportunities.
6.12.2 Continue eel sampling research and monitoring on the area.
6.12.3 Continue alligator research on the area.
6.12.4 Continue scrub research on the area.
6.12.5 Explore and pursue cooperative research opportunities through universities and the Fish and Wildlife Research Institute.
6.12.6 Continue to coordinate and cooperate with the Anastasia Mosquito Control District on mosquito control activities and related research opportunities.
6.12.7 Continue cooperation with the GTMNERR on research opportunities.
6.12.8 Continue eel sampling research and monitoring on the area.
6.12.9 Continue alligator research on the area.
6.12.10 Continue scrub research on the area.
6.12.11 Explore and pursue cooperative research opportunities through universities and the Fish and Wildlife Research Institute.
6.12.12 Continue to coordinate and cooperate with the Anastasia Mosquito Control District on mosquito control activities and related research opportunities.
Short-term
Long-term
Guana River Wildlife Management Area
Management Plan - Goals and Objectives - Timelines for Completion

8 Resource Management Challenges and Strategies

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

8.1 Challenge: Lake Ponte Vedra water releases may potentially impact adjacent estuaries.

8.1.1 Strategy: Cooperate and coordinate with the GTMNERR regarding water releases and on studies of the potential impacts on adjacent estuaries.

8.2 Challenge: There are two inholdings that are on the FWC Inholdings and Additions list for the GRWMA, one is seven acres and the other is 100 acres. These inholdings present an array of management challenges for the GRWMA. Specifically, the 100-acre inholding could be intensively developed in the near future, which would adversely impact the hydrology and natural resources of the GRWMA.

8.2.1 Strategy: As appropriate and feasible, continue to pursue acquisition of the inholdings that are on the FWC Inholdings and Additions list.

8.3 Challenge: The GRWMA is part of a larger ecosystem over which the FWC has limited control but within which the activities of others have a great effect on the WMA.

8.3.1 Strategy: Continue to maintain and establish rapport with landowners adjacent to the WMA; provide technical assistance and advice in order to assure the welfare of ecosystem components such as the Guana River and Lake Ponte Vedra, and other wetlands; establish working relationships with local representatives of regulatory agencies (i.e., SJRWMD, St. Johns County, DEP, U.S. Army Corps of Engineers) so solutions can be quickly sought if conflicts arise.

8.4 Challenge: It is unclear if all of the private docks located on Lake Ponte Vedra have been properly approved and permitted by the DEP District Office in Jacksonville. The presence of unpermitted permanent structures on Lake Ponte Vedra can inhibit the ability of FWC staff to conduct proper management of the lake and its associated wetlands and can result in the spread of exotic and invasive species onto the GRWMA.

8.4.1 Strategy: Cooperate with DEP to verify that all private docks on Lake Ponte Vedra are properly authorized and permitted.

8.5 Challenge: As a result of competing property claims, it is necessary to verify whether the entire boundary of Lake Ponte Vedra is considered to be State-owned and within the GRWMA lease.

8.5.1 Strategy: Cooperate with DEP-DSL to verify boundaries of the GRWMA and specifically Lake Ponte Vedra.

8.6 Challenge: Nutrient loading from adjacent property may be affecting the water quality and associated habitats of Lake Ponte Vedra.

8.6.1 Strategy: Cooperate with the SJRWMD and the GTMNERR for water quality monitoring to support efforts to reduce nutrient loading.

8.7 Challenge 6: Due to increased land use changes in the vicinity of the GRWMA, there are smoke management challenges during prescribed burns due to proximity to major roadways and residential areas.

8.7.1 Strategy: Use available tools (e.g., National Weather Service spot fire weather forecasts, FFS Smoke Screen GIS analysis tool, press releases, and notices) and resources to minimize smoke impact and increase outreach for areas of potential impact.

8.8 Challenge 7: Exotic invasive plants from adjacent private lands are spreading to the GRWMA.

8.8.1 Strategy: Coordinate with FWC's LAP to work with adjacent landowners to control and manage exotic invasive plants on adjacent properties.

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

8.9 Challenge 8: Ingress/egress at Six Mile Landing during waterfowl hunts can be difficult due to traffic congestion on A1A.

8.9.1 Strategy: Coordinate with the GTMNERR and waterfowl hunting community to develop a solution.

8.10 Challenge 9: Illegal access, poaching, vandalism and other violations occur on the GRWMA.

8.10.1 Strategy: Continue to coordinate with FWC Law Enforcement to ensure adequate law enforcement presence is maintained on the area.

9 Cost Estimates and Funding Sources

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

The cost estimate below, although exceeding what FWC typically receives through the appropriations process, is estimated to be what is necessary for optimal management and is consistent with the current and planned resource management and operation of the GRWMA. Cost estimate categories are those currently recognized by FWC and the Land Management Uniform Accounting Council. More information on these categories, as well as the Fiscal Year 2013-2014 operational plan showing detailed cost estimates by activity and categories of expenditures, may be found in Appendix 13.16.

Table 15. Cost Estimate: Maximum Expected One Year

Guana River WMA Management Plan Cost Estimate
Maximum expected one year expenditure

Resource Management	Expenditure	Priority	Priority schedule:
Exotic Species Control	$7,638	(1)	**(1) Immediate (annual)**
Prescribed Burning	$31,421	(1)	(2) Intermediate (3-4 years)
Cultural Resource Management	$2,169	(1)	*(3) Other (5+ years)*
Timber Management	$3,033	(1)	
Hydrological Management	$51,274	(1)	
Other (Restoration, Enhancement, Surveys, Monitoring, etc.)	$111,871	(1)	
Subtotal	**$207,406**		
Administration			
General administration	**$9,751**	(1)	
Support			
Land Management Planning	$43,586	(1)	
Land Management Reviews	$4,311	(3)	
Training/Staff Development	$6,506	(1)	
Vehicle Purchase	$94,379	(2)	
Vehicle Operation and Maintenance	$64,922	(1)	
Other (Technical Reports, Data Management, etc.)	$3,731	(1)	
Subtotal	**$217,435**		
Capital Improvements			
New Facility Construction	$3,523	(3)	
Facility Maintenance	$98,991	(1)	
Subtotal	**$102,513**		
Visitor Services/Recreation			
Info./Education/Operations	**$22,746**	(1)	
Law Enforcement			
Resource protection	**$8,964**	(1)	
Total	**$568,816**	*	

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

Table 16. Cost Estimate: Ten-year Projection

Guana River WMA Management Plan Cost Estimate
Ten-year projection

Resource Management	Expenditure	Priority
Exotic Species Control	$67,111	(1)
Prescribed Burning	$276,071	(1)
Cultural Resource Management	$19,055	(1)
Timber Management	$26,647	(1)
Hydrological Management	$450,503	(1)
Other (Restoration, Enhancement, Surveys, Monitoring, etc.)	$982,907	(1)
Subtotal	**$1,822,294**	
Administration		
General administration	**$85,672**	(1)
Support		
Land Management Planning	$382,951	(1)
Land Management Reviews	$12,342	(3)
Training/Staff Development	$57,166	(1)
Vehicle Purchase	$332,122	(2)
Vehicle Operation and Maintenance	$570,413	(1)
Other (Technical Reports, Data Management, etc.)	$32,781	(1)
Subtotal	**$1,387,775**	
Capital Improvements		
New Facility Construction	$3,523	(3)
Facility Maintenance	$869,743	(1)
Subtotal	**$873,266**	
Visitor Services/Recreation		
Info./Education/Operations	**$199,847**	(1)
Law Enforcement		
Resource protection	**$78,763**	(1)
Total	**$4,447,617**	*

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

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

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

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

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

11 Compliance with Federal, State, and Local Governmental Requirements

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

When public facilities are developed on areas managed by the FWC, every effort is made to comply with Public Law 101 - 336, the Americans with Disabilities Act. As new facilities are developed, the universal access requirements of this law are followed in all cases except where the law allows reasonable exceptions (e.g., where handicap access is structurally impractical or where providing such access would change the fundamental character of the facility being provided).

Uses planned for the GRWMA are in compliance with the Conceptual State Lands Management Plan and its requirement for "balanced public utilization," and are in compliance with the mission of the FWC as described in its Agency Strategic Plan (Appendix 13.8). 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 372, 253, 259, 327, 370, 403, 870, 373, 375, 378, 487, and 597 FS.

The FWC has developed and utilizes an Arthropod Control Plan for the GRWMA in compliance with Chapter 388.4111 FS (Appendix 13.17). This plan was developed in cooperation with the local St. Johns County arthropod control agency. This plan is also in conformance with the Local Government Comprehensive Plan as approved and adopted for St. Johns County, Florida (Appendix 13.18).

12 Endnotes

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SEE VOLUME 2 OF 2 OF THE GUANA RIVER WILDLIFE MANAGEMENT AREA MANAGEMENT PLAN FOR APPENDICES