FLORIDA DEPARTMENT OF
Environmental Protection

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, FL 32399

Ron DeSantis
Governor

Jeanette Nuñez
Lt. Governor

Noah Valenstein
Secretary

February 15, 2019

Mr. Steven Cutshaw
Division of Recreation and Parks
Department of Environmental Protection
3900 Commonwealth Boulevard, MS 525
Tallahassee, Florida 32399-3000

RE: St. Sebastian River Preserve State Park – Lease No. 4118 and 4397

Dear Mr. Cutshaw:

On **February 15, 2019**, the Acquisition and Restoration Council (ARC) recommended approval of the **St. Sebastian River Preserve State Park** management plan. Therefore, Division of State Lands, Office of Environmental Services, acting as agent for the Board of Trustees of the Internal Improvement Trust Fund, hereby approves the **St. Sebastian River Preserve State Park** management plan. The next management plan update is due February 15, 2029.

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

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

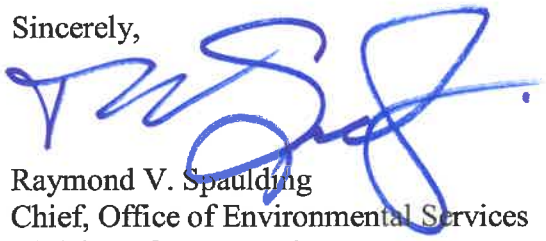
Pursuant to s. 259.036(2), F.S., management areas that exceed 1,000 acres in size, shall be scheduled for a land management review at least every 5 years.

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

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

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

Sincerely,



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

St. Sebastian River Preserve State Park

Approved

Unit Management Plan

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Division of Recreation and Parks
February 2019

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INTRODUCTION

St. Sebastian River Preserve State Park is in Brevard and Indian River Counties (see Vicinity Map). Access to the northern half of the park is from Buffer Preserve Drive, off Babcock Street, approximately 3 miles north of Fellsmere. WW Ranch Road provides access to the southeast quadrant off County Road 512 approximately two miles east of Interstate 95 (see Reference Map). The Vicinity Map also reflects significant land and water resources existing near the park.

St. Sebastian River Preserve State Park was initially acquired by the Board of Trustees of the Internal Improvement Fund (Trustees) on January 4, 1995 with funds from the P2000/CARL program. Since the initial purchase, the Trustees and the St. Johns River Water Management District (SJRWMD) have jointly acquired several parcels and added them to the park. Currently, the park comprises 21,629.35 acres. The Trustees and SJRWMD hold fee simple title to the park. On March 29, 1996, the Trustees leased the property to the Florida Department of Environmental Protection (FDEP), Division of Marine Resources under a 50-year lease (Lease Number 4118). This lease will expire on March 28, 2046. On January 31, 2003, the Trustees and SJRWMD leased the property to FDEP, Office of Aquatic Managed Areas under a 50-year lease (Lease Number 4397). This lease will expire on January 30, 2053. Management of both leases was transferred to Division of Recreation and Parks (DRP).

St. Sebastian River Preserve State Park is designated single-use to provide public outdoor recreation and conservation. There are no legislative or executive directives that constrain the use of this property (see Addendum 1).

Purpose and Significance of the Park

The purpose of St. Sebastian River Preserve State Park is to limit the development in the area to provide a water quality buffer for the St. Sebastian River and Indian River Lagoon and to protect the critical habitats of imperiled species particularly the Florida Manatee.

Park Significance

- St. Sebastian River Preserve State Park is one of the largest conservation areas in the Indian River – South Brevard County region. The park provides critical water quality protection for the St. Sebastian River and Indian River Lagoon.

- The park preserves a large expanse of open longleaf pine and wiregrass forest that was once commonplace throughout Florida. In addition to pine flatwoods the park protects cypress domes, scrubby flatwoods, sandhill, a

rare strand swamp and a forest of red, black and white mangroves that border the St. Sebastian River.

- The park provides critical habitat for several of imperiled bird species including the red-cockaded woodpecker, the crested caracara, and the Florida scrub-jay. The park is also known as an exceptional spot for viewing The Florida Manatee. Manatees are common in the St. Sebastian River and the C-54 canal during winter and spring.

- The park provides an array of cultural sites representing a wide span of human history from paleolithic hunting and gathering cultures to the working landscapes of the nineteenth and twentieth centuries including logging, turpentining, ranching, and farming.

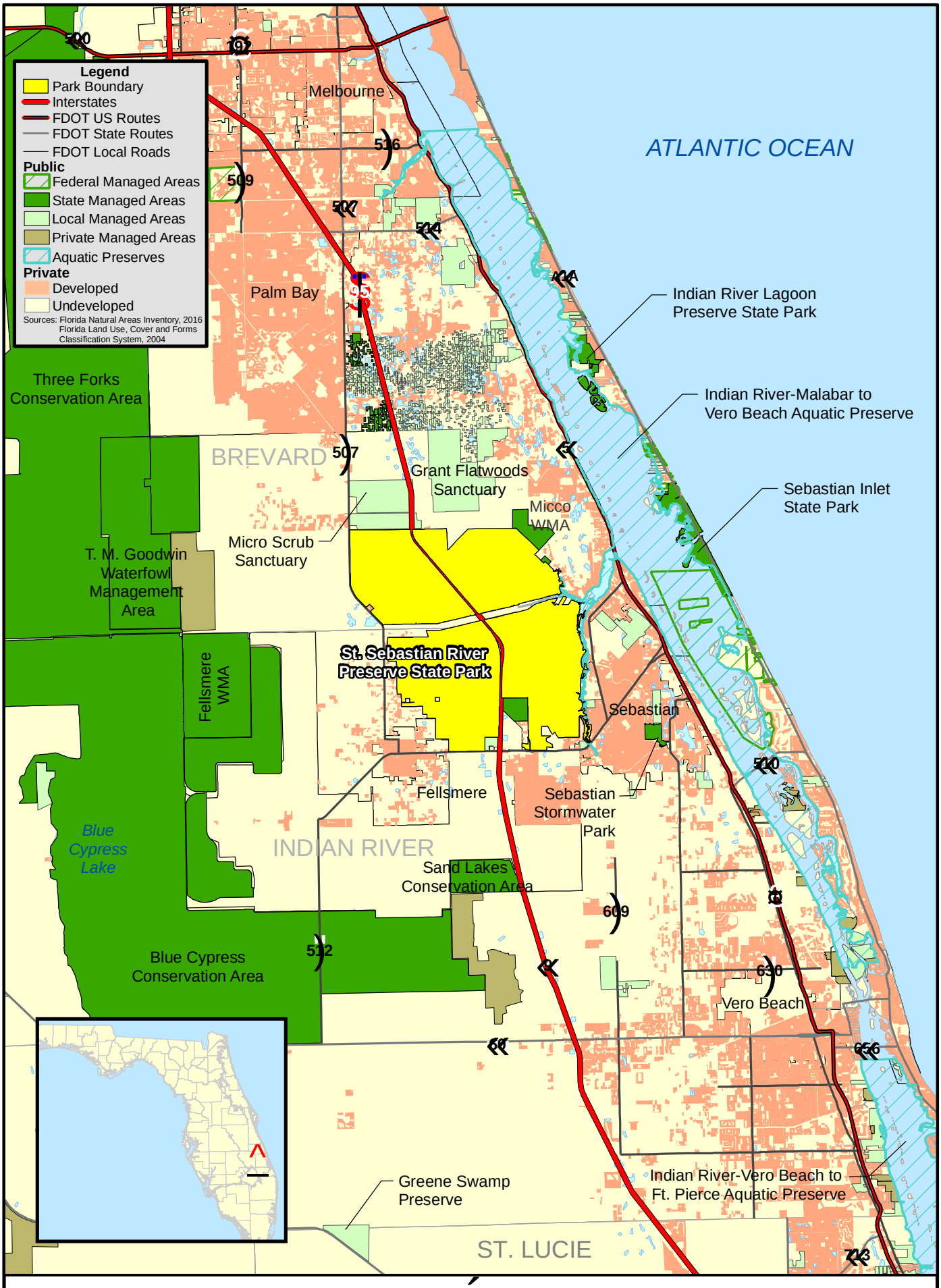
- The park provides quality outdoor resource-based recreation, with over 60 miles of multi-use trails available for hiking, biking, horseback riding, and nature study and access to more than ten miles of the St. Sebastian River and its tributaries for paddling, boating, and fishing.

St. Sebastian River Preserve State Park is classified as a State Preserve in the DRP's unit classification system. In the management of a State Preserve, preservation and enhancement of natural conditions is all important. Resource considerations are given priority over user considerations and development is restricted to the minimum necessary for ensuring its protection and maintenance, limited access, user safety and convenience, and appropriate interpretation. Permitted uses are primarily of a passive nature, related to the aesthetic, educational and recreational enjoyment of the preserve, although other compatible uses are permitted in limited amounts. Program emphasis is placed on interpretation of the natural and cultural attributes of the preserve.

Purpose and Scope of the Plan

This plan serves as the basic statement of policy and direction for the management of St. Sebastian River Preserve State Park as a unit of Florida's state park system. It identifies the goals, objectives, actions and criteria or standards that guide each aspect of park administration, and sets forth the specific measures that will be implemented to meet management objectives and provide balanced public utilization. The plan is intended to meet the requirements of Sections 253.034 and 259.032, Florida Statutes, Chapter 18-2, Florida Administrative Code, and is intended to be consistent with the State Lands Management Plan. With approval, this management plan will replace the 2005 approved plan.

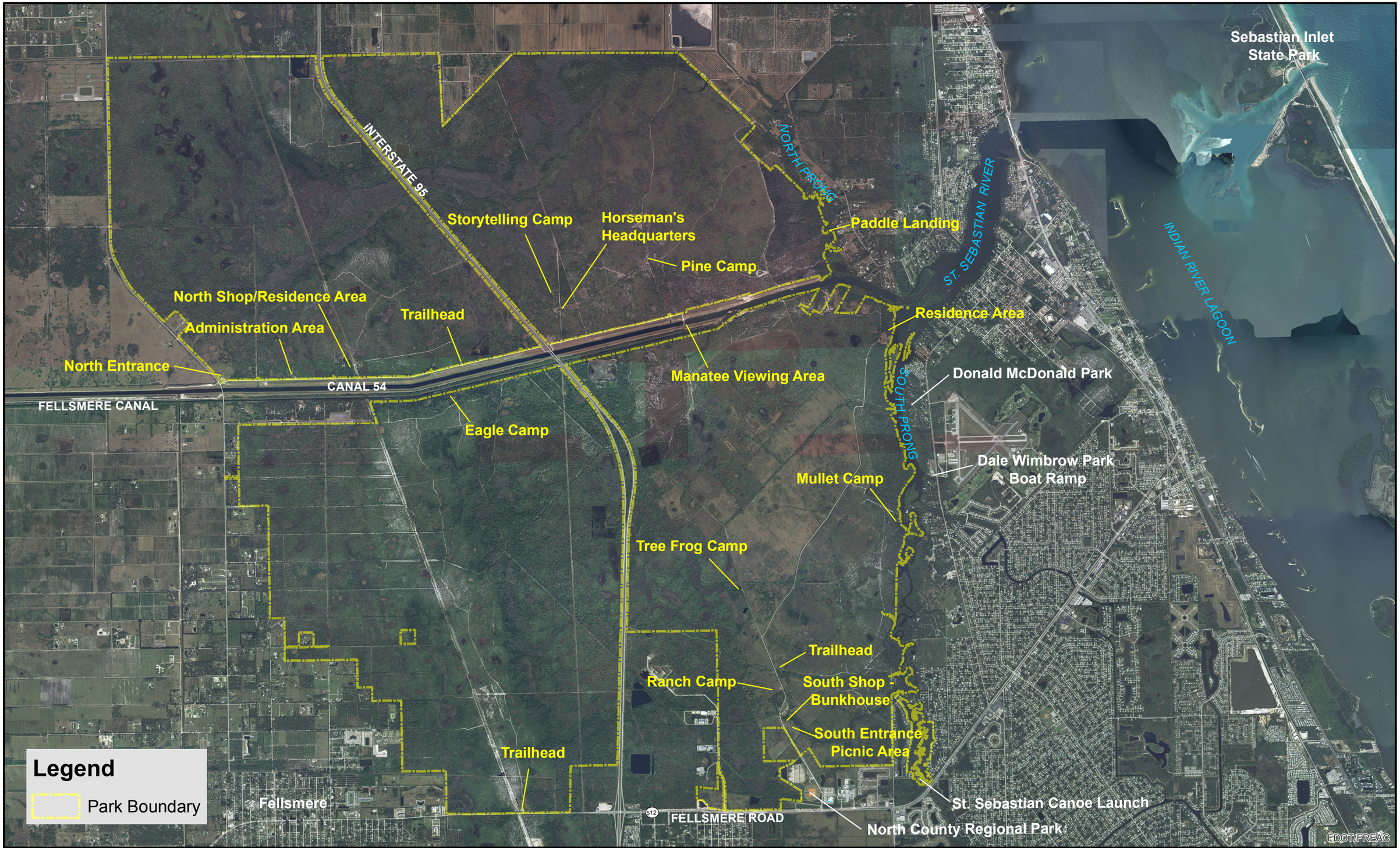
The plan consists of three interrelated components: The Resource Management Component, the Land Use Component and the Implementation Component. The



ST. SEBASTIAN RIVER PRESERVE STATE PARK

Florida Department of Environmental Protection
Division of Recreation and Parks

VICINITY MAP



ST. SEBASTIAN RIVER
PRESERVE STATE PARK

N

0 0.275 0.55 1.1 Mile

Florida Department of Environmental Protection
Division of Recreation and Parks
Date of aerial: 2011

REFERENCE MAP

Resource Management Component provides a detailed inventory and assessment of the natural and cultural resources of the park. Resource management needs and issues are identified, and measurable management objectives are established for each of the park's management goals and resource types. This component provides guidance on the application of such measures as prescribed burning, exotic species removal, imperiled species management, cultural resource management and restoration of natural conditions.

The Land Use Component is the recreational resource allocation plan for the park. Based on considerations such as access, population, adjacent land uses, the natural and cultural resources of the park, and current public uses and existing development, measurable objectives are set to achieve the desired allocation of the physical space of the park. These objectives identify use areas and propose the types of facilities and programs as well as the volume of public use to be provided.

The Implementation Component consolidates the measurable objectives and actions for each of the park's management goals. An implementation schedule and cost estimates are included for each objective and action. Included in this table are (1) measures that will be used to evaluate the DRP's implementation progress, (2) timeframes for completing actions and objectives and (3) estimated costs to complete each action and objective.

All development and resource alteration proposed in this plan is subject to the granting of appropriate permits, easements, licenses, and other required legal instruments. Approval of the management plan does not constitute an exemption from complying with the appropriate local, state or federal agencies.

In accordance with 253.034(5) F.S., the potential of the park to accommodate secondary management purposes was analyzed. These secondary purposes were considered within the context of DRP's statutory responsibilities and the resource needs and values of the park. This analysis considered the park's natural and cultural resources, management needs, aesthetic values, visitation and visitor experiences. For this park, it was determined that timber management and cattle grazing conducted as part of the park's natural community management and restoration activities could be accommodated in a manner that would be compatible and not interfere with the primary purpose of resource-based outdoor recreation and conservation. These compatible secondary management purpose are addressed in the Resource Management Component of the plan.

DRP has determined that uses such as, water resource development projects, water supply projects, stormwater management projects, linear facilities and sustainable agriculture and forestry (other than those forest management activities specifically identified in this plan) would not be consistent with this plan or the management purposes of the park.

In accordance with 253.034(5) F.S. the potential for generating revenue to enhance management was also analyzed. Visitor fees and charges are the principal source of revenue generated by the park. It was determined that timber management and cattle grazing conducted as part of the park's natural community management and restoration activities would be appropriate at this park as additional sources of revenue for land management since they are compatible with the park's primary purpose of resource-based outdoor recreation and conservation. Generating revenue from consumptive uses that are not related to resource management activities is not contemplated in this management plan.

DRP may provide the services and facilities outlined in this plan either with its own funds and staff or through an outsourcing contract. Private contractors may provide assistance with natural resource management and restoration activities or a concessionaire may provide services to park visitors in order to enhance the visitor experience. For example, a concessionaire could be authorized to sell merchandise and food and to rent recreational equipment for use in the park. A concessionaire may also be authorized to provide specialized services, such as interpretive tours, or overnight accommodations when the required capital investment exceeds that which DRP can elect to incur. Decisions regarding outsourcing, contracting with the private sector, the use of concessionaires, etc. are made on a case-by-case basis in accordance with the policies set forth in DRP's Operations Manual (OM).

Management Program Overview

Management Authority and Responsibility

In accordance with Chapter 258, Florida Statutes and Chapter 62D-2, Florida Administrative Code, the Division of Recreation and Parks (DRP) is charged with the responsibility of developing and operating Florida's recreation and parks system. These are administered in accordance with the following policy:

It shall be the policy of the Division of Recreation and Parks to promote the state park system for the use, enjoyment, and benefit of the people of Florida and visitors; to acquire typical portions of the original domain of the state which will be accessible to all of the people, and of such character as to emblemize the state's natural values; conserve these natural values for all time; administer the development, use and maintenance of these lands and render such public service in so doing, in such a manner as to enable the people of Florida and visitors to enjoy these values without depleting them; to contribute materially to the development of a strong mental, moral, and physical fiber in the people; to provide for perpetual preservation of historic sites and memorials of statewide significance and interpretation of their history to the people; to contribute to the tourist appeal of Florida.

The Board of Trustees of the Internal Improvement Trust Fund (Trustees) has granted management authority of certain sovereign submerged lands to the DRP under Management Agreement MA 68-086 (as amended January 19, 1988). The management area includes a 400-foot zone from the edge of mean high water where a park boundary borders sovereign submerged lands fronting beaches, bays, estuarine areas, rivers or streams. Where emergent wetland vegetation exists, the zone extends waterward 400 feet beyond the vegetation. The agreement is intended to provide additional protection to resources of the park and nearshore areas and to provide authority to manage activities that could adversely affect public recreational uses.

Many operating procedures are standardized system-wide and are set by internal direction. These procedures are outlined in the OM that covers such areas as personnel management, uniforms and personal appearance, training, signs, communications, fiscal procedures, interpretation, concessions, public use regulations, resource management, law enforcement, protection, safety and maintenance.

Park Management Goals

The following park goals express DRP's long-term intent in managing the state park:

- Provide administrative support for all park functions.
- Protect water quality and quantity in the park, restore hydrology to the extent feasible and maintain the restored condition.
- Restore and maintain the natural communities/habitats of the park.
- Maintain, improve or restore imperiled species populations and habitats in the park.
- Remove exotic and invasive plants and animals from the park and conduct needed maintenance-control.
- Protect, preserve and maintain the cultural resources of the park.
- Provide public access and recreational opportunities in the park.
- Develop and maintain the capital facilities and infrastructure necessary to meet the goals and objectives of this management plan.

Management Coordination

The park is managed in accordance with all applicable laws and administrative rules. Agencies having a major or direct role in the management of the park are discussed in this plan.

The Florida Department of Agriculture and Consumer Services (FDACS), Florida Forest Service (FFS), assists DRP staff in the development of wildfire emergency

plans and provides the authorization required for prescribed burning. The Florida Fish and Wildlife Conservation Commission (FWC) assists staff in the enforcement of state laws pertaining to wildlife, freshwater fish and other aquatic life existing within the park. In addition, the FWC aids DRP with wildlife management programs, including imperiled species management. The Florida Department of State (FDOS), Division of Historical Resources (DHR) assists staff to ensure protection of archaeological and historical sites. The Florida Department of Environmental Protection (DEP), Florida Coastal Office (FCO) aids staff in aquatic preserves management programs.

At the St. Sebastian River Preserve State Park, ongoing coordination programs include active management of the park's imperiled animal species, particularly the red cockaded woodpecker and the Florida scrub jay, with the FWC and the USFWS. Division staff works with the St. Johns River Water Management District on an ambitious hydrological restoration program and with both the water management district and the U.S. Army Corps of Engineers on the management of the C-54 and Fellsmere canals and associated control and maintenance facilities. FCO and Division staff collaborate regarding water quality protection and enhancement, in addition to other issues within the state park.

Public Participation

DRP provided an opportunity for public input by conducting a public workshop and an Advisory Group meeting to present the draft management plan to the public. These meetings were held on Wednesday June 6,2018 and Thursday June 7, 2018, respectively. Meeting notices were published in the Florida Administrative Register, May 29, 2018 Vol 44/104, included on the Department Internet Calendar, posted in clear view at the park, and promoted locally. The purpose of the Advisory Group meeting is to provide the Advisory Group members an opportunity to discuss the draft management plan (see Addendum 2).

Other Designations

St. Sebastian River Preserve State Park is not within an Area of Critical State Concern as defined in Section 380.05, Florida Statutes, and it is not presently under study for such designation. The park is a component of the Florida Greenways and Trails System, administered by the Department’s Office of Greenways and Trails.

All waters within the park have been designated as Outstanding Florida Waters, pursuant to Chapter 62-302, Florida Administrative Code. Surface waters in this park are also classified as Class III waters by the Department. This park is adjacent to the Indian River-Malabar to Vero Aquatic Preserve as designated under the Florida Aquatic Preserve Act of 1975 (Section 258.35, Florida Statutes).

RESOURCE MANAGEMENT COMPONENT

Introduction

The Florida Department of Environmental Protection (FDEP), Division of Recreation and Parks (DRP) in accordance with Chapter 258, Florida Statutes, has implemented resource management programs for preserving for all time the representative examples of natural and cultural resources of statewide significance under its administration. This component of the unit plan describes the natural and cultural resources of the park and identifies the methods that will be used to manage them. Management measures expressed in this plan are consistent with the DRP's overall mission in natural systems management. Cited references are contained in Addendum 3.

The DRP's philosophy of resource management is natural systems management. Primary emphasis is placed on restoring and maintaining, to the degree possible, the natural processes that shaped the structure, function and species composition of Florida's diverse natural communities as they occurred in the original domain. Single species management for imperiled species is appropriate in state parks when the maintenance, recovery or restoration of a species or population is complicated due to constraints associated with long-term restoration efforts, unnaturally high mortality or insufficient habitat. Single species management should be compatible with the maintenance and restoration of natural processes and should not imperil other native species or seriously compromise the park values.

The DRP's management goal for cultural resources is to park sites and objects that represent Florida's cultural periods, significant historic events or persons. This goal often entails active measures to stabilize, reconstruct or restore resources, or to rehabilitate them for appropriate public use.

Because park units are often components of larger ecosystems, their proper management can be affected by conditions and events that occur beyond park boundaries. Ecosystem management is implemented through a resource management evaluation program that assesses resource conditions, evaluates management activities and refines management actions, and reviews local comprehensive plans and development permit applications for park/ecosystem impacts.

The entire park is divided into management zones that delineate areas on the ground that are used to reference management activities (see Management Zones Map). The shape and size of each zone may be based on natural community type, burn zone, and the location of existing roads and natural fire breaks. It is important to note that all burn zones are management zones; however, not all management zones include fire-dependent natural communities. Table 1 reflects the management zones with the acres of each zone.

Table 1. St. Sebastian River Preserve State Park Management Zones			
Management Zone	**Acreage**	**Managed with Prescribed Fire**	**Contains Known Cultural Resources**
SSR-001n	67.6747112	Y	N
SSR-001s	37.13282327	Y	N
SSR-002	179.4882321	Y	N
SSR-003n	89.3109745	Y	N
SSR-003s	130.6197573	Y	N
SSR-004	290.3886066	Y	N
SSR-005n	267.0984743	Y	N
SSR-005s	251.4918229	Y	N
SSR-006	186.3348778	Y	N
SSR-007	86.82391945	Y	N
SSR-008e	215.0257412	Y	N
SSR-008w	91.98052696	Y	N
SSR-009	380.3800732	Y	N
SSR-010	126.0108657	Y	N
SSR-011n	100.0853118	Y	N
SSR-011s	42.16659898	Y	N
SSR-012	136.7635986	Y	N
SSR-013	79.69427062	Y	N
SSR-014	418.1059283	Y	N
SSR-014A	24.61529062	Y	N
SSR-015	232.3340949	Y	N
SSR-016n	372.6006779	Y	N
SSR-016s	92.85983427	Y	N
SSR-017	65.93543227	Y	N
SSR-018	312.464754	Y	N
SSR-019	205.1488332	Y	N
SSR-020e	29.2091161	Y	N
SSR-020w	73.52174356	Y	Y
SSR-021e	262.9196283	Y	N
SSR-021w	112.8962499	Y	N
SSR-022	172.3567623	Y	N
SSR-023e1	40.31813423	Y	Y
SSR-023e2	21.61123742	Y	N
SSR-023e3	23.26150886	Y	N
SSR-023w	77.81946536	Y	N
SSR-024	30.32953319	Y	N
SSR-025	76.84623747	Y	N
SSR-026	167.8954642	Y	N
SSR-027	104.5531736	Y	N
SSR-028e	20.4712533	Y	Y
SSR-028w	140.53097	Y	N
SSR-029e	167.9364332	Y	N
SSR-029w	191.7582054	Y	N

Table 1. St. Sebastian River Preserve State Park Management Zones			
Management Zone	**Acreage**	**Managed with Prescribed Fire**	**Contains Known Cultural Resources**
SSR-030	276.6171017	Y	N
SSR-031	109.2950707	Y	N
SSR-032	177.573138	Y	N
SSR-033	193.832235	Y	N
SSR-034	185.6289026	Y	N
SSR-035n	103.3010998	Y	N
SSR-035s	122.5508157	Y	N
SSR-036	314.3327404	Y	Y
SSR-037	249.0699182	Y	N
SSR-038	163.3732946	Y	N
SSR-039c	80.24114444	Y	N
SSR-039n	8.104054443	Y	N
SSR-039s	57.5225675	Y	N
SSR-040n	14.01411627	Y	N
SSR-040s	212.4695426	Y	N
SSR-041	155.8732178	Y	N
SSR-042	115.4378997	Y	N
SSR-042A	14.06064026	Y	N
SSR-043	214.2286158	Y	Y
SSR-044	84.7876061	Y	N
SSR-045	97.00682921	Y	Y
SSR-046	84.76099582	Y	N
SSR-047	5.892881508	Y	N
SSR-047e	14.61330186	Y	N
SSR-047ne	57.09418876	Y	N
SSR-047se	64.48716909	Y	N
SSR-047w	110.1298286	Y	N
SSR-048	314.5170484	Y	N
SSR-049e	9.013909863	Y	N
SSR-049w	51.51962806	Y	N
SSR-050n	9.082199836	Y	N
SSR-050s	44.57985875	Y	N
SSR-051	134.0091103	Y	N
SSR-052e	59.70303735	Y	Y
SSR-052w	44.91802977	Y	N
SSR-053	211.8286838	Y	N
SSR-054c	16.15434166	Y	N
SSR-054n	20.66223879	Y	N
SSR-054s	25.98636699	Y	N
SSR-055c	53.21832727	Y	N
SSR-055n	12.45755694	Y	N
SSR-055s	187.3468899	Y	N
SSR-056n	69.82982269	Y	N

Table 1. St. Sebastian River Preserve State Park Management Zones			
Management Zone	**Acreage**	**Managed with Prescribed Fire**	**Contains Known Cultural Resources**
SSR-056s	25.89575212	Y	N
SSR-057	186.7888432	Y	N
SSR-058e	37.97422028	Y	N
SSR-058w	23.76764803	Y	N
SSR-059n	62.48096655	Y	N
SSR-059se	14.92844233	Y	N
SSR-059sw	11.59817236	Y	N
SSR-060e	54.9941221	Y	N
SSR-060n	226.6422322	Y	N
SSR-060s	64.19845137	Y	N
SSR-060se	56.42707879	Y	N
SSR-060w	145.7990799	Y	N
SSR-061	69.57705408	Y	N
SSR-062n	19.43657471	Y	N
SSR-062s	174.520102	Y	N
SSR-063c	8.211362397	Y	N
SSR-063n	64.76076425	Y	N
SSR-063s	203.5592685	Y	N
SSR-064e	24.68360793	Y	N
SSR-064n	250.4236353	Y	N
SSR-064s	150.929953	Y	N
SSR-065n	149.3519461	Y	N
SSR-065s	168.0054239	Y	N
SSR-066	46.12534461	Y	N
SSR-067	247.8554357	Y	N
SSR-068	210.7512048	Y	N
SSR-069	227.8281863	Y	N
SSR-070	43.10397	Y	N
SSR-071	107.0932223	Y	N
SSR-072	74.03611462	Y	N
SSR-073e	0.484038473	Y	N
SSR-073w	22.52242006	Y	Y
SSR-074	113.261986	Y	N
SSR-075	72.73156594	Y	N
SSR-076	123.9646012	Y	N
SSR-077	74.75495019	Y	N
SSR-077se	15.8648371	Y	N
SSR-078e	25.08429988	Y	N
SSR-078w	84.89157067	Y	N
SSR-079	125.4392744	Y	N
SSR-080	81.42476451	Y	N
SSR-081	110.1709307	Y	N
SSR-081se	6.172775214	Y	N

Table 1. St. Sebastian River Preserve State Park Management Zones			
Management Zone	**Acreage**	**Managed with Prescribed Fire**	**Contains Known Cultural Resources**
SSR-082	136.2606396	Y	N
SSR-083e	63.6584471	Y	N
SSR-083w	20.45779704	Y	N
SSR-084	81.52553544	Y	Y
SSR-085	147.5845157	Y	Y
SSR-086	83.30209213	Y	Y
SSR-087	51.60791085	Y	N
SSR-088	330.5776461	Y	N
SSR-089n	39.59762449	Y	N
SSR-089s	10.27568063	Y	N
SSR-090n	266.2557061	Y	N
SSR-090s	56.06859531	Y	N
SSR-091	63.82047654	Y	N
SSR-092	212.4453597	Y	Y
SSR-093	129.3315588	Y	N
SSR-094c	44.81624351	Y	N
SSR-094e	41.6358391	Y	N
SSR-094w	15.97879552	Y	N
SSR-095e	174.0567268	Y	N
SSR-095w	103.1047311	Y	N
SSR-096e	128.99582	Y	N
SSR-096w	63.23919754	Y	N
SSR-097e	98.62946844	Y	N
SSR-097n	66.19605304	Y	N
SSR-097ne	16.33510331	Y	N
SSR-097nw	17.76448165	Y	N
SSR-097w	40.50328714	Y	N
SSR-098e	261.6036023	Y	N
SSR-098sw	33.1792296	Y	N
SSR-098w	81.99151647	Y	N
SSR-099	114.1802214	Y	N
SSR-100	269.9694988	Y	N
SSR-101e	66.18713294	Y	N
SSR-101w	16.23744616	Y	N
SSR-102	112.4629774	Y	N
SSR-103	38.83237979	Y	N
SSR-104	352.4272296	Y	N
SSR-105e	110.3874668	Y	N
SSR-105n	27.8063561	Y	N
SSR-105w	287.3425671	Y	N
SSR-106ne	69.88393491	Y	N
SSR-106nw	92.16086669	Y	N
SSR-106se	84.00096462	Y	N

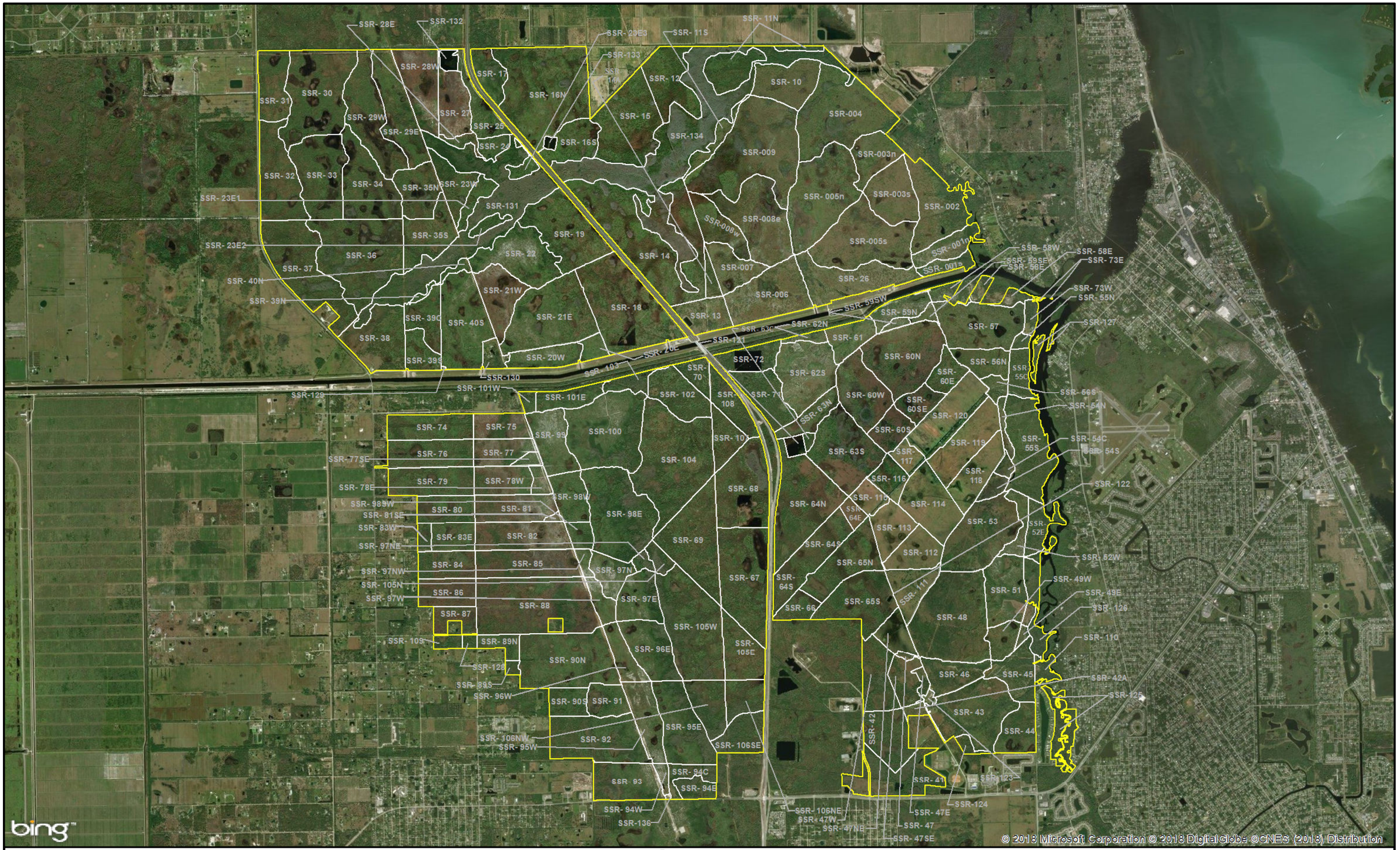
Table 1. St. Sebastian River Preserve State Park Management Zones			
Management Zone	**Acreage**	**Managed with Prescribed Fire**	**Contains Known Cultural Resources**
SSR-107	67.48670536	Y	N
SSR-108	77.01923246	Y	N
SSR-109	20.04803762	Y	N
SSR-110	23.2593142	Y	N
SSR-111	78.40016455	Y	N
SSR-112	87.65886697	Y	N
SSR-113	84.70678072	Y	N
SSR-114	151.1602936	Y	N
SSR-115	42.54993415	Y	N
SSR-116	56.27984257	Y	N
SSR-117	36.08351605	Y	N
SSR-118	105.2459584	Y	N
SSR-119	137.5014416	Y	N
SSR-120	156.6354623	Y	N
SSR-121	19.49480099	N	N
SSR-122	7.832898246	N	N
SSR-123	10.10247666	N	N
SSR-124	14.38871454	N	N
SSR-125	70.75669964	N	N
SSR-126	27.55160359	N	N
SSR-127	15.88951349	N	N
SSR-128	10.40014155	N	N
SSR-129	0.715675565	N	N
SSR-130	30.74164724	N	N
SSR-131	421.5274704	N	N
SSR-132	17.95946764	N	N
SSR-133	7.681697495	N	N
SSR-134	569.7923332	N	N
SSR-136	1.395610574	N	N

Resource Description and Assessment

Natural Resources

Topography

Lands within the St. Sebastian River Preserve State Park are relatively flat, with an average elevation of 24 feet above mean sea level. The highest spots are in the scrubby flatwoods on the north side of the park, west of I-95, where elevations reach 33 to 34 feet. The property slopes gently to the east, towards the St. Sebastian River. The greatest topographic variation on the property can be found along the river, where periodically steep bluffs occur along the western bank. The



ST. SEBASTIAN RIVER
PRESERVE STATE PARK

0 0.25 0.5 1 Mile

Florida Department of Environmental Protection
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MANAGEMENT ZONES MAP

elevation changes from approximately 5 feet to 20 feet above mean sea level in a relatively narrow band.

Geology

White (1970) divided Florida into three major geomorphic zones. The park falls within the Mid-Peninsular zone and is "characterized by discontinuous highlands in the form of sub-parallel ridges separated by broad valleys." In general, highlands are well drained and correspond to high recharge areas, while lowlands are often swampy and poorly drained. Within the Mid-Peninsular zone, the park lies within the Eastern Valley sub-unit and includes a portion of Ten Mile Ridge.

Soils

The park has 58 different soil types (see Soils Map), including those found in disturbed areas. The soil survey was compiled by the U.S. Department of Agriculture, Soil Conservation Service in the soil survey of Brevard County (Huckle et al. 1974) and Indian River County (Wettstein et al. 1987). Addendum 4 contains detailed descriptions of the soil types within this unit.

Soil and water conservation will be largely addressed under hydrologic restoration. Management activities will follow generally accepted best management practices to prevent soil erosion and conserve soil and water resources in the park. Removal of interior ditching and restoration of sheet flow to the greatest extent possible will result in improvements to water quality and erosion prevention.

Minerals

Valuable mineral resources, such as oil, gas or phosphate are not known in the area (Scott 1992).

Hydrology

***Groundwater*:** The St. Sebastian River Preserve State Park overlies two aquifers (groundwater reservoirs), the Floridan and the surficial. The Floridan aquifer underlies the entire state of Florida and the Coastal Plain of Alabama, Georgia and South Carolina. In the region of the park, the top of the Floridan Aquifer is 100-500 feet below ground level, and is 2,800-3,200 feet thick. There are no areas of high recharge within the park. The surficial aquifer consists of sand and shell deposits with uppermost layers contiguous with the land surface. Both aquifers are artesian, meaning that the groundwater is confined beneath a non-porous geologic formation (Duncan et al. 1994).

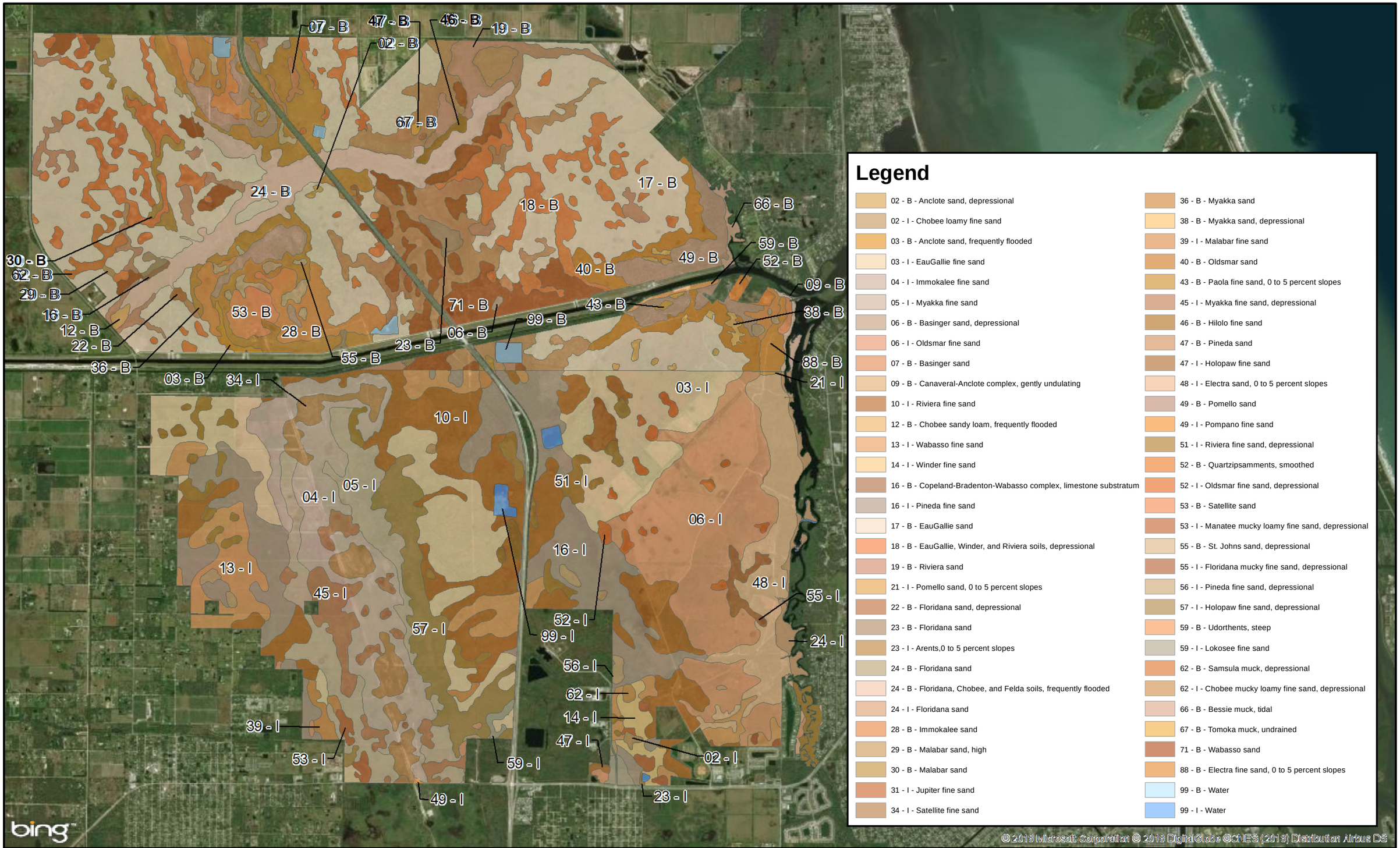
Brevard and Indian River counties are areas of artesian flow and have low probabilities for sinkhole development. There are no springs within the park or within Brevard or Indian River counties (Fernald et al. 1985). However, numerous surficial springs do occur in both Indian River and Brevard Counties and may possibly occur at the SSRPSP.

Surface Water: Major surface water features within the park include the St. Sebastian River and Herndon Swamp. The C-54 Canal is a man-made structure that was built to provide flood relief to the upper St. Johns River basin. During major storm events, water is discharged from the upper St. Johns River marsh through the C-54 Canal into the Indian River Lagoon. All surface waters within the park are designated as Class III waters. The St. Sebastian River Preserve State Park is adjacent to the Indian River – Malabar to Vero Beach Aquatic Preserve which has been designated as an Outstanding Florida Water, pursuant to Chapter 62-302 F.A.C. and classified as Class III waters by the FDEP. The Indian River Lagoon is one of the country's most productive, diverse, and commercially and recreationally important estuaries.

Drainage Basin: The park lies within the St. Sebastian River drainage basin. Sub-basins are described by Steward and Van Arman (1987).

Regional Drainage Patterns: The region is flat and was characterized historically by its many poorly drained swamps. Historically, the land drained naturally to the east into the St. Sebastian River. In recent times, drainage has been dramatically altered by the construction of numerous canal systems for urban and agricultural drainage. Thousands of acres of St. Johns River marsh floodplain were converted to agricultural land, adding abnormal amounts of freshwater to the Indian River Lagoon. Without the diversion canals, water would have discharged into the Indian River Lagoon only during major floods.
Freshwater discharge enters the Indian River Lagoon as over-land flow and as point discharges through several natural creeks and man-made canals, including the Fellsmere Canal and C-54 Canal. The C-54 Canal was built as part of the old Upper St. Johns River Flood Control Project to convey excess floodwaters from the St. Johns River marshes to the Indian River Lagoon through the St. Sebastian River. The C-54 Canal empties into the St. Sebastian River at Structure S-157, which has a maximum discharge capacity of 6,500 cubic feet per second (cfs). The upper basin project was redesigned in the 1980's to address environmental concerns with the original design and the role of the C-54 changed. As part of the original upper basin project, C-54 discharged directly from the St. Johns River to the lagoon. However, C-54 is no longer directly connected to the St. Johns River, but instead serves only as an emergency overflow for the St. Johns Water Management Area to ensure that extreme flood events do not overtop the flood protection levees. The analysis and restoration of the lagoon's hydrology is a complex project being handled by St. Johns River Water Management District (SJRWMD) staff and other agencies separately from the management of the park.

Drainage Patterns within the park: Black and white aerial photography from 1943, 1951, 1958, 1980, 1989, and infrared aerial photography from 1984 and 1994 were used to determine changes in land use and hydrology over time. The evaluation indicated present drainage patterns in the park are considerably different from historic drainage patterns. Historically, park lands generally drained eastward to the St. Sebastian River. Construction of the C-54 Canal, Fellsmere Canal and Interstate 95, subdivided drainage into four nearly disjunct quadrants. Each of the quadrants is discussed below.



Legend

- 02 - B - Anclote sand, depressional
- 02 - I - Chobee loamy fine sand
- 03 - B - Anclote sand, frequently flooded
- 03 - I - EauGallie fine sand
- 04 - I - Immokalee fine sand
- 05 - I - Myakka fine sand
- 06 - B - Basinger sand, depressional
- 06 - I - Oldsmar fine sand
- 07 - B - Basinger sand
- 09 - B - Canaveral-Anclote complex, gently undulating
- 10 - I - Riviera fine sand
- 12 - B - Chobee sandy loam, frequently flooded
- 13 - I - Wabasso fine sand
- 14 - I - Winder fine sand
- 16 - B - Copeland-Bradenton-Wabasso complex, limestone substratum
- 16 - I - Pineda fine sand
- 17 - B - EauGallie sand
- 18 - B - EauGallie, Winder, and Riviera soils, depressional
- 19 - B - Riviera sand
- 21 - I - Pomello sand, 0 to 5 percent slopes
- 22 - B - Floridana sand, depressional
- 23 - B - Floridana sand
- 23 - I - Arents,0 to 5 percent slopes
- 24 - B - Floridana sand
- 24 - B - Floridana, Chobee, and Felda soils, frequently flooded
- 24 - I - Floridana sand
- 28 - B - Immokalee sand
- 29 - B - Malabar sand, high
- 30 - B - Malabar sand
- 31 - I - Jupiter fine sand
- 34 - I - Satellite fine sand
- 36 - B - Myakka sand
- 38 - B - Myakka sand, depressional
- 39 - I - Malabar fine sand
- 40 - B - Oldsmar sand
- 43 - B - Paola fine sand, 0 to 5 percent slopes
- 45 - I - Myakka fine sand, depressional
- 46 - B - Hilolo fine sand
- 47 - B - Pineda sand
- 47 - I - Holopaw fine sand
- 48 - I - Electra sand, 0 to 5 percent slopes
- 49 - B - Pomello sand
- 49 - I - Pompano fine sand
- 51 - I - Riviera fine sand, depressional
- 52 - B - Quartzipsamments, smoothed
- 52 - I - Oldsmar fine sand, depressional
- 53 - B - Satellite sand
- 53 - I - Manatee mucky loamy fine sand, depressional
- 55 - B - St. Johns sand, depressional
- 55 - I - Floridana mucky fine sand, depressional
- 56 - I - Pineda fine sand, depressional
- 57 - I - Holopaw fine sand, depressional
- 59 - B - Udorthents, steep
- 59 - I - Lokosee fine sand
- 62 - B - Samsula muck, depressional
- 62 - I - Chobee mucky loamy fine sand, depressional
- 66 - B - Bessie muck, tidal
- 67 - B - Tomoka muck, undrained
- 71 - B - Wabasso sand
- 88 - B - Electra fine sand, 0 to 5 percent slopes
- 99 - B - Water
- 99 - I - Water

ST. SEBASTIAN RIVER
PRESERVE STATE PARK

0 0.25 0.5 1 Mile

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SOILS MAP

The major drainage feature within the northeast portion of the park is Herndon Swamp, which drains from the southwest to the northeast. Historically, water flowed from the swamp to the north prong of the St. Sebastian River through two drainage paths. One was east through an extension of the swamp and the second extended north from the park, then arched east and south to the North Prong. The northern drainage route was lost when the land was converted to citrus groves; the North Canal was built as a drainage replacement. A portion of Herndon Swamp used to drain excessively into the North Canal through large erosion ditches cut into the north levee, however these eroded sites were restored in a mitigation project under the management of the SJRWMD in 2007. Now water only drains into North Canal from Herndon Swamp during extreme rain events. Furthermore, SJRWMD in partnership with FDEP, FDOT, and Brevard County purchased the Wheeler property located in southernmost Brevard County adjacent to the park's northeast property line. The Micco Water Management Area was designed to reduce pollutant loads from the Sottile Canal watershed from entering the Sebastian River and eventually the Indian River Lagoon as well as restore habitat connectivity between Herndon Swamp with the park and the floodplain of the North Prong to the Sebastian River. The Micco Water Management Project was completed in 2016.

The general drainage pattern for areas adjacent to Herndon Swamp is towards the swamp or North Canal, then east to the North Prong. Areas south of Herndon Swamp nearer to the C-54 Canal generally drain south to what was once the West Prong and is now the C-54 Canal. The North and West Prongs converge and flow east to meet the South Prong, which flows north/northeast and discharges into the Indian River Lagoon.

Herndon Swamp remains as the prominent drainage feature in the northwest portion of the park. Adjacent lands generally drain to the swamp, then northeast towards the North Prong of the St. Sebastian River. Drainage northeast through the swamp has been disrupted by elevated roadbeds, a power line easement and I-95. Some flow in Herndon Swamp does continue northeast through culverts under I-95. Drainage through the swamp had also been disrupted by several ditches that diverted the historic flow southward to the C-54 Canal. In 2000-2005 mitigation monies were sought to fill in several of these ditches in efforts to restore the natural drainage to the greatest extent practical. Approximately ten miles of ditches were filled in the park at no cost to the state. However, an additional 60 miles still need to be evaluated for potential filling.

The southwest quadrant of the park contains the Carson Platt Tract and a portion of the Coraci Tract, where a high sandy ridge west of I-95 divides the quadrant into easterly and westerly drainages. On either side of the ridge, drainage historically flowed away from the ridge as sheetflow. East of the ridge, canals now intercept the sheet flow and divert surface water through culverts under I-95, and on to small creeks connecting to the St. Sebastian River. West of the ridge, 12 ditches running east to west drain into a canal located approximately ½ mile west of the park boundary.

Drainage in the southeast quadrant of the park historically flowed eastward across wet prairies, depression marshes, wet swales, and pine flatwoods, eventually

collecting in numerous small seasonal streams which flowed on to the St. Sebastian River through sandy ridges along the south and west prongs. This pattern was disrupted when numerous ditches were constructed to drain pastures and surrounding wooded areas for agriculture. The network of ditches was connected to existing natural creeks along the eastern edge of the park that empty into the South Prong of the St. Sebastian River and the C-54 Canal. In addition, several raised roadbeds constructed through the southeast quadrant of the park intercept sheet flow and divert it into the network of drainage ditches.

The park has endured a number of hydrologic alterations, including major disruptions within the park, and large-scale modifications to surrounding properties. Irreversible changes have occurred, complicating restoration efforts.

The first hydrologic alteration occurred in 1916 with the construction of the Fellsmere Canal. The canal is still present today and is located immediately south of the C-54 Canal. It drained marshland west of the park, carrying the water east to the West Prong of the St. Sebastian River. The second major change occurred in the early 1920s when the Graves Brothers constructed 12 miles of elevated logging tram roads throughout the park. A railroad was installed on the tram roads and used to transport timber to Wabasso. The tracks were removed prior to 1937, but the tram roads are still present and serve as an obstacle to sheetflow.

Other than these two changes, natural drainage patterns within and around were still functioning as of 1943. Review of aerial photography from that year revealed that no canals had been built between Micco Road and the Fellsmere Canal. In the 1950s, a series of canals were built north of the park, including North Canal. Citrus groves were planted north and east of the park in the 1960s. The Hudman Tree Farm and two V-shaped canals were built in 1963. The northern drainage channel for Herndon Swamp was destroyed and replaced by North Canal. Florida Power Company installed double power lines on the east side of the park in 1957, and Florida Gas installed an underground gas line through the center of the park in 1958. Both lines required construction of cleared, elevated roads. Culverts were installed in the sections through the swamp.

The C-54 Canal was constructed in 1968. It was built on top of the West Prong of the St. Sebastian River and is bordered by large levees. The canal splits the park into northern and southern halves. Southerly drainage from the northern half of the park was provided by five drainage outlets to the canal. The outlets were not placed at points of natural drainage. The C-54 Canal and the drainage outlets reduced southerly drainage and had a major impact on the hydrology of the park.

Interstate-95 was built from 1968 to 1970, and split the park into disjunct east and west units. Although numerous culverts were placed under the highway, I-95 caused major changes in drainage patterns. Six borrow pits, with associated haul roads, were dug along the road corridor to provide fill for the elevated highway. A portion of flatwoods was cleared for an asphalt plant during construction of the highway and is an open field today. Two additional underground gas lines were installed on the west side of the I-95 corridor in 1970 and 1995.

After the alterations, portions of the Corrigan Tract no longer drained effectively and some areas became excessively wet. Many shallow ditches were dug between 1968 and 1993 to provide relief from flooding, to protect pine trees and restore cattle forage. In some cases, the ditching may have been too extensive, as some plant communities now have an insufficient hydroperiod to perpetuate themselves. For example, much of the wet prairie community in the park has an insufficient hydroperiod and is being invaded by woody shrubs and/or pine trees. Similarly, much of the basin swamp community has unnatural understory components and would benefit from a longer hydroperiod.

Three large ditches were constructed on the Mary A and Egan Tracts prior to purchase by the State. The three interconnected ditches extended from the north boundary of the park and emptied into the C-54 Canal. In 1999, the ditch located in the Mary A parcel (the northernmost of the three ditches) was backfilled as part of a mitigation project. As a part of another mitigation project, the northern portion of Egan ditch was also backfilled. The remainder of the ditch was filled in 2003 as part of a Florida FDEP Restoration project. Monitoring reports associated with these projects submitted to SJRWMD indicate that the hydrology has been successfully restored as evidenced by the high-water elevation in the wetlands; recruitment of appropriate wetland vegetation was also apparent and is expected to continue.

Many ditches were present on the extreme southern portions of the Coraci Tract prior to 1943; however, minimal interior ditching was present on the majority of the site. The ditches presumably were constructed to promote agricultural development in the area, primarily improved pasture for cattle grazing. Additional ditch construction accompanied conversion of natural habitat to agricultural lands until the early 1990s. Larger drainage canals including the Fleming Grant Canal, two canals associated with the industrial park, and several unnamed canals were constructed after 1943. The two canals associated with the industrial park are deeded, maintained drainage easements.

Hydrologic Restoration Projects: Hydrologic alterations within and around the park have been extensive. The system of ditches constructed to improve drainage for agricultural land uses has significantly impacted many natural communities by altering historic drainage patterns, reducing the level and duration of inundation in wetlands, and reducing water retention in pine flatwoods communities. Ecological consequences of the increased drainage and reduced hydroperiod include a decrease in the size of many isolated wetland communities, shifts in the species composition and the physiognomy of plant communities, invasion by exotic species, and the encroachment of mesophytic species into wetlands. Drainage has also facilitated an increase in the frequency and intensity of fire in communities where infrequent low intensity fires would occur, such as dome, hydric hammock, and floodplain swamp. This has resulted in significant damage to many forested wetland areas, especially isolated cypress or black gum dominated dome and baygall communities.

Restoration of all impacted areas will not be possible; some alterations such as I-95 and the C-54 Canal are permanent. However, a number of objectives and action items have been identified and are identified in the “Resource Management Program/Management Goals, Objectives, and Actions” section of the UMP.

Natural Communities

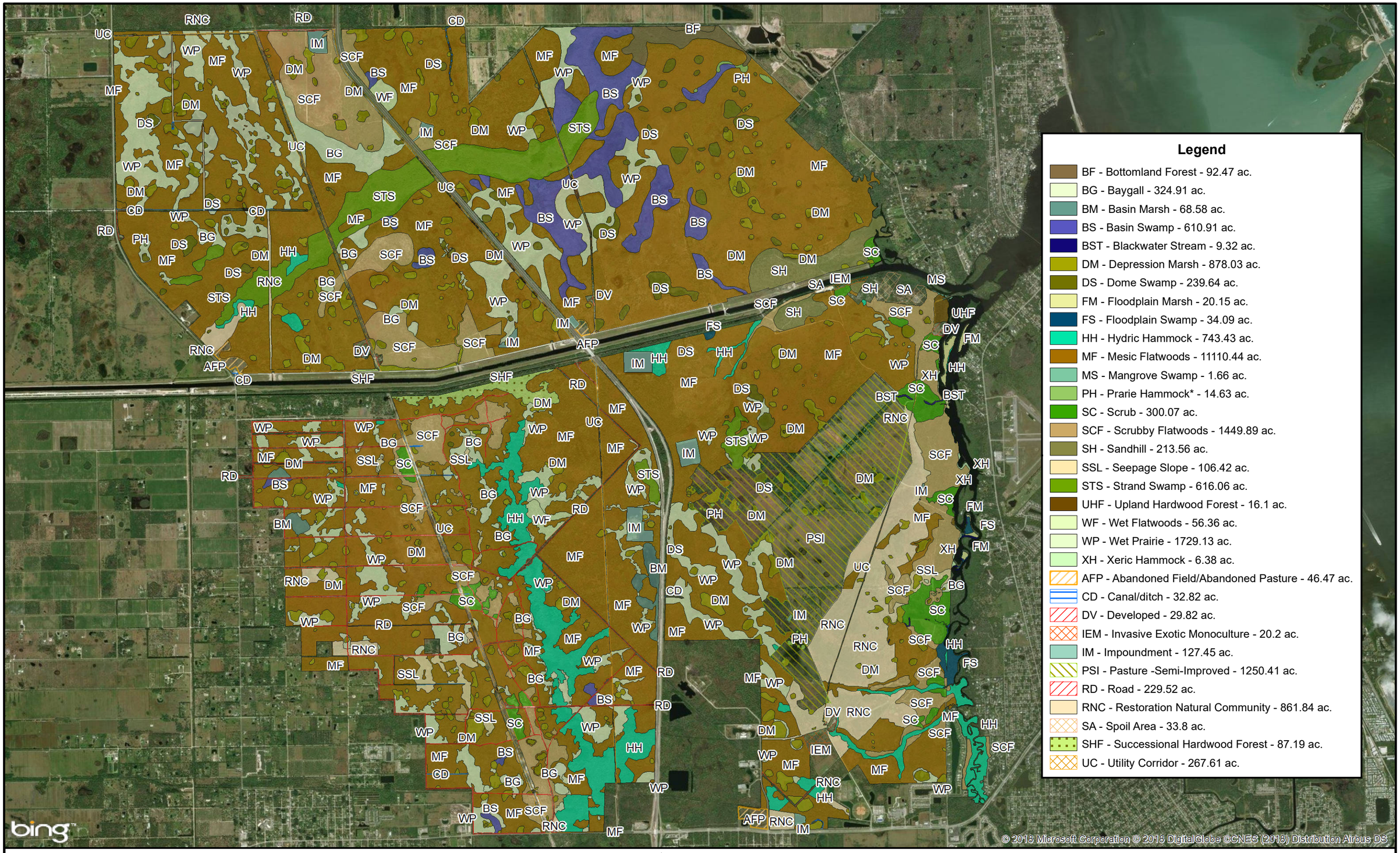
This section of the management plan describes and assesses each of the natural communities found in the state park. It also describes the desired future condition (DFC) of each natural community and identifies the actions that will be required to bring the community to its desired future condition. Specific management objectives and actions for natural community management, exotic species management, imperiled species management [and population restoration] are discussed in the Resource Management Program section of this component.

The system of classifying natural communities employed in this plan was developed by the Florida Natural Areas Inventory (FNAI). The premise of this system is that physical factors such as climate, geology, soil, hydrology and fire frequency generally determine the species composition of an area, and that areas that are similar with respect to those factors will tend to have natural communities with similar species compositions. Obvious differences in species composition can occur, however, despite similar physical conditions. In other instances, physical factors are substantially different, yet the species compositions are quite similar. For example, coastal strand and scrub--two communities with similar species compositions--generally have quite different climatic environments, and these necessitate different management programs. Some physical influences, such as fire frequency, may vary from FNAI's descriptions for certain natural communities in this plan.

When a natural community within a park reaches the desired future condition, it is considered to be in a "maintenance condition." Required actions for sustaining a community's maintenance condition may include; maintaining optimal fire return intervals for fire dependent communities, ongoing control of non-native plant and animal species, maintaining natural hydrological functions (including historic water flows and water quality), preserving a community's biodiversity and vegetative structure, protecting viable populations of plant and animal species (including those that are imperiled or endemic), and preserving intact ecotones that link natural communities across the landscape.

The park contains 22 distinct natural communities as well as altered landcover types (see Natural Communities Map). A list of known plants and animals occurring in the park is contained in Addendum 5.

<u>Upland Hardwood Forest</u>
Desired Future Condition: This community is characterized as having a well-developed, closed canopy dominated by deciduous hardwood tree species on mesic soils in areas that are sheltered from fire. At St. Sebastian River Preserve overstory tree species will include pignut hickory (*Carya glabra*), live oak (*Quercus virginiana*), laurel oak (*Q. laurifolia*), sugarberry (*Celtis laevigata),* and southern magnolia (*Magnolia grandiflora*). Understory species will include trees and shrubs such as beautyberry (*Callicarpa americana*), hog plum (*Ximenia americana*). Carolina laurelcherry (*Prunus caroliniana*), American elm (*Ulmus americana*)*,* gum bully (*Sideroxylon lanuginosum*), and red bay (*Persea borbonia*). Ground cover will consist of various shade tolerant herbaceous species, sedges, and vines.



ST. SEBASTIAN RIVER
PRESERVE STATE PARK

N

0 0.25 0.5 1 Mile

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NATURAL COMMUNITIES MAP

Description and Assessment: This community occurs adjacent to the Sebastian River and just south of the peninsula. The natural community is in fair condition. Several cultural sites are located within this community and therefore have resulted in long term soil disturbance which has allowed invasive plants, mainly rosary pea and Cogon Grass to gain a foothold. Feral hogs also prefer this shaded community. An aggressive exotic animal removal program must be continued and strengthened.

General Management Measures: FWC funded contractors to treat the invasive exotic plants Rosary Pea and Cogon Grass within this community in 2015. It is imperative to continue treatment of these aggressive exotic plants in order to eventually achieve the desired future condition.

Prairie Mesic Hammock

Desired Future Condition: Mesic hammock is a well-developed evergreen hardwood and/or palm forest which occurs, with variation, throughout much of peninsular Florida. At St. Sebastian River Preserve a variant of mesic hammock, prairie mesic hammock, is represented at various locations throughout the park. In general, prairie mesic hammocks are characterized as isolated patches of canopied hammock found within a larger matrix of fire-adapted vegetation (usually dry prairie or mesic flatwoods). Dominant vegetation will include cabbage palm (*Sabal palmetto*), live oak, or a mixture of the two species. Common species in therelatively open understory will include saw palmetto (*Serenoa repens*), wax myrtle (*Myrica cerifera*), stoppers (*Eugenia* spp.), marlberry (*Ardisia escallonioides*), and various epiphytes. Soils may include a thick leaf layer underlain by mixed sands and organic material deposited over a limestone substrate. At St. Sebastian River Preserve prairie mesic hammock will be allowed to burn on the same frequency as the adjacent fire type community, allowing fires to naturally burn across ecotones. On organic substrates, fires will be appropriately planned to avoid high intensity ground fires resulting in the upper soil level being completely consumed.

Description and Assessment: This community is located primarily on the southern half of the park. Prairie hammocks remaining within existing natural communities appear to be in very good condition, with minimal invasion of exotic plants. Hammocks occurring within disturbed areas typically have some Brazilian pepper (*Schinus terebinthifolius*), Caesarweed (*Urena lobate*), and other exotic plant species. Several prairie hammocks occur within the existing cattle lease. These hammocks, exhibit trails and browse lines from regular cattle use. Feral pigs (*Sus scrofa*) also frequent prairie hammocks, particularly when acorns are dropping. Invasion of exotic plants and animal species is the biggest threat to this community. Exotic plant species invade individual hammocks and replace the native understory vegetation; exotic animals such as feral pigs root up and destroy ground cover vegetation.

General Management Measures: Continued treatment of the non-native plant and animal species discussed above as well as increased fire frequency of the surrounding natural communities are the most important management actions that need to be implemented in order to achieve the desired future conditions.

Xeric Hammock

Desired Future Condition: Xeric hammock is characterized as an evergreen forest growing on well-drained sandy soils. At St. Sebastian River Preserve, xeric hammock is considered a late successional stage of scrub or sandhill that occurs in small isolated patches on excessively well drained soils. The primary vegetation of this community will consist of a low, closed canopy dominated by sand live oak (*Quercus geminata*) which provides shady conditions for other plant species. Other overstory plant species will include Chapman's oak (*Quercus chapmanii*), and laurel oak (*Q. laurifolia*). Sand pine (*Pinus clausa*), South Florida slash pine (*P. elliottii* var. *densa*), and longleaf pine (*P. palustris*) will also be present as a minor overstory component. Understory species found in this community will include saw palmetto, fetterbush (*Lyonia lucida*), rusty fetterbush (*L. ferruginea*), myrtle oak (*Quercus myrtifolia*), yaupon holly (*Ilex vomitoria*), Hercules' club (*Zanthoxylum clava-herculis*), and Florida rosemary (*Ceratiola ericoides*). A sparse groundcover layer of wiregrass (*Aristida stricta* var. *beyrichiana*) and other herbaceous species may exist but will typically be absent. A continuous leaf litter layer may also be present.

Description and Assessment: This community type occurs in narrow strips along the St. Sebastian River where it is protected from intense fires. Xeric hammock occurs adjacent to oak scrub and scrubby flatwoods communities, and probably represents an advanced successional stage of these communities.

Epiphytes, including the Florida butterfly orchid (*Encyclia tampensis*) and several species of airplants (*Tillandsia spp.*) are abundant.

General Management Measures: This community is in good condition and no special management actions are proposed.

Sandhill

Desired Future Condition: Sandhill communities are characterized by a canopy of widely spaced pine trees with a sparse midstory of deciduous oaks. A moderate to dense groundcover of grasses, herbs, and low shrubs is also typically present. At St. Sebastian River Preserve the dominant pine of sandhill will be longleaf (*Pinus palustris*). Herbaceous cover will be very dense, containing large quantities of wiregrass, and generally low in stature. Much of the plant diversity in this community is contained within the herbaceous layer and will include other three-awn grasses (*Aristida spp.*), pineywoods dropseed (*Sporobolus junceus*), lopsided indiangrass (*Sorghastrum secundum*), and bluestems (*Andropogon spp.*). In addition to groundcover and pines, scattered individual tree species such as turkey oak (*Quercus laevis*), and sand live oak (*Quercus geminata*) will be present. In old growth conditions, some turkey oaks will be over 100 years old. The Optimal Fire Return Interval for this community will be 1-3 years.

Description and Assessment: This community occurs in the central-eastern portion of the park adjacent to the C-54 Canal. Small patches of sandhill are found on both the north and south sides of the canal. This distribution generally corresponds with deposits of Pomello sand on well-drained ridges that occurred along the old West Prong of the St. Sebastian River. This represents one of the southernmost occurrences of this community type in the region. Protected wildlife species that are observed in the sandhill include the Florida gopher frog (*Rana capito*), eastern indigo snake and gopher tortoise (*Gopherus polyphemus*). This community is in excellent condition. However, African Jewelfish (*Hemichromis letourneuxi*) has been recently discovered in the nearby depression marshes which support gopher frog breeding. This exotic fish is known to eat tadpoles and no gopher frog tadpoles were discovered in the most recent surveys of the depression marshes surrounding the sandhill where they once occurred. This exotic fish could greatly impact the future of the gopher frog.

General Management Measures: The community is in excellent condition because several restoration projects have occurred over the last decade within this habitat in order to achieve the desired future conditions. Although it is currently in excellent condition, it will need to continued prescribed fire application every 18-24 months preferably in the growing season to remain in that condition. The sandhill sites serve as some of the most productive red-cockaded woodpecker habitats on the park and continued low-intensity, high-frequency fire will ensure that their current and future cavity trees will flourish.

Scrub

Desired Future Condition: Within scrub habitats, the dominant plant species will include scrub oak (*Quercus inopina*), sand live oak, myrtle oak, Chapman's oak, saw palmetto, and rusty staggerbush (*Lyonia ferruginea*). Optimally there will be a mix of short and medium height scrub 4-5 feet tall and no tall scrub greater than 5 feet with abundant open sandy areas that support many imperiled and/or endemic plant species including large-flowered rosemary (*Conradina grandiflora*); these species will be regularly flowering and replenishing their seed banks. In addition, sand pine (*Pinus clausa*), where present, will usually not be dominant in abundance, percent cover, or height. Some areas of mature sand pine may occur because due to fire management and providing mosaic, it is impossible to have more than 70 percent of scrub in optimal condition at one point in time. The Optimal Fire Return Interval for this community is difficult to define and is more dependent upon continued observations of scrub height and structure rather than a defined period. The goal will be to attain optimal scrub height with open sandy patches and a mosaic of burned and unburned areas.

Description and Assessment: Scrub occurs in several locations along the eastern edge of the park on sandy ridges adjacent to the St. Sebastian River known as the Atlantic Coastal Ridge and along a sand ridge on the Carson Platt and Corrigan parcels known as the Ten Mile Ridge. Several listed species occur in scrub in the park including large-flowered rosemary (*Conradina grandiflora*), Curtiss' milkweed

(*Asclepias curtissii*), and Florida scrub-jays (*Aphelocoma coerulescens*). The scrub in the park is in a variety of conditions ranging from poor to excellent. Major efforts have been put into restoring this community type for the benefit of the Florida scrub-jay since St. Sebastian River Preserve comprises the largest portion of the south Brevard-Indian River-St. Lucie metapopulation, which is the fourth largest metapopulation in the state. Over the past 2 decades grants to improve scrub have been provided by the USFWS, FWC, and TNC.

General Management Measures: Scrub is the most difficult natural community to manage at St. Sebastian River Preserve State Park. Scrub is one of those natural communities that most likely would have burned and been maintained by fires that occurred under extreme weather conditions including very low humidity, very high temperatures, long term droughts, and/or very high winds. These conditions cannot be reproduced or imitated under prescribed fire conditions due to St. Sebastian's proximity to urban interface such as Interstate 95, schools, airports, neighborhoods, etc. Prior to burning a particular zone containing scrub, the vegetation within the scrub must be mechanically treated. Vegetation treatments allow the fuels to die and dry out as well as change the compaction of the fuels to make it easier to achieve desired prescribed fire outcomes under moderate weather conditions.

Wet Flatwoods

Desired Future Condition: Wet flatwood are pine forests characterized by a sparse or absent midstory and a dense groundcover of water-loving (hyrdrophytic) grasses, herbs, and low shrubs. At St. Sebastian River Preserve dominant pine species will be longleaf (*Pinus palustris*) and South Florida slash (*Pinus elliottii* var. *densa)*. Pond cypress (*Taxodium ascendens*) will reach canopy height in some locations of the park. The canopy will be open, with pines being widely scattered and of variable age classes. Native herbaceous cover will include hooded pitcherplants (*Sarracenia minor*) and other plants such as terrestrial orchids will be present and abundant in some areas. Common shrubs will include fetterbush (*Lyonia lucida*), gallberry (*Ilex glabra*), and wax myrtle. The Optimal Fire Return Interval for this community will be 2-4 years.

Description and Assessment: Wet flatwoods in the park are in fair to good condition, depending on the level of hydrological disturbance. In areas with minimal disturbance, the community is intact. In areas with adjacent drainage canals, the wet flatwoods community is transitioning to mesic flatwoods.

General Management Measures: Continued back filling of drainage ditches is needed to protect and restore this community. Continued treatment of invasive plants and a more aggressive fire return interval are also needed.

Mesic Flatwoods:

Desired Future Condition: Mesic flatwoods are characterized by an open canopy of tall pines and a dense, low ground layer of low shrubs, grasses and forbs. This community has minimal topographic relief and the soils contain a hardpan layer within a few feet of the surface which impedes percolation of water. Due to these factors, water can saturate the sandy surface soils for extended periods during the

wet season but lengthy droughts also commonly occur during the dry season. At St. Sebastian River Preserve longleaf and South Florida slash will be the dominant pine species. Shrub species found in this community will include saw palmetto, gallberry (*Ilex glabra*), fetterbush (*Lyonia lucida*), coastalplain staggerbush (*Lyonia fruticosa*), dwarf live oak (*Quercus minima*), shiny blueberry (*Vaccinium myrsinites*), and dwarf huckleberry (*Gaylussacia dumosa*). The herbaceous layer will consist primarily of grasses including wiregrass, pineywoods dropseed (*Sporobolus junceus*), and broomsedge (*Andropogon* spp.). The Optimal Fire Return Interval for this community will be 1-3 years.

Description and Assessment: This is the most widely represented natural community in the park. Mesic flatwoods have been impacted by a number of disturbances including ditching, timbering, stumping, the construction of roads and utility easements, and conversion of native ground cover to improved pasture. These disturbances have resulted in localized changes in species composition, diversity and abundance, and have provided sites for invasion of exotic plant species. Changes in hydrology resulting from the ditch network and the prior conversion of native ground cover to improved pasture are the most problematic of these disturbances and will require significant restoration efforts.

Despite these perturbations, the majority of the mesic flatwoods on the northern portion of the park are in good to excellent condition. In fact, flatwoods on the northeast section of the park have been touted as some of the best examples of flatwoods in the state of Florida. This is due to an ongoing collaborative project between the USFWS Coastal Program, Tall Timber's Upland Ecosystem Restoration Project and the St. Sebastian River Preserve State Park. The goal of the project is to increase application of prescribed fire and mechanical treatments (roller chopping) to benefit imperiled and declining fire-dependent wildlife species and the natural communities they depend upon. A majority of the flatwoods on the northeast quadrant have been rollerchopped in the spring, mainly March and April, and then immediately burned 4-8 weeks later in May or June. This has resulted in a drastic transition of a mostly saw palmetto dominated understory to a diverse grass dominated understory. The zones that have received this treatment have then been placed on an 18-24-month fire return interval. As mentioned earlier almost all of the flatwoods on the northeast quadrant have received this treatment. When that section of the park is completed, additional grant funding will be sought to continue the project within the mesic flatwoods on the northwest quadrant of the park.

In general, upon state acquisition, the north side of the park contained much higher species diversity and much more open character of the land which can be attributed to the former owners' fire management program and much lower cattle stocking rate than the south side of the park. Much of the mesic flatwoods on the southern half of the park have not been burned as frequently and generally exhibit much heavier fuel loads.

General Management Measures: The mesic flatwoods located on the northeast quadrant require diligent effort to keep those zones on an 18-24-month fire return interval in order to preserve the very diverse low stature grass understory. On the

northwest section of the park the same strategy discussed above that has been implemented by the collaboration between the USFWS, UERP and SSRPSP will need to be initiated and completed. Some of the flatwoods on the south side of the park will need extensive timbering before a prescribed fire can be initiated. Some of the flatwoods have not been burned since state acquisition due to their extremely high fuel loading that was inherited from previous management. In order to implement prescribed fire, these zones will have to be timbered and chopped. All flatwoods on the park are at risk of Cogon grass (*Imperata cylindrica*) and Jaragua grass (*Hyparrhenia rufa*) infestations. Park staff and contractors have done a good job treating infestations within mesic flatwoods, but efforts will need to be increased.

Scrubby flatwoods

Desired Future Condition: Scrubby flatwoods are characterized by having an open canopy of widely spaced pine trees and a low, shrubby understory dominated by scrub oaks and saw palmetto. At St. Sebastian River Preserve the dominant tree species of the interior portions of scrubby flatwoods will be longleaf pine (*Pinus palustris*) and South Florida slash pine. Mature sand pines will typically not be present. There will be a diverse shrubby understory often with patches of bare white sand scattered throughout. A scrub-type oak "canopy" will contain a variety of oak age classes/heights across the landscape. Dominant shrubs will include sand live oak, myrtle oak, Chapman's oak, saw palmetto, rusty staggerbush (*Lyonia ferruginea*), and tarflower (*Bejaria racemosa*). Cover by herbaceous species will often be low to moderately dense. At St. Sebastian, common herbaceous species of scrubby flatwoods will include wiregrass, chalky bluestem (*Andropogon virginicus* var. *glaucus*), broomsedge bluestem (*Andropogon virginicus* var. *virginicus*), dwarf huckleberry (*Gaylussacia dumosa*), gopher apple (*Licania michauxii*), and shiny blueberry (*Vaccinium myrsinites*). Rare plants found in this community will include pine pinweed (*Lechea divaricata*) and nodding pinweed (*Lechea cernua*). The Optimal Fire Return Interval for this community will be 4-6 years, with management goals of maintaining suitable habitat for the Florida scrub- jay (*Aphelocoma coerulescens*) and creating a mosaic of burned and unburned areas.

Description and Assessment: Scrubby flatwoods are situated along north to south oriented sandy ridges on the east side of I-95 and along the South Prong of the St. Sebastian River. Its distribution corresponds with deposits of Eau Gallie sand and Electra sand 0-5 percent slopes. Scrubby flatwoods typically occur in a mosaic with mesic flatwoods and scrub.

This community is characterized by an open canopy of longleaf pine and a diverse mix of mesic flatwoods and scrub species in the understory. The presence of myrtle oak and Chapman's oak are key indicators of this community type. The ground cover includes a mix of wiregrass, gopher apple, running oak (*Q. pumila*), narrowleaf silkgrass (*Pityopsis graminifolia*), and various other grasses and herbs. Wildlife found in scrubby flatwoods includes gopher frogs, gopher tortoises, eastern indigo snakes and Florida scrub-jays. Scrubby flatwoods are utilized extensively by scrub-jays.

The condition of this community varies considerably throughout the park. Patches burned at regular intervals (every 4-6 years) are in very good condition. Most scrubby flatwoods patches in the northern half of the unit are in very good condition because of regular prescribed burning. Scrubby flatwoods on the southern half of the park were in poor to fair quality before state acquisition due to lack of regular fire. However, much like the scrub habitat mentioned earlier, they have received much management attention since state acquisition and exhibit measurable habitat improvements.

General Management Measures: As with scrub, prescribed burning overgrown scrubby flatwoods can be very difficult due to the lack of fine fuels available to carry fire into the oak canopy. As with scrub, mechanical techniques such as roller chopping speed up the restoration process by immediately reducing the stature of the oak canopy and providing fuels to carry fire. Roller chopping in conjunction with prescribed burning also creates open patches that are important for scrub-jays.

Seepage Slope

Desired Future Condition: Seepage slope is an open, grass-sedge dominated community kept continuously moist by groundwater seepage. This community typically occurs in fragmented topography with large (30 to 50 ft.) variations in elevation and is usually bordered by well-drained sandhill or upland pine habitat. At St. Sebastian River Preserve dominant herbaceous species of seepage slope communities will include wiregrass (drier portions), toothache grass (*Ctenium aromaticum*), plumed beaksedge (*Rhynchospora plumosa*), hooded pitcherplant (*Sarracenia minor*), and sundews (*Drosera spp.*). Scattered shrubs will include gallberry (*Ilex glabra*) and coastalplain St. John's-wort (*Hypericum brachyphyllum*). The Optimal Fire Return Interval for this community will be 1-3 years.

Description and Assessment: The seepage slope community is found in one area on the south-central portion of the park. This community type is situated between two sandy ridges. The seepage slope is vegetated by a dense growth of fetterbush and gallberry with no overstory and minimal ground cover that includes both cutthroat grass and hooded pitcher plants. This seepage area transitions upslope into mesic flatwoods and scrub. This community appears to be in good condition.

General Management Measures: Although this community is in good condition, it nevertheless experiences disturbed hydrology by the series of 13 east/west ditches that traverse the Carson Platt property. These ditches are currently within the Fellsmere Water Control District Easements and cannot be restored at this time. However, the park should continue to communicate with Fellsmere Water Control District in case there is a time in which these ditches can be filled and restored. Also, a 1-3 year fire return interval needs to be achieved within the seepage slopes and Old World climbing fern (*Lygodium microphyllum*), that oftentimes establishes in this community, should continue to be treated.

Wet Prairie

Desired Future Condition: Wet prairie is an herbaceous community found on wet soils on somewhat flat or gentle slopes located between lower-lying depression

marshes, shrub bogs, or dome swamps and slightly higher wet or mesic flatwoods, or dry prairie. At St. Sebastian River Preserve trees will be few or absent in wet prairie communities. Groundcover will be dense and will include wiregrass, blue maidencane (*Amphicarpum muhlenbergianum*) and various sedges (*Carex* spp.). Flowering herbs found in wet prairie will include purple false foxglove (*Agalinis purpurea*), pipeworts (*Eriocaulon* spp.), milkworts (*Polygala* spp.), meadowbeauties (*Rhexia* spp.), rosegentians (*Sabatia* spp.), yellow-eyed grass (*Xyris spp.*), white-top sedge (*Rhynchosporo latifolia*), and numerous composite species from a variety of genera. Carnivorous species in wetter areas will include hooded pitcher plants (*Sarracenia minor*), sundews (*Drosera* spp.), butterworts (*Pinguicula* spp.), and bladderworts (*Utricularia spp.*). The Optimal Fire Return Interval for this community will be 2-3 years.

Description and Assessment: Wet prairie is scattered throughout the park. This community generally occurs in association with mesic flatwoods, dome and basin swamp communities. It is characterized by irregularly shaped, seasonally flooded drainages or depressions vegetated by a diversity of grasses, sedges, rushes, pipeworts, and other herbaceous species with sandweed and scattered slash pine and wax myrtle.

Wet prairie is extremely sensitive to hydrologic alterations; almost the entire historic wet prairie on the park has been heavily impacted. The construction of I-95, internal roads and utility easements, and interior drainage ditches altered historic flow patterns and decreased the frequency and duration of inundation. This has resulted in the invasion of woody shrub species and pine trees into an herbaceous species dominated community. On portions of the site, fire exclusion has also contributed to the invasion of woody species onto wet prairie.

General Management Measures: Restoration of wet prairie will require continued backfilling or plugging of ditches to eliminate or reduce drainage and re-establish historic drainage patterns by installing culverts through roads and berms. Restoring hydrological conditions couples with prescribed fire should recover the wet prairie community. In areas where heavy encroachment of woody species has occurred, which is most obvious on the northwest quadrant of the park, mechanical techniques such as roller chopping may be utilized to speed up or improve the efficacy of the restoration process.

<u>Depression Marsh</u>
Desired Future Condition: Depression marsh is characterized as a shallow, usually rounded, depression in sand substrate with herbaceous vegetation or small shrubs. Depression marsh typically occurs in landscapes occupied by fire-dominated communities such as mesic flatwoods, dry prairie, or sandhill. At St. Sebastian River Preserve trees will be few and, if present, will occur primarily in the deeper portions of this natural community. Dominant vegetation will include maidencane (*Panicum hemitomon*), panic grasses (*Panicum spp.*), common reed (*Phragmites australis*), pickerelweed (*Pontederia cordata*), arrowheads (*Sagittaria spp.*), common buttonbush (*Cephalanthus occidentalis*), peelbark St. John's wort (*Hypericum fasciculatum*), and Carolina willow (*Salix caroliniana*). The Optimal Fire

Return Interval for this community will be 2-10 years and is dependent on the fire frequency of adjacent communities.

Description and Assessment: The depression marsh community is characterized by seasonally wet ponds scattered throughout the matrix of other communities found in the park. Vegetation in the community type includes a diverse mixture of grasses, sedges, rushes, and aquatic emergent species, organized in concentric bands based on tolerances to the level and duration of inundation. Small tree or shrub islands periodically occur within depression marshes. These wetlands are important breeding grounds for a number of reptiles and amphibians, as well as sandhill cranes (*Grus canadensis*). The quality of depression marshes in the park ranges from excellent to poor.

General Management Measures: Undisturbed depression marshes on this unit are in very good condition and require no special management actions. A number of marshes have been impacted by drainage ditches, roads and firelines. Marshes impacted by drainage ditches exhibit characteristic signs of encroachment by mesic species and a reduction in size due to a reduction in the level and duration of inundation. These ditches need to be filled to recover these wetlands. Some roads and firelines pass through or around the perimeter of several marshes. Where possible, these roads and firelines will be rerouted. The invasive exotic aquatic species, African Jewelfish (*Hemichromis letournexi*) was recently documented in several depression marshes. Surveys have shown that gopher frog tadpoles have disappeared from these marshes since the appearance of this exotic fish. Staff is currently working with FWC fisheries biologists to determine a course of action for eliminating the African Jewelfish from the marshes, but currently no reasonable method exists.

Basin Marsh

Desired Future Condition: Basin marshes are typically inundated freshwater herbaceous wetlands that may occur in a variety of situations. In contrast to depression marshes, basin marshes are not small or shallow inclusions found within fire-dominated communities. Species composition in basin marshes can generally be divided into submersed, floating-leaved, emergent, and grassy zones depending on water depth. At St. Sebastian River Preserve trees will be few and, if present, will occur primarily in the deeper portions of this natural community. There will be little accumulation of dead grassy fuels due to frequent burning; one should be able to see the soil surface through the vegetation when the community is not inundated with water. Dominant vegetation of basin marsh will include maidencane (*Panicum hemitomon*), common reed (*Phragmites australis*), pickerelweed (*Pontederia cordata*), arrowheads (*Sagittaria spp.*), common buttonbush (*Cephalanthus occidentalis*), peelbark St. John's wort (*Hypericum fasciculatum*), and Carolina willow. The Optimal Fire Return Interval for this community will be 2-10 years and is dependent on the fire frequency of adjacent communities.

Description: Basin marsh occurs only in one area adjacent to I-95 on the southwest quadrant of the park and just below one of the many borrow pits that occurs in the park that were constructed by FDOT to help with drainage of I-95. Currently this

community has a higher than desirable shrub layer and excess fuel buildup. It also contains several invasive plant species most notably, Brazilian pepper (*Schinus terebithifolis*) and Wright's nutrush (*Sclera lacustris*). Due to the presence of extensive wetland communities to the south and east, as well as the series of large ditches that surround this general area of the park, it is often very difficult if not impossible to reliably access this portion of the park. In addition to these complications, the community is adjacent to I-95 which makes this area very difficult to burn on the desired fire return interval. Therefore, this community is only in fair condition.

General Management Measures: The improvement of this community is dependent upon a hydrological assessment that can determine if more culverts are needed and practical under I-95 or if ditches surrounding this community can be filled in without causing off-site impacts. Access to this area needs to be improved without impacting the hydrology any further so that weedy invasive plant species can be treated and maintained. Once access is improved, fire can be applied more reliably, however, this community is adjacent to I-95 and therefore complicates fire application.

Floodplain Marsh

Desired Future Condition: Floodplain marsh is a wetland community that occurs in river floodplains and is dominated by herbaceous and/or shrubby vegetation. At St. Sebastian River Preserve trees will be few and, if present, will occur primarily in the deeper portions of this natural community. There will be little accumulation of dead grassy fuels due to frequent burning; one should be able to see the soil surface through the vegetation when the community is not inundated with water. Dominant vegetation in floodplain marsh will include sand cordgrass (*Spartina bakeri*), sawgrass (*Cladium jamaicense*), maidencane, panicgrasses (*Panicum spp.*), common reed (*Phragmites australis*), pickerelweed, arrowheads (*Sagittaria spp.*), common buttonbush (*Cephalanthus occidentalis*), peelbark St. John's wort (*Hypericum fasciculatum*), and Carolina willow. The Optimal Fire Return Interval for this community will be 2-10 years and is dependent on the fire frequency of adjacent communities.

Description and Assessment: Floodplain marsh occurs in several small patches along the south prong of the St. Sebastian River. This community is maintained by periodic flooding of the river. Floodplain marsh is vegetated primarily by sand cordgrass (*Spartina bakeri*), giant leather fern (*Acrostichum danaeifolium*), and string-lily (*Crinum americanum*). Common buttonsbush and pond apple (Annona glabra) also occur sporadically. Floodplain marsh on this unit is generally in fair to good condition. Some areas have been invaded by Brazilian pepper, wild taro (Colocasia esculenta), and Old World Climbing Fern.

General Management Measures: The only special management action proposed for this community is the continued treatment of invading exotic plants.

Dome Swamp

Desired Future Condition: Dome swamp is an isolated, forested, depression wetland

that occurs within fire maintained communities such as mesic flatwoods. Although these swamps are typically small in size, some may be large and shallow. The characteristic dome appearance is created by smaller trees that grow on the outer edge of the swamp (water is shallower and there is less peat in the soils) and larger trees that grow in the interior. At St. Sebastian River Preserve, pond cypress will typically dominate this community, but swamp tupelo (*Nyssa sylvatica* var. *biflora*) may also form a pure stand or occur as a co-dominant species. Other subcanopy species will include red maple (*Acer rubrum*), dahoon holly (*Ilex cassine*), swamp bay (*Persea palustris*), and loblolly bay (*Gordonia lasianthus*). Shrubs will be absent to moderate, depending on fire frequency, and will include Virginia willow (*Itea virginica*), fetterbush (*Lyonia lucida*), common buttonbush, and wax myrtle. Herbaceous species will range from absent to dense within this community and will include various ferns, maidencane, sawgrass (*Cladium jamaicense*), sedges (*Carex* spp.), lizard's tail (*Saururus cernuus*), and sphagnum moss (*Sphagnum spp.*). Vines and epiphytes will also be commonly found. Because maintaining the appropriate hydrology and fire frequency is crucial to preserving the structure and species composition of this natural community, the dome swamps at St. Sebastian River Preserve will be allowed to burn on the same frequency as the adjacent fire type community, thus allowing fires to naturally burn across ecotones.

Description and Assessment: Domes occur in shallow depressions within mesic flatwoods and wet prairie communities. Domes are typically vegetated by pond cypress, which are frequently covered in bromeliads, with a mixed understory of hydrophytic shrubs such as wax myrtle, sandweed, and common buttonbush. Ground cover vegetation is variable. In more open cypress domes, a vigorous carpet of maidencane or pickerelweed may occur; in domes with denser canopies, the ground cover may be limited to a few ferns.

Domes within the park are in excellent to poor condition, depending upon the level of disturbance. Undisturbed domes whose ecotones have received frequent fire and whose hydrology has been maintained typically have a very open understory with few shrubs and encroaching mesic species. Domes that are disturbed have typically had their hydrology disrupted and contain significant numbers of encroaching mesic species like slash pine, presence of invasive exotic plant species, and evidence of intense fires.

General Management Measures: Management activities for domes that are in good to excellent condition include maintenance of the appropriate hydroperiod, continued low intensity burning at the appropriate fire return interval of the surrounding fire dependent communities, and protection of bromeliads from collectors. Domes that have been drained by ditches and are in fair to poor condition will require hydrological restoration by the backfilling of ditches and continued survey and treatment of invasive exotic plant species. Feral hog often take refuge in wet shady domes and can cause catastrophic ground disturbance in these systems. An aggressive feral hog management program must be adopted and maintained for the protection of this natural community.

Basin Swamp

Desired Future Condition: Basin swamps are forested basin wetlands that are highly variable in size, shape, and species composition that can withstand an extended hydroperiod. While mixed species canopies are common within this community, the dominant trees of basin swamps at St. Sebastian River Preserve will be pond cypress and swamp tupelo. Other canopy species will include South Florida slash pine, red maple, dahoon holly, and loblolly bay. Shrub species will include a variety of species including Virginia willow (*Itea virginica*), swamp dogwood (*Cornus foemina*), and wax myrtle. The herbaceous component will be variable and may include a wide variety of species such as maidencane, ferns, arrowheads (*Sagittaria spp.*), lizard's tail (*Saururus cernuus*), and sphagnum moss (*Sphagnum* spp.). At St. Sebastian River Preserve fire intervals in this community will vary and will be dependent on factors such as dominant vegetation, fire exposure, and drought.

Description and Assessment: Basin swamp occurs in several locations on the northern half of the park adjacent to Herndon Swamp. This community type occurs in shallow depressions of EauGallie, Wabasso and Felda sands. Basin swamps are characterized by irregularly shaped, seasonally flooded depressions surrounded by mesic flatwoods and wet prairie. Vegetation includes and overstory of pond-cypress with scattered slash pine and other hydrophytic trees. The understory and ground cover is comprised of a diverse mix of small woody shrubs, grasses, sedges, rushes, pipeworts (Eriocaulon spp.), and other herbaceous species. Most basin swamps have been impacted by increased drainage through the network of ditches constructed prior to purchase by the State. This has altered the hydroperiod of the swamps resulting in encroachment of mesic and weedy pioneer species as well as some invasive plant species. As a result, this community is in fair to poor condition.

General Management Measures: The filling of some of the ditches impacting this natural community has already occurred since state acquisition and drastically improved the hydrologic conditions within. Additional ditch filling should be implemented when feasible.

Strand Swamp

Desired Future Conditions: Strand swamps are shallow, forested, and typically elongated depressions or channels that are situated in a trough within a flat limestone plain. Soils in this community are composed of peat and sand, often of varying depths, situated over limestone. The normal hydroperiod typically ranges from 100 to 300 days and the water is deepest and remains for a longer time near the center of the strand. At St. Sebastian River Preserve the dominant canopy species will be bald cypress but pond cypress will occasionally be found in abundance as well. Understory plant species will include red maple, pond apple, laurel oak, cabbage palm, strangler fig (*Ficus aurea*), swamp bay, wax myrtle, and common buttonbush. Common herbaceous species will include swamplily (*Crinum americanum*), giant leather fern (*Acrostichum danaeifolium*), swamp fern (*Blechnum serrulatum*), royal fern (*Osmunda regalis*), sawgrass (*Cladium jamaicense*), and waterhyssops (*Bacopa spp.*). A variety of vines and epiphytes will also be found in this community. Although fire occurs rarely in strand swamps, fires from surrounding pine-dominated communities will often burn into the outer edges.

This is a common occurrence at St. Sebastian River Preserve due to the size of Herndon Swamp and will be managed as appropriate for existing environmental conditions.

Description and Assessment: This community occurs in Herndon Swamp. It occurs primarily on seasonal flooded Floridana, Chobee and Felda soils. Herndon Swamp flows to the northeast and eventually empties into the North Prong of the St. Sebastian River. Herndon Swamp is characterized by a seasonally inundated linear depression vegetated by a diverse overstory of bald cypress, pond cypress, red maple, water hickory, and other hydrophytic trees. Sabal palm, dahoon holly, wax myrtle, and other small trees and shrubs occur in the understory. The ground cover includes a diverse mix of ferns, woodsgrass (*Oplismenus hirtellus*) and other hydrophytic species.

Herndon Swamp has suffered a number of disturbances. Cypress was harvested from the strand swamp in the 1920's. A large canal on the Egan Tract was used to drain the southwest end of the swamp; the canal was partially filled in through a mitigation project and the remainder was filled in 2003 through a FDEP restoration project. A second canal along the northern boundary of the park was used to divert water from the northeast end of the swamp. However, in 2006-2007 SJRWMD repaired the blow outs into this north canal, so now Herndon Swamp no longer excessively drains into this canal. This action led to increase in the population of rare Hand Ferns that occurs in this portion of the park that were heavily stressed prior to the restoration. SJRWMD also acquired land to the north east and is currently developing it as a restoration site, stormwater park, and recreation area, to restore the historic flow of Herndon Swamp through Alligator Branch and into the North Prong of the St. Sebastian River.

Several utility corridors, I-95, and two old logging roads also impede the natural flow of water through the system. In addition to the increased drainage problems, these disturbances have resulted in the encroachment of exotic or ruderal species and an overall reduction in the size of the swamp.

Feral hogs seek refuge in these shaded, cypress dominated wetland systems and Herndon Swamp is no exception. There are several areas that exhibit signs of complete ground cover and midstory loss due to the presence of feral hogs. They continue to be a major threat to plant diversity within these systems and the cause of the spread of invasive exotic plants within these highly-disturbed soils.

Herndon Swamp is a large feature that traverses much of the entire north portion of the park. Conditions within the swamp range from excellent to poor.

General Management Measures: Management activities required to improve conditions in Herndon Swamp include the elimination of drainage ditches, installation of culverts through roads or berms impeding flow, the removal of exotic plant and animal species, the completion of the SJRWMD Wheeler Park, and the continued surveying of rare and endangered plants such as Hand Fern which are

good indicators that appropriate microclimates are being achieved within this community.

Floodplain Swamp

Desired Future Conditions: Floodplain swamp is a frequently or permanently flooded community found in low lying areas along streams and rivers. Soils typically consist of a mixture of sand, organics, and alluvial materials. At St. Sebastian River Preserve the closed canopy will be dominated by bald cypress but will also include swamp tupelo as well as water hickory (*Carya aquatica*), red maple, American elm (*Ulmus americana*), and swamp laurel oak (*Quercus laurifolia*). Understory and groundcover will typically be sparse in this community and it is generally too wet to support fire.

Description and Assessment: Floodplain swamp also occurs in several locations along the South Prong of the St. Sebastian River. Vegetation includes a divers overstory of red maple, bald cypress, laurel oak, water hickory, and other hydrophytic trees with a sparse understory including wax myrtle, common buttonbush, Carolina willow, and dahoon holly. The ground cover includes a patchy assemblage of ferns and aquatic emergent species. Exotics such as Brazilian pepper, date palm, and Old World Climbing Fern occur sporadically.

General Management Measures: This community is in fair to good condition and no special management actions other than exotic species control are proposed.

Baygall

Desired Future Conditions: Baygall is an evergreen, forested, peat-filled wetland community situated in a depression or at the base of slope. Seepage from adjacent upland areas will typically maintain saturated conditions in this natural community. At St. Sebastian River Preserve canopy trees will consist of loblolly bay (*Gordonia lasianthus*) and swamp bay (*Persea palustris*). Occasionally sparse pines (*Pinus spp.*) will also be present. A thick understory consisting of gallberry (*Ilex glabra*), fetterbush (*Lyonia lucida*), dahoon holly (*Ilex cassine*), and red maple will be present with climbing vines such as greenbriar (*Smilax* spp.) and muscadine grape (*Vitis* spp.) also found in abundance. The dominant baygall species are typically fire intolerant, indicating an infrequent Optimal Fire Return Interval of 25-100 years. At St. Sebastian River Preserve fires from adjacent communities will be allowed to enter baygall ecotone using careful management techniques to avoid hazards associated with peat fires.

Description and Assessment: Baygall occurs in several seepage-maintained depressions adjacent to Herndon Swamp. The largest representative of this community type occurs in the north-central portion of the park on the west side of I-95; it is maintained by seepage from a large sandy ridge to the north.

Baygall is vegetated by dense stands of loblolly bay with fetterbush, wax myrtle, dahoon holly (*I. cassine*), and other hydrophytic shrubs and small trees in the understory. Ground cover vegetation includes toothed mid-sorus fern (*Blechnum*

serrulatum), netted chain fern (*Woodwardia areolate*), cinnamon fern (*Osmunda cinnamomea*), and other herbaceous species like lizard's tail (*Saururus cernuus*).

As with most other wetland communities on site, baygall has been impacted by drainage ditches that reduced the hydroperiod and allowed encroachment of mesic species. Increased drainage also allowed more intense fires to encroach, killing canopy trees and setting the community back to an earlier successional stage. While this is a natural part of the life cycle of baygalls, repeated intense fires could eliminate the baygall community altogether. Overall the baygall community is in poor condition.

General Management Measures: Continued ditch restoration, low to moderately intense prescribed fire application, and treatment of encroaching invasive exotic species is required to achieve desired future conditions.

Hydric Hammock

Desired Future Conditions: Hydric hammock is characterized as an evergreen hardwood and/or palm forest with a closed canopy and variable understory dominated by palms, with sparse to moderate ground cover of grasses and ferns. Soils of this community type are typically moist with limestone very near the surface. At St. Sebastian River Preserve canopy species will include laurel oak, cabbage palm, live oak, swamp tupelo, American elm, red maple and other hydrophytic tree species. Soils will be poorly drained but only occasionally flooded. Prescribed fire will be introduced into hydric hammock communities at St. Sebastian River Preserve by allowing fires to naturally burn across ecotones from fires originating in adjacent upland communities.

Description and Assessment: Hydric hammock occurs along the upper edges of other forested wetland communities and along several seasonal streams. These hammocks are generally vegetated by sabal palm, laurel oak and live oak, with little understory vegetation. Ferns are common in the ground cover. This community type also supports considerable numbers of epiphytes, including hand fern.

Hydric hammocks on site are in good to fair condition, depending on the level of disturbance resulting from drainage, adjacent land conversion, or feral hog activity. Drained areas typically exhibit some soil subsidence and increasing numbers of mesic species. Hammocks adjacent to lands cleared for pasture typically have been invaded by weedy pioneer species and invasive exotics such as Brazilian pepper.

General Management Measures: Recovering the disturbed hydric hammocks on site will require backfilling drainage ditches to restore hydrology and replanting adjacent cleared areas to reduce edge and eliminate seed sources of pioneer species. Invasive exotic plants will need to continue to be treated and maintained and aggressive feral hog management actions undertaken.

Bottomland Forest

Desired Future Conditions: Bottomland forest is characterized as a low lying, mesic to hydric community prone to periodic flooding. At St. Sebastian River Preserve vegetation will consist of a mature closed canopy of deciduous and evergreen trees. Overstory species will consist of loblolly bay, water oak, sugarberry, and American elm. Pine trees, red maple, and bald cypress may also be present in this community as well. The understory may be open or dense and will include species such as wax myrtle and swamp dogwood. Presence of groundcover will be variable and will consist of witchgrass (*Dicanthelium spp*.), slender woodoats (*Chasmanthium laxum*), and various sedges. Fire is typically not a significant factor in this community and is usually limited to random lightning strikes hitting individual trees.

Description and Assessment: Bottomland forest occurs in two locations in the northern half of the park, along the north prong of the St. Sebastian River and the eastern extension of Herndon Swamp. Bottomland forest is characterized by a dense canopy of live oak, water oak, red maple, water hickory, and pignut hickory with a dense subcanopy of sabal palms. A number of species occur in the understory and ground cover including wax myrtle, common buttonbush, twinberry (*Myrcianthes fragrans*), lizard's tail, toothed mid-sorus fern, netted chain fern, and royal fern. Hand fern, an endangered species, is one of the many species of epiphytes occurring in bottomland forest.

Along the eastern extension of Herndon Swamp, this community was significantly impacted by increased drainage through blow outs into a large ditch along the north boundary of the park known as North Canal; this reduced the quantity and frequency of water flowing through this extension to the north prong of the St. Sebastian River. This promoted the invasion of exotic, native ruderal, and mesic species into the community, and allowed fire to encroach into areas that typically would not burn. This increased drainage into North Canal also impacted epiphyte populations, particularly hand fern, which depends on high humidity levels and protection from frequent fire. This rendered the community in poor condition.

In 2006, just after the approval of the last unit management plan, SJRWMD restored this area so that the swamp no longer drained excessively into north canal. Since that time aggressive management actions were taken to extensively treat all of the invasive exotic plants that had encroached when water had been drained. Also, a steady increase in hand fern has been documented since the completion of this restoration project. As a result, the community has improved from its poor condition assessment in the last UMP to fair.

General Management Measures: Currently, the invasive exotic plants are in maintenance condition but will need annual treatments in order to remain in that condition. In order for the condition of this community to continue to improve aggressive management has to be dedicated to the eradication of feral hogs. Feral hogs seek refuge in the bottomland forest and have left the understory and midstory of this community in poor condition in several places throughout. Continued monitoring of hand fern populations is important to ensure that the

appropriate water levels and microclimates are being maintained within this community.

Mangrove Swamp

Desired Future Conditions: Mangrove swamp is typically characterized as a dense forest occurring along relatively flat, low wave energy, marine and estuarine shorelines. Soils are generally anaerobic and are saturated with brackish water at all times, becoming inundated at periods of high tide. At St. Sebastian River Preserve the dominant overstory species of this community will include red mangrove (*Rhizophora mangle*), black mangrove (*Avicennia germinans*), white mangrove (*Laguncularia racemosa*), and buttonwood (*Conocarpus erectus*). These species will occur either in mixed stands or often in differentiated, monospecific zones based on varying degrees of tidal influence, levels of salinity, and type of substrate. Red mangroves will typically dominate the deepest water, followed by black mangrove in the intermediate zone, and white mangroves and buttonwood in the highest, least tidally influenced zone. In general, mangroves will typically occur in dense stands with little to no understory but may also be sparse, particularly in the upper tidal reaches where salt marsh species dominate. When present, shrub species will include seaside oxeye (*Borrichia frutescens*), and vines including coinvine (*Dalbergia ecastaphyllum*) and rubbervine (*Rhabdadenia biflora*), and herbaceous species such as saltwort (*Batis maritime*), shoregrass (*Monanthocloe littoralis*), perennial glasswort (*Sarcocornia perennis*), and giant leather fern (*Acrostichum danaeifolium*). Mangrove swamp communities are particularly vulnerable to climate change impacts such as rising sea levels and the increasing frequency and severity of tropical weather systems.

Description and Assessment: Mangrove swamp covers the perimeter of the peninsula that projects into the South Prong of the St. Sebastian River. Vegetation in this community consists primarily of red mangrove (*Rhizophora mangle*), black mangrove (*Avicennia germinanas*), white mangrove (*Laguncularia racemose*), giant leather fern and string-lily. This community was being overtaken by date palms, Brazilian pepper, and rosary pea, but was recently treated for all category I and II invasive plant species. Currently this community is in good condition.

General Management Measures: At this point the continued maintenance of invasive exotic plant species is the only management activity proposed.

Blackwater Stream

Desired Future Conditions: Blackwater stream communities can be characterized as perennial or intermittent watercourses originating in lowlands where extensive wetlands with organic soils collect rainfall and runoff, discharging it slowly into the stream. The stained waters of these communities are typically laden with tannins, particulates, and dissolved organic matter derived from drainage through adjacent swamps. Emergent and floating vegetation may occur along the shallower and slower-moving sections of blackwater streams, but is often limited by steep banks and dramatic seasonal fluctuations in water levels. At St. Sebastian River Preserve species of this community will include goldenclub (*Orontium aquaticum*), dotted smartweed (*Polygonum punctatum*), and various grasses (*Poaceae spp.*) and

sedges (*Cyperus spp.*). Desired conditions will also include minimizing disturbance and alterations and preserving adjacent natural communities.

Description and Assessment: This community type is represented by the upper reaches of the St. Sebastian River and several unnamed tributaries of the river.

The St. Sebastian River drains a watershed of approximately 78 square miles, one-third of which is contained within the park. Significant alterations in past years have dramatically changed the St. Sebastian River. The construction of the Fellsmere Canal (1916) and the C-54 Canal (1968) eliminated the historic West Prong of the river and facilitated the discharge of the large volumes of freshwater and nutrient-laden runoff from agricultural lands west of the park into the estuarine system. The upper reaches of the North Prong were canalized and most the associated wetlands north of the park were developed for residential uses or converted to agricultural lands. Residential and agricultural development has occurred along most of the South Prong. Drainage from the surrounding development discharges into the river through canals. All the unnamed tributaries in the park are characterized as seasonal, sand bottom, blackwater streams. Narrow linear wetland corridors are associated with the streams. Most of the historic stream channels remain intact; however, drainage ditches constructed in previous years to drain the park were connected to the streams. Some of the greatest Lygodium infestations occur within these blackwater streams as they provide the perfect microclimate needed for this fern.

General Management Measures: The ditches should be back filled; this will force the water into depressional wetlands that would gradually drain into the streams through interconnected wetlands or as sheetflow. The streams need to be surveyed and treated for invasive plant species, especially Lygodium on an annual basis.

Altered Landcover Types

Abandoned Field/Abandoned Pasture
Desired Future Condition: A matrix of wet prairie, mesic flatwoods, prairie hammocks, and depression marshes. Please see descriptions for these natural communities above.

Description and Assessment: Several areas of abandoned fields and pastures are present from the previous land use prior to state acquisition. Most of these abandoned pastures are located on the southeast quadrant and are adjacent or near the current maintained cattle lease. Others are located on the northwest quadrant near the park's visitor center and adjacent to Interstate I-95. The abandoned pasture on the south side of the park is dominated by a matrix of native species and the exotic limpo grass (*Hemarthria altissima*). The abandoned pastures on the north side of the park have a larger percentage of natives, but still have the presence of exotic Bahia grass.

General Management Measures: Several restoration techniques will be used to drive the abandoned fields and pastures to their desired future conditions. In areas where

native ground cover dominates over invasive ground cover, continued removal of invasive grasses and the continued application of fire may be the main tools used. On the south side where limpo grass is the dominant ground cover, the park may need to experiment with controlled restoration grazing, prior to implementation of other restoration techniques.

Pasture/Improved

Desired Future Condition: A matrix of wet prairie, mesic flatwoods, prairie hammocks, and depression marshes. Please see descriptions for these natural communities above.

Description and Assessment: The park maintains an active cattle lease of approximately 1,016 acres. When the state acquired the land, this area was in active cattle and was already improved. The state decided to maintain this as an active cattle lease to serve as an interim management tool. At some point in the future, when all other restoration needs have been met, the park will consider renegotiating the lease to begin a phased restoration approach to these pasture sites which were originally a matrix of wet prairie, mesic flatwoods, prairie hammocks and depression marshes. The current planned restoration needs for the park will take greater than a 10-year period so it is estimated that consideration of restoration of the improved pasture will not occur during the 10-year period of this management plan.

General Management Measures: Since this is currently in active cattle lease, restoration activities will take place only after the lease is terminated. Several restoration tactics including invasive plant removal, prescribed fire, full scale ground cover restoration, possible grazing for the purpose of restoration, and ditch filling where necessary will be some of the activities required to drive this community to its desired future condition.

Artificial pond

The park contains 6 FDOT managed borrow pits that are used to help divert surface water for I-95. These borrow pits are permanent features.

Canal/ditch

Two large parallel canals, the C-54 and Fellsmere Canals divide the park into north and south sections. The SJRWMD manages the C-54 canal and the adjacent levee and road. The Fellsmere Water Control District owns and manages the Fellsmere Canal and adjacent road. The park has over 80 miles of ditches. Ten of these miles have already been filled in through mitigation projects ranging from 2000-2005. Sixty miles still need to be evaluated for potential ditch filling and the remaining ten miles are not considered for filling or plugging since they are either associated with utility easements or are essential to park operations.

Developed

The park has a visitor center and associated parking area, an administration building and associated parking area, 2 shop compounds, a north and south camphost area, and 4 resident sites. The park also maintains 6 primitive camping

sites including just fire rings and benches and areas to place tents with relatively small parking lots. The park also has 2 equestrian day use areas with stalls and small open fields for trailer parking.

Invasive exotic monoculture
The significant invasive exotic monocultures on the park are contained within the discussion of improved pasture and abandoned pasture/fields above. The groundcover consists mainly of several types of exotic pasture grasses.

Spoil Area
The park has a spoil area located at the northern property line of the southeast quadrant up against the C-54 canal. The spoil site remains from the dredging of the C-54 canal. Spoil from this area is often used for continued park road improvement and maintenance.

Utility Corridor
Several easements exist on the park. Florida Power and Light Corporation maintains an above ground powerline that traverses the entire western portion of the park and runs south to north. A second powerline is located on the northwest quadrant of the park near the north property line. The FDOT maintains Interstate 95 (I-95) that bisects the property into east and west halves. Florida Gas Transmission has two underground gas lines. One lies on the west side of the I-95 corridor and basically follows the highway corridor through the entire park, and the other lies east of I-95, running north/northwest to south/southeast through the northeast quadrant and directly north to south through the southwest quadrant.

Imperiled Species

Imperiled species are those that are (1) tracked by FNAI as critically imperiled (G1, S1) or imperiled (G2, S2); or (2) listed by the U.S. Fish and Wildlife Service (USFWS), Florida Fish and Wildlife Conservation Commission (FWC) or the Florida Department of Agriculture and Consumer Services (FDACS) as endangered, threatened or of special concern.

Overall, management activities on the park will be based on an ecosystem management approach. Listed species are declining statewide and/or nationally and often require special management attention to ensure their continued survival. Parks usually encompass only a fragment of a species' original habitat, and habitat on adjacent lands can be lost to development. Development and land conversion has restricted movement within many species' ranges to small, disjunct fragments. For many listed species, government-managed lands offer the best hope for survival. The designated species found in the park will benefit from the large scale natural systems management approach that will be used.

A top management priority for the park is to maintain or increase existing populations of listed species of plants and animals occurring on site. Species that are more common will also be managed and inventories of all plants and animals found within the park will be maintained.

There are currently 74 designated species that have been observed at the SSRPSP: 28 plants and 46 animals. There are a number of these species for which a recovery plan has been developed. These include the Florida manatee, crested caracara, bald eagle, Florida scrub-jay, snail kite, wood stork, and the eastern indigo snake (USFWS 1999); the revised red-cockaded woodpecker plan was released in 2003. Management activities will be based on recommendations for the recovery of each of these species.

Due to the substantial number of protected species using the SSRPSP, management will consider temporary and/or seasonal closure of selected areas to allow sensitive habitat and species to recover from human induced impacts.

The welfare of designated species is an important concern of the Division. In many cases, these species will benefit most from proper management of their natural communities. At times, however, additional management measures are needed because of the poor condition of some communities, or because of unusual circumstances that aggravate the problems of a species. To avoid duplication of efforts and conserve staff resources, the Division will consult and coordinate with appropriate federal, state and local agencies for management of designated species. Specifically, data collected by the FWC and USFWS as part of their ongoing research and monitoring programs will be reviewed periodically to inform management of decisions that may have an impact on designated species at the park.

Virtually all the designated species of plants and animals within the SSRPSP were listed because of habitat destruction. Although the major resource management action for designated species is habitat management, additional actions are warranted for several species. All management actions taken will be in accordance with approved USFWS recovery plans (i.e., U.S. Fish and Wildlife Service 1999). Staff will coordinate with the USFWS and FWC on any required permits related to management activities that affect designated species. A number of projects directed at designated species are ongoing and should be continued. Discussion of several designated species and management needs are discussed below.

Florida Manatee. Although Florida manatee is a marine mammal and does not occur within the uplands that are managed by the Division as the St. Sebastian River Preserve State Park. They are important to note since this species was one of the main drivers in the acquisition of this parcel originally as a buffer preserve.

The Florida manatee, an herbivorous marine mammal, is confined with rare exceptions to peninsular Florida and coastal Georgia. The behavior of manatees is distinguished by seasonal cold-induced migration and aggregations in warm-water refugia. Manatees are generalist herbivores and feed on all forms of fresh and brackish water aquatic vegetation, including immersed, floating and submerged varieties, and some overhanging and shoreline terrestrial plants (Hartman 1971; Husar 1978; and Hurst and Beck, 1988).

Two-day winter synoptic aerial surveys are used to estimate a minimum population of manatees. The highest two-day count occurred in January/February 2017, with an estimated minimum of 3488 manatees in the Atlantic Coast Region of Florida, and an estimated 6620 manatees statewide (FFWCC, Manatee Synoptic Surveys 2017).

Brevard County, Florida is utilized by large proportion of the Atlantic Coast population of manatees. Manatees utilize the Indian River Lagoon, Banana River and the St. Sebastian River year-round. The region supports essential habitat and offers shelter, fresh water, feeding, resting, mating and calving areas. The St. Sebastian River is an important stop-over point and moderate winter warm-water aggregation site for manatees in migration along the East Coast. Data collected from aerial and ground surveys, and telemetry studies, demonstrate that greater than 150 manatees may occupy the St. Sebastian River area in winter and up to 100 in other seasons. In winter, manatees aggregate near the spillway structure, in North Prong, and C-54 Canal. Manatees are concentrated along the C-54 Canal near the Fellsmere Canal outfall and a freshwater seep on the southern bank of the canal across from the east end of the northern berm. Telemetry studies revealed these manatees often travel daily from the St. Sebastian River to the Indian River Lagoon to feed on seagrass beds. State and Federal wildlife managers expect numbers of over-wintering manatees to increase in the St. Sebastian River as nearby power plants with warm water effluents are phased-out over time.

The Florida Manatee Sanctuary Act of 1978 established motorboat speed regulation for manatee protection to regions of critical concern around the state. The surface waters surrounding the St. Sebastian Preserve State Park are regulated for manatee protection. The St. Sebastian River and C-54 canal West of the US 1 bridge and East of the North Prong have been designated as "Slow Speed All Year" zones. "Idle Speed" zones are designated west from the North Prong in the C-54 and include the entire North Prong. A Motor Boats Prohibited Zone extends 2,500 feet east of the S-157 spillway structure within the C-54.

Fish as well as manatees aggregate under the spillway structure and in C-54 during cold spells. Recreational fishing has become increasingly popular from shore following public ownership. Researchers have documented that manatees in the C-54 Canal are being impacted by increased boat traffic, disturbance at resting and drinking areas, and are being hooked and entangled in fishing tackle. Increased pressure from recreational fishing is predicted, if additional access is provided to the southern banks of the C-54 from shore. As recommended in the 2001, Florida Manatee Recovery Plan, Task 1.7.2, (minimize manatee injuries and deaths caused by fisheries and entanglement), a seasonal “No Entry” zone is recommended along the southern bank of the C-54 and at the spillway structure.

Furthermore, enforcement of speed zones is crucial to ensure protection of manatees with the St. Sebastian River system. Enforcement of the prohibition on

feeding manatees is also important. Continued coordination with the Aquatic Preserve Program and FWC is critical.

Fox Squirrel *(Sciurus niger shermani)*. This mammal historically occurred in sandhill and pine flatwoods communities in the park; however, they have not been seen on the property for the last 30-40 years and are considered extirpated. As discussed earlier, many restoration efforts have been accomplished in our sandhill and flatwoods communities in the park. If reintroduction programs become available, St. Sebastian should be evaluated as a potential site since site conditions are in excellent condition.

Bachman's Sparrow *(Aimophila aestivalis).* Due to the large acreage of well managed and restored flatwoods habitat, this species is flourishing. Continued implementation of mostly growing season prescribed fire should continue to benefit this species. In collaboration with the Tall Timber's Upland Ecosystem Restoration Program and the U.S.F.W.S Coastal Grants Program, this species is currently being monitored.

Florida Scrub-Jay. Florida scrub-jays are listed as a threatened species by both state and federal authorities. The Florida scrub-jay is the only species of bird unique to Florida and is vulnerable to extinction because of habitat destruction, degradation and fragmentation (Breininger 2004). Scrub-jays occur primarily in patches of scrubby flatwoods and oak scrub. Jays also frequently utilize pastures and other open disturbed areas when they occur adjacent to oak scrub or scrubby flatwoods.

Using new data, the south Brevard-Indian River-St. Lucie metapopulation meets the criteria that once defined core populations; core status will be designated in the new draft recovery plan soon to be released. The Florida scrub-jay recovery plan is likely to recommend a population increase at the St. Sebastian River Preserve. The large amount of scrub and flatwoods at the park probably make it the most important area for Florida scrub-jay recovery along the mainland of Florida's Atlantic Coast (Breininger 2004).

In 1997, a scrub-jay study in the park began north of C-54 Canal with funding from the USFWS. The study expanded into the Coraci and Carson Platt Tracts. Although USFWS funding expired in 2002, most territory clusters within the park continue to be studied by a combination of park volunteers, park staff, and the original principal investigator. The number of territories ranged from 13 in 1997 to its highest of 58 in 2003 to 38 in 2017. The increase occurred as the large tracts of Coraci and Carson Platt were acquired and added to the original preserve. The 2005 population size was 42 territories which represented a 24 percent decline from 2004. Given that the population appeared stable for seven years, the decline is probably temporary with an uncertain cause (Breininger, 2005). It has been proposed that the active 2004 hurricane season greatly affected food supply and reproduction. It is also important to note that the much of the jay habitat in the surrounding areas was being lost to development in the late 90's and early 2000's and St. Sebastian provided some of the only refugia in the area which may have also contributed to

the higher numbers reported in 2003. From 2005-2017, population numbers have lingered around the 40-territory mark without any significant decreases or increases in a ten-year period.

Although under absolute ideal circumstances, the estimated potential population size at the SSRPSP is 105 territories, it is nearly impossible due to the nature of fire management to keep all of these in optimal condition at any given time. Therefore, realistically it is estimated that St. Sebastian could support up to 75-85 territories.

Since state acquisition many restoration activities have occurred on hundreds of acres of scrub-jay habitat and continues to occur. Scrub-jay habitat across the park would benefit by continued timbering and mechanical treatment of scrub that was degraded prior to state acquisition. The bulk of the data is currently collected by a small group of dedicated and skilled volunteers. While volunteer programs are very beneficial, a more secure funding source to support the scrub-jay demographic study should be sought especially since St. Sebastian is such a critical area to the state- wide survival of this species which is declining state wide. The information collected and recommendations made will be used to improve management of scrub-jay habitat. Continued fire management should be combined with mechanical treatments when necessary to recover scrub-jay habitat in poor condition and manage higher quality habitat patches. Fine-tuning the existing fire management program by introducing additional summer burns once fuel loads have been reduced should further benefit scrub-jays. Care will be taken to avoid extensively burning occupied habitat during nesting season and patchy mosaic fires will be the main resource management goal within occupied habitat.

Florida Sandhill Crane *(Grus canadensis pratensis).* This subspecies resides in Florida year-round and should not be confused with the migrant subspecies from the mid-west that visits Florida in the late fall and winter. The park offers an abundance of excellent crane habitat. Sandhill cranes nest January through June, in the seasonal ponds surrounded by open pine flatwoods. When vegetation grows too tall, cranes cannot adequately view predators and they will nest elsewhere. The active fire management program in the park benefits cranes by maintaining the open vegetation structure they prefer. The park also has pastures and open flatwoods for insect foraging and supports many favored crane food plants. No special management activities beyond continuing the fire management program are needed to maintain sandhill cranes.

Wood Stork (Mycteria americana). Large numbers of wood storks use the park during optimal feeding conditions when fluctuating water levels concentrate large numbers of fish in a limited area. At these times groups of eighty or more storks have been observed. The wading bird pond northeast of I-95 also provides good shallow water habitat for storks and other wading birds. The park also offers good resting habitat for storks. No special management activities are needed for wood storks.

Osprey (Pandion haliaetus). Ospreys nest within the park and fish within the St. Sebastian River and C-54 Canal. Other than protecting nesting sites, no special management actions are required for this species.

Wading Birds. A number of listed wading bird species use the park for feeding and resting. No special attention is needed for these species except to continue the fire management program, improve or increase habitat through hydrological restoration, and continue to treat invasive exotic plant and animal species that disrupt their habitat.

Raptors. Merlin (*Falco columbarius*) and northern harrier (*Circus cyaneus*) are winter residents in Florida and do not breed here. They favor wet prairies and marshes, dry prairies, and agricultural environments. They do not require any special management attention.

Red-cockaded Woodpecker. Red-cockaded woodpeckers (RCW) are listed as endangered by the USFWS and as a species of special concern by FWC. This species requires old-growth pine forests where nest cavities are excavated in living trees infected with red heart disease which generally does not occur until the tree is at least 70 years of age. The woodpeckers flake off bark to create a smooth surface on the tree, and peck resin wells around the cavity to drip sap and repel egg-eating snakes. Red-cockaded woodpeckers are cooperative breeders that forage, nest and roost together as a family unit. The non-breeding young stay with the parents to assist in raising the next group of young. Each member of the family maintains its own active cavity tree, and the breeding male's cavity tree is usually used for nesting. Adults also work to create new cavity trees throughout the year, as it takes six months to two years to create a suitable cavity.

From early population surveys, staff concluded that RCWs occurred on the park in low numbers and were not using all available habitats. In 1997, the SJRWMD funded a two-year study of the population at the park to obtain more information to ensure the survival of the species over the long-term. The study was designed to determine the population biology, evaluate habitat characteristics and provide management recommendations. During the study, nine active cluster sites were identified and monitored. However, after the study it was determined that with aggressive management, the park had the potential to support 25 clusters on about 5,000 acres of available RCW habitat. This number may be an overestimation since the study only considered the welfare of RCWâ€™s and did not consider the critical importance that St. Sebastian plays in the survival of Florida scrub-jays. In the next version of the Recovery plan, the potential may only be 20-23 clusters. The RCW population at the park is listed as a Central Support Population in the USFWS Recovery Plan. State and Federal lands are considered designated as central support populations if they have the capacity to harbor ten or more active clusters.

Since this initial two year study and in collaboration with other agencies, the following actions have been taken to ensure the survival of the RCW population at the park; (1) an aggressive management program utilizing prescribed fire was implemented; (2) critical RCW habitat was targeted for restoration; (3) continued monitoring tracked trends in population size, reproductive success, and survivorship of RCWs (4) new cluster sites were created and several artificial cavities were placed within existing clusters; (5) all cavities within clusters were cleaned, maintained and/or replaced when necessary; (6) SSRPSP became a member of the South-Central Florida RCW Recovery Unit and aggressively participated in the translocation program; (7) Protected all cavity trees from potential wildfire or prescribed fire impacts.

In 2004-2005, this area suffered from extremely active hurricane seasons. Overall, half of the cavity trees died from snapping or falling over due to high winds produced by Hurricanes Jean, Francis and Wilma. Several birds were found dead inside their cavities after the hurricane. These cavity trees broke at the cavity and apparently trapped and killed the RCW simultaneously. Because of these devastating storms, the park was left with just a few birds spread throughout only three clusters. Aggressive measures such as an emergency post hurricane habitat assessment and translocation were implemented in efforts to help an already small and vulnerable population.

Since that time, the management actions already mentioned above have continued and the park is well on its way to reaching its recovery goals with 14 active clusters recorded during the 2017 breeding season.

Crested Caracara. Crested caracaras (*Caracara cheriway*) have been documented using the park. This species is listed as threatened by the FWC and the USFWS. All observations have been of individuals foraging in open pasture areas. No pairs or nesting activity has been documented. No specific management actions are planned at this time.

Gopher Tortoise. Considering the abundance of available habitat, the excellent burn program, and the lack of past hunting, gopher tortoises should be in abundance. However, no formal data is available at this time. General observations have been made since state acquisition and seem to indicate a good presence of large adults but low numbers of juveniles. More formal surveys are needed to determine the population size of gopher tortoises. Information gathered will be used to evaluate habitat occupancy, provide demographic information on the tortoise population and evaluate the efficacy of habitat management activities.

The gopher tortoise is recognized as a keystone species as their burrows provide refuge for more than 350 species. Tortoises inhabit a variety of natural communities including sandhill, scrub, scrubby flatwoods and mesic flatwoods, habitats that can be found within the park. The accepted standardized methodology for surveying gopher tortoises is Line Transect Distance Sampling (LTDS). In July 2015, a gopher tortoise LTDS survey was completed in the NE tract of SSRPSP (Smith and Howze, 2016, Final Report submitted to the Florida Fish and Wildlife Conservation Commission and can be found in AD. 11). LTDS surveys were conducted by a 3-person survey crew within 1,140 ha of suitable gopher tortoise habitat. Results of this survey indicate the tortoise population in the NE tract of SSRPSP comprised approximately 977 tortoises (95% CL: 644-1,483) at a density of 0.857 tortoises/ha (95% CL: 0.564-1.301). Representation of all age groups was documented during the survey, indicating recruitment is occurring on-site. FWC recommends that LTDS surveys are repeated every 5-10 years to document population trends and/or variation in response to habitat management activities over time. Gopher tortoise LTDS pilot surveys were also conducted in the SE, NW, and SW tracts between 2014-2015, but encounter rates of gopher tortoises were too small to warrant a full gopher tortoise LTDS survey; this indicates these tracts are likely not as suitable for tortoises as the NE tract. Pilot surveys should be repeated every 5-10 years to determine if populations have increased and warrant a full LTDS survey.

Eastern Indigo Snake. The eastern indigo snake is listed by both the USFWS and FWC as a threatened species. Populations are declining due to habitat destruction and excessive collection for the pet trade. It is estimated that this large snake has a home range of approximately 125 to 250 acres. Seven adult eastern indigo snakes were radio-tracked between 1998 and 2004 on the park as part of a larger study of habitat use and survival in central Florida. The study was funded by the Bailey Wildlife Foundation, USFWS and Avon Park Bombing Range. The sample size was too small to characterize home range size and survival on SSRPSP alone. Habitat-specific survival information and home range sizes will be available after data analyses near completion. The first published product of the study is cited in Addendum 2. The results of this population viability analyses regarding SSRPSP were very uncertain because there was little data on recruitment and survival of several life history stages. It seemed that extinction risk on SSRPSP was high without further land acquisition adjacent to the park, but such risk declined rapidly if proposed acquisitions were completed. Within the current boundaries of the SSRPSP the eastern indigo snake should benefit from the existing habitat management program and does not need special protection except enforcement of rules protecting all plants and animals and prohibiting collection.

Florida Gopher Frog. The Florida gopher frog is mostly a nocturnal species that utilizes ephemeral wetlands within the scrub and sandhill and is known to occupy gopher tortoise burrows. During breeding season, from early spring to late autumn, gopher frogs travel relatively great distances and congregate in shallow grassy ponds to breed. In 2012 FWC surveyed and found gopher frog tadpoles in eight ponds on all four quadrants of the park. Although gopher frogs have been observed and even photographed on the park in the past, these were the first documented breeding in ponds. In early 2016 FWC returned to install a frog logger audio recorder in one of these documented ponds as well as resurvey the eight original ponds for the maintained presence of gopher frog tadpoles. So far only five of the original ponds have been surveyed. No gopher frog tadpoles were documented in the five ponds surveyed to date. In fact, almost no tadpoles of any species were documented. However, they did document the presence of the exotic African Jewelfish which is known to devastate local amphibian populations. SSRPSP is currently working with FWC fisheries staff to determine the next course of action. At this time however, there is no logical and effective way to eradicate African jewelfish from these ponds without causing unintended impacts to all species utilizing the ponds.

Fishes. A comprehensive survey to inventory and monitor the distribution and abundance of fishes and selected invertebrates of the St. Sebastian River was conducted in 1999-2000 (Paperno and Brodie 2000). Three notable species slashcheek goby (*Gobionellus pseudofasciatus*), opossum pipefish (*Oostethus brachyurus lineatus*), and bigmouth sleeper (*Gobiomorus dormitor*)) were found in the St. Sebastian River. They are among the few examples of euryhaline tropical freshwater species found in North America. The St. Sebastian River is thought to provide the only suitable habitat north of the Caribbean and Central America for these species because water temperatures are higher than in other freshwater tributaries of peninsular Florida. None of the above are protected species. Park staff

will continue coordination with FWC and the Aquatic Preserve program to protect, manage, and monitor this crucial and rare habitat.

All plants and animals within the park are protected. Enforcement against collection and destruction will be an important part of conserving these rare species. Environmental education programs at the park will include information about rare plants and their conservation needs, as well as reasons why the public should not collect plants or animals from natural areas. For the most part, protection from collection, continuation of the existing fire management program, continued hydrological restoration, and the treatment of invasive exotic plant and animal species are the only steps available to protect rare plant species.

Two species of wild pine, cardinal airplant (*Tillandsia fasciculata*) and giant air plant (*T. utriculata*) occur in moist hammocks, cypress domes and swamps in the park. Bromeliads in Florida suffer from two threats: harvest by collectors and destruction by the exotic metamasius weevil (*Metamasius callizona*). The weevil was imported along with bromeliads in the early 1990s. Since 2003, researchers from the University of Florida have been researching the effects of the metamasius weevil at the park; in several areas, the weevil caused devastation to the local population but several years later the populations have recovered.

The celestial lily (*Nemastylis floridana*) is endemic to Florida but only occurs in a few eastern counties. This perennial herb benefits from the fire management program, which maintains the required open habitat. Additional surveys will better document the occurrence of this species in the Park.

Catesby's lily (*Lilium catesbaei*), also known as pine lily, is found in well-managed flatwoods. Other listed species found in pine flatwoods include garberia (*Garberia heterophylla*) and Florida beargrass (*Nolina atopocarpa*).
The hand fern (*Ophioglossum palmatum*) occurs in the boots of cabbage palms. Hand ferns can be killed by frost, fire, and increased drainage of their wetland habitat. Hand ferns will re-grow following infrequent low intensity fires, as long as the cabbage palm boots do not burn away. However, increased drainage of hand fern habitat allows higher intensity fires to encroach into the wetlands. This frequently burns off the boots of the cabbage palms and eliminates the substrate they grow on. In addition, increased drainage alters the moist microclimate hand ferns require. Increasing the hydroperiod of hand fern habitat should greatly benefit this protected species as well as implementing prescribed fire techniques that would prevent fire from slamming into these communities. Hand fern have been surveyed in the park since state acquisition. Recent surveys indicate an increase in hand fern in the northeast portion of Herndon Swamp adjacent to the restoration project on North Canal conducted in 2006 that was discussed extensively in the natural communities section in relation to bottomland forest.

The butterfly orchid (*Encyclia tampensis*) is an epiphytic orchid growing in swamps and wet hammocks in the park. Terrestrial orchid species including grass pink (*Calopogon multiflorus*) and several species of ladies-tresses (*Spiranthes spp.*) have

been observed blooming in mesic flatwoods, particularly following prescribed burns. Orchids are extremely vulnerable to harvest by collectors.

Royal fern (*Osmunda regalis*) and cinnamon fern (*Osmunda cinnamomea*) are considered to be commercially exploited. Both grow in wet woods and swamps, and can be found in forested wetlands. Nodding clubmoss (*Lycopodium cernuum*), another commercially exploited species, occurs in wet pinelands and prairies.

Spoon-leaved sundew (*Drosera intermedia*), blue butterwort (*Pinguicula caerulea*), and yellow butterwort (*Pinguicula lutea*) are all small herbaceous plants found in pine flatwoods and wet prairie communities throughout the park. Protection of these species is dependent on maintaining the hydrologic and pyrogenic characteristics of their preferred habitats.

The hooded pitcher plant (*Sarracenia minor*) occurs in several locations in the park and has been documented on the southeast and southwest quadrants. Some of the bigger occurrences are located around a digressional wetland next to the powerlines on the north side of the property and in seepage areas along the Ten Mile Ridge in the Carson Platt Tract. This carnivorous plant has flourished under the active fire management program. However, feral hogs favor this habitat for rooting. Increasing efforts to eradicate feral hogs will benefit hooded pitcher plants.

Large-flowered rosemary (*Conradina grandiflora*) occurs in scrub and scrubby flatwoods throughout the park. It favors open sandy areas and is most abundant along fire lines, roads, and fence lines.

Curtiss' milkweed (*Asclepias curtissi*) occurs in a small area of scrub on the southern half of the park. This endangered species favors open sandy patches in

scrub and is generally most abundant along roads or fire lines. Nodding pinweed (*Lechea cernua*), a threatened species, also prefers open sandy areas in scrub. Both species depend on periodic fires to maintain openings.

Prickly-pear cactus (*Opuntia stricta*) occurs only on one spoil mound at the intersection of C-54 Canal and the South Prong. The presence of this species on site is an artifact of disturbance. No special management actions are required.

Twinberry (*Myrcianthes fragrans*) occurs in hammocks, primarily adjacent to the North and South Prongs. Twinberry is abundant in several areas. No special management actions are required for this species.

Table 2 contains a list of all known imperiled species in the park and identifies their status as defined by various entities. It also identifies the types of management actions that are currently being taken by DRP staff or others, and identifies the current level of monitoring effort. The codes used under the column headings for management actions and monitoring level are defined following the table. Explanations for federal and state status as well as FNAI global and state rank are provided in Addendum 6.

Table 2: Imperiled Species Inventory						
Common and Scientific Name	**Imperiled Species Status**				**Management Actions**	**Monitoring Level**
	FWC	**USFWS**	**FDACS**	**FNAI**		
PLANTS						
Curtiss' milkweed Asclepias curtissii			E		1, 2	1
Manyflowered grasspink *Calopogon multiflorus*			E		1, 2	1
Large-flowering false rosemary *Conradina grandiflora*			T	G3,S3	1, 2, 13, 7	1
Spoonleaf sundew *Drosera intermedia*			T	G5,S3	1, 2	1
Florida butterfly orchid *Encyclia tampensis*			CE		2	1
Garberia Garberia heterophylla			T		1, 2	1
Snowy orchid *Habenaria nivea*			T		1, 2	1
Nodding pinweed *Lechea cernua*			T	G3,S3	1, 2	1
Drysand pinweed *Lechea divaricata*			E	G2,S2	1, 2	1
Catesby's lily *Lilium catesbaei*			T		1, 2, 13	1

Table 2: Imperiled Species Inventory						
Common and Scientific Name	**Imperiled Species Status**				**Management Actions**	**Monitoring Level**
	FWC	**USFWS**	**FDACS**	**FNAI**		
Nodding club-moss *Lycopodiella cernua*			CE		1, 2	1
Florida milkwine *Matelea floridana*			E	G2,S2	1, 2	1
Twinberry *Myrcianthes fragrans*			T		2	1
Celestial lily *Nemastylis floridana*			E	G2,S2	1, 2	1
Florida beargrass *Nolina atopocarpa*			T	G3,S3	1, 2	1
Hand fern *Ophioglossum palmatum*			E	G4,S2	2, 4, 13	3
Erect pricklypear *Opuntia stricta*			T		1, 2	1
Cinnamon fern *Osmunda cinnamomea*			CE		2	1
Royal fern *Osmunda regalis var. spectabilis*			CE		2	1
Blueflower butterwort *Pinguicula caerulea*			T		1, 2	1
Yellow butterwort *Pinguicula lutea*			T		1, 2	1

Table 2: Imperiled Species Inventory						
Common and Scientific Name	**Imperiled Species Status**				**Management Actions**	**Monitoring Level**
	FWC	**USFWS**	**FDACS**	**FNAI**		
Giant orchid *Pteroglossaspis ecristata*			T	G2,S2	1, 2	1
Leafless beaked orchid *Sacoila lanceolata*			T		2	1
Hooded pitcherplant *Sarracenia minor*			T		1, 2, 10, 13	3
Lacelip ladiestresses *Spiranthes laciniata*			T		2	1
Cardinal airplant *Tillandsia fasciculata var. densispica*			E		2, 13	2
Giant airplant *Tillandsia utriculata*			E		2, 13	2
Red-margin zephyr-lily *Zephyranthes simpsonii*			T	G2,G3,S3	1, 2	1
FISH						
Bigmouth sleeper *Gobiomorus dormitor*				G4,S2	N/A	N/A
Slashcheek goby *Gobinellus pseudofasciatus*				G3,G5,S1	N/A	N/A

Table 2: Imperiled Species Inventory						
Common and Scientific Name	**Imperiled Species Status**				**Management Actions**	**Monitoring Level**
	FWC	**USFWS**	**FDACS**	**FNAI**		
Opossum pipefish *Microphus brachyurus*				G4,G5,S2	N/A	N/A
AMPHIBIANS						
Florida gopher frog *Rana capito*				G3,G4,S3	1, 2, 4, 7	2
REPTILES						
American alligator *Alligator mississippiensis*	FT (S/A)	T(S/A)		G5, S4	2, 4	1
Eastern diamondback rattlesnake *Crotalus adamanteus*				G4,S3	1, 2, 6, 13	1
Eastern indigo snake Drymarchon corais cooperi	FT	LT		G4,T3,S3	1, 2, 7,13	1
Gopher tortoise *Gopherus polyphemus*	ST			G3,S3	1, 2, 6, 7,13	2
Florida pine snake *Pituophis melanoleucus mugitus*	ST			G4,T3?,S3	1, 2, 13	1
BIRDS						
Cooper's hawk *Accipiter cooperii*				G5,S3?	1, 2	1

Table 2: Imperiled Species Inventory						
Common and Scientific Name	**Imperiled Species Status**				**Management Actions**	**Monitoring Level**
	FWC	**USFWS**	**FDACS**	**FNAI**		
Bachman's sparrow *Aimophila aestivalis*				G3,S3	1, 2, 7	3
Roseate spoonbill *Platalea ajaja*	ST			G5,S2	2	1
Florida scrub-jay *Apheloma coerulescens*	FT	LT		G2,S2	1, 2, 6, 7, 8, 10,13	4
Limpkin *Aramus guarauna*				G5,S3	2	1
Burrowing owl *Athene cunicularia*	ST			G4 T3, S3	1, 2, 7	1
Crested caracara *Caracara cheriway*	FT	LT		G5,S2	1, 2, 13	1
Little blue heron *Egretta caerulea*	ST			G5,S4	2	1
Snowy egret *Egretta thula*				G5,S3	2	1
Tricolored heron *Egretta tricolor*	ST			G5,S4	2	1
Swallow-tailed kite *Elanoides forficatus*				*G5,S2*	2	1
White ibis *Eudocimus albus*				G5, S4	2	1

Table 2: Imperiled Species Inventory						
Common and Scientific Name	**Imperiled Species Status**				**Management Actions**	**Monitoring Level**
	FWC	**USFWS**	**FDACS**	**FNAI**		
Merlin *Falco columbarius*				G5, S2	1, 2	1
Peregrine falcon *Falco peregrinus*				G4,S2	1, 2	1
Magnificent frigatebird *Fregata magnificens*				G5, S1	2	1
Florida sandhill crane *Grus canadensis pratensis*	ST			G5T2T3,S2S3	1, 2, 13	1
American oystercatcher *Haematopus palliatus*	ST			G5,S2	2, 4	1
Bald eagle *Haliaeetus leucocephalus*				G4,S3	1, 2, 6, 7, 10	3
Worm-eating warbler *Helmitheros vermivorus*				G5,S1	1, 2	1
Least bittern *Ixobrychus exilis*				G5,S4	2	1
Wood stork *Mycteria americana*	FT	LT		G4,S2	2	1
Yellow-crowned night-heron *Nyctanassa violacea*				G5,S3	2	1

Table 2: Imperiled Species Inventory						
Common and Scientific Name	**Imperiled Species Status**				**Management Actions**	**Monitoring Level**
	FWC	**USFWS**	**FDACS**	**FNAI**		
Black-crowned night-heron *Nycticorax nycticorax*				G5,S3	2	1
Osprey *Pandion haliaetus*				G5,S3S4	2	1
Painted bunting *Passerina ciris*				G5,S3	2	1
Brown pelican *Pelecanus occidentalis*				G4,S3	2	1
Red-cockaded woodpecker *Picoides borealis*	FE	LE		G3, S2	1, 2, 3, 5, 7, 8, 13	4
Hairy woodpecker *Picoides villosus*				G5, S3	1, 2, 6, 7	1
Florida clapper rail *Rallus longirostris scottii*				G5TS?, S3?	2	1
Snail kite *Rostrhamus sociabilis plumbeus*	FE	LE		G4G5,T2	2	1
Black skimmer *Rhynchops niger*	ST			G5, S3	2	1
Louisiana waterthrush *Seiurus motacilla*				G5, S2	2	1

Table 2: Imperiled Species Inventory						
Common and Scientific Name	**Imperiled Species Status**				**Management Actions**	**Monitoring Level**
	FWC	**USFWS**	**FDACS**	**FNAI**		
American redstart *Setophaga ruticilla ruticilla*				G5, S2	2	1
Least tern *Sterna antillarum*	ST			G4, S3	2	1
Caspian tern *Sterna caspia*				G5, S2	2	1
Royal tern *Sterna maxima*				G5, S3	2	1
MAMMALS						
Florida manatee *Trichechus manatus latirostris*	FT	E		G2, S2	10, 13	3

Management Actions:

1. Prescribed Fire
2. Exotic Plant Removal
3. Population Translocation/Augmentation/Restocking
4. Hydrological Maintenance/Restoration
5. Nest Boxes/Artificial Cavities
6. Hardwood Removal
7. Mechanical Treatment
8. Predator Control
9. Erosion Control
10. Protection from visitor impacts (establish buffers)/law enforcement
11. Decoys (shorebirds)
12. Vegetation planting
13. Outreach and Education
14. Other

Monitoring Level:

Tier 1. Non-Targeted Observation/Documentation: includes documentation of species presence through casual/passive observation during routine park activities (i.e. not conducting species-specific searches). Documentation may be in the form of Wildlife Observation Forms, or other district specific methods used to communicate observations.

Tier 2. Targeted Presence/Absence: includes monitoring methods/activities that are specifically intended to document presence/absence of a particular species or suite of species.

Tier 3.	Population Estimate/Index: an approximation of the true population size or population index based on a widely-accepted method of sampling.
Tier 4.	Population Census: A complete count of an entire population with demographic analysis, including mortality, reproduction, emigration, and immigration.
Tier 5.	Other: may include habitat assessments for a particular species or suite of species or any other specific methods used as indicators to gather information about a particular species.

Detailed management goals, objectives and actions for imperiled species in this park are discussed in the Resource Management Program section of this component and the Implementation Component of this plan.

Exotic and Nuisance Species

Exotic species are plants or animals not native to Florida. Invasive exotic species are able to out-compete, displace or destroy native species and their habitats, often because they have been released from the natural controls of their native range, such as diseases, predatory insects, etc. If left unchecked, invasive exotic plants and animals alter the character, productivity and conservation values of the natural areas they invade.

Exotic animal species include non-native wildlife species, free ranging domesticated pets or livestock, and feral animals. Because of the negative impacts to natural systems attributed to exotic animals, the DRP actively removes exotic animals from state parks, with priority being given to those species causing the greatest ecological damage.

In some cases, native wildlife may also pose management problems or nuisances within state parks. A nuisance animal is an individual native animal whose presence or activities create special management problems. Examples of animal species from which nuisance cases may arise include venomous snakes or raccoons and alligators that are in public areas. Nuisance animals are dealt with on a case-by-case basis in accordance with the DRP's Nuisance and Exotic Animal Removal Standard.

Detailed management goals, objectives and actions for management of invasive exotic plants and exotic animals are discussed in the Resource Management Program section of this component.

<u>Plants</u>

As the private lands surrounding the park become more developed, the park faces urban interface issues and the borders are exponentially susceptible to encroachment of invasive/exotic plants. This area experienced a development boom from 2001-2004 and is once again experiencing a boom. Greater development pressure around the park means less control over the species that can enter the park by wind, water, rhizome, or carried by wildlife since there are few to no laws regulating private lands and non-native plants.

Prior to state acquisition, the property was in private ownership. While the state has done a very good job managing this park, there are inherit differences between private and state management strategies. As a state managing agency, the FPS relies on a host of outside agencies, contractors, and volunteers to help accomplish our resource management goals.

St. Sebastian is essentially broken up into four disjunct quadrants and is bisected by Interstate I-95 splitting the park into east and west segments and the C-54 and Fellsmere Canals splitting it into north and south segments. These canal levees are disturbed areas that require frequent mowing and maintenance. While the SJRWMD manages the levees in cooperation with the Army Corps they utilize contractors that can change on an annual basis to mow and cut the levees. These contractors may also be bringing non-native seed on to the park. The same applies to the Fellsmere Canal which is managed by the Fellsmere Water Control District. Interstate 95 right of way is maintained by the FDOT. While they do conduct invasive species management from time to time, these corridors are still a significant seed source of nonnative plants. St. Sebastian also contains two large powerline and gas line easements that traverse the property. These easements are also maintained by Florida Power and Light and Florida Gas Transmission and their associated contractors. These easements, canals, and roads traversing the park provide large open expanses of areas where invasive plants can establish and where offsite equipment can repetitively spread them greatly complicating the park's invasive exotic plant treatment program.

As discussed earlier in this plan, the park has experienced more than a century of hydrological disturbances. These ditches, canals, raised roadbeds, I-95, and utility easements have significantly disrupted the hydro-period of most wetland communities in the park and have directly led to the encroachment of weedy invasive plants within these areas. While efforts have been taken, and will continue to be taken to restore the hydrology to the greatest extent practical, some of these disturbances are permanent and cannot be restored. This contributes to the complications of the invasive exotic plant program.

St. Sebastian provides almost 70 miles of multi-use trails for hikers, bikers, and equestrian users. Concentrations of invasive exotics grasses have been documented along trails and near campsites and day use areas likely caused by the activities of some trail users.

St. Sebastian is approximately 22,000 acres and contains almost 3,000 infested acres of non-native invasive plants distributed throughout. While about one third of these infested acres are contained within the active cattle lease that was planted with exotic forage grasses such as Bahia and Hemarthria, nearly 2,000 infested acres remain. Since state acquisition a variety of efforts and approaches have been implemented to combat this problem. In all efforts, park staff are careful to use the most up to date herbicide type and rate recommendations provided by the University of Florida IFAS the Florida Exotic Pest Plant Council, AmeriCorps FLCC program, periodic OPS herbicide tech funding, FTE staff, and the use of the FWC Invasive Plant contractor program and herbicide bank have all been critical components in our multi-pronged approach to this problem. The integrity of St. Sebastian, its ecosystems, diversity, and protected species would be at a much greater risk if it were not for the efforts

of all these agencies and groups. Table 3 summarizes these efforts over the last decade.

Table 3. Exotic Invasive Plant Removal Completed					
Fiscal Year	**Infested Acres**	**Total Infested Acres Treated**	**Infested Acres Treated In-House**	**Infested Acres Treated FWC-IPM Contractor**	**Gross Areas Worked**
2005-06		3.075			
2006-07		86.816			
2007-08		27.560			
2008-09		41.750			
2009-10		609.675			
2010-11		465.500			
2011-12	2755.200	90.666	42.906	47.760	1099.500
2012-13	2755.200	95.312	95.312	0	2104.250
2013-14	2755.200	134.918	103.424	31.495	2667.500
2014-15	2751.400	212.903	152.028	60.875	3135.450
2015-16	2993.8	328.4			3580.3

St. Sebastian currently has 33 FLEPPC Category I and 18 Category II exotic plant species, but the most problematic species are briefly discussed below.

Cogongrass (*Imperata cylindrica*) is found throughout the entirety of the park and has been by far our most invasive and problematic species this past decade. This species is especially aggressive as it can spread by both seed and rhizome. This is often a plant that is brought in by off-site equipment and can be observed in abundance in both surrounding counties. Treatment of the plant is further complicated because the most effective herbicide is soil active and kills everything surrounding it and because of the deep rhizomes it is difficult to kill often requiring several treatments and monitoring. Cogon grass is also especially vicious because it has adapted to hydric conditions, mesic conditions, and xeric conditions and can be found in almost all natural communities at the park.

Old World Climbing Fern (*Lygodium microphyllum*) is an aggressive invader of wet areas and has been found on all four quadrants of the park. It is especially common in cypress strands and swamps and can grow to the tops of trees and from dense mats which shade the tree and the epiphytes growing on them. It also crowds out native ferns and other groundcover. The major concentrations are within the cypress domes of the Egan and Corrigan Tracts, the north prong of the Sebastian River, the seasonal creeks leading to the south prong, as well as the 13 linear ditches on the Platt Tract. Japanese climbing fern (*Lygodium japonicum*) has also been found on the park and is less abundant although considered a similar threat to Old world and will be treated the same.

Brazilian pepper (*Schinus terebenthifolius*) occurs primarily along the C-54 and Fellsmere Canals, the South prong of the St. Sebastian River, the various ditches, North Canal, and within Herndon swamp and its associated wetlands. Smaller scattered clumps and individuals are located all over the park. Park resources have been used to treat the smaller scattered clumps and FWC contractor resources have been used to treat the larger infestations located within Herndon Swamp. Cooperative agreements and grant funding will need to be sought in order to tackle the large infestations located on the eastern end of the C-54 canal, along the Fellsmere canals and our north property line.

Rosary Pea (*Abrus precatorius*) occurs in disturbed areas and shows an affinity for dry sites such as scrub, sandhill, and spoil. It is extremely difficult to eradicate due to very high seed production and high germination rate. Larger infestations occur north of the park's south residences, on the peninsula, and near the north shop area. Smaller infestations occur throughout the park.

Strawberry guava (*Psidium Cattleianum*) and Common guava (*Psidium guajava*) occur mainly within the management zones located on western side of our southwest quadrant, along the Fellsmere Canal and around most of the cultural homesteads in the park. Some of the Platt Tract used to be in active agriculture prior to state acquisition and contains several disturbed sites where a variety of exotics can get established. The park's western property boundary is adjacent to several 1, 5 and 10-acre ranchettes that intentionally planted guava as a desirable fruit bearing tree. This is also the case with most of the homestead cultural sites. Guava can be difficult to treat because it can form extremely dense stands of smaller stems that can form guava thicket forests that are difficult to navigate. FWC contractors have been utilized for initial treatments of these areas and AmeriCorps FLCC members have maintained the sites in the years following the initial treatments.

Melaleuca (*Melaleuca quinquinervia*) was initially found in about 70 scattered locations throughout the park in the late 1990s just after state acquisition. Most of the sites had only 50 trees and only four were more than an acre. Melaleuca was originally given top priority in invasive plant management and was under maintenance control. However, recent periods of extended water inundation have resulted in the emergence of many seedlings in these once maintained areas. Park resources have been recently directed back to the eradication of this species before it becomes a big problem once again.

Torpedo grass (*Panicum repens*) invades open wetland areas, displacing the native vegetative cover. It is mostly confined to disturbed areas such as wet roads through woods, road shoulders, ponds in pastures, and in the ditches that were filled through various mitigation projects. Although there is an abundance of torpedo grass at St. Sebastian, it seems to stay within these wetter disturbed areas and therefore priority has not been given to this species. The species will continue to be monitored to see if it does start to invade un-disturbed adjacent natural communities.

Limpo grass (Hemarthria altissima) occurs on the southeast quadrant of the park. It was intentionally planted as forage for cattle prior to state acquisition. Some of the limpo grass occurs within the existing active cattle lease but much of it occurs outside of the lease. The areas are extensive and cover hundreds of acres. Limpo grass is not treated at this time since a large comprehensive groundcover restoration plan would need to be funded and implemented in order to eradicate this exotic pasture grass.

Several other grasses including Natal grass (*Melinis repens*), Guinea grass (Panicum maximum), Jaragua (Hyparrhenia rufa), and Para grass (*Urochloa mutica*) are in scattered locations throughout the park. Grasses common for horse hay feed are often in abundance near equestrian use facilities and along trails. Priority is given to grasses that are invading restored and good quality natural communities or those occurring along fire lines so they are not spread during fire line prep work.

Table 3 contains a list of the Florida Exotic Pest Plant Council (FLEPPC) Category I and II invasive, exotic plant species found within the park (FLEPPC 2016). The table also identifies relative distribution for each species and the management zones in which they are known to occur. An explanation of the codes is provided following the table. For an inventory of all exotic species found within the park, see Addendum 5.

Table 4: Inventory of FLEPPC Category I and II Exotic Plant Species

Common and Scientific Name	FLEPPC Category	Distribution	Management Zone (s)
PLANTS			
Abrus precatorius - Rosary pea	I	2	SSR-001s, SSR-002, SSR-006, SSR-020e, SSR-020w, SSR-036, SSR-040s, SSR-063n, SSR-071, SSR-073w, SSR-078w, SSR-083e, SSR-090s, SSR-092
		3	SSR-058e, SSR-072, SSR-130
Alternanthera philoxeroides - Alligatorweed	II	2	SSR-68
Casuarina cunninghamiana - River she oak	II	2	SSR-005s
Casuarina equisetifolia - Australian-pine	I	1	SSR-109, SSR-125
Cinnamomum camphora - Camphor-tree	I	2	SSR-037, SSR-083e, SSR-106se, SSR-109, SSR-131

Table 4: Inventory of FLEPPC Category I and II Exotic Plant Species			
Common and Scientific Name	**FLEPPC Category**	**Distribution**	**Management Zone (s)**
Colocasia esculenta - Wild taro	I	2	SSR-110, SSR-125
Cupaniopsis anacardioides - Carrotwood	I	2	SSR-011n
Dactyloctenium aegyptium – Durban crowfootgrass	II	2	SSR-43, SSR 99
Dioscorea bulbifera - Air-potato	I	2	SSR-001n, SSR-001s, SSR-002, SSR-052e, SSR-055c, SSR-055n, SSR-055s, SSR-110, SSR-126
		3	SSR-125
Epipremnum pinnatum – Golden pothos	II	2	SSR-44, SSR-45
Eugenia uniflora - Surinam cherry	I	2	SSR-036
Hemarthria altissima - Limpo grass	II	2	SSR-116
		3	SSR-060n, SSR-060w, SSR-064n, SSR-115, SSR-117, SSR-120
		4	SSR-060s, SSR-060se, SSR-063s, SSR-064e
Hydrilla verticillata - Waterthyme	I	3	SSR-76, SSR-79, SSR-80
Hyparrhenia rufa - Jaragua	II	2	SSR-006
Imperata cylindrica - Cogon grass	I	1	SSR-077

Table 4: Inventory of FLEPPC Category I and II Exotic Plant Species			
Common and Scientific Name	**FLEPPC Category**	**Distribution**	**Management Zone (s)**
		2	SSR-003n, SSR-005s, SSR-006, SSR-007, SSR-008w, SSR-012, SSR-013, SSR-014, SSR-016n, SSR-016s, SSR-017, SSR-018, SSR-020w, SSR-021e, SSR-025, SSR-036, SSR-039c, SSR-044, SSR-045, SSR-047ne, SSR-047se, SSR-047w, SSR-048, SSR-060e, SSR-062s, SSR-063n, SSR-064n, SSR-064s, SSR-070, SSR-071, SSR-072, SSR-074, SSR-076, SSR-078w, SSR-079, SSR-083e, SSR-083w, SSR-084, SSR-085, SSR-086, SSR-087, SSR-088, SSR-089n, SSR-089s, SSR-090s, SSR-093, SSR-094w, SSR-105e, SSR-106ne, SSR-109, SSR-111, SSR-112, SSR-113, SSR-114, SSR-115, SSR-116, SSR-117, SSR-118, SSR-119, SSR-120, SSR-124, SSR-128, SSR-130,SSR-131
		3	SSR-015, SSR-041, SSR-042, SSR-043, SSR-052w
Jasminum fluminense - Brazilian jasmine	I	2	SSR-131
		3	SSR-083w
Lantana camara - Lantana	I	1	SSR-129

Table 4: Inventory of FLEPPC Category I and II Exotic Plant Species			
Common and Scientific Name	**FLEPPC Category**	**Distribution**	**Management Zone (s)**
		2	SSR-036, SSR-043, SSR-052e, SSR-057, SSR-061, SSR-073e, SSR-094w, SSR-101e, SSR-130
Leucaena leucocephala - Lead tree	II	2	SSR-043
Ligustrum lucidum – Glossy privet	I	2	SSR-36
Ludwigia peruviana – Peruvian primrosewillow	I	3	SSR-83E
Luziola subintegra - Tropical american water grass	I	2	SSR-120
Lygodium japonicum - Japanese climbing fern	I	2	SSR-083w, SSR-084, SSR-087
Lygodium microphyllum - Old world climbing fern	I	1	SSR-004
		2	SSR-001s, SSR-002, SSR-003n, SSR-005n, SSR-008e, SSR-009, SSR-011s, SSR-029w, SSR-030, SSR-033, SSR-034, SSR-036, SSR-044, SSR-046, SSR-055n, SSR-056s, SSR-081, SSR-084, SSR-085, SSR-087, SSR-090s, SSR-092, SSR-094w, SSR-109

Table 4: Inventory of FLEPPC Category I and II Exotic Plant Species			
Common and Scientific Name	**FLEPPC Category**	**Distribution**	**Management Zone (s)**
		3	SSR-001n, SSR-029e, SSR-045, SSR-051, SSR-069, SSR-086
Macroptilium lathyroides – Wild bushbean	II	2	SSR-60E, SSR-119, SSR-117
Melaleuca quinquenervia - Melaleuca	I	1	SSR-003n, SSR-004, SSR-008e, SSR-010, SSR-037, SSR-102, SSR-107
		2	SSR-005n, SSR-009
Melia azerdarach – Chinaberry	II	2	SSR-35S, SSR-39C, SSR-39N
Melinis repens - Natal grass	I	2	SSR-059se
Momordica charantia - Balsampear	II	2	SSR-47E, SSR-40S
Nephrolepis cordifolia - Tuberous sword fern	I	2	SSR-036, SSR-083w, SSR-106se
Neyraudia reynaudiana - Burma reed	I	2	SSR-044, SSR-073w, SSR-125
Panicum maximum - Guinea grass	II	2	SSR-036, SSR-038, SSR-083w
Panicum repens - Torpedo grass	I	2	SSR-003n, SSR-004, SSR-005n, SSR-008e, SSR-009, SSR-020w, SSR-021e, SSR-031, SSR-032, SSR-033, SSR-036, SSR-037, SSR-038, SSR-040s, SSR-047ne, SSR-047w, SSR-083e, SSR-131

Table 4: Inventory of FLEPPC Category I and II Exotic Plant Species			
Common and Scientific Name	**FLEPPC Category**	**Distribution**	**Management Zone (s)**
		3	SSR-030, SSR-034, SSR-042, SSR-
Pennisetum purpureum - Elephantgrass	I	2	SSR-11N, SSR-23E2
Phoenix reclinata - Senegal date palm	II	2	SSR-036, SSR-073e, SSR-083w, SSR-084, SSR-109
Pistia stratiotes – Water-lettuce	I	3	SSR-62N
Psidium cattleianum - Strawberry guava	I	1	SSR-071
		2	SSR-036, SSR-083w, SSR-084, SSR-087, SSR-109, SSR-134
Psidium guajava - Guava	I	1	SSR-038, SSR-062n
		2	SSR-012, SSR-083e, SSR-083w, SSR-090s, SSR-102, SSR-134
Rhynchelytrum repens – Rose natalgrass	I	2	SSR-60N, SSR-76, SSR-80, SSR-101W
Ricinus communis - Castor bean	II	1	SSR-037, SSR-070
Sansevieria hyacinthoides - Bowstring hemp	II	2	SSR-038
Sapium sebiferum - Chinese tallow tree	I	1	SSR-038
		2	SSR-131, SSR-134
Schefflera actinophylla - Schefflera	I	1	SSR-071
		2	SSR-083w, SSR-131
Schinus terebinthifolius - Brazilian pepper	I	2	SSR-005s, SSR-007, SSR-011n, SSR-014,

Schinus terebinthifolius - Brazilian pepper	I	2	SSR-005s, SSR-007, SSR-011n, SSR-014, SSR-014A, SSR-015, SSR-016n, SSR-016s, SSR-017, SSR-018, SSR-019, SSR-025, SSR-026, SSR-030, SSR-032, SSR-036, SSR-037, SSR-039s, SSR-040s, SSR-043, SSR-044, SSR-046, SSR-047e, SSR-047se, SSR-048, SSR-053, SSR-054c, SSR-054n, SSR-054s, SSR-055n, SSR-056s, SSR-057, SSR-059n, SSR-062n, SSR-063n, SSR-064n, SSR-064s, SSR-067, SSR-068, SSR-072, SSR-073e, SSR-076, SSR-077, SSR-079, SSR-080, SSR-085, SSR-086, SSR-087, SSR-089n, SSR-089s, SSR-090s, SSR-092, SSR-102, SSR-104, SSR-105e, SSR-106ne, SSR-107, SSR-111, SSR-112, SSR-114, SSR-115, SSR-116, SSR-117, SSR-118, SSR-119, SSR-120, SSR-124

Table 4: Inventory of FLEPPC Category I and II Exotic Plant Species			
Common and Scientific Name	**FLEPPC Category**	**Distribution**	**Management Zone (s)**
	I	3	SSR-001n, SSR-001s, SSR-002, SSR-012, SSR-031, SSR-041, SSR-042, SSR-042A, SSR-047, SSR-047w, SSR-052e, SSR-055c, SSR-055s, SSR-058e, SSR-065s, SSR-070, SSR-071, SSR-073w, SSR-078w, SSR-083e, SSR-093, SSR-094e, SSR-101e, SSR-101w, SSR-103, SSR-106se, SSR-108, SSR-110, SSR-113, SSR-125, SSR-126, SSR-127, SSR-128, SSR-130, SSR-134
		4	SSR-084, SSR-094w, SSR-109
Sesbania punicea - Purple sesban	II	2	SSR-057
Solanum diphyllum – Twoleaf nightshade	II	2	SSR-55S
Solanum viarum - Tropical soda apple	I	1	SSR-115
		2	SSR-111, SSR-112, SSR-113, SSR-114, SSR-117, SSR-118, SSR-119
		3	SSR-047ne
Sphagneticola trilobata - Wedelia	II	2	SSR-073e
Tradescantia spathacea - Oysterplant	II	2	SSR-28W

Table 4: Inventory of FLEPPC Category I and II Exotic Plant Species			
Common and Scientific Name	**FLEPPC Category**	**Distribution**	**Management Zone (s)**
Urena lobata - Caesar's weed	I	2	SSR-011n, SSR-012, SSR-014, SSR-026, SSR-036, SSR-070, SSR-083w
Urochloa mutica - Para grass	I	2	SSR-044, SSR-089n, SSR-125

Distribution Categories:

0 No current infestation: All known sites have been treated and no plants are currently evident.

1 Single plant or clump: One individual plant or one small clump of a single species.

2 Scattered plants or clumps: Multiple individual plants or small clumps of a single species scattered within the gross area infested.

3 Scattered dense patches: Dense patches of a single species scattered within the gross area infested.

4 Dominant cover: Multiple plants or clumps of a single species that occupy a majority of the gross area infested.

5 Dense monoculture: Generally, a dense stand of a single dominant species that not only occupies more than a majority of the gross area infested, but also covers/excludes other plants.

6 Linearly scattered: Plants or clumps of a single species generally scattered along a linear feature, such as a road, trail, property line, ditch, ridge, slough, etc. within the gross area infested.

Exotic Animals

Feral hogs (*Sus scrofa*) are the most serious exotic animal problem on the park. They occur throughout and can cause significant ecological damage unless their numbers are kept low. Hogs were introduced to Florida by Spanish explorers in the early 1500s. They are voracious predators of ground nesting birds, snakes, and have been known to eat new born deer. They are omnivorous and dig up large patches of earth looking for tubers and roots. They create patches of disturbed soil throughout the park, which in turn provide perfect habitat for a number of undesirable exotic plant species. Wild hogs in Florida are known to carry 47 different parasitic and infectious diseases, including pseudorabies and brucellosis. (Forrester 1992).

In this part of Florida feral hogs breed year-round, and a sow can produce four to twelve piglets per litter. Eradication has been attempted in natural areas throughout the state, but has never been achieved. It is difficult to remove every pig on a property, and even if removal is successful, more pigs immigrate from neighboring properties. The best that can be hoped for is to keep population levels low.

At St. Sebastian, the ground cover of several wetland systems has been completely destroyed and a hooded pitcher plant site was almost lost due to the destructive habits of feral hogs.

In efforts to diminish feral hog populations the park uses three strategies; approved contractors, park staff, and a volunteer trapping program. Table 5 reflects park efforts over the last decade to reduce feral hogs at the park is below. In this past decade, the park has removed 4,161 feral hogs. While this has certainly helped, more efforts are needed to combat the problem.

Table 5. Feral Hog Removal	
Fiscal Year	**Feral Hogs (Total #)**
2005-06	82
2006-07	339
2007-08	592
2008-09	480
2009-10	413
2010-11	430
2011-12	573
2012-13	641
2013-14	416
2014-15	195
2015-16	250

Other exotic animal species inhabiting the park include Coyote, Cuban Tree Frog, and several freshwater/brackish water fish including, African Jewelfish (*Hemichromis letourneuxi*), Tilapia (*Oreochromis sp*.), Armored catfish (*Loricariidae sp.*), and walking catfish (*Clarias batrachus*). Park staff does not actively pursue coyote but if seen passively they are eliminated. Exotic fish species are extremely difficult to eradicate as they can easily transfer from one water body to the next during high water periods in the park. Staff works closely with FWC fisheries experts to become knowledgeable of any new efforts or methodologies to eliminate these aggressive exotic fish.

Special Natural Features

The St. Sebastian River Preserve State Park is the largest upland property in public ownership in the Indian River/south Brevard County region. The site also contains excellent examples of scrub community type and the only undeveloped sandhill habitat in Brevard County. As mentioned earlier, the SSRP comprised the largest portion of the south Brevard-Indian River-St. Lucie metapopulation of Florida scrub-jays which is the fourth largest metapopulation in the state. Due to extensive groundcover and mid-story restoration over the last decade, SSRPSP has been described as having some of the best examples of mesic flatwoods in the state.

As an interesting historical note, in 1889 the famous ornithologist Frank Chapman made a journey to the headwaters of the St. Sebastian River in search of Carolina parakeets. He found about 50 of these rapidly disappearing birds during the week. In a paper dated November 1, 1889, Frank Chapman described the St. Sebastian River – "The Sebastian is a beautiful river; no words of mine can adequately describe it. Half a mile wide at its mouth, it narrows rapidly, and three miles above

appears as a mere stream which at our camp, eight miles up, was not more than fifty feet in width and about fifteen in depth. Its course is exceedingly irregular and winding; the banks as we found them are high and for some distance from the water densely grown with palms and cypresses which, arching, meet overhead, forming most enchanting vistas, and in many places, there was wild profusion of blooming convolvulus [morning glory] and moon flower. Immediately back of this semi-tropical growth appeared the pines, which extended as far back as the eye could reach, with occasional openings termed 'prairies', varying in extent from two or three to as many as a hundred acres, where the trees were replaced by a species of tall grass growing scantily in the shallow water which flooded these meadows." (Chapman 1889)

Cultural Resources

This section addresses the cultural resources present in the park that may include archaeological sites, historic buildings and structures, cultural landscapes and collections. The Florida Department of State (FDOS) maintains the master inventory of such resources through the Florida Master Site File (FMSF). State law requires that all state agencies locate, inventory and evaluate cultural resources that appear to be eligible for listing in the National Register of Historic Places. Addendum 7 contains the FDOS, Division of Historical Resources (DHR) management procedures for archaeological and historical sites and properties on state-owned or controlled properties; the criteria used for evaluating eligibility for listing in the National Register of Historic Places, and the Secretary of Interior's definitions for the various preservation treatments (restoration, rehabilitation, stabilization and preservation). For the purposes of this plan, significant archaeological site, significant structure and significant landscape means those cultural resources listed or eligible for listing in the National Register of Historic Places. The terms archaeological site, historic structure or historic landscape refer to all resources that will become 50 years old during the term of this plan.

Condition Assessment

Evaluating the condition of cultural resources is accomplished using a three-part evaluation scale, expressed as good, fair and poor. These terms describe the present condition, rather than comparing what exists to the ideal condition. Good describes a condition of structural stability and physical wholeness, where no obvious deterioration other than normal occurs. Fair describes a condition in which there is a discernible decline in condition between inspections, and the wholeness or physical integrity is and continues to be threatened by factors other than normal wear. A fair assessment is usually a cause for concern. Poor describes an unstable condition where there is palpable, accelerating decline, and physical integrity is being compromised quickly. A resource in poor condition suffers obvious declines in physical integrity from year to year. A poor condition suggests immediate action is needed to reestablish physical stability.

Level of Significance

Applying the criteria for listing in the National Register of Historic Places involves the use of contexts as well as an evaluation of integrity of the site. A cultural resource's significance derives from its historical, architectural, ethnographic or archaeological context. Evaluation of cultural resources will result in a designation of NRL (National Register or National Landmark Listed or located in an NR district), NR (National Register eligible), NE (not evaluated) or NS (not significant) as indicated in the table at the end of this section.

There are no criteria for determining the significance of collections or archival material. Usually, significance of a collection is based on what or whom it may represent. For instance, a collection of furniture from a single family and a particular era in connection with a significant historic site would be considered highly significant. In the same way, a high-quality collection of artifacts from a significant archaeological site would be of important significance. A large herbarium collected from a specific park over many decades could be valuable to resource management efforts. Archival records are most significant as a research source. Any records depicting critical events in the park's history, including construction and resource management efforts, would all be significant.

The following is a summary of the FMSF inventory. In addition, this inventory contains the evaluation of significance.

Prehistoric and Historic Archaeological Sites
Desired future condition: All significant archaeological sites within the park that represent Florida's cultural periods or significant historic events or persons are preserved in good condition in perpetuity, protected from physical threats and interpreted to the public.

Description: There are currently 13 FMSF recognized archeological sites located within the boundaries of St. Sebastian River Preserve State Park. These include sites containing prehistoric artifacts and shell middens, and turpentine camps and homesteads.

Condition Assessment: Of the sites at the park, nine are considered to be in poor condition. These assessments are based on a variety of factors including erosion, exotic plant and animal encroachment, and/or the lack of site evidence remaining on park property. The remaining sites are considered to be in fair or good condition and are currently being utilized by the park or have had no significant changes to the site since the last assessment in 2001.

General Management Measures: Park staff will continue to remove exotic invasive plant and animal species located within and encroaching on these sites. Monitoring efforts will include identifying erosion and other factors that may cause deterioration and/or destabilization of these sites and taking corrective measures to reduce further deterioration.

Description: 8BR1780, the Herndon Homestead, was built around 1889 and burned in the early 1940s.

Condition Assessment: The site is only a surface scatter of debris and whatever underground features may exist, therefore the condition assessment is poor. Since it is a known historic house site, development should be sited elsewhere, to avoid the site (Florida Department of State, Florida Master Site File: 8BR1780, Vojnovski et al. 2001).

Description: 8BR1781, Yates Homestead/Wilbur's Hammock, was originally planted in citrus, and currently exists as fencing debris, scrap, and a well point.

Condition Assessment: The condition assessment is poor (Florida Department of State, Florida Master Site File: 8BR1781, Vojnovski et al. 2001).

General Management Measures: Due to the site isolation and remoteness, this provides necessary protection from visitor impacts. For any future horseback / hiking trails, consider routing away from this site, or interpretive signage if trail passes.

Description: 8BR1782, the Graves Brothers Lumber/Turpentine Camp, is a 1930s-satellite camp for the Graves brothers' turpentine and logging operation. All that survives is a row of burnt posts, and piers from a small structure, now destroyed.

Condition Assessment: The condition assessment is poor. Staff should protect the remaining wooden posts and piers from additional burning during controlled burns by raking the site to reduce or remove the fuel load (Florida Department of State, Florida Master Site File: 8BR1782, Vojnovski et al. 2001).

General Management Measures: Measures will be taken to protect remaining post from fire under prescribed conditions.

Description: 8BR1783, the Survey Marker Midden, named for the 1964 U.S. Army Corps of Engineers survey marker located to the south of the site, is a dirt/bone/shell midden dating to the Malabar I culture.

Condition Assessment: The site does not appear to have been disturbed, and the condition assessment is good (Florida Department of State, Florida Master Site File: 8BR1783, Vojnovski et al. 2001).

General Management Measures: Monitor site for deterioration from river induced erosion.

General Management Measures: Identify and reduce vegetation, potential interpretation.

Description: 8BR1813, the Hardee Point Midden, is a Malabar I-II cultural period shell midden on a bluff on the west side of the St. Sebastian River.

Condition Assessment: The site is being eroded by the river, and because of that threat, the condition assessment is poor. Site stabilization is recommended (Florida Department of State, Florida Master Site File: 8BR1813, Vojnovski et al. 2001).

General Management Measures: Erosion activity for this site is ongoing due to location along river's edge. Site stabilization is recommended. Information regarding the quantification of the frequency and severity has not been maintained and as such was not available. Monitor site to determine exact impact to the site.

Description: 8BR1824, the Frank Hunter Homestead, originally comprised three to five houses, all of which had burned by the early 1950s. Today all that remains of the homesteads are the ruins of associated cow pens. Currently there is insufficient information to determine if the site is eligible for the National Register of Historic Places.

Condition Assessment: The condition assessment is poor (Florida Department of State, Florida Master Site File: 8BR1824, Vojnovski et al. 2001).

Description: 8IR851, the Carlton House, was originally built in the neoclassical style at some point after 1895, by John B. Carlton. In the late 1930s or early 1940s his son, Chester Carlton, tore down the house and reduced it to standing wall sections and foundations.

Condition Assessment: The condition assessment is poor. The ruins should be protected, preserved and interpreted for park visitors. Currently there is not sufficient information to determine if the site is eligible for the National Register (Florida Department of State, Florida Master Site File: 8IR851, Vojnovski et al. 2001).

General Management Measures: Monitor site structure from human impact. Consider interpretive panel for visitor's education of this historical site.

Description: 8IR852, the River Bluff Shell Scatter, was recorded by David Dickel in 1992 as located on a bluff overlooking the St. Sebastian River. The 2001 CARL survey was unable to relocate this site, which perhaps has eroded away or been buried by shifting sand and vegetation. The condition assessment is unknown and perhaps destroyed (Florida Department of State, Florida Master Site File: 8IR852, Vojnovski et al. 2001).
Condition Assessment: Site location unknown, therefore assessment is Unknown.
General Management Measures: Monitor site for erosion from the river bank due to wave action and fluctuations in water levels.
Description: 8IR987, Creek Crossing, is the remains of an early 20th century bridge that crossed an unnamed creek.
Condition Assessment: Two timbers are all that survive; therefore, the condition assessment is poor (Florida Department of State, Florida Master Site File: 8IR987, Vojnovski et al. 2001).

General Management Measures: Wooden bridge has a current impact with natural deterioration due to age and partial immersion in the creek. Human impact with hiking and horseback riders may cause further damage to this cultural site.

Description: 8IR992, the Fire Break Structures, are a complex of early 20th century structural remains, made of poured concrete, of uncertain use.
Condition Assessment: The structures were damaged during the construction of a fire break, and the condition assessment is poor (Florida Department of State, Florida Master Site File: 8IR992, Vojnovski et al. 2001).
General Management Measures: Remove vegetation, and protect structure from tractor work.

Description: 8IR993, the Frankie and Tony's Site, is a surface scatter and brick pile at the location of a house occupied by the two men named above, who farmed the site in the 1930s.

Condition Assessment: No ruins of the house survive, and the condition assessment is poor (Florida Department of State, Florida Master Site File: 8IR993, Vojnovski et al. 2001).

Description: 8IR994, the Sam Dale Site, is the general site of an early 20th century homestead and farm, the ruins of which have now vanished.
Condition Assessment: The condition assessment is poor (Florida Department of State, Florida Master Site File: 8IR994, Vojnovski et al. 2001).

Description: 8IR995, the Yates 2 Site, is the general site of an early 20th century homestead and farm of William D. Yates, who cut and delivered firewood off the property.

Condition Assessment: No ruin of any structure survives, and the condition assessment is poor (Florida Department of State, Florida Master Site File: 8IR995, Vojnovski et al. 2001).

Resource Group

Desired Future Condition: All significant resource groups within the park that represent Florida's cultural periods or significant historic events or persons are preserved in good condition in perpetuity, protected from physical threats and interpreted to the public.

Description: 8IR990, the Hernandez-Capron Trail, is a separate section of the same Hernandez-Capron Trail listed above as 8BR1766, and is likely eligible for the National Register.

Condition Assessment: The condition assessment is also good (Florida Department of State, Florida Master Site File: 8IR990, Vojnovski et al. 2001).

General Management Measures: Identify, and reduce encroachment.

Description: 8IR988, the Graves Brothers Tram Line, is the surviving roadbed of an early 20th century logging tram rail line.
Condition Assessment: Most of the rails were removed at the end of the logging lease. The condition assessment is poor (Florida Department of State, Florida Master Site File: 8IR988, Vojnovski et al. 2001).

General Management Measures: Identify extent of location, and ensure ground disturbance is avoided.

Description: 8IR989, the Dinky Line or Trans-Florida Central Railway, is the surviving roadbed of an early to mid-20th century freight and passenger standard gauge rail line that ran across the park from Sebastian to Fellsmere and Broadmoor.

Condition Assessment: Most of the rails have been removed. There are two separate surviving sections of the roadbed, each section labeled with the same FMSF number. The condition assessment is good (Florida Department of State, Florida Master Site File: 8IR989, Vojnovski et al. 2001).

General Management Measures: Continue to remove vegetation of tram bed, ensure Interpretation of the site.

Description: 8BR1766, the Hernandez-Capron Trail, was built by Brigadier General Joseph M. Hernandez, commander of the East Florida Militia, during the Second Seminole War. The trail linked St. Augustine with Fort Pierce at St. Lucie. After the war, the new road allowed settlers to move into the Brevard/Indian River area, and ranchers used it to move cattle until the 1970s. Because of its importance as a major transportation route, especially during the Second Seminole War, and its association with Hernandez, the trail is probably eligible for listing in the National Register of Historic Places.

Condition Assessment: The trail has become overgrown with vegetation within the park, and its condition assessment is good (Florida Department of State, Florida Master Site File: 8BR1766, Vojnovski et al. 2001).

General Management Measures: Identify and reduce vegetation, potential interpretation.

Description: 8IR1182, Fellsmere Drainage, is a small drainage canal that was dredged in the first half of the 20th century and is ineligible for listing in the National Register.

(Florida Department of State, Florida Master Site File: 8IR1182, Ambrosino, 2006)

Description: 8IR1206, Circle F Ranch Cattle Pens, is a rural historic landscape dating back to the establishment of Circle F Ranch in 1946 by J. Arthur Pancoast and C. B. Moak. Associated structures include the Pancoast-Moak Foreman's Residence (8IR991) and the Circle F Shop (8BR1827).

(Florida Department of State, Florida Master Site File: 8IR1206, Coll, 2007)

Historic Structures

Desired future condition: All significant historic structures and landscapes that represent Florida's cultural periods or significant historic events or persons are preserved in good condition in perpetuity, protected from physical threats and interpreted to the public.

Description: There are three historic structures on the park. These structures are remnants of the Circle F Ranch and are currently being utilized as shop building, bunkhouse and residence areas.

8BR1784, the Hanshaw/Widener House or L-House site, is the location of a 1920s homestead, now torn down, and the 1950s L-shaped ranch style house that replaced it on the same site. The horse barn dates to 1947, the dock to 1951 and a garage apartment east of the barn housed the construction workers building the L-House. The L-House itself was always used as a retreat by absentee landowners, but now is the residence of the park manager. Hardee Point Midden, a large Malabar I-II period site, is just to the north, and probably extends south onto the house site. There is not sufficient information on the site to determine if it is eligible for the National Register of Historic Places.

Condition Assessment: The condition assessment is good (Florida Department of State, Florida Master Site File: 8BR1784, Vojnovski et al. 2001).
General Management Measures: There has been evidence of Powder post beetle activity at site. Actions have been taken to eliminate the infestation in the Garage house. Continue to monitor site for activity.
Description: 8IR991, the Pancoast-Moak Residence, is a frame vernacular structure built in 1948 as the foreman's residence and office for the cattle ranch. This facility has been renovated as the park's bunkhouse used for researchers, AmeriCorps program members, and fire personnel.
Condition Assessment: The condition assessment is good (Florida Department of State, Florida Master Site File: 8IR991, Vojnovski et al. 2001).
Description: 8IR1207, the Circle F Shop, is a late 1940s ranch barn. Currently the park uses the facility for equipment storage and repair.
Condition Assessment: The condition assessment is good (Florida Department of State, Florida Master Site File: 8IR1207, Vojnovski et al. 2001).
General Management measures: The facilities are being utilized and maintained.

<u>Collections</u>

Desired future condition: All historic, natural history and archaeological objects within the park that represent Florida's cultural periods, significant historic events or persons, or natural history specimens are preserved in good condition in perpetuity, protected from physical threats and interpreted to the public.
Description: o6a.165.1.1 DHR Loaned Turpentine Cat face with nails and gutters, used for interpretation in the park's Visitor Center.

Condition Assessment: The loaned collection is stored in a climate controlled building protected by a collection case, therefore its condition is considered to be good.

General Management Measures: The collections are stored in locked case and climate controlled building. The protection and interpretation of this exhibit are the best way to ensure it stays in good condition.

Detailed management goals, objectives and actions for the management of cultural resources in this park are discussed in the Cultural Resource Management Program section of this component. Table 4 contains the name, reference number, culture or period, and brief description of all the cultural sites within the park that are listed in the Florida Master Site File. The table also summarizes each site's level of significance, existing condition and recommended management treatment. An explanation of the codes is provided following the table.

Table 6. Cultural Sites Listed in the Florida Master Site File					
Site Name and FMSF #	**Culture / Period**	**Description**	**Significance**	**Condition**	**Treatment**
8BR1780 Hearndon Homestead	Historic/Late 19th-early 20th century	Archaeological Site	NE	G	P
8BR1781 Yates Homestead Wilbur's Hammock	Historic/Late 19th – early 20th century	Archaeological Site	NE	G	P
8BR1782 Graves Brothers Lumber/Turp Camp	Historic/Early 20th century – 1930's	Archaeological Site	NE	F	P
8BR1783 Survey Marker Midden	Historic/Unspecified	Archaeological Site	NE	G	ST
8BR1784 Hanshaw/Widener House	Historic/ 1920's-1950's	Historic Structure	NE	G	P
8IR1182 Fellsmere Drainage	Historic/Unspecified	Resource Group	NE	F	P
8IR1206 Circle F Ranch Cattle Pens	Historic/Unspecified	Resource Group	NE	F	P
8BR1766 Hernandez Trail	Historic/Unspecified	Resource Group	NE	G	P
8BR1813 Hardee Point Midden	Historic/Unspecified	Archaeological Site	NE	P	ST
8BR1824 Frank Hunter Homestead	Historic/19th Century-20th Century	Archaeological Site	NE	P	P
8IR851 Carlton House	Historic/Early 1920's – 1940's	Archaeological Site	NE	F	P
8IR852 River Bluff Shell Scatter	Prehistoric/Unspecified	Archaeological Site	NE	P	ST

Table 6. Cultural Sites Listed in the Florida Master Site File					
Site Name and FMSF #	**Culture/Period**	**Description**	**Significance**	**Condition**	**Treatment**
8IR987 Creek Crossing	Historic/Early to Mid-19th century	Archaeological Site	NE	P	P
8IR988 Graves Brothers Tram Railroad	Historic/Unspecified	Resource Group	NE	P	P
8IR989 Trans Florida Central Railroad	Historic/Early 20th Century	Resource Group	NE	G	P
8IR990Hernendez Capron Trail Indian River County	Historic/Unspecified	Resource Group	NE	G	P
8IR991 Forman's Residence/Bunkhouse	Historic/1948	Historic Structure	NE	G	P
8IR992 Fire Break Structures	Historic/1910-1930's	Archaeological Site	NE	P	P
8IR993 Frankie and Tony's Homestead	Historic/1930-1940's	Archaeological Site	NE	P	P
8IR994 Sam Dale Homestead	Historic/1930's	Archaeological Site	NE	P	P
8IR995 Yates Homestead #2	Historic/Early 20th Century	Archaeological Site	NE	P	P
8IR1207 Circle F Shop	Historic/Late 1940's	Historic Structure	NE	G	P

Significance:

NRL National Register listed
NR National Register eligible
NE not evaluated
NS not significant

Condition

G	Good
F	Fair
P	Poor
NA	Not accessible
NE	Not evaluated

Recommended Treatment:

RS	Restoration
RH	Rehabilitation
ST	Stabilization
P	Preservation
R	Removal
N/A	Not applicable

Resource Management Program

Management Goals, Objectives and Actions

Measurable objectives and actions have been identified for each of the DRP's management goals for St. Sebastian River Preserve State Park. Please refer to the Implementation Schedule and Cost Estimates in the Implementation Component of this plan for a consolidated spreadsheet of the recommended actions, measures of progress, target year for completion and estimated costs to fulfill the management goals and objectives of this park.

While, the DRP utilizes the ten-year management plan to serve as the basic statement of policy and future direction for each park, a number of annual work plans provide more specific guidance for DRP staff to accomplish many of the resource management goals and objectives of the park. Where such detailed planning is appropriate to the character and scale of the park's natural resources, annual work plans are developed for prescribed fire management, exotic plant management and imperiled species management. Annual or longer- term work plans are developed for natural community restoration and hydrological restoration. The work plans provide the DRP with crucial flexibility in its efforts to generate and implement adaptive resource management practices in the state park system.

The work plans are reviewed and updated annually. Through this process, the DRP's resource management strategies are systematically evaluated to determine their effectiveness. The process and the information collected is used to refine techniques, methodologies and strategies, and ensures that each park's prescribed management actions are monitored and reported as required by Sections 253.034 and 259.037, Florida Statutes.

The goals, objectives and actions identified in this management plan will serve as the basis for developing annual work plans for the park. The ten-year management plan is based on conditions that exist at the time the plan is developed. The annual work plans provide the flexibility needed to adapt to future conditions as they change during the ten-year management planning cycle. As the park's annual work plans are implemented through the ten-year cycle, it may become necessary to adjust the management plan's priority schedules and cost estimates to reflect these changing conditions.

Natural Resource Management

Hydrological Management

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

The natural hydrology of most state parks has been impaired prior to acquisition to one degree or another. Florida's native habitats are precisely adapted to natural drainage patterns and seasonal water level fluctuations, and variations in these factors frequently determine the types of natural communities that occur on a particular site. Even minor changes to natural hydrology can result in the loss of plant and animal species from a landscape. Restoring state park lands to original natural conditions often depends on returning natural hydrological processes and conditions to the park. This is done primarily by filling or plugging ditches, removing obstructions to surface water "sheet flow," installing culverts or low-water crossings on roads, and installing water control structures to manage water levels.

Objective A: Conduct/obtain an assessment of the park's hydrological restoration needs.

Action 1 Develop a comprehensive hydrological restoration plan for the entire park

Due to the complexity of the hydrological alterations that have occurred throughout the park's history, it is imperative that a park specific comprehensive hydrologic study and subsequent hydrological restoration plan be developed before any large-scale restoration takes place. Completion of a comprehensive hydrology study would help managers better assess potential off-site impacts and problems while affecting the greatest level of restoration possible. Although the park is broken up into 4 quadrants, it would be difficult to study each quadrant independently since they are connected via large box culverts under I-95. However, to reduce cost, it may be possible to first conduct a study of the north side, and then proceed with the south side independent of one another. Hopefully this study will be conducted as soon as possible since the information gleaned from the results will allow the park to proceed.

Objective B: Restore natural hydrological conditions and functions to natural communities throughout park.

The acreage of hydrological restoration and the natural communities that will be impacted will be determined after the results of the study are acquired. Based on the results of the hydrological assessment, the following action items may take place wherever feasible:

Action 1 Continue to eliminate ditches by plugging and backfilling to restore wetland communities

Action 2	Evaluate raised roadbeds in the park that impede water flow. Reconnect or relocate roads
Action 3	Evaluate the potential to increase water conveyance through Herndon Swamp at gas line road
Action 4	Evaluate the potential to increase water conveyance through the powerline easement
Action 5	Evaluate the potential to increase water conveyance under I-95
Action 6	Rework the remaining south drains into the C-54 canal

The interior ditch system drains a number of isolated wetland communities and disrupts sheetflow through upland areas. Depending on the results of the comprehensive study, the ditches deemed able to be filled without offsite impacts need to be plugged and backfilled to restore the wetland communities and prevent further degradation of adjacent communities. Continued restoration of the interior ditch system throughout the park should be accomplished to the greatest extent practical. As of 2005, 9.2 miles of the interior ditch system have been restored with mitigation monies; 62.9 miles of interior ditch remain; and 10.7 miles are not proposed since they include roadside swales, gas line and powerline.

Raised roadbeds in the park impede water flow and alter historic drainage patterns. In several areas, the roads bisect and divide wetland communities. All raised roads will be evaluated for areas needing reconnection or possible relocation. Where necessary culverts and/or low water crossings will be installed and where practical roads may be relocated.

In the past, park staff have attempted to work with Florida Gas Company, Florida Power and Light Company, and FDOT to help facilitate water conveyance under their easements. We have not had success in accomplishing this goal. We will continue to work with these agencies in the future. Currently the few culverts that do exist under the gasline road through Herndon swamp are completely crushed. The culverts under the powerline easement through Herndon swamp and other wetland areas are not adequate.

Part of the hydrological study needs to evaluate the necessity of the drainage outlets that divert water from the north portion of the park into C-54 Canal. Those that are not needed should be plugged and backfilled and where necessary several should be relocated to areas that historically drained into the west prong of the St. Sebastian River.

Objective C: Aid in the improvement of water quality in the St. Sebastian River and the Indian River Lagoon

Action 1	Ensure that cattle lessee is using Best Management Practices within lease area
Action 2	Assess impact of 2 drainage easements on the Coraci Tract and purchase easements if necessary

Action 3	Replace septic systems at the 2 south residences located directly on the river and convert to environmentally-friendly systems
Action 4	Continue interagency cooperative efforts to collect water quality and biological data in the St. Sebastian River and the Indian River Lagoon. Support aquatic preserve staff
Action 5	Continue to provide trash collection and monofilament recycling at any existing and proposed fishing and public use areas along the river

The cattle lease contract needs to be evaluated to include best management practices. The St. Sebastian River is the second largest tributary to the Indian River Lagoon which was once North America's most diverse estuary, but is now and imperiled waterbody. The park was originally purchased as a buffer preserve to protect the river and lagoon from negative impacts. Any actions conducted on the park need to benefit water quality and not degrade it further.

Two drainage easements on the south end of the park carry stormwater from an industrial park on the west boundary into tributaries of the South Prong of the St. Sebastian River. These drainage canals also bisect and drain several wetlands along their length within the park. Purchase of the easement along the canals should be investigated. The canals should ultimately be rerouted into a retention system that would limit direct discharge in to the St. Sebastian River system.

Natural Communities Management

Goal: Restore and maintain the natural communities/habitats of the park.

The DRP practices natural systems management. In most cases, this entails returning fire to its natural role in fire-dependent natural communities. Other methods to implement this goal include large-scale restoration projects as well as smaller scale natural communities' improvements. Following are the natural community management objectives and actions recommended for the state park.

Prescribed Fire Management: Prescribed fire is used to mimic natural lightning-set fires, which are one of the primary natural forces that shaped Florida's ecosystem. Prescribed burning increases the abundance and health of many wildlife species. A large number of Florida's imperiled species of plants and animals are dependent on periodic fire for their continued existence. Fire-dependent natural communities gradually accumulate flammable vegetation; therefore, prescribed fire reduces wildfire hazards by reducing these wild land fuels.

All prescribed burns in the Florida state park system are conducted with authorization from the FDACS and FFS. Wildfire suppression activities in the park are coordinated with the FFS.

Objective A: Within 10 years, have 14,000 acres of the park maintained within the optimum fire return interval.

Action 1	Develop/update annual burn plan
Action 2	Manage fire dependent communities by burning between 4803 - 12,952 acres annually
Action 3	Have all mesic flatwoods and sandhill located north of the canal on a 1.5 to 2.5 year fire return interval
Action 4	Initiate fire within 75 percent of the backlog zones that have never received fire since state acquisition and have no recorded fire history
Action 5	Continue relationship with UERP and USFWS to benefit fire adapted species
Action 6	Maintain at least 50 percent of scrub and scrubby flatwoods in optimal condition at any given time.

Table 7 contains a list of all fire-dependent natural communities found within the park, their associated acreage and optimal fire return interval, and the annual average target for acres to be burned.

Table 7: Prescribed Fire Management

Natural Community	**Acres**	**Optimal Fire Return Interval (Years)**
Mesic Flatwoods	10,879.82	1-3
Sandhill	210.11	1-3
Seepage Slope	107.54	1-3
Wet Prairie	1,687.09	2-3
Depression Marsh	882.29	2-4
Wet Flatwoods	55.45	3-5
Basin Marsh	73.60	4-6
Scrubby Flatwoods	1,433.32	4-6
Scrub	298.16	4-12
Annual Target Acreage	4,803-12,952	

Prescribed fire is planned for each burn zone on the appropriate interval. The park's burn plan is updated annually because fire management is a dynamic process. To provide adaptive responses to changing conditions, fire management requires careful planning based on annual and very specific burn objectives. Each annual burn plan is developed to support and implement the broader objectives and actions outlined in this ten-year management plan.

The primary objectives of prescribed fire at SSRPSP are:

1. Restoration or preservation of fire-adapted natural communities.
2. Restoration or preservation of habitat for rare plant and animal species.
3. Creation of a vegetation mosaic by varying intensity, frequency and season of burn within each maintained natural community.

4. Promotion of diversity within natural communities.
5. Stimulation of flowering in herbs, forbs, and other vascular plants.
6. Reintroduction of lightning season fire regimes.
7. Reduction of hazardous fuels through cool season burns.
8. Maintenance of natural transition zones between vegetation types.
9. Reduction of wildfires and resulting smoke management problems through management of fuel loads.

To accomplish these stated objectives using prescribed fire, the park was partitioned into 120 burn zones ranging in size from 53 to 548 acres. SSRPSP contains 22 natural communities. Nine of these natural communities including, mesic flatwoods, sandhill, scrub, scrubby flatwoods, basin marsh, depression marsh, seepage slope, wet flatwoods, and wet prairie are fire dependent. Three of the altered landcover types including abandoned field/pasture, pasture/improved, and pasture/semi-improved also require fire to drive them toward their desired future condition. SSRPSP has an annual ecological target burning acreage of approximately 4,803-12,952. Since the park is so large, SSRPSP has hundreds of miles of firebreaks of which a percentage needs to be maintained annually depending on the park's annual burn plan. Due to its large size, several burn zones are often combined for a single day burn event. SSRPSP utilizes natural fire breaks such as Herndon Swamp and the hydric hammocks where possible, but also had an extensive and well-established ditch and road system developed prior to state acquisition. The complexities of implementing a prescribed fire program at SSRPSP are enormous and land managers throughout the state have called this park one of the most challenging places to burn in the Florida. The combination of having a major highway, Interstate 95, bisecting the property as well as the proximity to the coast are just a few examples of the complexities.

SSRPSP uses several strategies to help mitigate the complexities of prescribed fire. One strategy includes cooperation with other state parks within the FPS system and other agencies and organizations such as TNC, Prescribed Fire Training Center (PFTC), SJRWMD, FWC, Kennedy Space Center (KSC), Brevard County Environmentally Endangered Lands Program (EELS), FFS, and several college fire programs that often help with day of burn operations and serve as crew or crew bosses. It is always challenging to meet the minimum crew requirements for any given burn. Other agency, organization, and state park support is critical to implementing our burn program. Another strategy to help mitigate prescribed fire complexity is the manipulation of fuels by reducing the structure which in turn allows the implementation of fire on multiple burn zones by making conditions safer and more efficient. The presence of I-95, other major roads, airports, schools, utility easements and all other urban interface complications make smoke management concerns especially critical at the park. Combining burn zones allows for fewer burn days and potential smoke management concerns in any given year. Furthermore, due to our proximity to the coast and the urban interface issues, appropriate weather parameters, under which the park can safely implement prescribed fire and accomplish our ecological goals, are few in any given year. Benefits must be maximized when appropriate weather conditions occur.

One of the most successful ways of manipulating fuel structure and composition is by establishing partnerships that help accomplish a variety of vegetation mechanical treatments such as roller-chopping, pine thinning, and brontosaurus work. The best example of such partnership is with the Tall Timbers Upland Ecosystem Restoration Program (UERP) and the USFWS Coastal Program to fund, research, and facilitate much needed vegetation management, and fire implementation on the focal area which includes the entire northeast quadrant of the park. The main goal of the partnership is to increase application of prescribed fire and mechanical treatments to benefit imperiled and declining fire-dependent wildlife species and the natural communities they depend upon. Over 100 species of upland plants and animals have been identified in Florida's Comprehensive Wildlife Conservation Strategy (CWCS) (FWC 2005) as species of greatest conservation need (SGCN). These include imperiled species such as red-cockaded woodpecker, grasshopper sparrow, loggerhead shrike, brown-headed nuthatch, Bachman's sparrow, eastern meadowlark and gopher tortoise, as well as other declining and once common species such as northern bobwhite (FWC 2005). These species depend on frequent fires to sustain the habitats they require. The relationship was established six years ago and by the end of 2016 all fire dependent natural communities on the northeast quadrant of the park will be in maintenance condition with a fire frequency of 1.5 – 2 years. The increases in fire dependent species mentioned above has been dramatic. Over the next ten years, the park plans to continue this relationship and continue to seek funding to accomplish the same outcome on the entirety of the northwest quadrant. Work for 2017 has already been funded in this area.

Lastly, a large part of maintaining scrub in optimal condition involves the application of prescribed fire. Optimal condition is defined as a mix of short and medium height scrub 3.5 to 5 feet tall and no tall scrub greater than 5 feet with abundant open sandy areas that support many imperiled and/or endemic plant species and animal species. It is impossible to maintain 100 percent of the scrubby habitats in optimal condition at any one time but it will be a goal to maintain 50 percent of it within optimal condition within 10 years.

In order to track fire management activities, the DRP maintains a statewide burn database. The database allows staff to track various aspects of each park's fire management program including individual burn zone histories and fire return intervals, staff training and experience, backlog, etc. The database is also used for annual burn planning which allows the DRP to document fire management goals and objectives on an annual basis. Each quarter the database is updated and reports are produced that track progress towards meeting annual burn objectives.

Table 8 presents a summary of prescribed fire management activities completed at SSRPSP from FY 2005-2006 to FY 2015-2016.

Table 8. Completed Prescribed Fire Management Activities						
Fiscal Year	**Prescribed Fire Acres**	**Wildfire Acres**	**Total Acres Burned**	**Fire-Type Acres**	**Fire-Type Target Acres**	**Mechanical Treatment Acres**
2005-06	3,734	12	3,746	17,171	4116-8358	75
2006-07	342	1,114	1,456	17,171	4116-8358	12
2007-08	1,259	230	1,489	17,171	4116-8358	974
2008-09	2,988	226	3,214	17,171	4116-8358	571
2009-10	2,097	10	2,107	17,171	4116-8358	63
2010-11	665	41	706	17,171	4116-8358	181
2011-12	5,653	1,555	7,208	17,171	4116-8358	424
2012-13	3,509	4	3,513	17,171	4116-8358	572
2013-14	3,271	285	3,556	17,171	4116-8358	744
2014-15	5,788	18	5,806	17,171	4116-8358	417
2015-16	4,127	0	4,127	19,463	4725-9541	342

Natural Community Restoration: In some cases, the reintroduction and maintenance of natural processes is not enough to reach the desired future conditions for natural communities in the park, and active restoration programs are required. Restoration of altered natural communities to healthy, fully functioning natural landscapes often requires substantial efforts that may include mechanical treatment of vegetation or soils and reintroduction or augmentation of native plants and animals. For the purposes of this management plan, restoration is defined as the process of assisting the recovery and natural functioning of degraded natural communities to desired future condition, including the re-establishment of biodiversity, ecological processes, vegetation structure and physical characters.

Examples that would qualify as natural community restoration, requiring annual restoration plans, include large mitigation projects, large-scale hardwood removal and timbering activities, roller-chopping and other large-scale vegetative modifications. The key concept is that restoration projects will go beyond management activities routinely done as standard operating procedures such as routine mowing, the reintroduction of fire as a natural process, spot treatments of exotic plants, and small-scale vegetation management.

Following are the natural community/habitat restoration and maintenance actions recommended to create the desired future conditions in scrubby flatwoods, scrub, and the ruderal areas consisting of abandoned pasture and abandoned fields (See Desired Future Conditions Map).

Objective B: Conduct habitat/natural community restoration activities on 100 acres of scrub and 700 acres of scrubby flatwoods

Action 1	Timber 700 acres of scrubby flatwoods and 100 acres of scrub
Action 2	Reduce hardwoods over five feet in height on the same acres
Action 3	Acquire appropriate equipment to reliably conduct repetitive restoration activities to maintain scrub habitats

Regarding Florida scrub-jay habitat, updated data shows that higher tree cover in optimal height territories has a detrimental influence on demography. Past reports indicated a less certain conclusion because higher tree cover was associated with areas burned infrequently and otherwise suboptimal anyway (Breininger 2005, Breininger et al. 2006). Tree cover appears to be an important variable in combination with many other habitat factors in determining territory densities based on preliminary results from a more complicated analysis involving a larger regional data set (Breininger, 2008). Therefore, removing pines from these systems will improve demography. We will refer to the USFWS Scrub Management Guidelines for recommended pine densities in scrub habitats.

Objective C: Conduct natural community/habitat restoration activities on 25 acres abandoned pasture.

Action 1	Develop a groundcover restoration plan with the use of mitigation funds or in partnership with a sister agency who specializes in ground cover restoration of abandoned pasture
Action 2	Initiate restoration on 25 acres of abandoned pasture or abandoned field that surrounds the active cattle lease.

The preserve is large and has many natural community improvements and prescribed fire to implement over the next decade. It is the intention of park staff to continue to make improvements within the natural communities considered the low hanging fruits before undertaking large scale groundcover restoration projects on the pasture/abandon fields areas. It is the intention during the life of this management plan to focus on all the other park wide improvements and maintain the current cattle lease area as an interim management strategy until all other improvements are accomplished and we are ready to take on such a large project. With any large-scale groundcover restoration, there is a learning curve and site-specific complications. To expedite the learning process, the park will initiate groundcover restoration on 25 acres of abandoned pasture/abandoned fields immediately adjacent to the active cattle lease that will help determine techniques and methodology for future restoration efforts on the expansive cattle lease.

Natural Community Improvement: Improvements are similar to restoration but on a smaller, less intense scale. This typically includes small-scale vegetative management activities or minor habitat manipulation. Following are the natural community/habitat improvement actions recommended for mesic flatwoods at the park.

Objective D: Conduct habitat/natural community improvement activities on 4,000 acres of mesic flatwoods

Action 1	Continue partnership with UERP and USFWS and seek grant funding to rollerchop approximately 2,500 acres of mesic flatwoods on the northwest quadrant and apply a 1.5 to 2 year fire return interval
Action 2	Timber approximately 1,500 acres of pine located along I-95 on the southwest quadrant in order to safely apply prescribed fire that will limit excessive pine mortality to better achieve our desired future conditions as described earlier in the UMP for Mesic Flatwoods.

The UERP, USFWS, and SSRPSP collaborative relationship has been discussed previously. Specific land management activities on the northwest quadrant will include the frequent application of prescribed fire (mainly growing season, but dormant season where necessary) and roller chopping to facilitate prescribed fire. These techniques will be used to recover native plant diversity and increase populations of declining fire-dependent species. While prescribed fire and mechanical treatments have been utilized and tested, it is believed that frequent fire and combination treatments (fire & roller chopping), are essential management actions for restoring habitat for SGCN through reduction of shrub/palmetto coverage, decreased mid-story, and increased ground cover plant diversity and density. Since this relationship has been established with successful results and partial funding, this will be the first restoration priority.

SSRPSP has attempted to sell timber several times over the last decade without success. Hopefully, some pine stands can be thinned in the future. For many of the prescribed fire zones that have not received fire since state acquisition, they must undergo mechanical treatments, especially in the form of sustainable and ecological timbering, to safely apply fire that will render the desired ecological results.

<u>Imperiled Species Management</u>

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

The DRP strives to maintain and restore viable populations of imperiled plant and animal species primarily by implementing effective management of natural systems. Single species management is appropriate in state parks when the maintenance, recovery or restoration of a species or population is complicated due to constraints associated with long-term restoration efforts, unnaturally high mortality or insufficient habitat. Single species management should be compatible

with the maintenance and restoration of natural processes, and should not imperil other native species or seriously compromise park values.

In the preparation of this management plan, DRP staff consulted with staff of the FWC's Imperiled Species Management or that agency's Regional Biologist and other appropriate federal, state and local agencies for assistance in developing imperiled animal species management objectives and actions. Likewise, for imperiled plant species, DRP staff consulted with FDACS. Data collected by the USFWS, FWC, FDACS and FNAI as part of their ongoing research and monitoring programs will be reviewed by park staff periodically to inform management of decisions that may have an impact on imperiled species at the park.

Ongoing inventory and monitoring of imperiled species in the state park system is necessary to meet the DRP's mission. Long-term monitoring is also essential to ensure the effectiveness of resource management programs. Monitoring efforts must be prioritized so that the data collected provides information that can be used to improve or confirm the effectiveness of management actions on conservation priorities. Monitoring intensity must at least be at a level that provides the minimum data needed to make informed decisions to meet conservation goals. Not all imperiled species require intensive monitoring efforts on a regular interval. Priority must be given to those species that can provide valuable data to guide adaptive management practices. Those species selected for specific management action and those that will provide management guidance through regular monitoring are addressed in the objectives below.

Objective A: Develop/Update baseline imperiled species occurrence inventory lists for plants and animals.

Action 1	Complete a bat/small mammal survey
Action 2	Conduct a comprehensive herpetological inventory
Action 3	Conduct a comprehensive invertebrate survey

Forming valuable partnerships with other agencies and organizations is a way to acquire important baseline imperiled species information.

Objective B: Monitor and document 6 selected imperiled animal species in the park.

Action 1	Develop monitoring protocols for any rare and regionally important new species documented in the baseline surveys mentioned in Objective A for bats, small mammals, reptiles, amphibians, and invertebrates.
Action 2	Continue to implement monitoring programs for red-cockaded woodpeckers, bald eagles, Florida scrub-jays, Bachman's sparrow, gopher tortoises, and Florida gopher frogs for which protocols already exist and monitoring is underway

Red-cockaded woodpeckers and Florida scrub jays are currently being monitored at the Tier 4 level. Both have ongoing demographic studies since becoming a state park and nearly since state acquisition. It is imperative to continue monitoring both populations at this level because the information is a major driver of our management. Gopher tortoise, bald eagle, Bachman's sparrow, Florida gopher frog, and Florida manatee are monitored at a Tier 3 level. Bachman's sparrow is currently monitored through the efforts of our relationship with the UERP discussed earlier in the plan. That relationship is imperative to continue the monitoring of this species as well as other species of greatest conservation need particular to fire maintained flatwoods in the state of Florida. Florida gopher frogs are currently monitored by FWC staff by surveying ponds for tadpoles and installing frog logging audio recording devices at several breeding ponds. SSRPSP help with this effort. SSRPSP currently monitor gopher tortoises as part of post burn evaluation documentation since burrows are most easy to identify in recently burned areas. In conjunction with the efforts of FWC volunteers we also monitor bald eagles and Florida manatee.

Objective C: Monitor and document 8 selected imperiled plant species in the park.

Action 1	Update GIS mapping project for surveys originally conducted from 2000-2004 for Curtiss' milkweed, giant orchid, large-flowered false rosemary and snowy orchid.
Action 2	Continue to implement monitoring programs for handfern, hooded pitcher plant, giant airplant and cardinal airplant for which protocols already exist and monitoring is underway

From 200-2004 Curtiss' milkweed, Giant orchid, Large flowered false rosemary and and snowy orchid were located and mapped using GIS on the park. Those species have not been mapped since. Partner with local native plant societies and seek volunteer help to continue the mapping project that was established over a decade ago.

Handfern and hooded pitcher plant are currently monitored by park staff and park volunteers every three years. Detailed locations are acquired, linked to the park's GIS, and shapefiles are analyzed for population growth or decline. In 2002-2004 University of Florida conducted surveys on several cypress domes within the park documenting the devastating impacts of the Mexican bromeliad weevil. Those same domes are still surveyed by park staff every 2 years

Objective D: Continue participation in the RCW Southern Range Translocation Cooperative (SRTC)

Action 1	Attend annual SRTC meeting
Action 2	Continue to implement all management actions for RCW's outlined in the approved USFWS Recovery Plan and agreed upon by the cooperative

The SRTC objectives are to translocate RCW subadults from large or stable populations to augment population size and growth of small vulnerable populations. This reduces the risk of extirpation to small populations while accelerating population growth and reducing the future time required to achieve population size, conservation, and recovery objectives. The SRTC tasks are to: (1) identify donor and recipient populations and their status, (2) list recipient population bird needs, (3) tally total number of birds available from donor populations, (4) pair suitable donor and recipient populations, (5) prioritize and approve new recipient populations, (6) allocate birds to recipient populations, and (7) determine a translocation schedule.

The RCW population at the park is listed as a Central Support Population in the USFWS Recovery Plan. The park will continue to monitor this population and translocate RCW's per the Recovery Plan's and the SRTC's recommendations. The park will also continue to implement management strategies such as installing artificial nest cavities, protecting trees from fire damage, installing predator protection for nests, and implementing prescribed fire on a 1.5-2 year fire return interval mainly in the growing season in RCW occupied areas.

Objective E: Continue participation in the Brevard Adaptive Resource Management Model (ARM) and Working Group meetings for FSJ's

Action 1 Attend FSJ regional working group meeting and Brevard ARM meeting annually

While the management of FSJ's in the state of Florida at this point has nothing comparable to the well-oiled machine of the RCW SRTC, there are nonetheless smaller collectives that help inform managers. The current FSJ Recovery Plan is from 1990 and used limited data from the early 80's. An update to the current plan is in the process of being finalized. In the meantime, participation in regional working groups can sometimes be the only source of accurate updated information. FSJ managers in Brevard County benefit from some of the longest running studies in the state. The principal investigator, Dave Breininger, is still pursuing efforts to increase populations of FSJ's in the county and increase knowledge of FSJ ecology and management. The Brevard ARM is an effort to provide managers a model that helps land managers make decisions that help best benefit jays.

<u>Exotic Species Management</u>

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

The DRP actively removes invasive exotic species from state parks, with priority being given to those causing the most ecological damage. Removal techniques may include mechanical treatment, herbicides or biocontrol agents.

Objective A: Annually treat 150 infested acres of exotic plant species and 2,000 gross acres in the park.

Action 1	Annually develop/update exotic plant management work plan.
Action 2	Implement annual work plan
Action 3	Continue to apply for Invasive Plant Contractor funding through the FFWCC Upland Program/Mosquito Coast Working group
Action 4	Acquire Unmanned Aerial Vehicle (UAV) to assist with exotic plant surveys
Action 5	Continue to request and utilize AmeriCorps A.N.T. members at the park
Action 6	Continue to request OPS funding annually for invasive plant herbicide technicians
Action 7	Continue to plan and coordinate monthly staff invasive plant team days
Action 8	Evaluate impacts of exotic horse feed brought in to park by equestrian users and coordinate statewide FPS response if impacts are significant

It is critical to utilize every strategy possible to control exotic plants. The park is currently utilizing almost every strategy available and will continue to do so. Therefore, the park will continue to be involved with the FWC upland program, our local CISMA, request AmeriCorps and OPS personnel and implement staff team days.

The park currently contains almost 3,000 acres (2,964.6) of exotic plants. In order to efficiently assess the scope and scale of the invasive plant problem on a 22,000-acre park, it is imperative to utilize the best technologies available. Unmanned aerial vehicle (UAV) technology is becoming widely available and very inexpensive. As discussed earlier, exotic plants can grow exponentially. Survey data from just a few years prior can become obsolete. Re-surveying 22,000 acres of difficult to navigate terrain by foot, UTV, or truck is simply impractical, impossible and inefficient, especially on a yearly basis. For these reasons, acquisition of a UAV, training in its function and maintenance, and its integration with current GIS system is critical.

Objective B: Implement control measures on 1 exotic animal species in the park.

Action 1	Continue feral hog contract
Action 2	Seek a USDA contractor or funding from USDA
Action 3	Continue to train and equip staff and volunteers for removal using DRP standards
Action 4	Research new technology and methods for efficient removal
Action 5	Increase monitoring of effects and population of exotic animals
Action 6	Research control measures for exotic animals other than feral hogs

Moving forward with the exotic removal program the feral hog contractor is a crucial entity that provides consistent removal of feral hogs directly related to their population and density. The park should continue to pursue USDA funding and

ultimately a contractor to supplement this effort. In addition to the contractor's, additional training and equipment for park staff is needed to conform to DRP standards and will assist in the feral hog program. This can and will be added to by continuing to research, develop, and procure the latest technology like the jager pro traps or other complete sounder catch systems. The use of night vision and infrared technology will help determine population size and density as well as assist in the removal efforts. Ultimately, increased efforts are needed to evaluate the damages and effect on the park and to implement the eradication plan. This will enable the park to explore and research other control measures for exotic species posing a threat to the overall health of the park.

Cultural Resource Management

Cultural resources are individually unique, and collectively, very challenging for the public land manager whose goal is to park and protect them in perpetuity. The DRP will implement the following goals, objectives and actions, as funding becomes available, to park the cultural resources found in St. Sebastian River Preserve State Park.

Goal: Protect, preserve and maintain the cultural resources of the park.

The management of cultural resources is often complicated because these resources are irreplaceable and extremely vulnerable to disturbances. The advice of historical and archaeological experts is required in this effort. All activities related to land clearing, ground disturbing activities, major repairs or additions to historic structures listed or eligible for listing in the National Register of Historic Places must be submitted to the FDOS, Division of Historical Resources (DHR) for review and comment prior to undertaking the proposed project. Recommendations may include, but are not limited to concurrence with the project as submitted, pre-testing of the project site by a certified archaeological monitor, cultural resource assessment survey by a qualified professional archaeologist, modifications to the proposed project to avoid or mitigate potential adverse effect. In addition, any demolition or substantial alteration to any historic structure or resource must be submitted to the DHR for consultation and the DRP must demonstrate that there is no feasible alternative to removal and must provide a strategy for documentation or salvage of the resource. Florida law further requires that DRP consider the reuse of historic buildings in the park in lieu of new construction and must undertake a cost comparison of new development versus rehabilitation of a building before electing to construct a new or replacement building. This comparison must be accomplished with the assistance of the DHR.

Objective A: Assess and evaluate 20 of 20 recorded cultural resources in the park.

Action 1 Complete 17 assessments/evaluations of archaeological sites.

Action 2 Complete 1 Historic Structures Reports (HSR's) for historic buildings and cultural landscape. Prioritize stabilization, restoration and rehabilitation projects.

Assessments were completed on 17 sites during 2014-2015, three sites are in need of further education and location determination; once determined an assessment of these sites should be completed. These sites are historically valuable and directly relate to our statement of interpretation for the park; the Hernandez Capron trail (Brevard and Indian River county), the Graves Brothers Tram, all need assessments. The Hardee point midden has monitoring of erosion and should be annually monitored for potential action needs. The remainder of the sites will be evaluated through staff protection during fire operations and resource management activities, and then assessments completed at the five-year mark of this plan in 2020. Sites with high visitor impact such as the Carlton house are annually treated with staff projects for visitor impact protection and vegetation control, these evaluations should continue to be done to prevent further degradation of the site.

The three historic structures identified are being utilized and maintained, these sites are continually evaluated and repaired as needed. The Hanshaw/widener house is composed of multiple structures including a concrete structure in the water. This site should be evaluated for significance and maintenance, structures have been treated for insects degrading the stability and should be monitored for retreatment by site residents.

Objective B: Compile reliable documentation for all recorded historic and archaeological resources.

Action 1 Ensure all known sites are recorded or updated in the Florida Master Site File.
Action 2 Conduct oral history interviews.

Continue staff training for archeological monitoring and ability to update, and maintain the FMSF. This can be done with staff and volunteers; the assessments completed in 2015 have been through the work of skilled volunteers to "ground truth" current data and reflecting in the FMSF. An archaeological predictive model was completed in 2010. The model located high, medium, and low sensitivity areas as a tool for identifying archaeological sites within the park. Predictive models are only useful if staff are involved in actually identifying sites and then being able to interpret their significance and inclusion; this is also often very different than what is on the property dependent on prior history and use. Oral history has been completed with locals and recorded. Work will need to continue in this area to ensure additions are made and put into the statement for interpretation data. Staff has been crucial to the maintenance of these sites, this should continue to ensure all staff knows of these sites and the needs each individual site present, especially for sensitivity during resource operations, and simply for the interpretation of our park.

Objective C: Bring 3 of 20 recorded cultural resources into good condition.

Action 1	Design and implement regular monitoring programs for cultural sites
Action 2	Create and implement a cyclical maintenance program for each cultural resource.
Action 3	Research significance on sites with limited information due to unknown location.
Action 4	Add Historical structure assessment to annual residence inspections for appropriate structures.

Continue staff involvement on continual awareness of sites locations, and condition. Sites should be visited regularly and on at least an annual basis, preferably as a staff project, or volunteer assignment. Structures should be inspected annually, sites, trails, and collections should be inspected every other year in addition to the continual monitoring needs during prescribed fires and resource management operations, knowledge of site location is crucial. Three of the ten sites are identified as poor are due to lack of prior knowledge and identification, and the inability to locate significant markers. 8IR992 fire break structures need to be controlled for vegetation management and identified for prep around during resource operations, this site can be brought to good condition, and interpreted with minor operational adjustments and research. 8BR1782 Graves Bothers Turpentine camp is in fair condition, staff knowledge of the location has led to degradation of the site, this site has now been identified and will be treated for vegetation control and prep during prescribed fire operations, this site can be brought into good condition and researched for connection of the tram and potentially additional site information. 8IR851 Carlton House is in poor condition based on vegetation management and high visitor impact, steps to reduce those impacts, and annually inspect and maintain this site, along with visitor interpretation, can bring this site into good condition and into a routinely maintained site.

Special Management Considerations

Timber Management Analysis

Chapters 253 and 259, Florida Statutes, require an assessment of the feasibility of managing timber in land management plans for parcels greater than 1,000 acres if the lead agency determines that timber management is not in conflict with the primary management objectives of the land. The feasibility of harvesting timber at this park during the period covered by this plan was considered in context of the DRP's statutory responsibilities and an analysis of the park's resource needs and values. The long-term management goal for forest communities in the state park system is to maintain or re-establish old-growth characteristics to the degree practicable, with the exception of those communities specifically managed as early successional.

St. Sebastian River Preserve State Park is designated as a single-use park. As such, timber management is only permitted as a method of natural community restoration and maintenance rather than as an ongoing extractive activity. The feasibility of managing/harvesting timber at SSRP State Park during the period covered by the UMP was considered pursuant to the DRP statutory responsibilities to analyze the park's resource needs and values. The long-term management goal for forest communities in the state park system is to maintain or re-establish natural characteristics to the degree practicable, except in those natural communities specifically managed for a structure that differs from that described in the timber assessment found at reference sites for those communities established by the Florida Natural Areas Inventory (FNAI). In the case of imperiled species, the management of certain natural communities may differ from standard treatments to provide optimum habitat conditions within the park.

Most natural communities evaluated at St. Sebastian had overstory pine stocking levels within or slightly below the range and hardwood overstory stocking levels above the upper limits identified for corresponding Florida Natural Areas Inventory (FNAI) Reference Sites. The Timber Management Analysis found in Addendum 8 provides additional details. Overstory thinning is a management tool that may be utilized in areas which have overstocked conditions. However, the specific management goals and objectives for each natural community are detailed in the Resource Management Component. Activities related to stand improvement, including palmetto and midstory reduction, are ongoing in many areas, as well.

The Timber Management Analysis found in Addendum 8 provides additional details. The information contained within the timber assessment may be utilized by park management in furtherance of the overall management goals for St. Sebastian. However, the specific management goals and objectives for each natural community detailed in the Resource Management Component shall take precedence over any possible treatment listed in the timber assessment. In the case of imperiled species, the management of certain natural communities may differ from the standard treatments suggested in the timber assessment to provide optimum habitat conditions within the park.

Arthropod Control Plan

All DRP lands are designated as "environmentally sensitive and biologically highly productive" in accordance with Ch. 388 and Ch. 388.4111 Florida Statutes. If a local mosquito control district proposes a treatment plan, the DRP works with the local mosquito control district to achieve consensus. By policy of FDEP since 1987, aerial adulticiding is not allowed, but larviciding and ground adulticiding (truck spraying in public use areas) is typically allowed. The DRP does not authorize new physical alterations of marshes through ditching or water control structures. Mosquito control plans temporarily may be set aside under declared threats to public or animal health, or during a Governor's Emergency Proclamation.

Sea Level Rise

Potential sea level rise is now under study and will be addressed by Florida's residents and governments in the future. The DRP will stay current on existing research and predictive models, in coordination with other FDEP programs and federal, state, and local agencies. The DRP will continue to observe and document the changes that occur to the park's shorelines, natural features, imperiled species populations, and cultural resources. This ongoing data collection and analysis will inform the Division's adaptive management response to future conditions, including the effects of sea level rise, as they develop.

Resource Management Schedule

A priority schedule for conducting all management activities that is based on the purposes for which these lands were acquired, and to enhance the resource values, is located in the Implementation Component of this management plan.

Land Management Review

Section 259.036, Florida Statutes, established land management review teams to determine whether conservation, preservation and recreation lands titled in the name of the Board of Trustees are being managed for the purposes for which they were acquired and in accordance with their approved land management plans. The considered recommendations of the land management review team and updated this plan accordingly.

St. Sebastian River Preserve State Park was subject to a land management review on July 15, 2015. The review team made the following determinations:

- The land is being managed for the purpose for which it was acquired.
- The actual management practices, including public access, complied with the management plan for this site.

LAND USE COMPONENT

Introduction

Land use planning and park development decisions for the state park system are based on the dual responsibilities of the Florida Department of Environmental Protection (DEP), Division of Recreation and Parks (DRP). These responsibilities are to preserve representative examples of original natural Florida and its cultural resources, and to provide outdoor recreation opportunities for Florida's citizens and visitors.

The general planning and design process begins with an analysis of the natural and cultural resources of the unit, and then proceeds through the creation of a conceptual land use plan that culminates in the actual design and construction of park facilities. Input to the plan is provided by experts in environmental sciences, cultural resources, park operation and management. Additional input is received through public workshops, and through environmental and recreational-user groups. With this approach, the DRP objective is to provide quality development for resource-based recreation throughout the state with a high level of sensitivity to the natural and cultural resources at each park.

This component of the unit plan includes a brief inventory of the external conditions and the recreational potential of the unit. Existing uses, facilities, special conditions on use, and specific areas within the park that will be given special protection, are identified. The land use component then summarizes the current conceptual land use plan for the park, identifying the existing or proposed activities suited to the resource base of the park. Any new facilities needed to support the proposed activities are expressed in general terms.

External Conditions

An assessment of the conditions that exist beyond the boundaries of the unit can identify any special development problems or opportunities that exist because of the unit's unique setting or environment. This also provides an opportunity to deal systematically with various planning issues such as location, regional demographics, adjacent land uses and park interaction with other facilities.

St. Sebastian River Preserve State Park is located within Brevard and Indian River Counties, about 7 miles west of Wabasso Beach in the southeast part of the state. Approximately 500,000 people live within 30 miles of the park. According to U.S. Census data (2015), approximately 20% of residents in Brevard County identify as black, Hispanic or Latino, or another minority group. About 59% of the population is of working age, which is defined as being between 18 and 64 years old (U.S. Census 2015). Approximately 24% of residents in Indian River County as black, Hispanic or Latino, or another minority group. About 48% of the population is of working age, which is defined

as being between 18 and 64 years old (U.S. Census 2015). The per capita income in Brevard and Indian River Counties is $27,571 and $31,882, respectively. The statewide per capita income is $28,930. (U.S. Census 2015).

The table below identifies significant resource-based recreation opportunities within 15 miles of St. Sebastian River Preserve State Park.

Table 9. Resource-Based Recreational Opportunities Near St. Sebastian River Preserve State Park

Name	Biking	Hiking	Swim / Beach Access	Boating / Paddling	Fishing	Wildlife Viewing	Overnight Stay	Hunting	Equestrian Facilities
Blue Cypress Conservation Area (SJRWMD)	✓	✓		✓	✓	✓	✓	✓	
Fort Drum Marsh Conservation Area (SJRWMD)	✓	✓		✓	✓	✓	✓	✓	✓
Three Forks Marsh Conservation Area (SJRWMD)	✓	✓		✓	✓	✓	✓	✓	
Micco Water Management Area (SJRWMD)	✓	✓				✓			✓
T.M. Goodwin Waterfowl Management Area (FWC)	✓	✓		✓	✓	✓		✓	
Micco Scrub Sanctuary (Brevard County)	✓	✓				✓			✓
Dale Wimbrow Park (Indian River County)		✓		✓	✓	✓			
Donald McDonald Park (Indian River County)				✓	✓	✓	✓		

The park is located in the Central East Vacation Region, which includes Volusia, Brevard, Indian River, Okeechobee, St. Lucie, and Martin Counties (Visit Florida

2016). According to the 2015 Florida Visitor Survey, approximately 7% of domestic visitors to Florida visited this region. Roughly 92% visitors to the region traveled to the Central East Region for leisure purposes. The top activities for domestic visitors were beach/waterfront (59%) followed by visiting friends/relatives (41%). Spring (33%) was the most popular travel season, followed by summer at 26%. Most visitors traveled by non-air (77%), reporting an average of 4.8 nights and spending an average of $111 per person per day including transportation (Visit Florida 2016).

Florida's Statewide Comprehensive Outdoor Recreation Plan (SCORP) indicates that the level of service in this region for freshwater fishing (non-boat), tent camping, and hunting is below the statewide median with demand for additional facilities increasing through 2020 (FDEP 2013).

Existing Use of Adjacent Lands

The park is divided into quadrants by the north-south alignment of Interstate 95 and the east-west alignment of the C-54 drainage canal. Land uses surrounding the state park are a mix of suburban residential, agricultural and commercial uses. East of the park are predominantly single-family residential developments and the town of Fellsmere is located just south of the park boundary. North and west of the park are predominantly agricultural lands, including ranches, citrus groves and pine plantations.

Planned Use of Adjacent Lands

Future residential development pressure is anticipated in the privately-owned areas surrounding the state park. Convenient access from Interstate 95 to Fellsmere Road along the southern park boundary will encourage the conversion of agricultural land in the area to suburban and related commercial development. Potential impacts to the park from future land use changes will include the possible degradation of surface water quality entering the park and complication of prescribed fire management activities in the park along the urban interface.

Florida Greenways and Trails System

The Florida Greenways and Trails System (FGTS) is made up of existing, planned and conceptual non-motorized trails and ecological greenways that form a connected, integrated statewide network. The FGTS serves as a green infrastructure plan for Florida, tying together the greenways and trails plans and planning activities of communities, agencies and non-profit organizations throughout Florida. Trails include paddling, hiking, biking, multi-use and equestrian trails. The Office of Greenways and Trails maintains a priority trails map and gap analysis for the FGTS to focus attention and resources on closing key gaps in the system.

In some cases, existing or planned priority trails run through or are adjacent to state parks, or they may be in close proximity and can be connected by a spur trail. State parks can often serve as trailheads, points-of-interest, and offer amenities such as camping, showers and laundry, providing valuable services for trail users while increasing state park visitation.

St. Sebastian River Preserve State Park has been designated as part of the Florida Greenways and Trails (FGT) system. The park is approximately four miles to the west of the East Coast Greenway, part of the FGT Priority Trail Network. The park is also within proximity of four land trail opportunity corridors: The Ten Mile Ridge/Sand Lakes Conservation Area Corridor, the Trans Florida Railroad Corridor, the South Brevard/Al Tuttle Trail Corridor and the Indian River Connector Corridor (FDEP 2015). These land trail opportunity corridors represent a just a few of local and regional trail planning efforts by local governments and transportation planning organizations in and around the park.

The North Indian River County (NIRC) Greenways Master Plan was developed in 2008 by the Indian River County Metropolitan Planning Organization. The plan establishes an interconnected system of greenways and blueways to promote multi-modal transportation, connect urban and rural areas, and enhance recreation and conservation opportunities (IRCMPO 2008). The plan identifies a series of potential greenway corridors that could connect the cities of Sebastian and Fellsmere to surrounding conservation lands including the St. Sebastian River Preserve State Park. Planned corridors extend north to the Fellsmere Canal, east to the Atlantic Coast, west to the Fellsmere Water Management Area and south to the Sand Lakes Conservation Area.

In Brevard County, the South Brevard Al Tuttle Trail is a natural and paved multi-use trail that will eventually link the communities of Malabar, Palm Bay, Valkaria, Grant and Micco and provide access to the northern boundary of the park.

The Trans-Florida Central Railroad Corridor extends from Sebastian west to the Fellsmere Water Management Area. This corridor utilizes the old Trans Florida Central Railroad right of way that once connected the City of Sebastian with the City of Fellsmere. Portions of the abandoned railroad right-of-way traverse the state park. A substantial amount of work has been done on this corridor by state and local officials and the eastern end of the Trans Florida trail from Interstate 95 east to North County Park was recently constructed by Indian River County.

The Central Railroad Corridor Greenway Pedestrian Overpass Project was completed by the FDOT in June 2018. This important project allows the Trans Florida Trail to travel west over Interstate 95 to the Fellsmere Trailhead Preserve and will facilitate the eventual extension of Trans Florida Trail

westward through a portion of the state park and connect to the City of Fellsmere.

The DRP has expressed support to the City of Fellsmere for the westward extension of the Trans Florida Trail through a portion of the park (see Conceptual Land Use Plan). This portion of the Trans Florida trail is to be constructed and maintained by the City of Fellsmere. DRP support for the trail is contingent of on the following conditions:

- The design and construction of the trail will not adversely impact potential habitat of the Florida Scrub Jay as determined through appropriate consultation with DRP and the US Fish and Wildlife Service.

- The design and construction of the trail will support the restoration of natural hydrologic connections between surrounding wetlands severed by the construction of the railroad berm.

- The trail will be designed and constructed to be fully functional as a fire line traversed by heavy firefighting equipment without damaging the trail surface and will ensure that all improvements are designed, constructed, operated and maintained in a manner compatible with prescribed burning practices. The maintenance and use of this portion of the trail will not prevent or adversely affect the park's ability to conduct prescribed fires. This includes, but may not limited to, all measures necessary to maximize safety such as assisting with posting and maintaining of smoke signage, complying with and assisting with traffic control and assisting with possible temporary closure of the park to pedestrian and vehicular traffic.

- Any trail construction will include the installation of gates at the boundaries of the Park so that DRP personnel can close the trail to public use for safety as neccesary.

St. Sebastian River Preserve State Park has a great potential for connection with these planned ecological and recreational greenways. The park's existing trail network can create a valuable link between proposed greenways in Brevard and Indian River County. The DRP actively supports creation of greenway connections and plans state parks for integration with adjacent greenways wherever it is feasible, given the specific environmental, public safety, operational or other constraints of the individual park. The park will continue to work with County governments, other agencies and adjacent landowners to facilitate connections to the existing trail network within the preserve.

Property Analysis

Effective planning requires a thorough understanding of the unit's natural and cultural resources. This section describes the resource characteristics and

existing uses of the property. The unit's recreation resource elements are examined to identify the opportunities and constraints they present for recreational development. Past and present uses are assessed for their effects on the property, compatibility with the site, and relation to the unit's classification.

Recreational Resource Elements

This section assesses the park's recreational resource elements, those physical qualities that, either singly or in certain combinations, can support various resource-based recreation activities. Breaking down the property into such elements provides a means for measuring the property's capability to support potential recreational activities. This process also analyzes the existing spatial factors that either favor or limit the provision of each activity.

Land Area

At nearly 22,000 acres, St. Sebastian River Preserve State Park provides a large expanse of natural resource land that is significant in both expanse and in quality. Twenty-one natural communities have been mapped on the park, providing a wide range of recreational and interpretive opportunities for visitors. Many of these communities are wetlands or seasonally wet by nature, and access by the public is limited during certain times of the year. With the exception of the maintenance road that runs parallel to the C-54 Canal and a park road extending from Fellsmere Road to a parking area near the South Prong of the St. Sebastian River, public vehicular access is limited to trailheads located at various points around the periphery of the park. The potential of this state park to provide a variety of recreational trails is exceptional and over 60 miles of shared-use trails are in place, located along existing park service roads and firebreaks.

Water Area

The St. Sebastian River provides recreational opportunities for canoeing and kayaking, with a variety of wildlife viewing opportunities. During the cooler months, manatees frequent the river and the C-54 Canal in large numbers. Access to the river is available from Mullet Camp within the park, the Indian River County canoe launch just north of Fellsmere Road, and the county's Dale Wimbrow and Donald McDonald Parks. In addition, several private boat ramps and private docks provide access to the river. Motorized boat traffic is heavy, at times, along the South Prong of the river. The C-54 Canal is a popular shoreline fishing resource, and provides opportunities for viewing manatees from its confluence with the river westward for approximately 2.4 miles to a water control structure.

Shoreline

The St. Sebastian River is divided into the North Prong and the South Prong, the former being narrower and less accessible to powerboats than the latter. The river shoreline is a steep, sandy bank providing outstanding scenic vistas, but highly susceptible to erosion if the vegetative cover is disturbed by foot traffic. Two canoe/kayak landings are provided in the park, one at Mullet Camp on the South Prong and one just north of the C-54 Canal on the North Prong.

Natural Scenery

Visual resources in the state park are outstanding. Natural communities such as wet prairie, prairie hammocks, sandhill and mesic flatwoods provide broad vistas and interesting patterns of vegetation. Herndon Swamp, a strand swamp community, offers a shady and enclosed visual environment, rich with epiphytic plants and other wetland vegetation. Scrub and scrubby flatwoods areas of the park are less attractive to the average visitor, excepting birders. Derelict agricultural fields and C-54 and I-95 corridors, while providing occasional interesting vistas, have the least potential for scenery appreciation in the park.

Significant Habitat

The most outstanding interpretive and recreational resources of the state park are provided by the diverse wildlife that inhabit the natural communities and use the river and drainage canal. Forty-six listed animal species inhabit or visit the state park, most notably bird species such as red cockaded woodpecker, Florida scrub-jay, bald eagle, sandhill cranes and wood storks. Manatees are common in the St. Sebastian River and the C-54 canal during winter and spring. Wildlife sightings including listed and common species, such as white-tailed deer and wild turkeys are the highlights of many visitors' park experiences. The variety of wildlife and habitats and, especially, the importance of the preserve as habitat for a number of important listed species, such as red-cockaded woodpeckers and Florida scrub jays, will be featured in the preserve's interpretive and education programs.

Archaeological and Historical Features

With 20 cultural sites listed on the Florida Site File, the state park provides a broad view of the cultural history of this part of Florida. Prehistoric sites include evidence of Native American uses extending from Paleolithic through Seminole cultures. Interesting historic sites include pioneer homesteads, a turpentine camp, a ranch house, the remains of a Neo-classical house on the bank of the river (the Carlton House), a bridge site, a logging tram, a historic railway and a historic cattle trail known as the Hernandez-Capron Trail. Although few of the park's cultural sites will be suitable for public visits, the cultural landscape indicated by the array of resources should be prominently featured in the interpretive programs provided at the state park. Interpretive programs that feature the historic uses of the property for cattle ranching, timbering and turpentine harvesting will be incorporated both in the visitor center and at appropriate locations on the preserve.

Assessment of Use

All legal boundaries, significant natural features, structures, facilities, roads and trails existing in the unit are delineated on the base map (see Base Map). Specific uses made of the unit are briefly described in the following sections.

Past Uses

The state park property has been used for cattle ranching, logging, turpentining and farming from the late 19th Century until it was acquired by public agencies. Public infrastructure development (I-95 and the C-54 Canal) and drainage canals to support the agricultural uses have created the greatest impacts to the property.

Other Uses

Public infrastructure development and maintenance along the C-54 Canal, I-95, a major powerline corridor and two gas line corridors extending through the park are the primary other uses that affect park management.

Future Land Use and Zoning

The DRP works with local governments to establish designations that provide both consistency between comprehensive plans and zoning codes and permit typical state park uses and facilities necessary for the provision of resource-based recreation.

The Brevard County future land use designation for the park is Public Conservation (PUB-CONS). This designation is intended to accommodate lands and facilities which are managed by federal, state and local governments within unincorporated Brevard County for conservation or preservation uses. Activities that are conducted on Public Conservation lands that enhance, protect or manage such lands for nature-based recreation, conservation or preservation purposes for the benefit of the public shall be considered as consistent with this designation (Brevard County 2011).

The zoning designation is Government Managed Land – Parks and Conservation (GML-P). This designation includes active and passive recreational uses as well as permanent or temporary conservation uses (Brevard County 2009). The Indian River County future land use and zoning designation is Public Lands Conservation (C-1). These lands include publicly owned and publicly managed conservation lands. Most development is prohibited within these areas. Housing for conservation management is permitted (Indian River County Land Development Code 2017).

Current Recreational Use and Visitor Programs

The existing forms of recreation at St. Sebastian River Preserve State Park include primitive camping, hiking, horseback riding, bicycling, picnicking,

fishing, paddling, boating, and wildlife viewing. The park offers a variety of interpretive programs to provide information about the park's wildlife and natural habitats.

St. Sebastian River Preserve State Park recorded 142,395 visitors in FY 2016/2017. By DRP estimates, the FY 2016/2017 visitors contributed $13.5 million in direct economic impact, the equivalent of adding 216 jobs to the local economy (FDEP 2017).

Protected Zones

A protected zone is an area of high sensitivity or outstanding character from which most types of development are excluded as a protective measure. Generally, facilities requiring extensive land alteration or resulting in intensive resource use, such as parking lots, camping areas, shops or maintenance areas, are not permitted in protected zones. Facilities with minimal resource impacts, such as trails, interpretive signs and boardwalks are generally allowed. All decisions involving the use of protected zones are made on a case-by-case basis after careful site planning and analysis.

At St. Sebastian River Preserve State Park, all wetland communities, wet flatwoods, wet prairies, sandhills, scrub, scrubby flatwoods communities have been designated as protected zones as delineated on the Conceptual Land Use Plan.

Existing Facilities

A variety of public and support facilities were adapted or developed by the St. Sebastian River Buffer Preserve staff prior to the transfer of the property to the Division of Recreation and Parks. The public facilities are in generally good condition, providing an extensive network of trails, campsites and interpretive opportunities throughout the park property (see Base Map).

Recreation Facilities

Trails (60 miles)

Primitive campsites (3)

Primitive group campsites (4)

Horse corrals (3)

Picnic shelters (2)

Canoe/kayak landings (2)

Trailheads (5)

Visitor center

Historic homesite

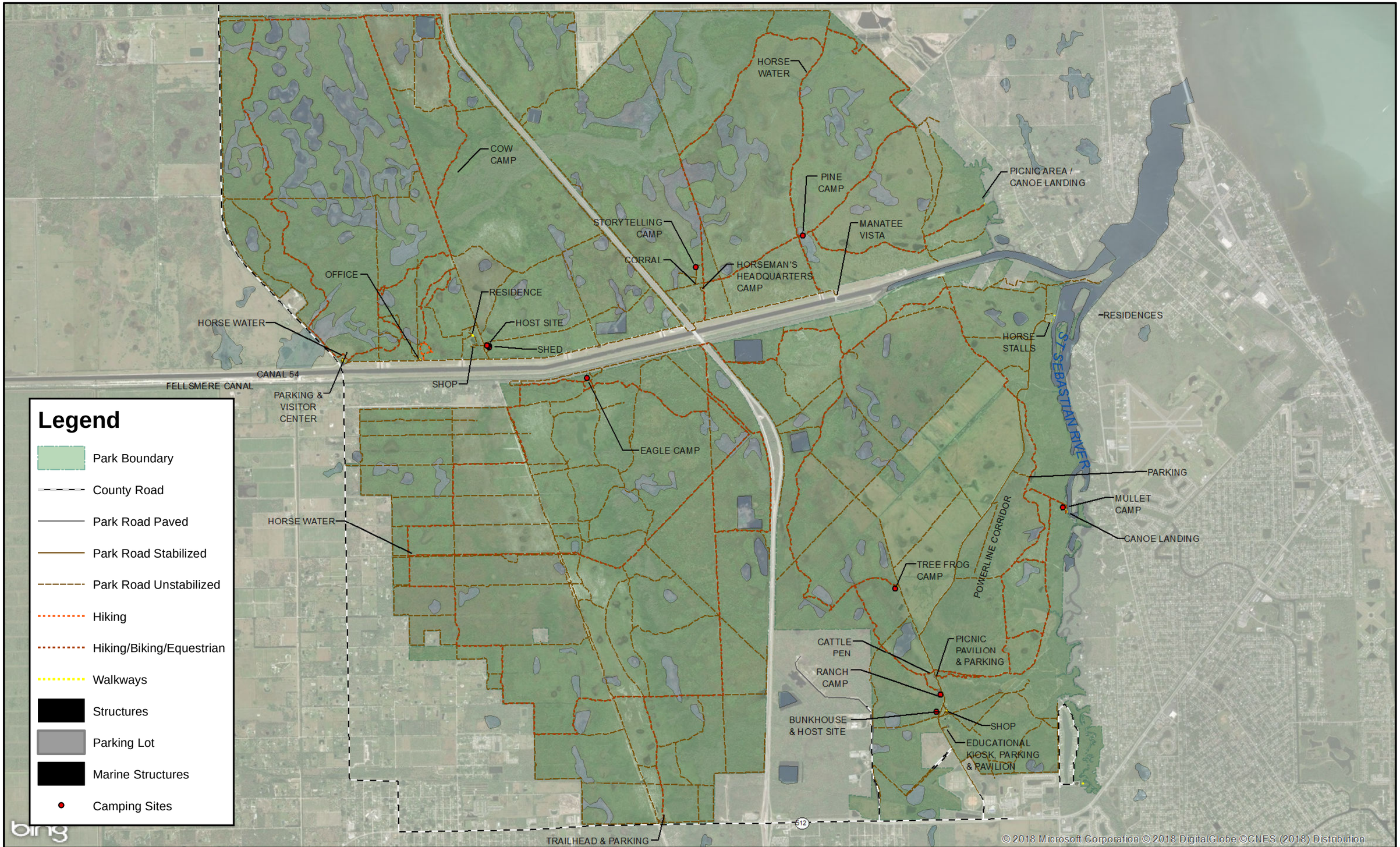
Support Facilities

Administrative office

Shop and storage buildings

Residences (3)

Bunkhouse



Legend

- Park Boundary
- County Road
- Park Road Paved
- Park Road Stabilized
- Park Road Unstabilized
- Hiking
- Hiking/Biking/Equestrian
- Walkways
- Structures
- Parking Lot
- Marine Structures
- Camping Sites

ST. SEBASTIAN RIVER PRESERVE STATE PARK

0 0.25 0.5 1 Mile

Florida Department of Environmental Protection
Division of Recreation and Parks
Date of aerial; 2011

BASE MAP

Conceptual Land Use Plan

The following narrative represents the current conceptual land use proposal for this park. The conceptual land use plan is the long-term, optimal development plan for the park, based on current conditions and knowledge of the park's resources, landscape and social setting (see Conceptual Land Use Plan). The conceptual land use plan is modified or amended, as new information becomes available regarding the park's natural and cultural resources or trends in recreational uses, in order to adapt to changing conditions. Additionally, the acquisition of new parkland may provide opportunities for alternative or expanded land uses. The DRP develops a detailed development plan for the park and a site plan for specific facilities based on this conceptual land use plan, as funding becomes available.

During the development of the conceptual land use plan, the DRP assessed the potential impact of proposed uses or development on the park resources and applied that analysis to determine the future physical plan of the park as well as the scale and character of proposed development. Potential resource impacts are also identified and assessed as part of the site planning process once funding is available for facility development. At that stage, design elements (such as existing topography and vegetation, sewage disposal and stormwater management) and design constraints (such as imperiled species or cultural site locations) are investigated in greater detail. Municipal sewer connections, advanced wastewater treatment or best available technology systems are applied for on-site sewage disposal. Creation of impervious surfaces is minimized to the greatest extent feasible in order to limit the need for stormwater management systems, and all facilities are designed and constructed using best management practices to limit and avoid resource impacts. Federal, state and local permit and regulatory requirements are addressed during facility development. This includes the design of all new park facilities consistent with the universal access requirements of the Americans with Disabilities Act (ADA). After new facilities are constructed, park staff monitors conditions to ensure that impacts remain within acceptable levels.

Potential Uses

Public Access and Recreational Opportunities

Goal: Provide public access and recreational opportunities in the park.

The existing recreational activities and programs of this state park are appropriate to the natural and cultural resources contained in the park and should be continued. New and/or improved activities and programs are also recommended and discussed below.

***Objective: Maintain the park's current recreational carrying capacity of 852 users per day*.**

The park will continue to provide opportunities for primitive camping, hiking, horseback riding, bicycling, picnicking, fishing, paddling, boating, and wildlife viewing. Interpretive programs will continue to be offered.

Objective: Expand the park's recreational carrying capacity by 120 users per day.

Picnicking opportunities will be expanded with the addition of a pavilion at the visitor center and tables at two proposed observation areas along the C-54 canal. Camping opportunities will be expanded with the addition of primitive campsites. Paddling opportunities will be expanded with the addition of a canoe/kayak launch on the north side of the C-54 canal near its confluence with the St. Sebastian River.

Objective: Continue to provide the current repertoire of 5 interpretive, educational and recreational programs on a regular basis.

Five interpretive programs are currently offered to park visitors. These programs include a guided swamp hike led by staff upon request and ability. The hike visits the heart of the strand swamp and cypress dome showcasing the natural features as well as a cultural homestead deep inside. The park also offers a ranger tram tour upon request and ability. This tour is tailored to the group and typically focuses on historical landscapes and natural resource management. The park is also host to the space coast birding fest, and multiple resource management led tours focusing on professional land stewards and the positive results from best management practices utilized at the preserve. The park uses as much passive interpretation as possible as well, putting displays in the county library, and through our visitor's center and park kiosks.

Objective: Develop 2 new interpretive, educational and recreational programs.

There is ability to expand on interpretive programs. Some being considered are campfire programs, and guided backpacking trips. Staffing for these will be seeking volunteer coverage to support implementation. Passive interpretation is the best way for this preserve to make sure the message is going out to the public. Kiosk materials will be updated. The expansion of school and scout programs is the next step. The park will continue to support of local events by providing interpretive materials.

Babcock St SE (Hwy 507)

I95

CANAL 54

US HWY 1

ST SEBASTIAN RIVER

CO Rd. 507

Fellsmere Rd. (CO Rd. 512)

Sebastian Blvd. (CO Rd. 512)

Storytelling Camp
Parking Area
Access Trail

Horseman's Headquarters
Restroom

Paddling Launch
Parking Area
Accessible Launch

North Entrance Area
Picnic Pavilion

Observation Area
Parking
Picnic Table

Observation Area
Parking
Picnic Table

Manatee Viewing Area
Parking Area
Restroom
Viewing Platform Improvements
Fishing Access Improvements

Tree Frog Camp
Relocation

Ranch Camp
Restroom

South Entrance
Picnic Area
Restroom

Trans Florida Trail Corridor
Future multi-use trail to be constructed by the City of Fellsmere

Legend

- Proposed Facilities
- Park Boundary
- TransFlorida Trail

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0 0.25 0.5 1 Miles

Florida Department of Environmental Protection
Division of Recreation and Parks

ST. SEBASTIAN RIVER PRESERVE STATE PARK

CONCEPTUAL LAND USE PLAN

Proposed Facilities

Capital Facilities and Infrastructure

Goal: Develop and maintain the capital facilities and infrastructure necessary to implement the recommendations of the management plan.

The existing facilities of this state park are appropriate to the natural and cultural resources contained in the park and should be maintained. New construction, as discussed further below, is recommended to improve the quality and safety of the recreational opportunities, to improve the protection of park resources, and to streamline the efficiency of park operations. The following is a summary of improved and new facilities needed to implement the conceptual land use plan for St. Sebastian River Preserve Park:

Objective: Maintain all public and support facilities in the park.

All capital facilities, trails and roads within the park will be kept in proper condition through the daily or regular work of park staff and/or contracted help.

Objective: Improve/repair 8 existing facilities and 1,700 feet of trail.

Major repair projects for park facilities may be accomplished within the ten-year term of this management plan, if funding is made available. These include the modification of existing park facilities to bring them into compliance with the Americans with Disabilities Act (a top priority for all facilities maintained by DRP). The following discussion of other recommended improvements and repairs are organized by use area within the park.

Visitor Center Area: The addition of a large picnic pavilion is proposed for this area to enhance picnicking and other activities and programs that occur here.

Horsemen's Headquarters Equestrian Camping Area: The existing composting restroom in this area will be replaced with a permanent facility.

Storytelling Camp: To avoid potential conflicts between campers and equestrians at the Horseman's Headquarters Area**,** a new parking lot and access trail is proposed to provide campers access to this primitive group camp. The parking area location is a previously disturbed area just south of the new stormwater-holding facility adjacent to I-95.

Manatee Viewing Area: This facility is located on St. Johns Water Management District property and managed by the state park. Improvements proposed for this area include a designated parking area, permanent restroom, viewing platform and fishing access improvements.

The improvements will be implemented in partnership and collaboration with the water management district.

Tree Frog Camp: This primitive group camping area is in a low-lying area that frequently floods. As hydrological restoration projects go forward, the camp may need to be relocated to higher ground. A dry site on the banks of a small borrow pit pond just south of the existing camp was identified as the best alternate location.

Trails: Adjustments may have to be made to the trail system depending on the nature and extent of future restoration activities.

Ranch Camp: A permanent restroom will be provided in this area. The new restroom will service the primitive group camp, equestrian campground, equestrian day use area, and trailhead area just to the north.

South Entrance Picnic Area: The addition of a permanent restroom is proposed due to the increasing use of this area for special events.

Objective: Construct 3 new facilities.

Canal 54 Observation Areas: Two stopping points will be provided along the park drive where visitors can enjoy the expansive views along the C-54 canal and have access for wildlife observation and shoreline fishing. Each observation area will have a small parking area (up to four cars) and a picnic table. Locations identified are just east of the scrub-jay trail and near the intersection of the Horsemen's Headquarters access drive and the park drive.

Primitive Campsites: New primitive campsites may be created to accommodate additional use in the future. These will be sited by park staff in disturbed areas along the trail network. Up to two additional primitive campsites are proposed.

Paddling Launch Area: A paddling launch will be developed along the C-54 Canal to provide paddlers with convenient access to the North Prong and a downstream landing for South Prong paddlers. An old boat ramp area along the canal was identified as the best location. A small parking area is proposed for the site. The site is on water management district property and, as with the Manatee Viewing Area, the construction of a facility here would depend on a partnership and collaboration with the SJRWMD.

Facilities Development

Preliminary cost estimates for these recommended facilities and improvements are provided in the Ten-Year Implementation Schedule and Cost Estimates (Table 8) located in the Implementation Component of this plan. These cost estimates are based on the most cost-effective construction standards available at this time. The preliminary estimates are provided to assist DRP in budgeting future park improvements, and may be revised as more information is collected

through the planning and design processes. New facilities and improvements to existing facilities recommended by the plan include:

Recreation Facilities

Visitor Center Area
Picnic pavilion

Horseman's Headquarters
Restroom

Storytelling Camp
Parking area (10 spaces)
Access trail

C-54 Observation Area (West)
Parking
Picnic table

C-54 Observation Area (East)
Parking
Picnic table

Manatee Viewing Area
Parking area
Restroom
Viewing platform improvements
Fishing access improvements

Paddling Launch Area
Paddling launch
Parking area (10 spaces)

Tree Frog Camp
Relocation

Ranch Camp
Restroom

South Entrance Picnic Area
Restroom

Recreational Carrying Capacity

Carrying capacity is an estimate of the number of users a recreation resource or facility can accommodate and still provide a high quality recreational experience and preserve the natural values of the site. The carrying capacity of a unit is determined by identifying the land and water requirements for each recreation activity at the unit, and then applying these requirements to the unit's land and water base. Next, guidelines are applied which estimate the physical capacity of the unit's natural communities to withstand recreational uses without significant degradation. This analysis identifies a range within which the carrying capacity most appropriate to the specific activity, the activity site and the unit's classification is selected (see Table 6).

The recreational carrying capacity for this park is a preliminary estimate of the number of users the unit could accommodate after the current conceptual development program has been implemented. When developed, the proposed new facilities would approximately increase the unit's carrying capacity as shown in Table 10.

Table 10. Recreational Carrying Capacity

	Existing Capacity*		Proposed Additional Capacity		Estimated Recreational Capacity	
Activity / Facility	**One Time**	**Daily**	**One Time**	**Daily**	**One Time**	**Daily**
Trails						
Shared Use	180	360			180	360
Picnicking	64	128	32	64	96	192
Fishing						
Shoreline	20	40			20	40
Boating						
Canoe/Kayak			20	40	20	40
Camping						
Primitive	24	24	16	16	40	40
Group	100	100			100	100
Visitor Center	50	200			50	200
TOTAL	**438**	**852**	**68**	**120**	**506**	**972**

*Existing capacity revised from approved plan according to DRP guide

Optimum Boundary

The optimum boundary map reflects lands considered desirable for direct management by the DRP as part of the state park. These parcels may include public or privately owned land that would improve the continuity of existing parklands, provide the most efficient boundary configuration, improve access to the park, provide additional natural and cultural resource protection or allow for future expansion of recreational activities. Parklands that are potentially surplus to the management needs of DRP are also identified. As additional needs are identified through park use, development, and research, and as land use changes on adjacent property, modification of the park's optimum boundary may be necessary.

Identification of parcels on the optimum boundary map is intended solely for planning purposes. It is not to be used in connection with any regulatory purposes. Any party or governmental entity should not use a property's identification on the optimum boundary map to reduce or restrict the lawful rights of private landowners. Identification on the map does not empower or suggest that any government entity should impose additional or more restrictive environmental land use or zoning regulations. Identification should

not be used as the basis for permit denial or the imposition of permit conditions.

Properties identified for optimum boundary for the state park include parcels at the confluence of the North Prong and South Prong where of the St. Sebastian River, along the C-54, and two private in-holdings. These properties are intended to buffer the park from potential development, support the park's resource management program, and to protect the watershed of the St. Sebastian River. At this time, no lands are considered surplus to the needs of the park.

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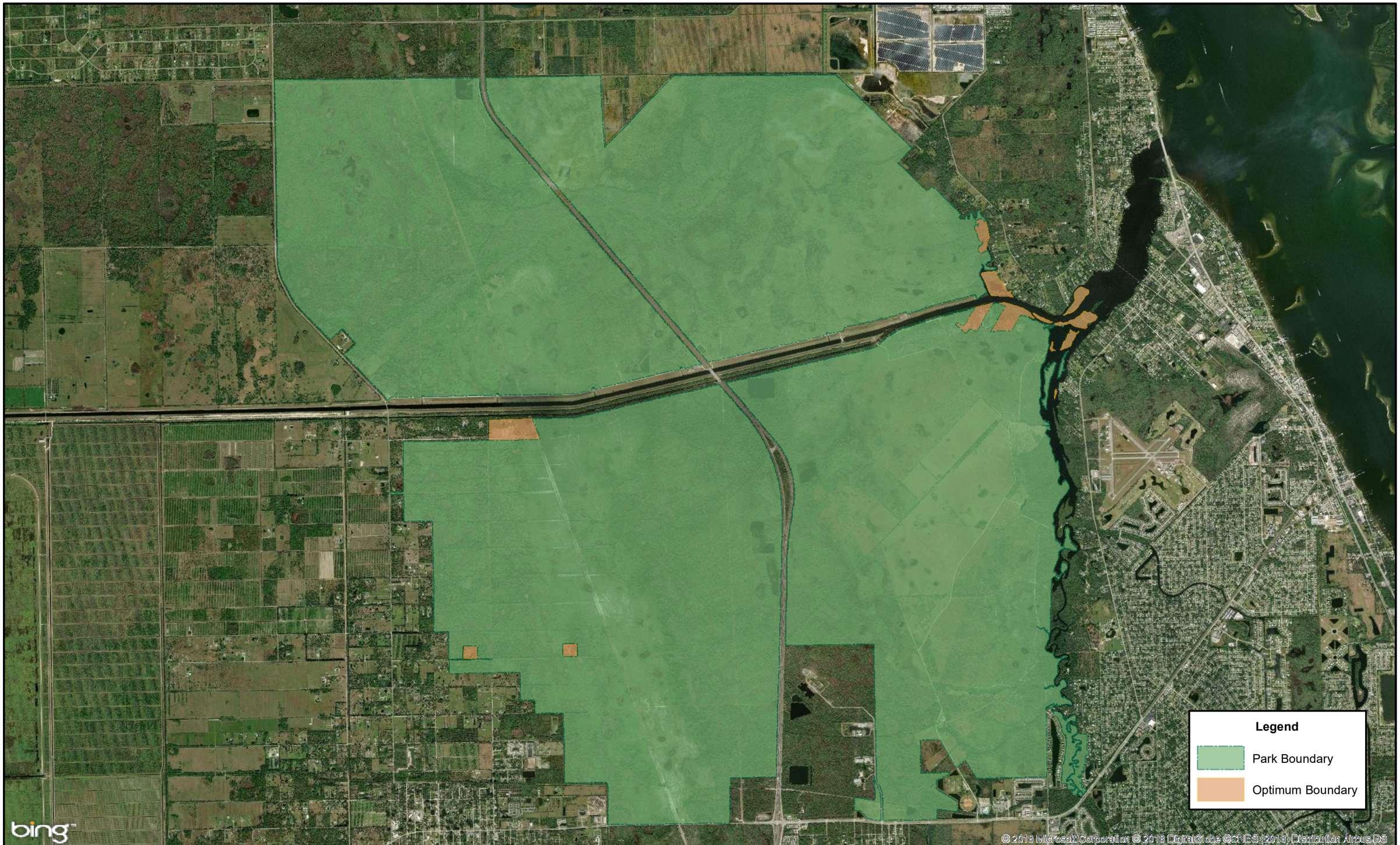

ST. SEBASTIAN RIVER
PRESREVE STATE PARK

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Florida Department of Environmental Protection
Division of Recreation and Parks
Date of aerial; 2011

OPTIMUM BOUNDARY MAP

IMPLEMENTATION COMPONENT

The resource management and land use components of this management plan provide a thorough inventory of the park's natural, cultural and recreational resources. They outline the park's management needs and problems, and recommend both short and long-term objectives and actions to meet those needs. The implementation component addresses the administrative goal for the park and reports on the Division of Recreation and Parks (DRP) progress toward achieving resource management, operational and capital improvement goals and objectives since approval of the previous management plan for this park. This component also compiles the management goals, objectives and actions expressed in the separate parts of this management plan for easy review. Estimated costs for the ten-year period of this plan are provided for each action and objective, and the costs are summarized under standard categories of land management activities.

MANAGEMENT PROGRESS

Since the approval of the last management plan for St. Sebastian River Preserve State Park in 2005, significant work has been accomplished and progress made towards meeting the DRP's management objectives for the park. These accomplishments fall within four of the five general categories that encompass the mission of the park and the DRP.

Park Administration and Operations

- Increased volunteer base has allowed for the expansion of visitor center hours from two to four days per week.

Resource Management

Natural Resources

- Applied annual average of 2,000 – 5,000 in prescribed fire
- Treated an annual average of 200-400 infested acres of exotic invasive plants
- Removed annual average of 150-300 exotic animals
- Mechanically treated 400-600 acres leading to approximately 4,000 acres restored

Cultural Resources

- Conducted ground truthing of all cultural site records
- All staff visited major sites annually
- Conducted site maintenance project days with the public

Recreation and Visitor Services

- Visitor center hours expanded from two to four days per week.

Park Facilities

- A visitor center was constructed at the North Entrance.
- Improvements were made to the visitor center area since construction including rehabilitation of the laboratory, native landscaping, and development of a camp fire program area.

- Improvements to Horseman's Headquarters include fence removal and establishment of a tent site.
- Improvements to Storytelling Camp include removal of old deck and addition of benches and a sink.
- Improvements to the Manatee Viewing Area include the addition of an observation deck, enhanced access to the water, and fence replacement.
- New trailheads were established at Pine Camp, Tree Frog Camp, Ranch Camp, and the North Entrance.
- All trails were updated with uniform fencing, new wayfinding markers, and improved water crossings.
- Improvements to Ranch Camp include new fencing, and tent sites.
- New accessible walkways and grills were provided at the South Entrance Picnic Area.

MANAGEMENT PLAN IMPLEMENTATION

This management plan is written for a timeframe of ten years, as required by Section 253.034 Florida Statutes. The Ten-Year Implementation Schedule and Cost Estimates (Table 11) summarizes the management goals, objectives and actions that are recommended for implementation over this period, and beyond. Measures are identified for assessing progress toward completing each objective and action. A time frame for completing each objective and action is provided. Preliminary cost estimates for each action are provided and the estimated total costs to complete each objective are computed. Finally, all costs are consolidated under the following five standard land management categories: Resource Management, Administration and Support, Capital Improvements, Recreation Visitor Services and Law Enforcement.

Many of the actions identified in the plan can be implemented using existing staff and funding. However, several continuing activities and new activities with measurable quantity targets and projected completion dates are identified that cannot be completed during the life of this plan unless additional resources for these purposes are provided. The plan's recommended actions, time frames and cost estimates will guide the DRP's planning and budgeting activities over the period of this plan. It must be noted that these recommendations are based on the information that exists at the time the plan was prepared. A high degree of adaptability and flexibility must be built into this process to ensure that the DRP can adjust to changes in the availability of funds, improved understanding of the park's natural and cultural resources, and changes in statewide land management issues, priorities and policies.

Statewide priorities for all aspects of land management are evaluated each year as part of the process for developing the DRP's annual legislative budget requests. When preparing these annual requests, the DRP considers the needs and priorities of the entire state park system and the projected availability of funding from all sources during the upcoming fiscal year. In addition to annual legislative appropriations, the DRP pursues supplemental sources of funds and staff resources wherever possible, including grants, volunteers and partnerships with other entities. The DRP's ability to accomplish the specific actions identified in the plan will be

determined largely by the availability of funds and staff for these purposes, which may vary from year to year. Consequently, the target schedules and estimated costs identified in Table 11 may need to be adjusted during the ten-year management planning cycle.

NOTE: THE DIVISION'S ABILITY TO COMPLETE THE OBJECTIVES OUTLINED BY THE MANAGEMENT PLAN IS CONTINGENT ON THE AVAILABILITY OF FUNDING AND OTHER RESOURCES FOR THESE PURPOSES.

Goal I: Provide administrative support for all park functions.		**Measure**	**Planning Period**	**Estimated Manpower and Expense Cost* (10-years)**
Objective A	**Continue day-to-day administrative support at current levels.**	Administrative support ongoing	C	**$168,000**
Objective B	**Expand administrative support as new lands are acquired, new facilities are developed, or as other needs arise.**	Administrative support expanded	C	**$24,000**
Goal II: Protect water quality and quantity in the park, restore hydrology to the extent feasible, and maintain the restored condition.		**Measure**	**Planning Period**	**Estimated Manpower and Expense Cost* (10-years)**
Objective A	**Conduct/obtain an assessment of the park's hydrological needs.**	Assessment conducted	UFN	**$200,000**
Action 1	Develop a comprehensive hydrogogical restoration plan for the entire park	Plan developed	UFN	$200,000
Objective B	**Restore natural hydrological conditions and function to natural communitities throughout the park.**	# Acres restored or with restoration underway	UFN	**$800,000**
Action 1	Continue to eliminate ditches by plugging and backfilling to restore wetland communities	# Miles of ditches filled	UFN	$300,000
Action 2	Evaluate raised roadbeds in the park that impede water flow. Reconnect or relocate roads.	# Crossings/culverts installed	UFN	$75,000
Action 3	Evaluate the potential to increase water conveyance through Herndon Swamp at gas line road	Evaluation completed	UFN	$50,000
Action 4	Evaluate the potential to increase water conveyance through the powerline easement.	Evaluation completed	UFN	$75,000
Action 5	Evaluate the potential to increase water conveyance under I-95.	Evaluation completed	UFN	$150,000
Action 6	Rework the remaining south drains into the C-54 canal.	# drains reworked	UFN	$150,000
Objective C	**Aid in the improvement of water quality in the St. Sebastian River and Indian River**	Aid provided	**LT**	**$222,000**
Action 1	Ensure cattle lessee is using BMP's within lease area.	BMPs implemented	ST	$0
Action 2	Assess impact of 2 drainage ditches on Coraci Tract and purchase easements if necessary.	Assessment conducted	UFN	$200,000
Action 3	Replace septic systems at the 2 south residences on the river and convert to environmentally-friendly systems.	Systems replaced	UFN	$12,000
Action 4	Continue interagency cooperative efforts to collect water quality and biological data	Efforts continued	C	$5,000
Action 5	Continue to provide trash collection and monofilament recylcling at use areas along the river	Actions continued	C	$5,000

* 2015 Dollars
ST = actions within 2 years
LT = actions within 10 years
C = long term or short term actions that are continuous or cyclical
UFN = currently unfunded need

NOTE: THE DIVISION'S ABILITY TO COMPLETE THE OBJECTIVES OUTLINED BY THE MANAGEMENT PLAN IS CONTINGENT ON THE AVAILABILITY OF FUNDING AND OTHER RESOURCES FOR THESE PURPOSES.

Goal III: Restore and maintain the natural communities/habitats of the park.		**Measure**	**Planning Period**	**Estimated Manpower and Expense Cost* (10-years)**
Objective A	**Within 10 years have 14,000 acres of the park maintained within optimal fire return interval.**	# Acres within fire return interval target	LT	**$4,002,000**
Action 1	Develop/update annual burn plan.	Plan updated	C	$2,000
Action 2	Manage fire dependent communities for ecosystem function, structure and processes by burning between 4,803 - 12,952 acres annually, as identified by the annual burn plan.	Average # acres burned annually	C	$4,000,000
Action 3	Have all mesic flatwoods and sandhill located north of the canal on a 1.5 - 2.5 year fire return interval	# Miles established	LT	$0
Action 4	Initiate fire within 75 percent of the backlog zones that have no recorded fire history	Facilities maintained	LT	$0
Action 5	Continue relationship with the UERP and USFWS to benefit fire adapted species	Relationship continued	C	$0
Action 6	Maintain at least 50 percent of the scrub and scrubby flatwoods in optimal condition	# Acres maintained in optimal condition	LT	$0
Objective B	**Conduct habitat/natural community restoration activities on 100 acres of scrub and 700 acres of scrubby flatwoods.**	# Acres restored or with restoration underway	ST or LT	**$1,400,000**
Action 1	Timber 700 acres of scrubby flatwoods and 100 acres of scrub	Plan developed/updated	LT	$0
Action 2	Reduce hardwoods aover five feet in height on the same acres	# Acres with restoration underway	LT	$200,000
Action 3	Acquire appropriate equipment to maintain scrub habitats	Equipment acquired	UFN	$1,200,000
Objective C	**Conduct natural community/habitat restoration activities on 25 acres of abandoned pasture**	# Acres restored or with restoration underway	UFN	$45,000
Action 1	Develop groundcover restoration plan	Plan developed	UFN	$5,000
Action 2	Initiate groundcover restoration plan	Plan initiated	UFN	$40,000
Objective D	**Conduct habitat/natural community improvement activities on 4,000 acres of mesic flatwoods**	# Acres improved or with improvements underway	LT	**$200,000**
Action 1	Rollerchop approximately 2,500 acres of mesic flatwoods on northwest quadrant and apply a 1.5 to 2 year fire return interval	# Acres rollerchopped	UFN	$200,000
Action 2	Timber approximately 1,500 acres of dense pine along I-95 in southwest quadrant	# Acres timbered	UFN	$0

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NOTE: THE DIVISION'S ABILITY TO COMPLETE THE OBJECTIVES OUTLINED BY THE MANAGEMENT PLAN IS CONTINGENT ON THE AVAILABILITY OF FUNDING AND OTHER RESOURCES FOR THESE PURPOSES.

Goal IV: Maintain, improve or restore imperiled species populations and habitats in the park.		**Measure**	**Planning Period**	**Estimated Manpower and Expense Cost* (10-years)**
Objective A	**Update baseline imperiled species occurrence inventory lists for plants and animals**	List updated	C	**$23,000**
Action 1	Complete a bat/small mammal survey		UFN	**$5,000**
Action 2	Conduct a comprehensive herpetological inventory		UFN	**$10,000**
Action 3	Conduct a comprehensive invertebrate survey		UFN	**$8,000**
Objective B	**Monitor and document 6 selected imperiled animal species in the park**	# Species monitored	C	**$200,000**
Action 1	Develop monitoring protocols for any imperiled animal species including regionally important new species documented in Objective A	# Protocols developed	ST	$0
Action 2	Continue to implement monitoring programs for red-cockaded woodpeckers, bald eagles, Florida scrub-jays, Bachman's sparrows, gopher tortoises, and Florida gopher frogs for which protocols already exist and monitoring is underway	# Species monitored	C	$200,000
Objective C	**Monitor and document 8 selected imperiled plant species in the park.**	# Species monitored	C	**$25,000**
Action 1	Update GIS mapping project for surveys originally conducted from 2000-2004 for Curtiss' milkweed, giant orchid, large-flowered false rosemary, and snowy orchid	Mapping project updated	ST	$10,000
Action 2	Continue to implement monitoring programs for handfern, hooded pitcher plant, giant airplant, and cardinal airplant for which protocols already exist and monitoring is underway	# Species monitored	C	$15,000
Objective D	**Continue participation in the RCW Southern Range Translocation Cooperative (SRTC)**	Participation continued	C	**$55,000**
Action 1	Attend annual SRTC meeting	Meeting attended	C	$5,000
Action 2	Continue to implement all management actions for RCW's outlined in the approved USFWS Recovery Plan and agreed upon by the cooperative	Management actions implemented	C	$2,000
Objective E	**Continue participation in the Brevard Adaptive Resource Management Model (ARM) and working group meetings for the Florida scrub-jay**	Participation continued	C	**$2,000**
Action 1	Attend FSJ regional working group meeting and Brevard ARM meeting annually	Meetings attended	C	$2,000
Goal V: Remove exotic and invasive plants and animals from the park and conduct needed maintenance-control.		**Measure**	**Planning Period**	**Estimated Manpower and Expense Cost* (10-years)**
Objective A	**Annually treat 150 infested acres and 2,000 gross acres of exotic plant species in the**	# Acres treated	C	**$2,506,000**
Action 1	Annually develop/update exotic plant management work plan.	Plan developed/updated	C	$2,000
Action 2	Implement annual work plan	Plan implemented	C	$2,500,000

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NOTE: THE DIVISION'S ABILITY TO COMPLETE THE OBJECTIVES OUTLINED BY THE MANAGEMENT PLAN IS CONTINGENT ON THE AVAILABILITY OF FUNDING AND OTHER RESOURCES FOR THESE PURPOSES.				
Action 3	Continue to apply for FWC invasive plant contractor funding	Funding applied for	C	$0
Action 4	Acquire unmanned aerial vehicle (UAV) to assist with exotic plant surveys	Equipment acquired	UFN	$0
Action 5	Continue to request and utilize AmeriCorps A.N.T. members at the park	AmeriCorp members requested/utilized	C	$0
Action 6	Continue to request OPS funding (annually) for invasive plant herbicide technicians	Technicians requested	C	$0
Action 7	Continue to plan and coordinate monthly staff invasive plant team days	Team days planned and coordinated	C	$4,000
Objective B	**Implement control measures on 1 exotic and nuisance animal species in the park.**	# Species for which control measures	C	**$82,000**
Action 1	Continue feral hog contract	Contract continued	C	$10,000
Action 2	Seek USDA contractor of funding from USDA	Contractor/funding sought	C	$0
Action 3	Continue to train and equip staff and volunteers for removal	Training continued	C	$40,000
Action 4	Research new technology and methods for efficient removal	Research conducted	UFN	$2,000
Action 5	Increase monitoring of effects and population of exotic animals	Monitoring increased	UFN	$25,000
Action 6	Research control measures for exotic animals other than feral hogs	Research conducted	UFN	$5,000
Goal VI: Protect, preserve and maintain the cultural resources of the park.		**Measure**	**Planning Period**	**Estimated Manpower and Expense Cost* (10-years)**
Objective A	**Assess and evaluate 20 of 20 recorded cultural resources in the park.**	Documentation complete	LT	**$4,500**
Action 1	Complete 20 assessments/evaluations of archaeological sites. Prioritize preservation and	Assessments complete	LT	$4,000
Action 2	Complete 1 Historic Structures Reports (HSR's) for historic buildings and cultural landscape. Prioritize stabilization, restoration and rehabilitation projects.	Reports and priority lists completed	UFN	$500
Objective B	**Compile reliable documentation for all recorded historic and archaeological sites.**	Documentation complete	LT	**$3,500**
Action 1	Ensure all known sites are recorded or updated in the Florida Master Site File.	# Sites recorded or updated	ST	$1,000
Action 2	Conduct oral history interviews	Interviews complete	LT	$2,500
Objective C	**Bring 3 of 20 recorded cultural resources into good condition.**	# Sites in good condition	UFN	**$72,000**
Action 1	Design and implement regular monitoring programs for cultural sites	Sites monitored	C	$10,000
Action 2	Create and implement a cyclical maintenance program for each cultural resource.	Programs implemented	C	$50,000

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NOTE: THE DIVISION'S ABILITY TO COMPLETE THE OBJECTIVES OUTLINED BY THE MANAGEMENT PLAN IS CONTINGENT ON THE AVAILABILITY OF FUNDING AND OTHER RESOURCES FOR THESE PURPOSES.				
Action 3	Research significance on sites with limited information due to unknown location	Projects completed	LT	$10,000
Action 4	Add historical structure assessment to annual residence inspections for appropriate structures	Historical structure assessment conducted	C	$2,000
Goal VII: Provide public access and recreational opportunities in the park.		**Measure**	**Planning Period**	**Estimated Manpower and Expense Cost* (10-years)**
Objective A	**Maintain the park's current recreational carrying capacity of 852 users per day.**	# Recreation/visitor	C	**$168,000**
Objective B	**Expand the park's recreational carrying capacity by 120 users per day.**	# Recreation/visitor	UFN	**$24,000**
Objective C	**Continue to provide the current repertoire of 5 interpretive, educational and recreational programs on a regular basis.**	# Interpretive/education programs	C	**$25,000**
Objective D	**Develop 2 new interpretive, educational and recreational programs.**	# Interpretive/education programs	ST	**$14,000**
Goal VIII: Develop and maintain the capital facilities and infrastructure necessary to meet the goals and objectives of this management plan.		**Measure**	**Planning Period**	**Estimated Manpower and Expense Cost* (10-years)**
Objective A	**Maintain all public and support facilities in the park**	Facilities maintained	C	**$2,514,000**
Objective B	**Continue to implement the park's transition plan to ensure facilities are accessible in accordance with the American with Disabilities Act of 1990.**	Plan implemented	LT	**$200,000**
Objective C	**Improve and/or repair 8 existing facilities and 1,700 feet of trail**	# Facilities/Miles of Trail	UFN	**$1,684,000**
Objective D	**Construct 3 new facilites**	# Facilities	UFN	**$111,000**
Objective E	**Expand maintenance activities as existing facilities are improved and new facilities are developed.**	Facilities maintained	UFN	**$500,000**

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C = long term or short term actions that are continuous or cyclical
UFN = currently unfunded need

NOTE: THE DIVISION'S ABILITY TO COMPLETE THE OBJECTIVES OUTLINED BY THE MANAGEMENT PLAN IS CONTINGENT ON THE AVAILABILITY OF FUNDING AND OTHER RESOURCES FOR THESE PURPOSES.

Summary of Estimated Costs

Management Categories		Total Estimated Manpower and Expense Cost* (10-years)
Resource Management		**$12,295,500**
Administration and Support		**$2,706,000**
Capital Improvements		**$1,995,000**
Recreation Visitor Services		**$731,000**
Law Enforcement Activities	Note: Law enforcement activities in Florida State Parks are conducted by the FWC Division of Law Enforcement and by local law enforcement agencies.	

* 2015 Dollars
ST = actions within 2 years
LT = actions within 10 years
C = long term or short term actions that are continuous or cyclical
UFN = currently unfunded need

Addendum 1—Acquisition History

LAND ACQUISITION HISTORY REPORT

Park Name	St. Sebastian River Preserve State Park
Date Updated	12/6/2016
County	Brevard and Indian River counties
Trustees Lease Number	Lease No. 4118 (BTIITF) and Lease No. 4397 (BTIITF/SJRWMD)
Legal Description	A legal description is available upon request to the Department of Environmental Protection
Current Park Size	21,629.35 acres
Purpose of Acquisition	The Board of Trustees of the Internal Improvement Trust Fund of the State of Florida acquired St. Sebastian River Preserve State Park to protect the West Indian Manatee and to limit development in the area.

Acquisition History

Parcel Name or Parcel DM-ID	Date Acquired	Initial Seller	Initial Purchaser	Size in acres	Instrument Type
DMID 313274	1/4/1995	Hugh Corrigan, III Family Limited Partnership	Board of Trustees of the Internal Improvement Trust Fund of the State of Florida (Trustees)	7,081.53	Warranty Deed
DMID 313274	11/17/1999	S. Thomas Hamilton, Jr., as personal representative of the estate of Carson Platt, deceased	Trustees and the St. Johns River Water Management District (Trustee & SRWMD)	5,417.51	Personal Representative's Deed
DMID14483	2/16/1996	D.S.C. of Newark Enterprices, Inc.	Trusees	3,602.26	Warranty Deed
DMID14528	2/11/1996	Anthony A. Coraci	Trustees	3,508.99	Warranty Deed
DMID344043	11/16/1995	Betty P. Parrish Jesse J. Parrish,III and Harry A. Jones	Trustees	1,527.08	Warranty Deed
DMID 331261	7/12/2001	St. Johns River Water Management District (SJWMD)	Trustees	1,165.15	Deed of Conveyance
DMID 327647	7/14/1999	Board of County Commissioners of Brevard County, Florida	Trustees	274.85	County Deed
DMID313272	3/20/2000	S. Thomas Hamilton, Jr., as personal representative of the estate of Carson Platt, deceased	Trustees & JRWMD	128.78	Personal Representativ's Deed
DMID330830	11/9/2001	Indian River County	Trustees	122.20	County Deed
DMID360586	6/13/2008	Fellsemere Development Corporation, Inc.	City of Fellsmere	83.79	Warranty Deed
DMID 348440	8/8/2006	The Virginia W. Russell Family Limited Partnership	State of Florida	46.10	Warranty Deed
DMID 313271	11/17/1999	S. Thomas Hamilton, Jr., as personal representative of the estate of Carson Platt, deceased	Trustees & JRWMD	41.58	Personal Representativ's Deed
DMID345437	8/11/2005	Donald M. Ansin	Indian River County	35.38	Warranty Deed
DMID339706	3/17/2003	Duncan A. McDonell	Trustees	17.22	Warranty Deed

Management Lease

Parcel Name or Lease Number	Date Leased	Initial Lessor	Initial Lessee	Current Term	Expiration Date
Lease Number 4118	3/29/1996	The Board of Trustees of the internal Improvement Trust Fund of the State of Florida	State of Florida Department of Environmental Protetion, Division of Marine Resources	50 years	3/28/2046
Lease Number 4397	1/31/2003	The Board of Trustees of the internal Improvement Trust Fund of the State of Florida and the St. Johns River Water management District	State of Florida Department of Environmental Portection, Office of Aquatic Managed Areas	50 years	1/30/2053

Outstanding Issue	Type of Instrument	Brief Description of the Outstanding Issue	Term of the Outstanding Issue
There is no deed related restriction or reservation on use of St. Sebastian River Pareserve State Park			

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Addendum 2—Advisory Group Members and Report

Local Government Representative
Susan Adams, Commissioner Indian River Board of County Commissioners
Michael Knight, Program Manager Brevard County Board of County Commissioners
Jason Nunemaker, City Manager City of Fellsmere

Agency Representatives
David Gunter, Chair Indian River Soil and Water Conservation District
Bud Crisafulli, Chair Brevard County Soil and Water Conservation District
Dylan Gavagni, Park Manager St. Sebastian River State Park
Amy Copeland, Land Manager St Johns Water Management District
Irene Sadowski, U.S Army Corps of Engineers
Todd Mecklenborg, Biologist U.S Fish and Wildlife Service
Shayna Jacques, Florida Fish and Wildlife Conservation Commission
Michael Edwards, Senior Forester Florida Forest Service
Julia Duggins, Archaeologist Florida Department of State Division of Historical Resources

Citizen Support Organization
Andrea Ash, President St. Sebastian River Preserve State Park Citizen Support Organization

Environmental and Conservation Group Representative
Leslie Maloney, Chair Sierra Club Turtle Coast Group
David Dixon, Pelican Island Audubon Society
Janice Broda, Florida Native Plant Society Eugenia Chapter

Local Private Property Owners
Vince Lamb Local Resident

Recreational User Group Representatives
Bill Alexander, Section Leader Florida Trail Association Indian River Chapter

Tourism and Economic Development Representative
Puneet Kapur, Chair Brevard County Tourist Development Council

St. Sebastian River Preserve State Park

DEP Advisory Group Staff Report

The Advisory Group meeting to review the proposed land management plan for St. Sebastian River Preserve State Park was held at the St. Sebastian River Preserve State Park Education Center on Thursday, June 7, 2018, from 9:00 a.m. to 12:00 p.m.

Susan Adams, Bud Crisafulli, Julie Duggins, Michael Edwards, Leslie Maloney, Bill Alexander, Andrea Ash, and Vince Lamb were not in attendance. All other appointed Advisory Group members were present as well as Evan Hall with Brevard County. Attending staff were Larry Fooks, Dylan Gavagni, Samantha McGee, and Sine Murray.

Ms. Murray began the meeting by explaining the purpose of the Advisory Group and reviewing the meeting agenda. She provided a brief overview of the Division's planning process and summarized public comments received during the previous evening's public workshop. She then asked each member of the advisory group to express his or her comments on the plans.

During the two-week public comment period following the advisory group meeting, the DRP received no additional comments from members of the public about the St. Sebastian River Preserve State Park unit management plan.

Summary of Advisory Group Comments

Shayna Jacques (Florida Freshwater Fish and Conservation Commission)

Ms. Jacques commented that there was nothing she didn't like in the plan. She supported the hydrological restoration efforts outlined in the plan, such as the commitment to fix the culverts along the gas line. Ms. Jacques commended the restoration objectives outlined in the draft plan and supported the concept of starting with smaller scale ground cover restoration efforts. She mentioned the importance of DRP participation in the local scrub jay working group. Ms. Jacques commented that recreation improvements outlined in the plan did not appear to impact or overburden the park's natural and cultural resources.

Amy Copeland (St. Johns River Water Management District)

Ms. Copeland approved of the goals and objectives identified in the plan. She mentioned that the property formerly known as Wheeler Farms or the Wheeler Farms Stormwater Project should now be referred to as the Micco Water Management Area (WMA) and that recreational activities available at Micco WMA included biking, hiking, wildlife viewing and equestrian use. Ms. Copeland requested that the plan be updated to reflect this information. She also suggested that additional information concerning a target basal area be added to the natural community restoration objectives.

Jason Nunemaker (City of Fellsmere)

Mr. Nunemaker expressed his appreciation for the cooperative relationship between the park and the city. He requested more emphasis on the importance of the park to recreational trail connectivity in the plan. He provided an overview of the city's greenways and trails planning efforts and stated that of importance to the City is the completion of the Trans Central Florida Rail Trail and mentioned that with the completion of the overpass for Interstate 95, that 13 miles of continuous paved trail could be created. He stated that the last remaining segment to complete is the portion located within the park. He acknowledged and appreciated the historical cooperation of the state park on completing this trail segment and asked that the plan include any language that could support future grant requests to complete the trail. Mr. Nunemaker indicated that the City wants to continue to partner with the state on this effort. He mentioned the City's efforts to create additional public recreational opportunities throughout the area specifically at the Fellsmere Water Management Area with a new boat ramp. Mr. Nunemaker indicated that he City is setting the stage for some "pretty sweet" recreational opportunities that should complement and help protect the resources of the preserve. The City would like to continue to work with the park staff to help minimize any future impacts to the preserve from future development plans.

Janice Broda (Florida Native Plant Society)

Ms. Broda expressed her appreciation for the level of detail in the plan and stated that what is accomplished at the park was "amazing" given the current level of staffing. Regarding management of native plants within the park, Ms. Broda indicated that the goals related to hydrological assessment and restoration are the most critical in addition to prescribed fire management and exotic invasive plant control.

Puneet Kapur (Brevard County Tourist Development Council)

Mr. Kapur indicated his support of the plan. Mr. Kapur noted that a lot of tourism is generated in the area from outdoor recreational activities like, kayaking, fishing and hunting and offered to support the park in any way they could. He mentioned that there are grant opportunities and provided an example of recent projects including a recent campground development at the nearby Three Folks Marsh Conservation Area.

Michael Knight (Brevard County Board of County Commissioners)

Mr. Knight commented that he thought it was a great plan and expressed his appreciation for all the cooperation between the park and Brevard County. He inquired about developing trail connections between Micco Scrub Sanctuary and Micco Water Management Area. Park manager, Mr. Gavagni commented that a trail connection between the park and Micco Water Management Area has already been established. Mr. Knight also inquired about the use of the park by commercial ecotour operators and if a special permit is required. Mr. Gavagni responded that

this use is relatively random and infrequent. Mr. Gavagni indicated that some guided groups, mainly equestrians are free to enter the park as there is no main access point or entry fee. Mr. Knight also inquired about monitoring to ensure the park's recommended carrying capacity. Mr. Gavagni described the methods used to estimate park attendance and Ms. Murray provided an overview of how the DRP establishes a park carrying capacity. Mr. Knight was curious about the design of the proposed paddling launch on the C-54 canal. Ms. Murray responded that the project would be designed to be universally accessible and appropriate to site conditions. Mr. Gavagni indicated that there would be a small parking area and that the launch would only support the launch of personal paddle craft and not commercial vendors.

Mr. Knight recognized the efforts of the park biologist, Samantha McGee on management of the park's scrub jay habitat and that the County wants to be sure that their resource management activities at Micco Scrub Sanctuary are compatible with management of the park. Mr. Knight inquired about the use of contract services and other methods for feral hog removal and Mr. Gavagni described the park's feral hog removal activity. Mr. Knight noted the need in the plan for additional equipment and asked for clarification. Ms. McGee explained that the presence of Interstate 95 complicates fire management in the park's scrub community. Therefore, to properly maintain the scrub habitat mechanical treatment is often required and that having certain pieces of equipment available at the park or district level would facilitate management of the scrub habitat. Mr. Knight also stated that he was still working on developing a Memorandum of Understanding to facilitate prescribed fire assistance between the park and Brevard County.

Todd Mecklenbourg (US Fish and Wildlife Service)

Mr. Mecklenbourg approved of the plan. He recommended that draft management objectives for scrub jay be consistent with the new update to the draft recovery plan for Florida scrub jay. Mr. Mecklenbourg indicated that there were some changes to the recommended vegetation management structure in the draft recovery plan. He inquired about the proposed metric for restoration activity and the cause of the population change for scrub jays from year to year. Ms. McGee responded with an overview of the relationship between restoration activities at the park and the potential impact to the scrub jay population. Mr. Mecklenbourg commented that he just wanted to be sure that the plan would provide flexibility so that the park would not be overly constrained by the management plan objectives. He commented that the USFWS did not want to overburden agencies and also ensure the greatest opportunity for federal grant funding. Mr. Mecklenbourg also offered to find ways to work with Brevard County and the park on grant proposals or needed equipment. He also mentioned the status of the Red-cockaded woodpecker and the pending reauthorization of the Endangered Species Act (ESA).

David Gunter (Indian River County Soil and Water Conservation District)

Mr. Gunter stated the he knew this land before state acquisition. He asked why there were so many different management zones and if it was based on the natural communities. He commented that hydrology is relatively simple to restore you just

need to construct something that will mimic the natural flow. Mr. Gunter mentioned the use of lidar in a hydrology assessment and if you have access to that data the cost of the assessment will decrease. He suggested that data may be available from Brevard County. Concerning exotic plants, Mr. Gunter commented that, "herbicide is your best friend.". He recognized that use of the word herbicide can cause concern with the public but that language regarding the use of herbicide to treat exotic plants should be strengthened in the plan. Mr. Gunter also stated that forage brought in from equestrian users can be a conduit for exotic plant seed. He suggested that the park develop some best management practices to limit the potential for exotic seed to be brought in with forage. He inquired if the current cattle lease was required to treat exotics and how that was handled with the lease agreement. Mr. Gavagni and Ms. McGee responded that the exotic plant treatment is a requirement in the lease agreement. Regarding equipment, Mr. Gunter commented that it was important to keep the same operator on the same piece of equipment as different operators increases your maintenance costs. He mentioned that there were opportunities to purchase surplus equipment from the Department of Defense and recommended that the park purchase equipment that has more than one function. Mr. Gunter thought that the park was doing a great job overall, and managing the park was a lot of work.

David Cox (Audubon Society, Pelican Island Chapter)

Mr. Cox commented that state parks do not receive enough funding and that he mentioned lack of funding as a concern when he participated in the park's land management review in 2015. He expressed his hope that with new leadership Florida's State Parks may be able to receive adequate funding. He expressed his opinion that organizations like Audubon of Florida can advocate to get funding to obtain equipment and the hydrological assessment. He stated that obtaining a current hydrological study is the key to successful restoration of the park. Mr. Cox suggested a possible addition to the park's Optimum Boundary map based on the property's connection to the park's hydrology. Mr. Cox also expressed the importance of the park to recreational trail connectivity within the area, particularly the trail crossing now available at the C-54 Canal and Fellsmere Canal. He mentioned that there were plans for trails running north to south along the Sebastian River down to the south end of the Indian River County. Mr. Cox inquired about our funding estimates for accessibility improvements at park facilities. Ms. Murray provided an overview of how accessibility upgrades are incorporated into the planning process and prioritized. Mr. Cox also thought that it was "amazing" what the park staff could accomplish "with such a thin budget." He stated that "the management is excellent, you should be proud, Kudos."

Summary of Written Comments from Advisory Group Members

Michael Edwards (Florida Forest Service)

Mr. Edwards was not able to attend the advisory group meeting but did submit written comments (see attached).

Staff Recommendations

The staff recommends approval of the proposed management plan for St. Sebastian River Preserve State Park as presented, with the following modifications:

- Additional language will be added to improve the discussion concerning regional trail and greenway planning efforts and the importance of the park to regional trail connectivity.
- The resource management component will be reviewed and updated based on advisory group comments including updates to restoration objectives and discussion on exotic plant treatment and pests and pathogens. Updates will also be made to the scientific names of plant and animal species as required.
- Editorial corrections will be made to the text and maps to update place names and provide the reader with additional information about the regional context of the park.
- Updates will be made to the park's Optimum Boundary map based on public and advisory group input.

Notes on Composition of the Advisory Group

Florida Statutes Chapter 259.032 Paragraph 10(b) establishes a requirement that all state land management plans for properties greater than 160 acres will be reviewed by an advisory group:

"Individual management plans required by s. 253.034(5), for parcels over 160 acres, shall be developed with input from an advisory group. Members of this advisory group shall include, at a minimum, representatives of the lead land managing agency, co-managing entities, local private property owners, the appropriate soil and water conservation district, a local conservation organization, and a local elected official."

Advisory groups that are composed in compliance with these requirements complete the review of State park management plans. Additional members may be appointed to the groups, such as a representative of the park's Citizen Support Organization (if one exists), representatives of the recreational activities that exist in or are planned for the park, or representatives of any agency with an ownership interest in the property. Special issues or conditions that require a broader representation for adequate review of the management plan may require the appointment of additional members. The Division's intent in making these appointments is to create a group that represents a balanced cross-section of the park's stakeholders. Decisions on appointments are made on a case-by-case basis by Division of Recreation and Parks staff.

Comments, and Suggestions for the St. Sebastian River Preserve State Park 2018 Draft Unit Management Plan

By: Michael Edwards, Senior Forester

Florida Forest Service-Other Public Lands

Most of my comments, and suggestions address the Natural Resource Management section of the SSRPSP 2018 draft Unit Management Plan. I have broken the comments up into topics of prescribed fire, timber management, exotic/ invasive species management, cultural resource management, recreational resource/facilities development, hydrology, resource protection, and notes.

Prescribed fire:

- I recommend that park managers cooperate with FFS when conducting prescribed burns in the 15,627 acres of pyric habitats (sandhill, mesic, wet, & scrubby flatwoods, scrub, wet prairie, depression marsh, basin marsh, & seepage slope). Specifically contacting the FFS Region 3, or Region 4 Wildfire Mitigation Team for assistance, when burning in wildland urban interface areas, and for assistance with notifying the public on the day of prescribed burns.
    - Orlando District (*Brevard*, Orange, Osceola, Seminole). Contact Cliff Frazier, Wildfire Mitigation Specialist, Clifford.Frazier@FreshFromFlorida.com
    - Forestry Center (Glades, Highlands, *Indian River*, Martin, Okeechobee, St. Lucie). Contact Melissa Yunas, Wildfire Mitigation Specialist, Melissa.Yunas@FreshFromFlorida.com
- Why is the prescribed burning 10-year objective less acres (14,000 acres) then what Table 7 shows as the total pyric acres (15,627)?
- The Draft UMP states in Action 4 to burn 75% of backlog zones, but how many acres of backlog zones are there?
- Including a map of the established "burn Zones" within the section on prescribed burning would be helpful. Perhaps even a map of the proposed burn zones for the next 1,5, or 10 years, and the preferred season to burn in (growing or dormant).

Timber management:

- Since SSRPSP is over 1,000 acres park managers, need to have a Timber Assessment written to evaluate the potential, and feasibility of managing timber resources for conservation, and revenue generation purposes (Section 1. Section 253.036, Florida Statutes). SSRPSP has recently completed a timber inventory, and has had a Timber Assessment written (Addendum 8).
- I have reviewed the new Timber Assessment, and recommend managers conduct the appropriate silvicultural treatments discussed for the specific stands at SSRPSP.
- DEP has a contract with private forestry consultants (F-4 Tech) to consult on forestry projects, and manage forestry project contracts on all properties.
- If SSRPSP Managers need to, they can still contact FFS for forestry advice;
  Michael Edwards
  Senior Forester, Florida Forest Service
  Other Public Lands Regions 3 and 4
  Michael.Edwards@FreshFromFlorida.com

Exotic/ invasive species management:

- Keep GIS/ GPS database of infected acres, and treated acres on SSRPSP.
- Have park staff involved with local CISMA;
    - Use staff involvement with CISMA to educate SSRPSP visitors and SSRPSP neighbors about threats that exotic/invasive species pose to SSRPSP natural habitat, and how SSRPSP visitors, and neighbors can help prevent introduction (example: don't move firewood).
    - Network with CISMA members to treat infected areas that SSRPSP staff may not be able to treat otherwise (example: work days).
- Contact FFS Forest Biologist, Jeff Eickwort: Jeffrey.Eickwort@FreshFromFlorida.com for information about how SSRPSP can work with adjacent landowners using a hold harmless agreement to treat invasive plants on private property.
- The UMP should mention how park staff address prevention, and control of pests, and pathogens within SSRPSP.

Cultural resource management:

- I recommend having appropriate SSRPSP staff complete the most current ARM Training.
- Create, and maintain an updated GIS database of the 2 archaeological trails, 15 archaeological sites, and 20 cultural sites at SSRPSP.
- Visit all sites at least once a year (which is the standard).
- The UMP should discuss how park staff will interpret these sites to the public; either at a visitor center, or signs along trails in the general area so that the public has a better understanding of the historical significance of the park within the region.

Recreational resource/facilities development:

- I recommend the use of permeable and semi-permeable construction materials for the construction, and maintenance of; trails, roads, parking lots, and other facilities development when available and practical to aid in the natural hydrological cycle.
- I recommend mentioning within the UMP, conversion of any existing facilities with septic to city/county sewage. Also, any new construction should be connected to city/county sewage, this should help protect the groundwater quality within SSRPSP and the adjacent Aquatic Preserve.

Hydrology:

- Obtain a hydrological assessment of SSRPSP.
    - Follow hydrological assessment recommendations.
    - Have a plan in place before, and after to mitigate the results of a hydrological restoration project (considering what the actual effects on the trees and groundcover of the natural communities).
- The UMP should discuss groundwater monitoring of both quality, and quantity.
- The UMP should discuss surface water monitoring of both quality, and quantity.

Resource Protection:

- The UMP needs to state if SSRPSP has had an official boundary survey, and if not, what is the plan on how to accomplish this.
- The UMP needs to address gates and fences, how staff install, and maintain these to protect SSRPSP resources.
- The UMP needs to address boundary signs.

- The UMP needs to address how law enforcement is utilized to protect the public and SSRPSP resources.

Notes:

- Check all references to maps, tables, and addendum numbers within the UMP. I noticed many references to wrong numbers.
- This UMP is very well written, and is easy to evaluate according to the DEP Land Management Review checklist items.

Addendum 3—References Cited

Breininger, D. R., M. L. Legare, and R. B. Smith. 2004. Eastern indigo snakes: influence of edge effects on population viability. Pages 299-311 in H. R. Akçakaya, M. A. Burgman, O Kindvall, C. C. Wood, P. Sjorgren-Gulve, J. S. Hatfield, and M. A. McCarthy, editors. Species conservation and management: case studies. Oxford University Press, New York.

Breininger, D.R. 2004. Florida scrub-jay habitat and population status on St. Sebastian State Buffer Reserve. Unpublished Draft 2004 Annual Report to the Florida Department of Environmental Protection, Tallahassee, FL. 37 pp.

Duncan, J. G., W. L. Evans III, and K.L. Taylor. 1994. Geologic framework of the lower Floridan aquifer system, Brevard County, Florida. Florida Geological Survey Bull 64. 90 pp.

Fernald, E. A. and D. J. Patton. 1985. Water resources atlas of Florida. Florida State University Press. 291 pp.

Florida Department of Environmental Protection, Office of Greenways and Trails 2015 Florida Greenways and Trails System Plan 2013-2017

Florida Department of State. Florida Master Site Files: 8BR1780, 8BR1781, 8BR1782, 8BR1783, 8BR1784, 8BR1766, 8BR1813, 8BR1824, 8IR1207, 8IR851, 8IR852, 8IR987, 8IR988, 8IR989, 8IR990, 8IR991, 8IR992, 8IR993, 8IR994, 8IR995.

Forrester, D.J. 1992. Parasites and diseases of wild mammals in Florida. University of Florida Press. 460 pp.

Huckle, H.F., H. D. Dollar, and R.F. Pendleton. 1974. Soil Survey of Brevard County, Florida. U.S. Dept. of Agriculture, Soil Conservation Service in cooperation with University of Florida, Agricultural Experiment Stations. Florida. 123 pp.

Indian River County Metropolitan Planning Organization 2008. North Indian River County Greenways Master Plan.

Paperno, R. and R. B. Brodie. 2000. A final summary of fisheries-independent sampling in the St. Sebastian River, Florida, March 1999 to June 2000. Florida Fish and Wildlife Conservation Commission. 23 pp.

Scott, T.M. 1992. A geological overview of Florida. Florida Geological Survey Open File Report No. 50. 78 pp.

Steward, J.S. and J.A. VanArman. 1987. Indian River Lagoon joint reconnaissance report. Final Report for Contracts CM-137 & CM-138. St. Johns River and South Florida Water Management Districts.

U.S. Fish and Wildlife Service. 1999. South Florida multi-species recovery plan. Atlanta, Georgia. 2172 pp.

U.S. Fish and Wildlife Service. 2003. Recovery plan for the red-cockaded woodpecker (*Picoides borealis*). Second Revision. Atlanta, Georgia. 316 pp.

Vojnovski, P.K., C. Newman, and B. Swann. 2001. Historical and archaeological investigations within the St. Sebastian River State Buffer Preserve, Brevard and Indian River counties, Florida. C.A.R.L. Archaeological Survey, Florida Bureau of Archaeological Research, Tallahassee, Florida.

Wettstein, C.A., C.V. Noble, and J.D. Slabaugh. 1987. Soil Survey of Indian River County, Florida. U.S. Dept. of Agriculture, Soil Conservation Service in cooperation with University of Florida, Agricultural Experiment Stations. Florida. 217 pp.

White, W. A. 1970. The geomorphology of the Florida Peninsula. Florida Geological Survey Bull. 51. 164 pp.

Addendum 4—Soil Descriptions

Anclote Series – Within this series, Anclote sand, depressional (2B) is found at the preserve. This is a nearly level, very poorly drained sandy soil in marshy depressions in the flatwoods, in broad areas on floodplains and in poorly defined drainageways. In most years the water table is within a depth of 10 inches for more than 6 months. In dry seasons it is deeper, but is seldom below a depth of 40 inches. This soil is occasionally flooded 2-7 days following heavy rains. Permeability is rapid in all layers. The available water capacity is moderate in the surface layer and low below this layer. Organic matter content is high in the surface layer, and natural fertility is low.

Arents, 0 to 5 percent slopes (23IR) – This soil consists of material dug from several areas that have different kinds of soil. This fill material is the result of earth-moving operations. This soil is used to fill such areas as sloughs, marshes, shallow depressions, swamps, and other low-lying areas above their natural ground levels. Permeability is moderately rapid to rapid. The water table varies with the amount of fill material and artificial drainage in any mapped area. In most years, the water table is at a depth of 24-36 inches for 2-4 months. During extended dry periods, no water table is within 5 feet of the surface.

Basinger Series – Within this series, Basinger sand, depressional (6B) and Basinger sand (7B) are found at this unit. This series consists of nearly level, poorly drained sandy soils in sloughs and depressions in the flatwoods. The soils formed in sandy marine sediments. Permeability is very rapid and the available water capacity is very low to low in all layers. Organic matter content is low.

Bessie Series – Within this series, Bessie muck, tidal (66B) is found at this unit. This series consists of very deep, very poorly drained, slow or very slow permeable organic soils in coastal mangrove swamps that are subject to daily or periodic flooding by high tides. They formed in marine deposits of organic materials over clayey and sandy sediments. Permeability is slow or very slow.

Canaveral Series - Within this series, the Canaveral-Anclote complex, gently undulating (9B) is found at this unit. These consist of nearly level and gently undulating, moderately well-drained sandy soils mixed with shell fragments. These soils are on low dune-like ridges bordering depressions and sloughs along the Atlantic Coast. They formed in marine sands and shell fragments. In most years the water table is at a depth of 10-40 inches for 2-6 months. Permeability is very rapid and the available water capacity is very low in all layers. Organic matter content is low.

Canova Series - Within this series, Canova muck (4IR) is found at this unit. The soils of this series are very poorly drained and moderately permeable; they were formed in sandy and loamy marine sediment under favorable conditions for the accumulation of organic material. These nearly level soils are in freshwater swamps and marshes. Under natural conditions, the water table is above the surface for most of the year.

Chobee Series - Within this series, Chobee sandy loam, frequently flooded (12B), Chobee loamy fine sand (2IR), and Chobee mucky loamy fine sand, depressional (62IR) are found at this unit. This series consists of nearly level, very poorly drained soils in marshy depressions and low areas of the floodplains. These soils formed in thick beds of moderately fine marine sediments. Under natural conditions, they are covered with shallow water or have a water table within a depth of 10 inches of the surface for more than 6 months during most years.

Copeland Series - Within this series, the Copeland-Bradenton-Wabasso complex (16B) is found at this unit. This complex consists of several nearly level, very poorly drained soils on low flats. In most years the water table is within a depth of 10 inches for more than 6 months. In dry seasons it is between 10-30 inches. This soil is flooded for 7 days to a month once every 5-20 years. Some areas are underlain by coquina rock instead of limestone.

EauGallie Series - Within this series, EauGallie sand (17B) and EauGallie, Winder, and Riviera soils, depressional (18B) are found at this unit. This series consists of nearly level, poorly drained sandy soils in the flatwoods. These soils are mainly on broad, low ridges. Some are in sloughs and shallow ponds. All formed in beds of sandy and loamy marine sediments. In wet seasons, the water table is within a depth of 10 inches of the surface for 2-4 months. In most years, the water table is at a depth of 48 inches for more than 6 months. Organic matter content is low.

Electra Series - Within this series, Electra fine sand, 0 to 5 percent slopes (88B and 48IR) is found at this unit. These soils are deep, somewhat poorly drained, slowly permeable or very slowly permeable soils that formed in thick beds of sandy and loamy marine sediment. These nearly level to gently sloping soils are on knolls on the flatwoods and in adjacent drainageways. The water table is at a depth of 25-40 inches for 4 consecutive months during most years and recedes to a depth of more than 40 inches during drier periods.

Floridana Series - Within this series, Floridana sand, depressional (22B), Floridana sand (23B and 24IR), Floridana, Chobee, and Felda soils, frequently flooded (24B), and Floridana mucky fine sand,

depressional (55IR) are found at this unit. They are very poorly drained, slowly permeable to very slowly permeable soils that formed in thick beds of sandy and loamy marine sediment. These nearly level soils are in depressions, in poorly defined drainageways, and on broad, low flats. The water table is above the surface for short periods after heavy rainfall or within a depth of 10 inches for more than 6 months during most years. It is at a depth of 10-30 inches for short periods during dry seasons. Depressional areas are ponded for 6 months or more.

Hilolo Series – Within this series, Hilolo fine sand (46B) is found at this unit. This series consists of deep, poorly drained slowly permeable soils formed in sandy and loamy marine sediments influenced by underlying alkaline materials. They occur on nearly level areas and along the borders of depressions and sloughs. Drainage is poor and runoff is slow. Permeability is moderate to very slow. The water table is within depths of 10 inches for 2-4 months and at depths of 10-40 inches for 6-9 months in most years.

Holopaw Series - Within this series, Holopaw fine sand (47IR) and Holopaw fine sand, depressional (57IR) are found at this unit. They are poorly drained, moderately slowly permeable soils that formed in thick beds of sandy and loamy marine sediment. These nearly level soils are on broad low flats, in poorly defined drainageways, and in depressional areas. The water table is within a depth of 10 inches of the surface for 2-6 months each year. The depressional areas are ponded for 6-9 months or more.

Immokalee Series - Within this series, Immokalee sand (28B) is found at this unit. Soils in this series are poorly drained, moderately permeable soils that formed in beds of sandy marine sediment. These nearly level soils are on broad flatwoods. In most years, the water table is within a depth of 10 inches of the surface for 1-3 months and at a depth of 10-40 inches for 6-9 months.

Jupiter Series – Within this series, Jupiter fine sand (3IR and 31IR) is found at this unit. They are poorly drained, rapidly permeable soils that formed in thin beds of sandy marine sediment underlain by fractured limestone bedrock. These nearly level soils are on low flats and hammocks. They are saturated during the wet periods.

Lokosee Series - Within this series, Lokosee fine sand (59IR) is found at this unit. These soils are poorly drained, slowly or very slowly permeable; they were formed in thick beds of sandy and loamy marine sediment. They occur on low hammocks, on broad low flats that are

adjacent to the flatwoods, and in poorly defined drainageways. In most years, the water table is within a depth of 10 inches of the surface for 2-4 months and at a depth of 10-40 inches for more than 6 months. During extended dry periods, it recedes to a depth of more than 40 inches.

Malabar Series - Within this series, Malabar sand, high (29B), Malabar sand (30B), and Malabar fine sand (39IR) are found at this unit. These soils are poorly drained, slowly permeable to very slowly permeable; they formed in thick beds of sandy and loamy marine sediment. They are found in low, narrow to broad sloughs, on flats, and in poorly defined drainageways. The water table is at a depth of less than 10 inches of the surface for 2-6 months each year and at a depth of 10-40 inches for most of the remainder of the year.

Manatee Series - Within this series, Manatee mucky loamy fine sand, depressional 53(IR) is found at this unit. Soils in this series are very poorly drained and moderately permeable; they formed in sandy and loamy marine sediment. These nearly level soils are in depressions, in poorly defined drainageways, and on broad, low flats. Under natural conditions, these soils are covered with shallow water, or they have a water table within a depth of 10 inches of the surface for more than 6 months of most years. Runoff is slow.

Myakka Series - Within this series, Myakka sand (36B), Myakka sand, depressional (38B), Myakka fine sand (5IR) and Myakka fine sand, depressional (45IR) are found at this unit. They are poorly drained, moderately permeable to moderately rapidly permeable soils that formed in beds of sandy marine sediment. These nearly level soils are on broad flatwoods and in depressions. In most years, the water table is within a depth of 10 inches of the surface for 1-3 months and at a depth of 10-40 inches for 6-9 months. Depressional areas are ponded for 6 months or more each year.

Oldsmar Series - Within this series, Oldsmar sand (40B), Oldsmar fine sand (6IR), and Oldsmar fine sand, depressional (52IR) are found at this unit. They are poorly drained, slowly permeable soils that formed in sandy and loamy marine sediment. These nearly level soils are on broad flatwoods and in depressional areas in the flatwoods. In most years, the water table is at a depth of 10-40 inches for more than 6 months and at a depth of less than 10 inches for 1-2 months.

Paola Series - Within this series, Paola fine sand, 0 to 5 percent slopes (43B) is found at this unit. They are excessively drained, very rapidly permeable soils that formed in thick deposits of marine or eolian sand. These nearly level to gently sloping soils are on the Atlantic Coastal Ridge. The water table is at a depth of more than 72 inches.

Pineda Series - Within this series, Pineda sand (47B and 16IR), and Pineda fine sand, depressional (56IR) are found at this unit. They are deep, poorly drained, slowly permeable to very slowly permeable soils that formed in thick beds of sandy and loamy marine sediment. These nearly level soils are on low hammocks and in broad, poorly defined sloughs. In most years, the water table is within a depth of 10 inches of the surface for 1-6 months and at a depth of 10-40 inches for more than 6 months. It recedes to a depth of more than 40 inches during extended dry periods.

Pomello Series - Within this series, Pomello sand (49B) and Pomello sand, 0 to 5 percent slopes (27IR) are found at this unit. They are moderately well-drained, moderately rapidly permeable soils that formed in thick beds of marine sediment. These nearly level to gently sloping soils are on low ridges and knolls in the flatwoods. The water table is at a depth of 24-40 inches for about 1-4 months during wet periods and at a depth of 40-60 inches during drier periods.

Pompano Series - Within this series, Pompano fine san (49IR) is found at this unit. These are poorly drained, rapidly permeable soils that formed in thick deposits of sandy marine sediment. These nearly level soils are in sloughs and poorly defined drainageways. The water table is within a depth of 10 inches of the surface for 2-6 months each year. During the drier periods, it is within a depth of about 30 inches for more than 9 months each year. Some areas are occasionally flooded for 2-7 days in some years.

Quartzipsamments, smoothed (52B) – this soil is nearly level to gently sloping and moderately well drained to somewhat poorly drained. It consists of thick deposits of sand and of mixed sand and shell fragments. This fill material is the result of earthmoving operations. They are commonly along major highways. Many areas are former sloughs, marshes, or shallow ponds that have been filled with various soil material to surrounding ground level or to elevations above natural ground level. Some areas were originally high ridges that have been excavated to below natural ground level and reworked. In a few places soils have been reworked in place and not moved. Drainage is variable. Most excavated areas are well-drained, but the water table is generally within a depth of 50 inches in filled areas. Permeability is variable but generally is very rapid. Available water capacity is also variable but generally is very low. Organic matter content is low.

Riviera Series - Within this series, Riviera sand (19B), Riviera fine sand (10IR), and Riviera fine sand, depressional (51IR) are found at this unit. They are poorly drained, slowly permeable to very slowly

permeable soils that formed in beds of sandy and loamy marine sediment. These nearly level soils are on low hammocks, in poorly defined drainageways, on broad, low flats, and in depressional areas. The water table is within a depth of 10 inches of the surface for 1-6 months and at a depth of 10-40 inches for more than 6 months in most years. It recedes to a depth of more than 40 inches during extended dry periods. The depressional areas are ponded for 6-9 months or more each year. The slope ranges from 0-2 percent.

Samsula Series – Within this series, Samsula muck, depressional (62B) is found at this unit. These are very poorly drained, rapidly permeable soils that formed in moderately thick beds of hydrophytic non-woody plant residue. These nearly level soils are in small depressions, poorly defined drainageways, and freshwater marshes and swamps. The water table is at or above the surface except during extended dry periods.

Satellite Series - Within this series, Satellite sand (53B) and Satellite fine sand (34IR) are found at this unit. These are somewhat poorly drained, very rapidly permeable soils that formed in theick beds of sandy marine sediment. These nearly level soils are on low knolls and ridges on the flatwoods. The water table is at a depth of 18-40 inches for 2-6 months and at a depth of 40-72 inches for 6 months or more in most years.

St. Johns Series - Within this series, St. Johns sand, depressional (55B) is found at this unit. This series consists of nearly level, poorly drained sandy soils on broad low ridges, in sloughs, in poorly defined drainageways, and in shallow intermittent ponds in the flatwoods. These soils formed in marine sands. Permeability is moderate in the weakly cemented layers and very rapid in all other layers. The available water capacity is moderate in the surface layer and weakly cemented layers and very low to low in all other layers. Organic matter content is moderate in the surface layer and weakly cemented layers and low in other layers.

Tomoka Series - Within this series, Tomoka muck, undrained (67B) is found at this unit. This series consists of nearly level, very poorly drained, well-decomposed organic soils in broad, flat marshes, small depressions, and swamps. These soils formed in moderately thick beds of hydrophytic, non-woody plant remains underlain by sandy and loamy mineral layers. Permeability is rapid in the organic layers and sandy layers and moderate to moderately rapid in the loamy layers. The available water capacity is very high in the organic layers, low in the

sandy layers, and moderate in the loamy layers. Organic matter content is very high.

Udorthents, steep (59B) – this soil consists of well-drained heterogeneous mixtures of sand, shell, and unconsolidated material that has been excavated from adjacent canals or other areas and deposited in irregular piles. These deposits are deep and form a continuous embankment along major canals; in other places, they may be only a few feet thick and may be spread over large areas. The seasonal high water table is usually below a depth of 72 inches. Permeability is variable but is generally rapid; available water capacity is also variable but usually is low.

Wabasso Series - Within this series, Wabasso sand (71B) and Wabasso fine sand (13IR) are found at this unit. They are poorly drained, slowly permeable or very slowly permeable soils that formed in sandy and loamy marine sediment. These nearly level soils are on broad flatwoods. In most years, the water table is at a depth of 10-40 inches for more than 6 months and at a depth of less than 10 inches of the surface for 1-2 months.

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Addendum 5—Plant and Animal List

St. Sebastian River Preserve State Park Plants

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)

BRYOPHYTES

Sphagnum moss..... *Sphagnum* sp.

PTERIDOPHYTES

Giant leather fern.....*Acrostichum danaeifolium*
Toothed midsorus fern;
swamp fern..... *Blechnum serrulatum*

Long strap fern.....*Campyloneurum phyllitidis*
Nodding club-moss.....*Lycopodiella cernua*.....BG,DS,HH,WF
Japanese climbing fern*.....*Lygodium japonicum*
Small-leaf climbing fern*.....*Lygodium microphyllum*
Tuberous sword fern*.....*Nephrolepis cordifolia*
Sword fern; wild Boston fern..... *Nephrolepis exaltata*
Hand fern.....*Ophioglossum palmatum*.....BF,FS
Cinnamon fern.....*Osmunda cinnamomea*..... BS,BG,DM,FM,FS
Royal fern..... *Osmunda regalis*..... BS,BG,BF,FM,FS
Golden polypody..... *Phlebodium aureum*
Resurrection fern..... *Pleopeltis polypodioides* var. *michauxiana*
Whisk-fern..... *Psilotum nudum*
Bracken fern.....*Pteridium aquilinum* var. *pseudocaudatum*
Meadow spike-moss..... *Selaginella apoda*
Shoestring fern.....*Vittaria lineata*
Netted chain fern..... *Woodwardia areolata*

GYMNOSPERMS

Red cedar..... *Juniperus virginiana*
Pond-cypress..... *Taxodium ascendens*
Bald-cypress.....*Taxodium distichum*
Sand pine..... *Pinus clausa*
Slash pine..... *Pinus elliottii*
Longleaf pine..... *Pinus palustris*

MONOCOTS

Flatspike sedge.....*Abildgaardia ovata*
Yellow colicroot.....*Aletris lutea*
Blue maidencane.....*Amphicarpum muhlenbergianum*
Florida bluestem..... *Andropogon floridanus*
Bushy bluestem.....*Andropogon glomeratus* var. *hirsutior*
Chalky bluestem..... *Andropogon virginicus* var. *glaucus*
Broomsedge bluestem.....*Andropogon virginicus* var. *virginicus*
Jack-in-the-pulpit..... *Arisaema triphyllum*
Wiregrass.....*Aristida beyrichiana*

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Arrowfeather threeawn	*Aristida purpurascens*	
Florida threeawn	*Aristida rhizomophora*	
Bottlebrush threeawn	*Aristida spiciformis*	
Common asparagus-fern*	*Asparagus setaceus*	
Common bamboo *	*Bambusa vulgaris*	
Densetuft hairsedge	*Bulbostylis ciliatifolia*	
Ware's hairsedge	*Bulbostylis warei*	
Southern bluethread	*Burmannia capitata*	
Manyflowered grasspink	*Calopogon multiflorus*	MF
Bandana-of-the-everglades	*Canna flaccida*	
Hop sedge	*Carex lupulina*	
Southern sandbur	*Cenchrus echinatus*	
Slender woodoats	*Chasmanthium laxum*	
Jamaica swamp sawgrass	*Cladium jamaicense*	
Wild taro*	*Colocasia esculenta*	
Dayflower	*Commelina diffusa*	
Whitemouth dayflower	*Commelina erecta*	
Seven-sisters; string-lily	*Crinum americanum*	
Toothachegrass	*Ctenium aromaticum*	
Baldwin's flatsedge	*Cyperus croceus*	
Yellow nutgrass; chufa flatsedge*	*Cyperus esculentus*	
Haspan flatsedge	*Cyperus haspan*	
Swamp flatsedge	*Cyperus ligularis*	
Papyrus flatsedge*	*Cyperus papyrus*	
Manyspike flatsedge	*Cyperus polystachyos*	
Pinebarren flatsedge	*Cyperus retrorsus*	
Tropical flatsedge	*Cyperus surinamensis*	
Durban crowfootgrass*	*Dactyloctenium aegyptium*	
Eggleaf witchgrass	*Dichanthelium ovale*	
India crabgrass*	*Digitaria longiflora*	
Air-potato*	*Dioscorea bulbifera*	
Baldwin's spikerush; roadgrass	*Eleocharis baldwinii*	
Yellow spikerush; pale spikerush	*Eleocharis flavescens*	
Indian goosegrass*	*Eleusine indica*	
Florida butterfly orchid	*Encyclia tampensis*	XH,BS,BF,STS
Golden pothos*	*Epipremnum pinnatum*	
Thalia lovegrass*	*Eragrostis atrovirens*	
Elliott's lovegrass	*Eragrostis elliottii*	
Slimflower lovegrass*	*Eragrostis gangetica*	
Purple lovegrass	*Eragrostis spectabilis*	
Flattened pipewort	*Eriocaulon compressum*	
Tenangle pipewort	*Eriocaulon decangulare*	

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Wild coco	*Eulophia alta*	
Saltmarsh fingergrass	*Eustachys glauca*	
Pinewoods fingergrass	*Eustachys petraea*	
Hurricanegrass	*Fimbristylis cymosa*	
Ditch fimbry*	*Fimbristylis schoenoides*	
Southern umbrellasedge	*Fuirena scirpoidea*	
Toothpetal false reinorchid	*Habenaria floribunda*	
Snowy orchis	*Habenaria nivea*	WF,WP
Waterthyme*	*Hydrilla verticillata*	
Coastalplain spiderlily	*Hymenocallis crassifolia*	
Fringed yellow stargrass	*Hypoxis juncea*	
Cogongrass*	*Imperata cylindrica*	
Dixie iris; prairie iris	*Iris hexagona*	
Forked rush	*Juncus dichotomus*	
Soft rush	*Juncus effusus* ssp. *solutus*	
Bog rush; Elliott's rush	*Juncus elliottii*	
Shore rush; grassleaf rush	*Juncus marginatus*	
Bighead rush	*Juncus megacephalus*	
Manyhead rush	*Juncus polycephalos*	
Needlepod rush	*Juncus scirpoides*	
Carolina redroot	*Lachnanthes caroliniana*	
Whitehead bogbutton	*Lachnocaulon anceps*	
Southern bogbutton	*Lachnocaulon beyrichianum*	
Catesby's lily; pine lily	*Lilium catesbaei*	MF,WF,WP
American spongeplant; frog's-bit	*Limnobium spongia*	
Common banana*	*Musa* x *paradisiaca*	
Celestial lily; fallflowering ixia	*Nemastylis floridana*	FM,FS,WF
Florida beargrass	*Nolina atopocarpa*	WF
Woodsgrass; basketgrass	*Oplismenus hirtellus*	
Goldenclub; neverwet	*Orontium aquaticum*	
Beaked panicum	*Panicum anceps*	
Maidencane	*Panicum hemitomon*	
Guineagrass*	*Panicum maximum*	
Torpedograss*	*Panicum repens*	
Bahiagrass*	*Paspalum notatum* var. *saurae*	
Early paspalum	*Paspalum praecox*	
Water paspalum	*Paspalum repens*	
Thin paspalum	*Paspalum setaceum*	
Vaseygrass *	*Paspalum urvillei*	
Green arrow arum	*Peltandra virginica*	
Elephantgrass; napiergrass*	*Pennisetum purpureum*	
Senegal date palm*	*Phoenix reclinata*	
Common reed	*Phragmites australis*	
Water-lettuce*	*Pistia stratiotes*	
Pickerelweed	*Pontederia cordata*	

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Giant orchid	*Pteroglossaspis ecristata*	SH,SCF,XH
Rose natalgrass*	*Rhynchelytrum repens*	
Starrush whitetop	*Rhynchospora colorata*	
Starrush whitetop	*Rhynchospora colorata*	
Fascicled beaksedge	*Rhynchospora fascicularis*	
Pinebarren beaksedge	*Rhynchospora intermedia*	
Narrowfruit horned beaksedge	*Rhynchospora inundata*	
Giant whitetop; sandswamp whitetop	*Rhynchospora latifolia*	
Sandyfield beaksedge	*Rhynchospora megalocarpa*	
Southern beaksedge	*Rhynchospora microcarpa*	
Bunched beaksedge	*Rhynchospora microcephala*	
Shortbeak beaksedge; Baldrush	*Rhynchospora nitens*	
Pineland beaksedge	*Rhynchospora perplexa*	
Plumed beaksedge	*Rhynchospora plumosa*	
Fairy beaksedge	*Rhynchospora pusilla*	
Wright's beaksedge	*Rhynchospora wrightiana*	
Cabbage palm	*Sabal palmetto*	
Sugarcane plumegrass	*Saccharum giganteum*	
Leafless beaked ladiestresses	*Sacoila lanceolata* var. *lanceolata*	MF,PF,81
Indian cupscale*	*Sacciolepis indica*	
Grassy arrowhead	*Sagittaria graminea*	
Bulltongue arrowhead	*Sagittaria lancifolia*	
Water spangles	*Salvinia minima*	
Bowstring hemp*	*Sansevieria hyacinthoides*	
White sunnybell	*Schoenolirion albiflorum*	
Softstem bulrush	*Scirpus tabernaemontani*	
Baldwin's nutrush	*Scleria baldwinii*	
Fringed nutrush	*Scleria ciliata* var. *ciliata*	
Netted nutrush	*Scleria reticularis*	
Tall nutgrass; whip nutrush	*Scleria triglomerata*	
Saw palmetto	*Serenoa repens*	
Yellow bristlegrass; yellow foxtail	*Setaria parviflora*	
Narrowleaf blueeyed grass	*Sisyrinchium angustifolium*	
Annual blueeyed grass*	*Sisyrinchium rosulatum*	
Jeweled blueeyed grass	*Sisyrinchium xerophyllum*	
Earleaf greenbrier	*Smilax auriculata*	
Laurel greenbrier	*Smilax laurifolia*	
Bristly greenbrier	*Smilax tamnoides*	
Lopsided Indiangrass	*Sorghastrum secundum*	
Sand cordgrass	*Spartina bakeri*	
Lacelip ladiestresses	*Spiranthes laciniata*	DM,FM,STS

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Spring ladiestresses	*Spiranthes vernalis*	MF,FM,FS,SSL,STS
Smutgrass*	*Sporobolus indicus*	
Pineywoods dropseed	*Sporobolus junceus*	
St. Augustinegrass*	*Stenotaphrum secundatum*	
Yellow hatpins	*Syngonanthus flavidulus*	
Fivefingers*	*Syngonium angustatum*	
Alligatorflag; fireflag	*Thalia geniculata*	
Cardinal airplant	*Tillandsia fasciculata* var. *densispica*	FS,HH,STS
Potbelly airplant	*Tillandsia paucifolia*	
Ballmoss	*Tillandsia recurvata*	
Southern needleleaf	*Tillandsia setacea*	
Spanish moss	*Tillandsia usneoides*	
Giant airplant	*Tillandsia utriculata*	FS,HH,STS
Purplequeen*	*Tradescantia pallida*	
Moses-in-the-cradle; oysterplant*	*Tradescantia spathacea*	
Eastern gamagrass; Fakahatcheegrass	*Tripsacum dactyloides*	
Southern cattail	*Typha domingensis*	
Broadleaf cattail	*Typha latifolia*	
Paragrass*	*Urochloa mutica*	
Shortleaf yelloweyed grass	*Xyris brevifolia*	
Carolina yelloweyed grass	*Xyris caroliniana*	
Elliott's yelloweyed grass	*Xyris elliottii*	
Spanish bayonet; aloe yucca*	*Yucca aloifolia*	
Adam's needle	*Yucca filamentosa*	
Redmargin zephyrlily	*Zephyranthes simpsonii*	WF,WP
Soldier's orchid; lawn orchid*	*Zeuxine strateumatica*	
Crowpoison; Osceola's plume	*Zigadenus densus*	
Corn; maize*	*Zea mays*	

DICOTS

Rosary pea*	*Abrus precatorius*	
Sweet acacia	*Acacia farnesiana*	
Pineland acacia	*Acacia pinetorum*	
Red maple	*Acer rubrum*	
Shyleaf	*Aeschynomene americana*	
Indian jointvetch*	*Aeschynomene indica*	
Purple false foxglove	*Agalinis purpurea*	
Hammock snakeroot	*Ageratina jucunda*	
Golden trumpet*	*Allamanda cathartica*	
Alligatorweed*	*Alternanthera philoxeroides*	
Sessile joyweed*	*Alternanthera sessilis*	
Spiny amaranth*	*Amaranthus spinosus*	
Common ragweed	*Ambrosia artemisiifolia*	
Bastard indigobush;		

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
False indigobush	*Amorpha fruticosa*	
Peppervine	*Ampelopsis arborea*	
Pond apple	*Annona glabra*	
Groundnut	*Apios americana*	
Marlberry	*Ardisia escallonioides*	
Florida Indian plantain	*Arnoglossum floridanum*	
Ovateleaf Indian plantain	*Arnoglossum ovatum*	
Scarlet milkweed; bloodflower*	*Asclepias curassavica*	
Curtiss' milkweed	*Asclepias curtissii*	SC
Florida milkweed	*Asclepias feayi*	
Swamp milkweed	*Asclepias incarnata*	
Fewflower milkweed	*Asclepias lanceolata*	
Savannah milkweed	*Asclepias pedicellata*	
Velvetleaf milkweed	*Asclepias tomentosa*	
Netted pawpaw	*Asimina reticulata*	
Climbing aster	*Aster carolinianus*	
Whitetop aster; pinebarren aster	*Aster reticulatus*	
Annual saltmarsh aster	*Aster subulatus*	
Whitetop aster; Dixie aster	*Aster tortifolius*	
Black mangrove	*Avicennia germinans*	
Silverling	Baccharis glomeruliflora	
Groundsel tree; sea myrtle	*Baccharis halimifolia*	
Lemon bacopa; blue waterhyssop	*Bacopa caroliniana*	
Herb-of-grace	*Bacopa monnieri*	
Coastalplain honeycombhead	*Balduina angustifolia*	
Tarflower	*Bejaria racemosa*	
Alabama supplejack; rattan vine	*Berchemia scandens*	
Beggarticks; romerillo	*Bidens alba*	
Burrmarigold; smooth beggarticks	*Bidens laevis*	
Smallfruit beggarticks	*Bidens mitis*	
Pineland rayless goldenrod	*Bigelowia nudata* ssp. *australis*	
False nettle; bog hemp	*Boehmeria cylindrica*	
Bushy seaside oxeye	*Borrichia frutescens*	
American bluehearts	*Buchnera americana*	
American beautyberry	*Callicarpa americana*	
Papaya*	*Carica papaya*	
Pineland chaffhead	*Carphephorus carnosus*	
Coastalplain chaffhead	*Carphephorus corymbosus*	

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Vanillaleaf	Carphephorus odoratissimus	
Hairy chaffhead	*Carphephorus paniculatus*	
Water hickory	*Carya aquatica*	
Scrub hickory	*Carya floridana*	
Pignut hickory	*Carya glabra*	
Love vine; devil's gut	*Cassytha filiformis*	
River sheoak*	*Casuarina cunninghamiana*	
Australian-pine*	*Casuarina equisetifolia*	
Gray sheoak*	*Casuarina glauca*	
Madagascar periwinkle*	*Catharanthus roseus*	
Sugarberry; hackberry	*Celtis laevigata*	
Spadeleaf	*Centella asiatica*	
Spurred butterfly pea	*Centrosema virginianum*	
Common buttonbush	*Cephalanthus occidentalis*	
Florida rosemary; sand heath	*Ceratiola ericoides*	
Partridge pea	*Chamaechrista fasciculata*	
Sensitive pea	*Chamaecrista nictitans*	
Pillpod sandmat	*Chamaesyce hirta*	
Hyssopleaf sandmat	*Chamaesyce hyssopifolia*	
Spotted sandmat	*Chamaesyce maculata*	
Gulf sandmat	*Chamaesyce thymifolia*	
Woolly sonbonnets; pineland daisy	*Chaptalia tomentosa*	
Mexican tea*	*Chenopodium ambrosioides*	
Coastalplain goldenaster	*Chrysopsis scabrella*	
Scrubland goldenaster	*Chrysopsis subulata*	
Spotted water hemlock	*Cicuta maculata*	
Camphortree*	*Cinnamomum camphora*	
Yellow thistle	*Cirsium horridulum*	
Nuttall's thistle	*Cirsium nuttallii*	
Citron*	*Citrullus lanatus*	
Sour orange*	*Citrus aurantium*	
Tangerine*	*Citrus reticulata*	
Sweet orange*	*Citrus sinensis*	
Grapefruit*	*Citrus* x *paradisi*	
Pine-hyacinth	*Clematis baldwinii*	
Tread-softly; finger-rot	*Cnidoscolus stimulosus*	
Blue mistflower	*Conoclinium coelestinum*	
Large-flowered rosemary	*Conradina grandiflora*	SC
Canadian horseweed	*Conyza canadensis* var. *pusilla*	
Florida tickseed	*Coreopsis floridana*	
Leavenworth's tickseed	*Coreopsis leavenworthii*	
Swamp dogwood; stiff dogwood	*Cornus foemina*	
Lanceleaf rattlebox*	*Crotalaria lanceolata*	
Smooth rattlebox*	*Crotalaria pallida* var. *obovata*	

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Rabbitbells	*Crotalaria rotundifolia*	
Showy rattlebox*	*Crotalaria spectabilis*	
Vente conmigo	*Croton glandulosus*	
Colombian waxweed	*Cuphea carthagenensis*	
Marsh parsley*	*Cyclospermum leptophyllum*	
Leafless swallowwort	*Cynanchum scoparium*	
Coinvine	Dalbergia ecastophyllum	
Whitetassels	*Dalea carnea*	
Feay's prairieclover	*Dalea feayi*	
Summer farewell	*Dalea pinnata* var. *adenopoda*	
Ticktrefoil	*Desmodium incanum*	
Panicledleaf ticktrefoil	*Desmodium paniculatum*	
Threeflower ticktrefoil*	*Desmodium triflorum*	
Carolina ponysfoot	*Dichondra caroliniensis*	
Poor joe; rough buttonweed	*Diodia teres*	
Virginia buttonweed	*Diodia virginiana*	
Common persimmon	*Diospyros virginiana*	
Pink sundew	*Drosera capillaris*	
Water sundew; spoonleaf sundew	*Drosera intermedia*	DM,DS
Oblongleaf twinflower	*Dyschoriste oblongifolia*	
Devil's potato; rubber vine	*Echites umbellata*	
False daisy	*Eclipta prostrata*	
Tall elephantsfoot	*Elephantopus elatus*	
Florida tasselflower*	*Emilia fosbergii*	
Lilac tasselflower*	*Emilia sonchifolia*	
American burnweed; fireweed	*Erechtites hieracifolia*	
Oakleaf fleabane	*Erigeron quercifolius*	
Prairie fleabane	*Erigeron strigosus*	
Early whitetop fleabane	*Erigeron vernus*	
Loquat*	*Eriobotrya japonica*	
Fragrant eryngo	*Eryngium aromaticum*	
Baldwin's eryngo	*Eryngium baldwinii*	
Button rattlesnakemaster	*Eryngium yuccifolium*	
Coralbean; Cherokee bean	*Erythrina herbacea*	
White stopper	*Eugenia axillaris*	
Spanish stopper; boxleaf stopper	*Eugenia foetida*	
Surinam cherry*	*Eugenia uniflora*	
Dogfennel	Eupatorium capillifolium	
Mohr's thoroughwort	*Eupatorium mohrii*	
Roundleaf thoroughwort	*Eupatorium rotundifolium*	
Lateflowering thoroughwort	*Eupatorium serotinum*	
Lesser Florida spurge	*Euphorbia polyphylla*	
Slender goldenrod	*Euthamia caroliniana*	

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Silver dwarf morningglory	*Evolvulus sericeus*	
Strangler fig; golden fig	*Ficus aurea*	
Weeping fig*	*Ficus benjamina*	
Florida swampprivet	*Forestiera segregata*	
Elliott's milkpea	*Galactia elliottii*	
Eastern milkpea	*Galactia regularis*	
Downy milkpea	*Galactia volubilis*	
Coastal bedstraw	*Galium hispidulum*	
Stiff marsh bedstraw	*Galium tinctorium*	
Garberia	*Garberia heterophylla*	SC,SCF
Southern beeblossom	*Gaura angustifolia*	
Dwarf huckleberry	*Gaylussacia dumosa*	
Carolina cranesbill	*Geranium carolinianum*	
Narrowleaf purple everlasting	*Gnaphalium falcatum*	
Sweet everlasting; rabbit tobacco	*Gnaphalium obtusifolium*	
Pennsylvania everlasting	*Gnaphalium pensylvanicum*	
Spoonleaf purple everlasting	*Gnaphalium purpureum*	
Globe amaranth*	*Gomphrena serrata*	
Loblolly bay	*Gordonia lasianthus*	
Rough hedgehyssop	*Gratiola hispida*	
Shaggy hedgehyssop	*Gratiola pilosa*	
English ivy*	*Hedera helix*	
Spanish daisy; bitterweed	*Helenium amarum*	
Southeastern sneezeweed	*Helenium pinnatifidum*	
Pinebarren frostweed	*Helianthemum corymbosum*	
Florida scrub frostweed	*Helianthemum nashii*	
Common sunflower*	*Helianthus annuus*	
Florida sunflower	*Helianthus floridanus*	
Stiff sunflower	*Helianthus radula*	
Pineland heliotrope	*Heliotropium polyphyllum*	
Limpograss*	*Hemarthria altissima*	
Swamp rosemallow	*Hibiscus grandiflorus*	
Rosemallow*	Hibiscus rosa-sinensis var. rosa-sinensis	
Queen-devil	*Hieracium gronovii*	
Coastalplain hawkweed	*Hieracium megacephalon*	
Manyflower marshpennywort	*Hydrocotyle umbellata*	
Skyflower	*Hydrolea corymbosa*	
Coastalplain St. John's-wort	*Hypericum brachyphyllum*	
Roundpod St. John's-wort	*Hypericum cistifolium*	
Sandweed; peelbark St. John's-wort	*Hypericum fasciculatum*	
Pineweeds; orangegrass	*Hypericum gentianoides*	
St. Andrew's-cross	*Hypericum hypericoides*	
Dwarf St. John's-wort	*Hypericum mutilum*	

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Atlantic St. John's-wort	*Hypericum reductum*	
Fourpetal St. John's-wort	*Hypericum tetrapetalum*	
Clustered bushmint; musky mint	*Hyptis alata*	
Comb bushmint*	*Hyptis pectinata*	
John Charles*	*Hyptis verticillata*	
Carolina holly; sand holly	*Ilex ambigua* var. *ambigua*	
Dahoon holly	*Ilex cassine*	
Inkberry; gallberry	*Ilex glabra*	
Yaupon	*Ilex vomitoria*	
Hairy indigo*	*Indigofera hirsuta*	
Trailing indigo*	*Indigofera spicata*	
Indigo	Indigofera suffruticosa	
Moonflowers	*Ipomoea alba*	
Mile-a-minute vine*	*Ipomoea cairica*	
Tievine	Ipomoea cordatotriloba	
Oceanblue morningglory	*Ipomoea indica*	
Man-of-the-earth	*Ipomoea pandurata*	
Saltmarsh morningglory	*Ipomoea sagittata*	
Heavenlyblue morningglory	*Ipomoea violacea*	
Juba's bush	*Iresine diffusa*	
Virginia willow; Virginia sweetspire	*Itea virginica*	
Bigleaf sumpweed	*Iva frutescens*	
Pineland waterwillow	*Justicia angusta*	
Shrimpplant*	*Justicia brandegeana*	
Virginia saltmarsh mallow	*Kosteletzkya virginica*	
Crapemyrtle*	*Lagerstroemia indica*	
White mangrove	*Laguncularia racemosa*	
Lantana; shrubverbena*	*Lantana camara*	
Nodding pinweed	*Lechea cernua*	SC
Dickert's pinweed	*Lechea deckertii*	
Drysand pinweed	*Lechea divaricata*	MF
Piedmont pinweed	*Lechea torreyi*	
Virginia pepperweed	*Lepidium virginicum*	
Chapman's gayfeather	*Liatris chapmanii*	
Garber's gayfeather	*Liatris garberi*	
Slender gayfeather	*Liatris gracilis*	
Dense gayfeather	*Liatris spicata*	
Shortleaf gayfeather	*Liatris tenuifolia* var. *quadriflora*	
Gopher apple	*Licania michauxii*	
Glossy privet*	*Ligustrum lucidum*	
Canada toadflax	*Linaria canadensis*	
Apalachicola toadflax	*Linaria floridana*	
Savannah false pimpernel	*Lindernia grandiflora*	
Florida yellow flax	*Linum floridanum*	

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Bay lobelia	*Lobelia feayana*	
Glade lobelia	*Lobelia glandulosa*	
White lobelia	*Lobelia paludosa*	
Winged primrosewillow	*Ludwigia alata*	
Seedbox	Ludwigia alternifolia	
Piedmont primrosewillow	*Ludwigia arcuata*	
Southeastern primrosewillow	*Ludwigia linifolia*	
Seaside primrosewillow	*Ludwigia maritima*	
Mexican primrosewillow	*Ludwigia octovalvis*	
Peruvian primrosewillow*	*Ludwigia peruviana*	
Creeping primrosewillow	*Ludwigia repens*	
Shrubby primrosewillow	*Ludwigia suffruticosa*	
Skyblue lupine	*Lupinus diffusus*	
Rose-rush	*Lygodesmia aphylla*	
Rusty staggerbush	*Lyonia ferruginea*	
Coastalplain staggerbush	*Lyonia fruticosa*	
Fetterbush	*Lyonia lucida*	
Loosestrife	Lythrum alatum var. lanceolatum	
Wild bushbean*	*Macroptilium lathyroides*	
Southern magnolia	*Magnolia grandiflora*	
Grassleaf Barbara's buttons	*Marshallia tenuifolia*	
Florida milkvine	*Matelea floridana*	PF,XH
Axilflower	*Mecardonia acuminata*	
Black medick*	*Medicago lupulina*	
Punktree*	*Melaleuca quinquenervia*	
Chinaberrytree*	*Melia azedarach*	
White sweetclover*	*Melilotus albus*	
Chocolateweed*	*Melochia corchorifolia*	
Creeping cucumber	*Melothria pendula*	
Florida keys hempvine	*Mikania cordifolia*	
Climbing hempvine	*Mikania scandens*	
Sensitive brier	*Mimosa quadrivalvis* var. *angustata*	
Partridgeberry; twinberry	*Mitchella repens*	
Lax hornpod	*Mitreola petiolata*	
Swamp hornpod	*Mitreola sessilifolia*	
Balsampear*	*Momordica charantia*	
Indianpipe	*Monotropa uniflora*	
Latexplant*	*Morrenia odorata*	
White mulberry*	*Morus alba*	
Red mulberry	*Morus rubra*	
Twinberry	*Myrcianthes fragrans*	PF
Southern bayberry; wax myrtle	*Myrica cerifera*	
Spatterdock; yellow pondlily	*Nuphar lutea*	
Cape blue waterlily*	*Nymphaea capensis* var. *zanzibariensis*	
American white waterlily	*Nymphaea odorata*	
Big floatingheart	*Nymphoides aquatica*	

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Swamp tupelo	*Nyssa sylvatica* var. *biflora*	
Cutleaf eveningprimrose	*Oenothera laciniata*	
Flattop mille graines*	*Oldenlandia corymbosa*	
Innocence; roundleaf bluet	*Oldenlandia procumbens*	
Clustered mille graine	*Oldenlandia uniflora*	
Pricklypear	*Opuntia humifusa*	
Erect pricklypear	*Opuntia stricta*	PF,XH
Scrub wild olive	*Osmanthus megacarpus*	
Common yellow woodsorrel	*Oxalis corniculata*	
Pink woodsorrel*	*Oxalis debilis* var. *corymbosa*	
Water cowbane	*Oxypolis filiformis*	
Feay's palafox	*Palafoxia feayi*	
Florida pellitory	*Parietaria floridana*	
Jerusalem thorn*	*Parkinsonia aculeata*	
Virginia creeper; woodbine	*Parthenocissus quinquefolia*	
Corkystem passionflower	*Passiflora suberosa*	
Avocado*	*Persea americana*	
Red bay	Persea borbonia var. borbonia	
Swamp bay	*Persea palustris*	
Florida false sunflower	*Phoebanthus grandiflorus*	
Oak mistletoe	*Phoradendron leucarpum*	
Turkey tangle fogfruit; Capeweed	*Phyla nodiflora*	
Mascarene island leafflower*	*Phyllanthus tenellus*	
Cutleaf groundcherry	*Physalis angulata*	
American pokeweed	*Phytolacca americana*	
Wild pennyroyal	*Piloblephis rigida*	
Blueflower butterwort	*Pinguicula caerulea*	SSL,WF,WP
Yellow butterwort	*Pinguicula lutea*	SSL,WF,WP
Small butterwort	*Pinguicula pumila*	
Pitted stripeseed	*Piriqueta caroliniana*	
Narrowleaf silkgrass	*Pityopsis graminifolia*	
Virginia plantain; southern plantain	*Plantago virginica*	
Stinking camphorweed	*Pluchea foetida*	
Sweetscent	*Pluchea odorata*	
Rosy camphorweed	*Pluchea rosea*	
Paintedleaf; fire-on-the-mountain	*Poinsettia cyathophora*	
Baldwin's milkwort	*Polygala balduinii*	
Drumheads	*Polygala cruciata*	
Tall pinebarren milkwort	*Polygala cymosa*	
Showy milkwort	*Polygala grandiflora*	
Procession flower	*Polygala incarnata*	

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Orange milkwort	*Polygala lutea*	
Candyroot	*Polygala nana*	
Racemed milkwort	*Polygala polygama*	
Low pinebarren milkwort	*Polygala ramosa*	
Yellow milkwort	*Polygala rugelii*	
Coastalplain milkwort	*Polygala setacea*	
Hairy jointweed	*Polygonella ciliata*	
Tall jointweed	*Polygonella gracilis*	
October flower	*Polygonella polygama*	
Dotted smartweed	*Polygonum punctatum*	
Rustweed; juniperleaf	*Polypremum procumbens*	
Paraguayan purslane*	*Portulaca amilis*	
Pink purslane; kiss-me-quick	*Portulaca pilosa*	
Combleaf mermaidweed	*Proserpinaca pectinata*	
Carolina laurelcherry	*Prunus caroliniana*	
Strawberry guava*	*Psidium cattleianum*	
Guava*	*Psidium guajava*	
Wild coffee	*Psychotria nervosa*	
Shortleaf wild coffee	*Psychotria sulzneri*	
Blackroot	Pterocaulon pycnostachyum	
Mock bishopsweed; Herbwilliam	*Ptilimnium capillaceum*	
Carolina desertchicory	*Pyrrhopappus carolinianus*	
Chapman's oak	*Quercus chapmanii*	
Sand live oak	*Quercus geminata*	
Bluejack oak	*Quercus incana*	
Turkey oak	*Quercus laevis*	
Laurel oak; diamond oak	*Quercus laurifolia*	
Dwarf live oak	*Quercus minima*	
Myrtle oak	*Quercus myrtifolia*	
Water oak	*Quercus nigra*	
Running oak	*Quercus pumila*	
Virginia live oak	*Quercus virginiana*	
Myrsine; colicwood	*Rapanea punctata*	
Rubbervine; mangrovevine	*Rhabdadenia biflora*	
West Indian meadowbeauty	*Rhexia cubensis*	
Pale meadowbeauty	*Rhexia mariana*	
Maid marian	*Rhexia nashii*	
Red mangrove	*Rhizophora mangle*	
Winged sumac	*Rhus copallinum*	
Tropical Mexican clover*	*Richardia brasiliensis*	
Rough Mexican clover*	*Richardia scabra*	
Castorbean*	*Ricinus communis*	
Rougeplant	*Rivina humilis*	
Sand blackberry	*Rubus cuneifolius*	
Southern dewberry	*Rubus trivialis*	
Blackeyed Susan	*Rudbeckia hirta*	

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Carolina wild petunia	*Ruellia caroliniensis*	
Britton's wild petunia*	*Ruellia tweediana*	
Swamp dock	*Rumex verticillatus*	
Bartram's rosegentian	*Sabatia bartramii*	
Shortleaf rosegentian	*Sabatia brevifolia*	
Coastal rosegentian	*Sabatia calycina*	
Largeflower rosegentian	*Sabatia grandiflora*	
Carolina willow; coastalplain willow	*Salix caroliniana*	
Lyreleaf sage	*Salvia lyrata*	
American elder; elderberry	*Sambucus nigra*	
Water pimpernel	*Samolus ebracteatus*	
Pineland pimpernel	*Samolus valerandi* ssp. *parviflorus*	
Popcorntree; Chinese tallowtree*	*Sapium sebiferum*	
White twinevine	*Sarcostemma clausum*	
Hooded pitcherplant	*Sarracenia minor*	DS,WF
Lizard's tail	*Saururus cernuus*	
Australian umbrella tree*	*Schefflera actinophylla*	
Brazilian pepper*	*Schinus terebinthifolius*	
Sweetbroom; licoriceweed	*Scoparia dulcis*	
Butterweed	*Senecio glabellus*	
Coffeeweed; sicklepod	*Senna obtusifolia*	
Danglepod	*Sesbania herbacea*	
Rattlebox*	*Sesbania punicea*	
Bladderpod; bagpod	*Sesbania vesicaria*	
Piedmont blacksenna	*Seymeria pectinata*	
Common wireweed; common fanpetals	*Sida acuta*	
Lima*	*Sida cordifolia*	
Cuban jute; Indian hemp	*Sida rhombifolia*	
Gum bully	Sideroxylon lanuginosum	
Florida bully	Sideroxylon reclinatum ssp. reclinatum	
Tough bully	*Sideroxylon tenax*	
American black nightshade	*Solanum americanum*	
Soda apple; cockroachberry	*Solanum capsicoides*	
Twoleaf nightshade*	*Solanum diphyllum*	
Tropical soda apple*	*Solanum viarum*	
Chapman's goldenrod	*Solidago odora* var. *chapmanii*	
Wand goldenrod	*Solidago stricta*	
Spiny sowthistle*	*Sonchus asper*	
Common sowthistle*	*Sonchus oleraceus*	
Woodland false buttonweed	*Spermacoce assurgens*	
Prostrate false buttonweed	*Spermacoce prostrata*	
Creeping oxeye*	Sphagneticola trilobata	

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Common chickweed*	*Stellaria media*	
Sweet shaggytuft	*Stenandrium dulce*	
Water toothleaf; corkwood	*Stillingia aquatica*	
Queensdelight	*Stillingia sylvatica*	
Pineland scalypink	*Stipulicida setacea*	
Eastern poison ivy	*Toxicodendron radicans*	
Virginia marsh St. John's-wort	*Triadenum virginicum*	
Forked bluecurls	*Trichostema dichotomum*	
Coatbuttons*	*Tridax procumbens*	
White clover; Dutch clover*	*Trifolium repens*	
American elm; Florida elm	*Ulmus americana*	
Caesarweed*	*Urena lobata*	
Humped bladderwort	*Utricularia gibba*	
Floating bladderwort	*Utricularia inflata*	
Eastern purple bladderwort	*Utricularia purpurea*	
Little floating bladderwort	*Utricularia radiata*	
Zigzag bladderwort	*Utricularia subulata*	
Highbush blueberry	*Vaccinium corymbosum*	
Darrow's blueberry	*Vaccinium darrowii*	
Shiny blueberry	*Vaccinium myrsinites*	
Deerberry	*Vaccinium stamineum*	
Purpletop vervain*	*Verbena bonariensis*	
White crownbeard; frostweed	*Verbesina virginica*	
Giant ironweed	*Vernonia gigantea*	
Walter's viburnum	*Viburnum obovatum*	
Fourleaf vetch	*Vicia acutifolia*	
Hairypod cowpea	*Vigna luteola*	
Bog white violet	*Viola lanceolata*	
Early blue violet	*Viola palmata*	
Common blue violet	*Viola sororia*	
Summer grape	*Vitis aestivalis*	
Muscadine	*Vitis rotundifolia*	
Tallow wood; hog plum	*Ximenia americana*	
Oriental false hawksbeard*	*Youngia japonica*	
Hercules'-club	Zanthoxylum clava-herculis	

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)

INVERTEBRATES

Butterflies & Moths (Lepidoptera)

Gulf Fritillary	*Agraulis vanillae*	
Cypress Looper*	*Anacamptodes pregracilis*	
Delaware Skipper	*Anatrytone logan*	
Tiger Moth	*Apantesis sp.*	
Monk Skipper	*Asbolis capucinus*	
Io Moth	*Automeris io*	
Blackberry Looper	*Chlorochlamys chloroleucaria*	
Queen	*Danaus gilippus*	
Rosy Maple Moth	*Dryocampa rubicunda*	
Sleepy Duskwing	*Erynnis brizo*	
Horace's Duskywing	*Erynnis horatius*	
Salt Marsh Moth	*Estigmene acrea*	
Palmetto Skipper	*Euphyes arpa*	OF
Varigated Fritillary	*Euptoieta claudia*	
Little Yellow	*Eurema lisa*	
Zebra Swallowtail	*Eurytides marcellus*	
Banded Tussock Moth	*Halysidota sp.*	
Common Buckeye	*Junonia coenia*	
Yellow Flannel Moth	*Lagoa pyxidifera*	
Raspberry Wave	*Leptostales laevitaria*	
Leucania	*Leucania adjuta*	
Stained Lophosis Moth	*Lophosis labeculata*	
Southern Chocolate Angle	*Macaria distribuaria*	
Dainty Sulphur	*Nathalis iole*	
Twin-spot Skipper	*Ologoria maculata*	
Decorated Owlet	*Pangrapta decoralis*	
Palmades Swallowtail	*Papilio palamedes*	
Spicebush Swallowtail	*Papilio trolius*	
Cloudless Sulphur	*Phoebis sennae*	
Pearl Crescent	*Phyciodes tharos*	
Whirlabout	*Polites vibex*	
Apple Sphinx	*Sphinx gordius*	
Gray Hairstreak	*Strymon melinus*	
Southern Emerald Moth	*Synchlora frondaria*	
Joyful Holomelina	*Viribi laeta*	
Southern Broken-Dash	*Wallengrenia otho*	

Crustaceans

Crab	*Callinectes ornatus*	SRST
Blue crab	*Callinectes sapidus*	SRST
Brown shrimp	*Farfantepenaeus aztecus*	SRST
Pink shrimp	*Farfantepenaeus duorarum*	SRST
White shrimp	*Litopenaeus setiferus*	SRST

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)

Grasshoppers (Orthoptera)

Spurthroat grasshopper.....*Melanoplus kissimmee*

Molluscs

Channeled apple snail*..... *Pomacea canaliculata*.....water

FISH

*African Jewelfish..... *Hemichromis letourneuxi*.....
Lined sole..... *Achirus lineatus*..... SRST
Mountain mullet..... *Agonostomus monticola*..... SRST
Striped anchovy..... *Anchoa hepsetus*..... SRST
Bay anchovy..... *Anchoa mitchilli*..... SRST
Bowfin..... *Amia calva*..... SRST
Sheepshead..... *Archosargus probatocephalus*..... SRST
Sea catfish..... *Arius felis*..... SRST
Silver perch..... *Bairdiella chrysoura*..... SRST
Frillfin goby..... *Bathyogobius soporator*..... SRST
Menhaden..... *Brevoortia* spp..... SRST
Crevalle jack..... *Caranx hippos*..... SRST
Horse-eye jack..... *Caranx latus*..... SRST
Swordspine snook..... *Centropomus ensiferus*..... SRST
Fat snook..... *Centropomus parallelus*..... SRST
Tarpon snook..... *Centropomus pectinatus*..... SRST
Snook..... *Centropomus undecimalis*..... SRST
Atlantic spadefish..... *Chaetodipterus faber*..... SRST
Florida blenny..... *Chasmodes saburrae*..... SRST
Bay whiff..... *Citharichthys spilopterus*..... SRST
Walking catfish*..... *Clarias batrachus*..... SRST
Spotted seatrout..... *Cynoscion nebulosus*..... SRST
Sheepshead minnow..... *Cyprinodon variegatus*..... SRST
Atlantic stingray..... *Dasyatis sabina*..... SRST
Bluntnose stingray..... *Dasyatis say*..... SRST
Irish pompano..... *Diapterus auratus*..... SRST
Striped mojarra..... *Diapterus plumieri*..... SRST
Fat sleeper..... *Dormitator maculatus*..... SRST
Gizzard shad..... *Dorosoma cepedianum*..... SRST
Threadfin shad..... *Dorosoma petenense*..... SRST
Spinycheek sleeper..... *Eleotris pisonis*..... SRST
Ladyfish..... *Elops saurus*..... SRST
Chain pickerel..... *Esox niger*..... SRST
Swamp darter..... *Etheostoma fusiforme*..... SRST
Silver jenny..... *Eucinostomus gula*..... SRST
Tidewater mojarra..... *Eucinostomus harengulus*..... SRST
Slender mojarra..... *Eucinostomus jonesi*..... SRST
Mojarra..... *Eucinostomus* spp..... SRST

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Lyre goby	*Evorthodus lyricus*	SRST
Eastern mosquitofish	*Gambusia holbrooki*	SRST
Yellowfin mojarra	*Gerres cinereus*	SRST
Bigmouth sleeper	*Gobiomorus dormitory*	SRST
Darter goby	*Gobionellus boleosoma*	SRST
Highfin goby	*Gobionellus oceanicus*	SRST
Slashcheek goby	*Gobionellus pseudofasciatus*	SRST
Freshwater goby	*Gobionellus shufeldti*	SRST
Marked goby	*Gibionellus stigmaticus*	SRST
Naked goby	*Gobiosoma bosc*	SRST
Code goby	*Gobiosoma robustum*	SRST
Scaled sardine	*Harengula jaguana*	SRST
Least killifish	*Heterandria formosa*	SRST
Brown hoplo*	*Hoplosternum littorale*	SRST
Suckermouth catfish	*Hypostomus plecostomus*	SRST
Flagfish	*Jordanella floridae*	SRST
Brook silversides	*Labidesthes sicculus*	SRST
Pinfish	*Lagodon rhomboides*	SRST
Spot	*Leiostomus xanthurus*	SRST
Longnose gar	*Lepisosteus osseus*	SRST
Florida gar	*Lepisosteus platyrhincus*	SRST
Sunfish	*Lepomis auritus*	SRST
Warmouth	*Lepomis gulosus*	SRST
Bluegill	*Lepomis macrochirus*	SRST
Dollar sunfish	*Lepomis marginatus*	SRST
Redear sunfish	*Lepomis microlophus*	SRST
Spotted sunfish	*Lepomis punctatus*	SRST
Crested goby	*Lophogobius cyprinoides*	SRST
Bluefin killifish	*Lucania goodei*	SRST
Rainwater killifish	*Lucania parva*	SRST
Snapper	*Lutjanus apodus*	SRST
Gray snapper	*Lutjanus griseus*	SRST
Tarpon	*Megalops atlanticus*	SRST
Silverside	*Menidia* spp	SRST
Clown goby	*Microgobius gulosus*	SRST
Opossum pipefish	*Microphis brachyurus*	SRST
Atlantic croaker	*Micropogonias undulatus*	SRST
Largemouth bass	*Micropterus salmoides*	SRST
Planehead filefish	*Monacanthus hispidus*	SRST
Striped mullet	*Mugil cephalus*	SRST
White mullet	*Mugil curema*	SRST
Taillight shiner	*Notropis maculatus*	SRST
Coastal shiner	*Notropis petersoni*	SRST
Leatherjack	*Oligoplites saurus*	SRST
Atlantic thread-herring	*Opisthonema oglinum*	SRST
Pigfish	*Orthopristis chrysoptera*	SRST
Southern flounder	*Paralichthys lethostigma*	SRST

* Non-Native Species

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Sailfin molly	*Poecilia latipinna*	SRST
Blackdrum	*Pogonias cromis*	SRST
Burro grunt	*Pomadasys crocro*	SRST
Bluefish	*Pomatomus saltatrix*	SRST
Red drum	*Sciaenops ocellatus*	SRST
Lookdown	*Selene vomer*	SRST
Southern puffer	*Sphoeroides nephalus*	SRST
Checkered puffer	*Sphoeroides testudineus*	SRST
Great barracuda	*Sphyraena barracuda*	SRST
Atlantic needlefish	*Strongylura marina*	SRST
Redfin needlefish	*Strongylura notata*	SRST
Timucu	*Strongylura timucu*	SRST
Chain pipefish	*Syngnathus louisianae*	SRST
Gulf pipefish	*Syngnathus scovelli*	SRST
Inshore lizardfish	*Synodus foetens*	SRST
Spotted tilapia*	*Tilapia mariae*	SRST
Blackchin tilapia*	*Tilapia melanotheron*	SRST
Hogchoker	*Trinectes maculatus*	SRST

AMPHIBIANS

Salamanders

Two-toed amphiuma	*Amphiuma means means*	BS,BG,DM,HH,SSL,SRST

Frogs and Toads

Florida cricket frog	*Acris gryllus dorsalis*	DM,FM
Oak toad	*Anaxyrus quercicus*	SH,SC,SCF,DM,FM
Southern toad	*Anaxyrus terrestris*	MTC
Greenhouse frog*	*Eleutherodactylus planirostris*	MTC
Eastern narrow-mouthed toad	*Gastrophryne carolinensis*	MTC
Green treefrog	*Hyla cinerea*	MTC
Pinewoods treefrog	*Hyla femoralis*	MF,SCF,WF,WP
Barking treefrog	*Hyla gratiosa*	PH,XH,HH
Squirrel treefrog	*Hyla squirella*	MTC
Cuban treefrog*	*Osteopilus septentrionalis*	81,82
Southern chorus frog	*Pseudacris nigrita verrucosa*	MF,SC,SCF,WF
Little grass frog	*Pseudocris ocularis*	MF,SC,SCF,WF
Florida gopher frog	*Lithobates capito aesopus*	MF,SC,SCF,DM,WF
Pig frog	*Lithobates grylio*	water
Southern leopard frog	*Lithobates utriculata*	MTC
Eastern spadefoot toad	*Scaphiopus holbrooki holbrooki*	MF,SC,SCF,DM,FS

REPTILES

Crocodilians

American alligator	*Alligator mississippiensis*	FS,SRST

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Turtles		
Florida softshell turtle	*Apalone ferox*	SRST
Florida snapping turtle	*Chelydra serpentina osceola*	SRST
Florida chicken turtle	*Deirochelys reticularia chrysea*	DS,SRST
Gopher tortoise	*Gopherus polyphemus*	MF,SH,SC,SCF,WF,MF
Striped mud turtle	*Kinosternon baurii palmarum*	FS,SRST
Florida mud turtle	*Kinosternon subrubrum*	FS,SRST
Peninsula cooter	*Pseudemys floridana peninsularis*	DS,SRST
Florida redbelly turtle	*Pseudemys nelsoni*	DS,SRST
Florida box turtle	*Terrapene carolina bauri*	MF,PH,SCF,UHF,HH
Lizards		
Green anole	*Anolis carolinensis*	MTC
Cuban brown anole*	*Anolis sagrei*	81,82
Six-lined racerunner	*Cnemidophorus sexlineatus*	SH,SC,SCF
Southeastern five-lined skink	*Eumeces inexpectatus*	PH,XH,HH
Indo-Pacific gecko*	*Hemidactylus garnottii*	81,82
Eastern slender glass lizard	*Ophisaurus attenuatus longicaudus*	MTC
Island glass lizard	*Ophisaurus compressus*	MF,SC,SCF,XH
Eastern glass lizard	*Ophisaurus ventralis*	MTC
Ground skink	*Scincella lateralis*	PH,XH,HH
Snakes		
Florida cottonmouth	*Agkistrodon piscivorus conanti*	BS,BF,FS,SRST
Florida scarlet snake	*Cemophora coccinea coccinea*	PH,MP
Southern black racer	*Coluber constrictor priapus*	MTC
Eastern diamondback Rattlesnake	*Crotalus adamanteus*	MF,PH,SH,SC,SCF
Southern ringneck snake	*Diadophis punctatus punctatus*	MTC
Eastern indigo snake	*Drymarchon corais couperi*	MF,PH,SH,SC,SCF
Eastern ratsnake	*Pantherophis guttata guttata*	MTC
Yellow rat snake	*Pantherophis obsoleta quadrivittata*	MTC
Striped swamp snake	*Regina alleni*	DS,FM,STS,WP
Eastern coachwhip	*Masticophis flagellum flagellum*	SH,SC,SCF,UHF
Eastern coral snake	*Micrurus fulvius fulvius*	SH,SC,SCF,UHF
Florida water snake	*Nerodia fasciata pictiventris*	BS,BF,FS,SRST
Brown water snake	*Nerodia taxispilota*	BS,BF,FS,SRST
Rough green snake	*Opheodrys aestivus aestivus*	MF,SCF,WF
Florida pine snake	*Pituophis melanoleucus mugitus*	MF,PH,SH,SC,SCF
South Florida black swamp snake	*Seminatrix pygaea cyclas*	DS,21,DM,WP

* Non-Native Species

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Florida brown snake	*Storeria dekayi victa*	MTC
Peninsula ribbon snake	*Thamnophis sauritus sackenii*	MTC
Eastern garter snake	*Thamnophis sirtalis sirtalis*	MTC

BIRDS

Common Loon	*Gavia immer*	OF
Pied-billed Grebe	*Podilymbus podiceps*	BS,DS,FM,FS,STS,SRST
American White Pelican	*Pelecanus erythrorhynchos*	water
Brown Pelican	*Pelecanus occidentalis*	water
Magnificent Frigatebird	*Frigata magnificens*	OF
Double-crested Cormorant	*Phalocrocorax auritus*	BS,DS,FS,STS,SRST,EWR
Anhinga	*Anhinga anhinga*	BS,DS,FS,STS,SRST,EWR
Great Egret	*Ardea alba*	MTC
Great Blue Heron	*Ardea herodias*	MTC
American Bittern	*Botaurus lentiginosus*	DM,DS,FM,STS,WP,EWR
Cattle Egret*	*Bubulcus ibis*	MTC
Green Heron	*Butorides virescens*	MTC
Little Blue Heron	*Egretta caerulea*	MTC
Snowy Egret	*Egretta thula*	MTC
Tricolored Heron	*Egretta tricolor*	MTC
Least Bittern	*Ixobrychus exilis*	DM,DS,FM,STS,WP,SRST
Yellow-crowned Night-heron	*Nyctanassa violacea*	BS,BG,DS,FM,FS,EWR
Black-crowned Night-Heron	*Mycticorax nycticorax*	BS,BG,DS,FM,FS,EWR
White Ibis	*Eudocimus albus*	MTC
Glossy Ibis	*Plegadis falcinellus*	BS,BG,DM,DS,FM,WP
Wood Stork	*Mycteria americana*	BS,DM,FM,FS,WP,EWR
Roseate Spoonbill	*Platalea ajaja*	EWR
Northern Pintail	*Anas acuta*	water,DM,FM,FS,EWR
Northern Shoveler	*Anas clypeata*	water,DM,FM,FS,EWR
American Green-winged Teal	*Anas crecca*	water,DM,FM,FS,EWR
Blue-winged Teal	*Anas discors*	water,DM,FM,FS,EWR
Mottled Duck	*Anas fulvigula*	water,DM,FM,SRST,EWR
Mallard	*Anas platyrhynchos*	BS,BG,DS,FS,WP,SRST
Wood Duck	*Aix sponsa*	BS,BG,DS,FS,WP,SRST
Muscovy Duck*	*Cairina moschata*	water
Black-bellied Whistling-duck	*Dendrocygna autumnalis*	DM,FM,FS,WP
Hooded Merganser	*Lophodytes cucullatus*	water,BG,DM,FM,SRST
Cooper's Hawk	*Accipiter cooperii*	MTC
Sharp-shinned Hawk	*Accipiter striatus*	MTC
Red-tailed Hawk	*Buteo jamaicensis*	MTC
Red-shouldered Hawk	*Buteo lineatus*	MTC
Broad-winged Hawk	*Buteo platypterus*	MTC
Crested Caracara	*Caracara cheriway*	81
Northern Harrier	*Circus cyaneus*	MTC
Swallow-tailed Kite	*Elanoides forficatus*	MTC
American Kestrel	*Falco sparverius*	MTC

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Merlin	*Falco columbarius*	MTC
Peregrine Falcon	*Falco peregrinus*	MTC
Bald Eagle	*Haliaeetus leucocephalus*	MTC
Osprey	*Pandion haliaetus*	DS,FM,FS,WP,EWR
Snail Kite	*Rostrhamus sociabilis*	DM,FM,WP
Turkey Vulture	*Cathartes aura*	MTC
Black Vulture	*Coragyps atratus*	MTC
Northern Bobwhite	*Colinus virginianus*	MF,PH,SH,SCF,UHF,XH
Sandhill Crane	*Grus canadensis*	MTC
Florida Sandhill Crane	*Grus canadensis pratensis*	MTC
Wild Turkey	*Meleagris gallopavo*	MTC
Sora	*Porzana carolina*	DM,FM,FS,WP,EWR
King Rail	*Rallus elegans*	DM,FM,FS,WP,EWR
Virginia Rail	*Rallus limicola*	DM,FM,FS,WP,EWR
Florida Clapper Rail	*Rallus longirostris scottii*	DM,FM,FS,WP,EWR
American Coot	*Fulica americana*	water,DM,FM,FS,SRST
Common Moorhen	*Gallinula chloropus*	water,DM,FM,FS,SRST
American Oystercatcher	*Haematopus palliatus*	81
Black-necked Stilt	*Himantopus mexicanus*	water,DM,FM,FS,SRST
Limpkin	*Aramus guarauna*	BS,DS,FM,FS,STS,SRST
Spotted Sandpiper	*Actitis macularia*	BS,BF,FS,STS,EWR
Upland Sandpiper	*Bartramia longicauda*	DM,FM,FS,WP,EWR
Pectoral Sandpiper	*Calidris melanotos*	DM,FM,FS,WP,EWR
Least Sandpiper	*Calidris minutilla*	DM,FM,FS,WP,EWR
Semipalmated Sandpiper	*Calidris pusilla*	DM,FM,FS,WP,EWR
Semipalmated Plover	*Charadrius semipalmatus*	81
Killdeer	*Charadrius vociferous*	81,82
Common Snipe	*Gallinago gallinago*	DM,FM,WP
Long-billed Dowitcher	*Limnodromus scolopaceus*	DM,FM,WP,EWR
American Woodcock	*Scolopax minor*	BF,FM,HH,SSL,WP,EWR
Lesser Yellowlegs	*Tringa flavipes*	DM,FM,WP,EWR
Greater Yellowlegs	*Tringa melanoleuca*	DM,FM,WP,EWR
Solitary Sandpiper	*Tringa solitaria*	BG,BF,FS,HH,WP,EWR
Herring Gull	*Larus argentatus*	OF
Laughing Gull	*Larus atricilla*	OF
Ring-billed Gull	*Larus delawarensis*	OF
Black Skimmer	*Rhynchops niger*	81,OF
Least Tern	*Sterna antillarum*	81,OF
Caspian Tern	*Sterna caspia*	81,OF
Forster's Tern	*Sterna forsteri*	81,OF
Royal Tern	*Sterna maxima*	81,OF
Rock Dove*	*Columba livia*	81
Common Ground-dove	*Columbina passerina*	MTC
Eurasian Collared-dove*	*Streptopelia decaocto*	81
White-winged Dove*	*Zenaida asiatica*	MTC
Mourning Dove	*Zenaida macroura*	MTC
Yellow-billed Cuckoo	*Coccyzus americanus*	MTC

* Non-Native Species

St. Sebastian River Preserve State Park Animals

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Burrowing Owl	*Athene cunicularia*	81
Great Horned Owl	*Bubo virginianus*	MTC
Eastern Screech Owl	*Otus asio*	MTC
Barred Owl	*Strix varia*	MTC
Barn Owl	*Tyto alba*	MTC
Chuck-will's-willow	*Caprimulgus carolinensis*	MTC
Whip-poor-will	*Caprimulgus vociferous*	MTC
Common Nighthawk	*Chordeiles minor*	OF
Chimney Swift	*Chaetura pelagica*	OF
Ruby-throated Hummingbird	*Archilochus colubris*	MTC
Belted Kingfisher	*Ceryle alcyon*	MTC
Northern Flicker	*Colaptes auratus*	MTC
Pileated Woodpecker	*Dryocopus pileatus*	MTC
Red-bellied Woodpecker	*Melanerpes carolinus*	MTC
Red-headed Woodpecker	*Melanerpes erythrocephalus*	SH,SC,SCF,XH,MF
Red-cockaded Woodpecker	*Picoides borealis*	MF
Downy Woodpecker	*Picoides pubescens*	MTC
Hairy Woodpecker	*Picoides villosus*	MTC
Yellow-bellied Sapsucker	*Sphyrapicus varius*	MTC
Eastern Wood-Pewee	*Contopus virens*	MF,PH,SH,SC,SCF,XH
Acadian Flycatcher	*Empidonax virescens*	MTC
Great Crested Flycatcher	*Myiarchus crinitus*	MTC
Eastern Phoebe	*Sayornis phoebe*	MTC
Gray Kingbird	*Tyrannus dominicensis*	HH,EWR,82
Scissor-tailed Flycatcher	*Tyrannus forficatus*	82
Eastern Kingbird	*Tyrannus tyrannus*	UHF,82
Loggerhead Shrike	*Lanius ludovicianus*	SH,82
Yellow-throated Vireo	*Vireo flavifrons*	MTC
White-eyed Vireo	*Vireo griseus*	MTC
Red-eyed Vireo	*Vireo olivaceus*	MTC
Blue-headed Vireo	*Vireo solitarius*	MTC
Florida Scrub-jay	*Aphelocoma coerulescens*	SC,SCF
American Crow	*Corvus brachyrhynchos*	MTC
Fish Crow	*Corvus ossifragus*	MTC
Blue Jay	*Cyanocitta cristata*	MTC
Purple Martin	*Progne subis*	OF
Barn Swallow	*Hirundo rustica*	OF
Cliff Swallow	*Petrochelidon pyrrhonota*	OF
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	OF
Tree Swallow	*Tachycineta bicolor*	OF
Tufted Titmouse	*Baeolophus bicolor*	MTC
Brown-headed Nuthatch	*Sitta pusill*	MF,SH,WF
Carolina Wren	*Thryothorus ludovicianus*	MTC
House Wren	*Troglodytes aedon*	MTC
Blue-gray Gnatcatcher	*Polioptila caerulea*	MTC

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Ruby-crowned Kinglet	*Regulus calendula*	MTC
Veery	*Catharus fuscescens*	MF,UHF,XH
Hermit Thrush	*Catharus guttatus*	UHF,XH,BS,BG,BF
Swainson's Thrush	*Catharus ustulatus*	MF,PH,UHF,STS
Eastern Bluebird	*Sialia sialis*	MF,PH,MF
American Robin	*Turdus migratorius*	MTC
Marsh Wren	*Cistothorus palustris*	DM,FM,WP
Sedge Wren	*Cistothorus platensis*	DM,FM,WP,EWR
Gray Catbird	*Dumetella carolinensis*	MTC
Northern Mockingbird	*Mimus polyglottos*	MTC
Brown Thrasher	*Toxostoma rufum*	MTC
Cedar Waxwing	*Bombycilla cedrorum*	MTC
Black-throated Blue Warbler	*Dendroica caerulescens*	MTC
Yellow-rumped Warbler	*Dendroica coronata*	MTC
Prairie Warbler	*Dendroica discolor*	MF,PH,SH,SC,SCF
Yellow-throated Warbler	*Dendroica dominica*	MTC
Blackburnian Warbler	*Dendroica fusca*	MTC
Magnolia Warbler	*Dendroica magnolia*	MTC
Palm Warbler	*Dendroica palmarum*	MTC
Chestnut-sided Warbler	*Dendroica pensylvanica*	MTC
Yellow Warbler	*Dendroica petechia*	BS,BG,BF,FS,HH,STS
Pine Warbler	*Dendroica pinus*	MF,PH,SH,SC,SCF,WF
Blackpoll Warbler	*Dendroica striata*	MTC
Cape May Warbler	*Dendroica tigrina*	MTC
Common Yellowthroat	*Geothlypis trichas*	MTC
Worm-eating Warbler	*Helmitheros vermivorus*	PH,SH,UHF,XH
Swainson's Warbler	*Limnothlypis swainsonii*	MTC
Black-and-white Warbler	*Mniotilta varia*	MTC
Northern Parula	*Parula americana*	MTC
Prothonotary Warbler	*Protonotaria citrea*	BS,DS,FS,STS
Ovenbird	*Seiurus aurocapillus*	MTC
Louisiana Waterthrush	*Seiurus motacilla*	MTC
Northern Waterthrush	*Seiurus noveboracensis*	MTC
American Redstart	*Setophaga ruticilla*	MTC
Orange-crowned Warbler	*Vermivora celata*	PH,SH,UHF,XH
Golden-winged Warbler	*Vermivora chrysoptera*	MTC
Tennessee Warbler	*Vermivora peregrina*	MTC
Blue-winged Warbler	*Vermivora pinus*	MTC
Hooded Warbler	*Wilsonia citrina*	MF,BS,WF
Scarlet Tanager	*Piranga olivacea*	MF,SH,UHF
Summer Tanager	*Piranga rubra*	MF,SH,UHF
Bachman's Sparrow	*Aimophila aestivalis*	MF,SCF,WF
Grasshopper Sparrow	*Ammodramus savannarum*	81
Lark Sparrow	*Chondestes grammacus*	81
Swamp Sparrow	*Melospiza georgiana*	MTC
Song Sparrow	*Melospiza melodia*	MF,PH,SH,SC,SCF,UHF
Savannah Sparrow	*Passerculus sandwichensis*	81

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Eastern Towhee	*Pipilo erythrophthalmus*	MF,PH,SC,SCF
Vesper Sparrow	*Pooecetes gramineus*	MF,SCF,MF
Clay-colored Sparrow	*Spizella pallida*	81
Chipping Sparrow	*Spizella passerina*	81
Field Sparrow	*Spizella pusilla*	81
White-throated Sparrow	*Zonotrichia albicollis*	MTC
Red-winged Blackbird	*Agelaius phoeniceus*	DM,DS,FM,HH,WP,EWR
Bobolink	*Dolichonyx oryzivorus*	MF,DM,FM,WP,WF,81
Baltimore Oriole	*Icterus galbula*	MTC
Brown-headed Cowbird*	*Molothrus ater*	MTC
Boat-tailed Grackle	*Quiscalus major*	MTC
Common Grackle	*Quiscalus quiscula*	MTC
Eastern Meadowlark	*Sturnella magna*	PH,81
European Starling*	*Sturnella vulgaris*	81
Northern Cardinal	*Cardinalis cardinalis*	MTC
Blue Grosbeak	*Guiraca caerulea*	MF,PH,81
Painted Bunting	*Passerina ciris*	MF,PH,SH,SC,SCF,UHF
Indigo Bunting	*Passerina cyanea*	MTC
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	MTC
American Goldfinch	*Carduelis tristis*	MTC

MAMMALS

Domestic cattle*	*Bos taurus*	81
Opossum	*Didelphis virginiana*	MTC
Nine-banded armadillo*	*Dasypus novemcinctus*	MTC
Eastern cottontail	*Sylvilagus floridanus*	MF,SCF
Marsh rabbit	*Sylvilagus palustris*	BF,DM,FM
Southern flying squirrel	*Glaucomys volans*	UHF
House mouse*	*Mus musculus*	81
Cotton mouse	*Peromyscus gossypinus*	MF,SH,SCF,UHF
Gray squirrel	*Sciurus carolinensis*	MTC
Hispid cotton rat	*Sigmodon hispidus*	MF,PH,UHF,WF
Florida manatee	*Trichechus manatus latirostris*	water
Coyote*	*Canis latrans*	MTC
Feral cat*	*Felis domesticus*	81,82
Bobcat	*Felis rufus*	MTC
River otter	*Lutra canadensis*	SRST
Striped skunk	*Mephitis mephitis*	MTC
Raccoon	*Procyon lotor*	MTC
Eastern spotted skunk	*Spilogale putorius*	SCF,UHF
Gray fox	*Urocyon cinereoargenteus*	MTC
Atlantic bottle-nosed dolphin	*Tursiops truncatus*	water
Axis deer*	*Axis axis*	MTC
Fallow deer*	*Dama dama*	MTC
White-tailed deer	*Odocoileus virginianus*	MTC
Wild pig*	*Sus scrofa*	MTC

* Non-Native Species

St. Sebastian River Preserve State Park Animals

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)

TERRESTRIAL

Beach Dune	BD
Coastal Berm	CB
Coastal Grassland	CG
Coastal Strand	CS
Dry Prairie	DP
Keys Cactus Barren	KCB
Limestone Outcrop	LO
Maritime Hammock	MAH
Mesic Flatwoods	MF
Mesic Hammock	MEH
Pine Rockland	PR
Prairie Hammock	PH
Rockland Hammock	RH
Sandhill	SH
Scrub	SC
Scrubby Flatwoods	SCF
Shell Mound	SHM
Sinkhole	SK
Slope Forest	SPF
Upland Glade	UG
Upland Hardwood Forest	UHF
Upland Mixed Woodland	UMW
Upland Pine	UP
Wet Flatwoods	WF
Xeric Hammock	XH

PALUSTRINE

Alluvial Forest	AF
Basin Marsh	BM
Basin Swamp	BS
Baygall	BG
Bottomland Forest	BF
Coastal Interdunal Swale	CIS
Depression Marsh	DM
Dome Swamp	DS
Floodplain Marsh	FM
Floodplain Swamp	FS
Glades Marsh	GM
Hydric Hammock	HH
Keys Tidal Rock Barren	KTRB
Mangrove Swamp	MS
Marl Prairie	MP
Salt Marsh	SAM
Seepage Slope	SSL
Shrub Bog	SHB
Slough	SLO
Slough Marsh	SLM

Strand Swamp	STS
Wet Prairie	WP

LACUSTRINE

Clastic Upland Lake	CULK
Coastal Dune Lake	CDLK
Coastal Rockland Lake	CRLK
Flatwoods/Prairie	FPLK
Marsh Lake	MLK
River Floodplain Lake	RFLK
Sandhill Upland Lake	SULK
Sinkhole Lake	SKLK
Swamp Lake	SWLK

RIVERINE

Alluvial Stream	AST
Blackwater Stream	BST
Seepage Stream	SST
Spring-run Stream	SRST

SUBTERRANEAN

Aquatic Cave	ACV
Terrestrial Cave	TCV

ESTUARINE

Algal Bed	EAB
Composite Substrate	ECPS
Consolidated Substrate	ECNS
Coral Reef	ECR
Mollusk Reef	EMR
Octocoral Bed	EOB
Seagrass Bed	ESGB
Sponge Bed	ESPB
Unconsolidated Substrate	EUS
Worm Reef	EWR

MARINE

Algal Bed	MAB
Composite Substrate	MCPS
Consolidated Substrate	MCNS
Coral Reef	MCR
Mollusk Reef	MMR
Octocoral Bed	MOB
Seagrass Bed	MSGB
Sponge Bed	MSPB
Unconsolidated Substrate	MUS
Worm Reef	MWR

ALTERED LANDCOVER TYPES

Abandoned field	ABF
Abandoned pasture	ABP
Agriculture	AG
Canal/ditch	CD
Clearcut pine plantation	CPP
Clearing	CL
Developed	DV
Impoundment/artificial pond	IAP
Invasive exotic monoculture	IEM
Pasture - improved	PI
Pasture - semi-improved	PSI
Pine plantation	PP
Road	RD
Spoil area	SA
Successional hardwood forest	SHF
Utility corridor	UC

MISCELLANEOUS

Many Types of Communities	MTC
Overflying	OF
81	Unknown
82	Unknown

Addendum 6—Imperiled Species Ranking Definitions

The Nature Conservancy and the Natural Heritage Program Network (of which FNAI is a part) define an element as any exemplary or rare component of the natural environment, such as a species, natural community, bird rookery, spring, sinkhole, cave or other ecological feature. An element occurrence (EO) is a single extant habitat that sustains or otherwise contributes to the survival of a population or a distinct, self-sustaining example of a particular element.

Using a ranking system developed by The Nature Conservancy and the Natural Heritage Program Network, the Florida Natural Areas Inventory assigns two ranks to each element. The global rank is based on an element's worldwide status; the state rank is based on the status of the element in Florida. Element ranks are based on many factors, the most important ones being estimated number of Element occurrences, estimated abundance (number of individuals for species; area for natural communities), range, estimated adequately protected EOs, relative threat of destruction, and ecological fragility.

Federal and State status information is from the U.S. Fish and Wildlife Service; and the Florida Fish and Wildlife Conservation Commission (animals), and the Florida Department of Agriculture and Consumer Services (plants), respectively.

FNAI GLOBAL RANK DEFINITIONS

G1..... Critically imperiled globally because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or fabricated factor.

G2..... Imperiled globally because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.

G3..... Either very rare or local throughout its range (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction of other factors.

G4..... apparently secure globally (may be rare in parts of range)

G5..... demonstrably secure globally

GH ..... of historical occurrence throughout its range may be rediscovered (e.g., ivory-billed woodpecker)

GX..... believed to be extinct throughout range

GXC..... extirpated from the wild but still known from captivity or cultivation

G#?..... Tentative rank (e.g.,G2?)

G#G# ..... range of rank; insufficient data to assign specific global rank (e.g., G2G3)

G#T# ..... rank of a taxonomic subgroup such as a subspecies or variety; the G portion of the rank refers to the entire species and the T portion refers to the specific subgroup; numbers have same definition as above (e.g., G3T1)

G#Q ..... rank of questionable species - ranked as species but questionable whether it is species or subspecies; numbers have same definition as above (e.g., G2Q)

G#T#Q ..... same as above, but validity as subspecies or variety is questioned.
GU ..... due to lack of information, no rank or range can be assigned (e.g., GUT2).
G? ..... Not yet ranked (temporary)
S1 ..... Critically imperiled in Florida because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor.
S2 ..... Imperiled in Florida because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.
S3 ..... Either very rare or local throughout its range (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction of other factors.
S4 ..... apparently secure in Florida (may be rare in parts of range)
S5 ..... demonstrably secure in Florida
SH ..... of historical occurrence throughout its range, may be rediscovered (e.g., ivory-billed woodpecker)
SX ..... believed to be extinct throughout range
SA ..... accidental in Florida, i.e., not part of the established biota
SE ..... an exotic species established in Florida may be native elsewhere in North America
SN ..... regularly occurring but widely and unreliably distributed; sites for conservation hard to determine
SU ..... due to lack of information, no rank or range can be assigned (e.g., SUT2).
S? ..... Not yet ranked (temporary)
N ..... Not currently listed, nor currently being considered for listing, by state or federal agencies.

LEGAL STATUS

FEDERAL

(Listed by the U. S. Fish and Wildlife Service - USFWS)

LE ..... Listed as Endangered Species in the List of Endangered and Threatened Wildlife and Plants under the provisions of the Endangered Species Act. Defined as any species that is in danger of extinction throughout all or a significant portion of its range.

PE ..... Proposed for addition to the List of Endangered and Threatened Wildlife and Plants as Endangered Species.

LT ..... Listed as Threatened Species. Defined as any species that is likely to become an endangered species within the near future throughout all or a significant portion of its range.

PT ..... Proposed for listing as Threatened Species.

C ..... Candidate Species for addition to the list of Endangered and Threatened Wildlife and Plants. Defined as those species for which the USFWS currently has on file sufficient information on biological vulnerability and threats to support proposing to list the species as endangered or threatened.

E(S/A) ..... Endangered due to similarity of appearance.

T(S/A) ..... Threatened due to similarity of appearance.

EXPE, XE .... Experimental essential population. A species listed as experimental and essential.

EXPN, XN ... Experimental non-essential population. A species listed as experimental and non-essential. Experimental, nonessential populations of endangered species are treated as threatened species on public land, for consultation purposes.

STATE

ANIMALS .. (Listed by the Florida Fish and Wildlife Conservation Commission - FWC)

FE ..... Federally-designated Endangered

FT ..... Federally-designated Threatened

FXN ..... Federally-designated Threatened Nonessential Experimental Population

FT(S/A) ..... Federally-designated Threatened species due to similarity of appearance

ST ..... Listed as Threatened Species by the FWC. Defined as a species, subspecies, or isolated population, which is acutely vulnerable to environmental alteration, declining in number at a rapid rate, or whose range or habitat, is decreasing in area at a rapid rate and therefore is destined or very likely to become an endangered species within the near future.

SSC ..... Listed as Species of Special Concern by the FWC. Defined as a population which warrants special protection, recognition or consideration because it has an inherent significant vulnerability to habitat modification, environmental alteration, human disturbance or substantial human exploitation that, in the near future, may result in its becoming a threatened species.

PLANTS .... (Listed by the Florida Department of Agriculture and Consumer Services - FDACS)

LE ..... Listed as Endangered Plants in the Preservation of Native Flora of Florida Act. Defined as species of plants native to the state that are in imminent danger of extinction within the state, the survival of which is unlikely if the causes of a decline in the number of plants continue, and includes all species determined to be endangered or threatened pursuant to the Federal Endangered Species Act of 1973,as amended.

LT ..... Listed as Threatened Plants in the Preservation of Native Flora of Florida Act. Defined as species native to the state that are in rapid decline in the number of plants within the state, but which have not so decreased in such number as to cause them to be endangered.

Addendum 7—Cultural Information

These procedures apply to state agencies, local governments, and non-profits that manage state-owned properties.

A. General Discussion

Historic resources are both archaeological sites and historic structures. Per Chapter 267, Florida Statutes, '*Historic property' or 'historic resource' means any prehistoric district, site, building, object, or other real or personal property of historical, architectural, or archaeological value, and folklife resources. These properties or resources may include, but are not limited to, monuments, memorials, Indian habitations, ceremonial sites, abandoned settlements, sunken or abandoned ships, engineering works, treasure trove, artifacts, or other objects with intrinsic historical or archaeological value, or any part thereof, relating to the history, government, and culture of the state."*

B. Agency Responsibilities

Per State Policy relative to historic properties, state agencies of the executive branch must allow the Division of Historical Resources (Division) the opportunity to comment on any undertakings, whether these undertakings directly involve the state agency, i.e., land management responsibilities, or the state agency has indirect jurisdiction, i.e. permitting authority, grants, etc. No state funds should be expended on the undertaking until the Division has the opportunity to review and comment on the project, permit, grant, etc.

State agencies shall preserve the historic resources which are owned or controlled by the agency.

Regarding proposed demolition or substantial alterations of historic properties, consultation with the Division must occur, and alternatives to demolition must be considered.

State agencies must consult with Division to establish a program to locate, inventory and evaluate all historic properties under ownership or controlled by the agency.

C. Statutory Authority

Statutory Authority and more in-depth information can be found at:
http://www.flheritage.com/preservation/compliance/guidelines.cfm

D. Management Implementation

Even though the Division sits on the Acquisition and Restoration Council and approves land management plans, these plans are conceptual. Specific information regarding individual projects must be submitted to the Division for review and recommendations.

Managers of state lands must coordinate any land clearing or ground disturbing activities with the Division to allow for review and comment on the proposed project. Recommendations may include, but are not limited to: approval of the project as submitted, cultural resource assessment survey by a qualified professional archaeologist, modifications to the proposed project to avoid or mitigate potential adverse effects.

Projects such as additions, exterior alteration, or related new construction regarding historic structures must also be submitted to the Division of Historical Resources for review and comment by the Division's architects. Projects involving structures fifty years of age or older, must be submitted to this agency for a significance determination. In rare cases, structures under fifty years of age may be deemed historically significant. These must be evaluated on a case by case basis.

Adverse impacts to significant sites, either archaeological sites or historic buildings, must be avoided. Furthermore, managers of state property should make preparations for locating and evaluating historic resources, both archaeological sites and historic structures.

E. Minimum Review Documentation Requirements

In order to have a proposed project reviewed by the Division, certain information must be submitted for comments and recommendations. The minimum review documentation requirements can be found at: http://www.flheritage.com/preservation/compliance/docs/minimum_review_documentation_requirements.pdf .

* * *

Questions relating to the treatment of archaeological and historic resources on state lands should be directed to:

Deena S. Woodward
Division of Historical Resources
Bureau of Historic Preservation
Compliance and Review Section
R. A. Gray Building
500 South Bronough Street
Tallahassee, FL 32399-0250

Phone: (850) 245-6425

Toll Free: (800) 847-7278
Fax: (850) 245-6435

The criteria to be used for evaluating eligibility for listing in the National Register of Historic Places are as follows:

1) Districts, sites, buildings, structures, and objects may be considered to have significance in American history, architecture, archaeology, engineering, and/or culture if they possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

- **a)** are associated with events that have made a significant contribution to the broad patterns of our history; and/or
- **b)** are associated with the lives of persons significant in our past; and/or
- **c)** embody the distinctive characteristics of type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; and/or
- **d)** have yielded, or may be likely to yield, information important in prehistory or history.

2) Ordinarily cemeteries, birthplaces, or graves of historical figures; properties owned by religious institutions or used for religious purposes; structures that have been moved from their original locations; reconstructed historic buildings; properties primarily commemorative in nature; and properties that have achieved significance within the past 50 years shall not be considered eligible for the *National Register*. However, such properties will qualify if they are integral parts of districts that do meet the criteria or if they fall within the following categories:

- **a)** a religious property deriving its primary significance from architectural or artistic distinction or historical importance; or
- **b)** a building or structure removed from its original location but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event; or
- **c)** a birthplace or grave of an historical figure of outstanding importance if there is no appropriate site or building directly associated with his productive life; or
- **d)** a cemetery which derives its primary significance from graves of persons of transcendent importance, from age, distinctive design features, or association with historic events; ora reconstructed building, when it is accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and no other building or structure with the same association has survived; or a property primarily commemorative in intent, if design, age, tradition, or symbolic value has invested it with its own exceptional significance; or
- **e)** a property achieving significance within the past 50 years, if it is of exceptional importance.

Restoration is defined as the act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and reconstruction of missing features from the restoration period. The limited and sensitive upgrading of mechanical, electrical and plumbing systems and other code-required work to make properties functional is appropriate within a restoration project.

Rehabilitation is defined as the act or process of making possible a compatible use for a property through repair, alterations and additions while preserving those portions or features that convey its historical, cultural or architectural values.

Stabilization is defined as the act or process of applying measures designed to reestablish a weather resistant enclosure and the structural stability of an unsafe or deteriorated property while maintaining the essential form as it exists at present.

Preservation is defined as the act or process of applying measures necessary to sustain the existing form, integrity and materials of an historic property. Work, including preliminary measures to protect and stabilize the property, generally focuses upon the ongoing maintenance and repair of historic materials and features rather than extensive replacement and new construction. New exterior additions are not within the scope of this treatment; however, the limited and sensitive upgrading of mechanical, electrical and plumbing systems and other code-required work to make properties functional is appropriate within a preservation project.

Addendum 8—Timber Management Analysis

St. Sebastian River Preserve State Park Timber Management Analysis

1. *Management Context and Best Management Practices*

Timber management at St. Sebastian River Preserve State Park is based on the desired future condition (DFC) of a management zone or natural community (NatCom) as determined by the DRP Unit Management Plans, along with guidelines developed by the Florida Natural Areas Inventory (FNAI). In most cases, the DFC will be closely related to the historic NatCom. However, it is important to note, that in areas where the historic community has been severely altered by past land use practices, the DFC may not always be the same as the historic NatCom. All timber management activities undertaken will adhere to, or exceed the current Florida Silvicultural Best Management Practices (BMPs) and Florida Forestry Wildlife BMPs for State Imperiled Species. DRP shall take all measures necessary to protect water quality and wildlife species of concern while conducting timber management activities. DRP has contracted with a private sector, professional forest management firm to complete this timber assessment: F4 Tech.

2. *Purpose of Timber Management Activities*

Timber management activities may be conducted to help improve or maintain current conditions to achieve the associated DFC. Timber management will primarily be conducted in upland NatComs. Candidate upland NatCom types may include mesic flatwoods, wet flatwoods, sandhill, upland pine, and upland mixed woodland along with scrubby flatwoods, scrub, and altered landcover types such as successional hardwood forest and pine plantations. There will likely be no scheduled timber management activities in historically hardwood-dominated or wetland NatCom types, e.g., upland hardwood forest, hydric hammock, and slope forest. In some circumstances, timber management may include the harvesting and removal of overstory invasive/exotic trees. Descriptions of community types are detailed in the in the Resource Management Component.

3. *Potential Silvicultural Treatments*

Several silvicultural treatments may be considered and utilized over the next ten years. The various types of timber harvests may include pine thinning, targeted hardwood overstory removal, and clearcutting. Silvicultural treatments will be selectively implemented to minimize potential impacts to water and soil resources, non-target vegetation, and wildlife (see BMPs). Depending upon the condition and marketability of the timber being manipulated, it is possible to generate revenue from the harvest. It is also possible the timber removal could be a cost to DRP. In all decisions, the mission of preserving and restoring natural communities will be the guiding factor.

Thinning is conducted to reduce the basal area (BA) or density of trees/stems in a stand to improve forest health and growth conditions for residual trees. Allowing trees more room to grow has the potential to increase tree and forest vigor, which helps mitigate the potential for damaging insect and disease outbreaks. Most tree harvesting/removals also increase sunlight reaching the forest floor and fine fuels that facilitate consistent fire return intervals and responses, which can benefit groundcover vegetation abundance, species richness, and overall ecological diversity. The disruption of natural fire regimes and fire return intervals can often result in the need to remove undesirable or overstocked hardwood stems that currently occupy

growing space in the canopy and sub-canopy. Clearcutting may be used to support restoration goals by removing off-site pine or hardwood species and is a precursor to establishing site-appropriate species. It can also be used to control insect infestations that are damaging or threatening forest resources and ecosystem conditions.

On occasion, salvage cuts may need to be conducted to remove small volumes of wood damaged by fire, wind storm, insect or other natural causes. The decision whether or not to harvest the affected timber will depend on the threat to the surrounding stands, risk of collateral ecological damage, and the volume/value of the trees involved. For example, small, isolated lightning-strike beetle kills are a natural part of a healthy ecosystem and normally would not be cut. However, if a drought caused the insect infestation to spread, the affected trees and buffer zone might have to be removed to prevent significant damage.

4. *Inventory Data and Potential Actions per Area of Interest or Management Zone*

St. Sebastian comprises 21,627 acres in Brevard and Indian River Counties. A total of 13,446 acres are associated with six (6) upland natural community (NatCom) types (excluding hydric hammock and altered landcover types) that are potential candidates for timber management. From October 2017 to January 2018, an inventory based on field plots was conducted across and within these areas to quantify overstory, midstory and understory conditions. Various park-level and NatCom-level summary statistics can be found in the following tables.

This timber assessment was based on management zone and NatCom boundary GIS data provided by DRP in December 2017. It is not intended to be prescriptive. Stakeholders and DRP staff are encouraged to view this timber assessment and inventory data as supplemental information for future consideration. Given the dynamic nature of property ownership and land management activities at St. Sebastian State Park, together with the timeframe required to create or update a UMP, it is possible that some tabular data may be dated. Therefore, NatCom acreages and recent treatments that occurred after the December 2017 period may not be reflected in the following tables.

St. Sebastian River Preserve State Park Timber Management Analysis

Table 1. General summary statistics for St. Sebastian River Preserve State Park

Number of Management Zones within the Park	200
Upland NatCom acres	13,187*

*Does not include the acreage for hydric hammock or invasive exotic monoculture.

Mesic Flatwoods (11,110.4 acres)

Longleaf (*Pinus palustris*) and south Florida slash pine (*Pinus elliottii var. densa*) are the preferred overstory pine species in the region. The FNAI reference site in this region for mesic flatwoods contains longleaf and south Florida slash pine at a basal area (BA) of 10 to 50 square feet per acre with non-pine at a density of between 0 and 26.2 trees per acre (TPA). The following table shows the overstory condition for this natural community at St. Sebastian and target overstory condition for mesic flatwoods in this region.

MZ ID	Mesic Flatwoods (Acres)	Current Average Overstory Conditions							Target Overstory Conditions	
		Pine BA (ft2/ac)	Pine TPA	Pine Volume (tons/ac)	Non-Pine BA (ft2/ac)	Non-Pine TPA	Non-Pine Volume (tons/ac)	Total Pine and Non-Pine Volume (tons/ac)	FNAI Reference Condition Pine BA Range (ft2/ac)	FNAI Reference Condition Non-Pine TPA Range
SSR-001n	18.0	10.0	11.6	2.9	0.0	0.0	0.0	2.9	10 - 50	0 - 0
SSR-002	176.2	13.7	15.4	8.2	3.0	5.0	0.0	8.2	10 - 50	0 - 0
SSR-003n	85.8	3.6	6.1	2.0	0.7	1.3	0.0	2.0	10 - 50	0 - 0
SSR-003s	127.2	5.3	17.5	1.7	0.0	0.0	0.0	1.7	10 - 50	0 - 0
SSR-004	234.1	10.8	19.9	4.6	0.0	0.0	0.0	4.6	10 - 50	0 - 0
SSR-005n	194.2	8.7	28.4	3.7	0.7	1.2	0.0	3.7	10 - 50	0 - 0
SSR-005s	203.1	14.7	54.4	4.6	0.3	0.6	0.0	4.6	10 - 50	0 - 0
SSR-006	151.9	5.6	10.2	2.2	0.0	0.0	0.0	2.2	10 - 50	0 - 0
SSR-007	83.1	4.3	5.9	2.0	0.0	0.0	0.0	2.0	10 - 50	0 - 0
SSR-008e	125.0	7.7	13.5	1.9	0.0	0.0	0.0	1.9	10 - 50	0 - 0
SSR-008w	35.4	6.7	15.1	3.3	0.0	0.0	0.0	3.3	10 - 50	0 - 0
SSR-009	213.3	4.9	6.6	2.5	2.3	11.9	0.2	2.7	10 - 50	0 - 0
SSR-010	111.5	10.5	16.6	5.3	0.0	0.0	0.0	5.3	10 - 50	0 - 0
SSR-011n	51.6	12.5	23.2	5.5	75.8	135.5	1.7	7.2	10 - 50	0 - 0
SSR-011s	30.5	15.0	50.0	7.4	0.0	0.0	0.0	7.4	10 - 50	0 - 0
SSR-012	79.5	12.7	27.6	5.4	6.0	11.0	0.0	5.4	10 - 50	0 - 0
SSR-013	60.4	12.5	33.3	5.1	10.8	18.5	0.0	5.1	10 - 50	0 - 0
SSR-014	199.9	14.7	35.0	6.0	6.8	12.1	0.2	6.3	10 - 50	0 - 0
SSR-015	178.0	24.0	54.0	13.6	11.7	22.0	0.0	13.6	10 - 50	0 - 0
SSR-016n	305.2	14.9	30.4	4.4	11.1	20.3	0.0	4.4	10 - 50	0 - 0
SSR-016s	66.2	5.0	9.1	2.7	0.0	0.0	0.0	2.7	10 - 50	0 - 0
SSR-017	27.5	7.5	14.8	0.0	96.3	166.9	20.8	20.8	10 - 50	0 - 0

St. Sebastian River Preserve State Park Timber Management Analysis

MZ ID	Mesic Flatwoods (Acres)	Pine BA (ft2/ac)	Pine TPA	Pine Volume (tons/ac)	Non-Pine BA (ft2/ac)	Non-Pine TPA	Non-Pine Volume (tons/ac)	Total Pine and Non-Pine Volume (tons/ac)	FNAI Reference Condition Pine BA Range (ft2/ac)	FNAI Reference Condition Non-Pine TPA Range
SSR-020w*	0.3	--	--	--	--	--	--	--	--	--
SSR-021e	154.2	22.3	38.4	12.0	2.7	5.0	0.0	12.0	10 - 50	0 - 0
SSR-021w	68.4	16.4	39.9	8.5	0.0	0.0	0.0	8.5	10 - 50	0 - 0
SSR-022	79.0	15.4	19.6	7.4	0.0	0.0	0.0	7.4	10 - 50	0 - 0
SSR-023e1	36.8	7.7	13.0	4.5	0.0	0.0	0.0	4.5	10 - 50	0 - 0
SSR-023e2*	14.5	--	--	--	--	--	--	--	--	--
SSR-023e3*	18.0	--	--	--	--	--	--	--	--	--
SSR-023w	66.5	15.0	58.8	6.0	4.0	7.3	0.0	6.0	10 - 50	0 - 0
SSR-026	74.5	15.3	37.8	7.6	10.6	22.5	2.3	9.9	10 - 50	0 - 0
SSR-028w*	22.6	--	--	--	--	--	--	--	--	--
SSR-029e	104.8	7.7	13.6	4.0	0.6	1.1	0.0	4.0	10 - 50	0 - 0
SSR-029w	111.0	7.8	14.7	4.2	1.7	3.1	0.0	4.2	10 - 50	0 - 0
SSR-030	125.5	15.0	24.3	7.1	0.0	0.0	0.0	7.1	10 - 50	0 - 0
SSR-031	47.4	25.0	51.3	12.7	0.0	0.0	0.0	12.7	10 - 50	0 - 0
SSR-032	77.8	23.9	78.4	10.5	0.0	0.0	0.0	10.5	10 - 50	0 - 0
SSR-033	104.1	22.6	50.2	10.6	0.0	0.0	0.0	10.6	10 - 50	0 - 0
SSR-034	128.1	18.1	28.3	9.3	0.0	0.0	0.0	9.3	10 - 50	0 - 0
SSR-035n	55.7	5.0	6.8	3.0	0.0	0.0	0.0	3.0	10 - 50	0 - 0
SSR-035s	98.2	4.7	5.7	2.8	0.5	1.0	0.0	2.8	10 - 50	0 - 0
SSR-036	206.6	13.6	23.3	8.2	0.3	0.6	0.0	8.2	10 - 50	0 - 0
SSR-037	220.9	17.8	51.8	8.5	2.5	4.6	0.0	8.5	10 - 50	0 - 0
SSR-038	93.8	39.4	103.5	20.4	8.8	13.2	0.5	20.9	10 - 50	0 - 0
SSR-039c	49.9	14.4	24.3	8.1	3.3	4.9	0.0	8.1	10 - 50	0 - 0
SSR-039n	7.9	25.0	31.2	16.5	0.0	0.0	0.0	16.5	10 - 50	0 - 0
SSR-039s	53.9	26.2	51.3	12.6	2.3	1.8	0.0	12.6	10 - 50	0 - 0
SSR-040n	8.8	16.7	39.8	9.3	0.0	0.0	0.0	9.3	10 - 50	0 - 0
SSR-040s	153.5	8.7	13.3	4.8	0.0	0.0	0.0	4.8	10 - 50	0 - 0
SSR-041	54.8	45.0	79.4	23.3	50.0	128.0	3.8	27.1	10 - 50	0 - 0
SSR-042*	81.2	--	--	--	--	--	--	--	--	--
SSR-043	100.2	4.7	17.0	1.7	15.8	30.1	0.8	2.5	10 - 50	0 - 0
SSR-044	68.5	27.5	90.4	14.7	6.3	11.5	0.0	14.7	10 - 50	0 - 0
SSR-045	7.6	10.0	12.1	5.0	0.0	0.0	0.0	5.0	10 - 50	0 - 0
SSR-046	14.5	6.7	10.7	2.0	86.7	166.6	8.5	10.6	10 - 50	0 - 0
SSR-047w	59.5	40.0	117.6	17.7	32.5	66.7	0.6	18.3	10 - 50	0 - 0
SSR-048	9.9	3.3	21.8	0.0	3.3	6.1	0.0	0.0	10 - 50	0 - 0
SSR-049e	5.6	10.0	16.1	3.4	0.0	0.0	0.0	3.4	10 - 50	0 - 0
SSR-049w	38.8	5.0	8.5	2.8	0.0	0.0	0.0	2.8	10 - 50	0 - 0

St. Sebastian River Preserve State Park Timber Management Analysis

MZ ID	Mesic Flatwoods (Acres)	Pine BA (ft2/ac)	Pine TPA	Pine Volume (tons/ac)	Non-Pine BA (ft2/ac)	Non-Pine TPA	Non-Pine Volume (tons/ac)	Total Pine and Non-Pine Volume (tons/ac)	FNAI Reference Condition Pine BA Range (ft2/ac)	FNAI Reference Condition Non-Pine TPA Range
SSR-051	19.5	10.0	17.5	4.6	0.0	0.0	0.0	4.6	10 - 50	0 - 0
SSR-052e*	1.0	--	--	--	--	--	--	--	--	--
SSR-052w	16.7	2.5	0.8	0.0	5.0	9.2	0.0	0.0	10 - 50	0 - 0
SSR-053	27.6	1.4	2.6	0.5	41.4	97.3	0.0	0.5	10 - 50	0 - 0
SSR-056n	62.6	7.3	13.2	3.3	0.0	0.0	0.0	3.3	10 - 50	0 - 0
SSR-056s	8.0	10.0	18.8	5.1	0.0	0.0	0.0	5.1	10 - 50	0 - 0
SSR-057	91.9	13.1	22.7	3.2	0.0	0.0	0.0	3.2	10 - 50	0 - 0
SSR-058w	4.6	5.0	7.6	2.4	0.0	0.0	0.0	2.4	10 - 50	0 - 0
SSR-059n*	10.6	--	--	--	--	--	--	--	--	--
SSR-059se*	14.5	--	--	--	--	--	--	--	--	--
SSR-059sw*	3.6	--	--	--	--	--	--	--	--	--
SSR-060e	52.9	21.1	59.7	9.8	0.0	0.0	0.0	9.8	10 - 50	0 - 0
SSR-060n	214.7	8.2	18.1	0.3	1.5	2.8	0.0	0.3	10 - 50	0 - 0
SSR-060s	51.0	2.0	15.5	0.0	5.0	9.2	0.0	0.0	10 - 50	0 - 0
SSR-060se	40.7	3.8	4.1	1.7	2.5	4.6	0.0	1.7	10 - 50	0 - 0
SSR-060w	113.2	6.0	28.4	1.6	0.0	0.0	0.0	1.6	10 - 50	0 - 0
SSR-061*	52.3	--	--	--	--	--	--	--	--	--
SSR-062n	16.1	2.0	2.6	0.9	0.0	0.0	0.0	0.9	10 - 50	0 - 0
SSR-062s	166.2	5.0	15.8	1.1	7.5	13.9	0.0	1.1	10 - 50	0 - 0
SSR-063c	7.1	40.0	117.4	20.6	2.5	4.6	0.0	20.6	10 - 50	0 - 0
SSR-063n	57.3	21.7	90.7	7.7	1.7	3.1	0.0	7.7	10 - 50	0 - 0
SSR-063s	52.8	46.3	151.8	20.1	0.0	0.0	0.0	20.1	10 - 50	0 - 0
SSR-064n	114.4	39.0	127.4	17.3	0.5	1.0	0.0	17.3	10 - 50	0 - 0
SSR-064s	89.9	10.0	27.5	3.3	0.8	1.4	0.0	3.3	10 - 50	0 - 0
SSR-065n	81.3	17.7	38.9	8.2	2.3	3.8	0.0	8.2	10 - 50	0 - 0
SSR-065s	77.5	28.6	85.1	13.0	6.4	8.9	1.1	14.1	10 - 50	0 - 0
SSR-066	33.4	20.0	83.9	6.1	1.7	3.1	0.0	6.1	10 - 50	0 - 0
SSR-067	179.7	18.8	71.6	5.1	8.8	16.0	0.2	5.3	10 - 50	0 - 0
SSR-068	102.5	16.7	49.0	6.2	0.0	0.0	0.0	6.2	10 - 50	0 - 0
SSR-069	206.4	20.0	70.5	8.0	7.1	14.2	1.0	9.0	10 - 50	0 - 0
SSR-070	36.2	50.0	132.2	24.2	21.4	65.9	0.0	24.2	10 - 50	0 - 0
SSR-071	105.7	34.7	102.6	18.3	12.0	22.4	2.5	20.8	10 - 50	0 - 0
SSR-072	23.2	23.3	24.9	14.6	30.0	61.8	2.4	17.0	10 - 50	0 - 0
SSR-074	57.3	4.0	7.1	1.8	0.0	0.0	0.0	1.8	10 - 50	0 - 0
SSR-075	54.5	2.0	0.9	1.6	0.0	0.0	0.0	1.6	10 - 50	0 - 0
SSR-076	73.0	2.7	10.0	1.2	0.0	0.0	0.0	1.2	10 - 50	0 - 0
SSR-077	51.3	1.8	2.4	0.0	0.0	0.0	0.0	0.0	10 - 50	0 - 0

St. Sebastian River Preserve State Park Timber Management Analysis

MZ ID	Mesic Flatwoods (Acres)	Pine BA (ft2/ac)	Pine TPA	Pine Volume (tons/ac)	Non-Pine BA (ft2/ac)	Non-Pine TPA	Non-Pine Volume (tons/ac)	Total Pine and Non-Pine Volume (tons/ac)	FNAI Reference Condition Pine BA Range (ft2/ac)	FNAI Reference Condition Non-Pine TPA Range
SSR-077se*	2.4	--	--	--	--	--	--	--	--	--
SSR-078e*	4.5	--	--	--	--	--	--	--	--	--
SSR-078w	70.3	8.8	37.9	3.4	1.3	1.3	0.0	3.4	10 - 50	0 - 0
SSR-079	79.9	5.7	12.1	2.9	0.0	0.0	0.0	2.9	10 - 50	0 - 0
SSR-080	37.1	6.7	13.8	3.8	0.0	0.0	0.0	3.8	10 - 50	0 - 0
SSR-081	83.8	1.3	3.9	0.7	0.7	1.2	0.0	0.7	10 - 50	0 - 0
SSR-081se	4.0	2.5	2.6	0.0	0.0	0.0	0.0	0.0	10 - 50	0 - 0
SSR-082	99.8	4.0	10.7	1.8	0.0	0.0	0.0	1.8	10 - 50	0 - 0
SSR-083e	45.1	2.9	5.7	1.5	0.0	0.0	0.0	1.5	10 - 50	0 - 0
SSR-083w	16.7	12.5	48.1	6.0	83.8	146.1	8.6	14.6	10 - 50	0 - 0
SSR-084	51.6	8.6	12.2	5.4	27.1	49.8	0.0	5.4	10 - 50	0 - 0
SSR-085	92.8	3.1	4.9	1.8	2.5	3.5	0.5	2.2	10 - 50	0 - 0
SSR-086	54.5	6.3	23.9	2.9	0.0	0.0	0.0	2.9	10 - 50	0 - 0
SSR-087	39.1	7.8	13.3	3.6	7.8	14.3	0.0	3.6	10 - 50	0 - 0
SSR-088	191.4	4.5	16.5	1.8	2.6	4.7	0.0	1.8	10 - 50	0 - 0
SSR-089n	33.5	5.6	6.3	1.7	28.9	49.5	0.0	1.7	10 - 50	0 - 0
SSR-089s*	8.4	--	--	--	--	--	--	--	--	--
SSR-090n*	148.2	--	--	--	--	--	--	--	--	--
SSR-090s	25.9	5.7	32.5	0.0	0.0	0.0	0.0	0.0	10 - 50	0 - 0
SSR-091	36.4	5.7	14.0	0.9	0.0	0.0	0.0	0.9	10 - 50	0 - 0
SSR-092	141.2	14.1	45.0	4.5	3.2	5.8	0.0	4.5	10 - 50	0 - 0
SSR-093	59.1	5.8	23.0	2.8	0.8	9.6	0.0	2.8	10 - 50	0 - 0
SSR-094c*	3.4	--	--	--	--	--	--	--	--	--
SSR-094e	16.6	2.5	1.6	1.5	0.0	0.0	0.0	1.5	10 - 50	0 - 0
SSR-095e	68.7	1.0	1.2	0.0	5.0	21.0	1.3	1.3	10 - 50	0 - 0
SSR-095w*	15.3	--	--	--	--	--	--	--	--	--
SSR-096e*	70.3	--	--	--	--	--	--	--	--	--
SSR-096w*	36.0	--	--	--	--	--	--	--	--	--
SSR-097e*	56.0	--	--	--	--	--	--	--	--	--
SSR-097n*	22.3	--	--	--	--	--	--	--	--	--
SSR-097ne*	5.4	--	--	--	--	--	--	--	--	--
SSR-097nw*	0.3	--	--	--	--	--	--	--	--	--
SSR-097w	23.2	1.7	1.2	1.1	0.0	0.0	0.0	1.1	10 - 50	0 - 0
SSR-098e	141.6	14.7	79.5	3.4	0.0	0.0	0.0	3.4	10 - 50	0 - 0
MZ ID	**Mesic Flatwoods**	**Pine BA (ft2/ac)**	**Pine TPA**	**Pine Volume**	**Non-Pine BA**	**Non-Pine**	**Non-Pine Volume**	**Total Pine and**	**FNAI Reference**	**FNAI Reference**

St. Sebastian River Preserve State Park Timber Management Analysis

	(Acres)			(tons/ac)	(ft2/ac)	TPA	(tons/ac)	Non-Pine Volume (tons/ac)	Condition Pine BA Range (ft2/ac)	Condition Non-Pine TPA Range
SSR-098sw	21.1	8.0	23.3	4.1	0.0	0.0	0.0	4.1	10 - 50	0 - 0
SSR-098w	65.0	5.5	4.5	3.5	0.0	0.0	0.0	3.5	10 - 50	0 - 0
SSR-099	26.7	3.3	4.1	2.1	0.0	0.0	0.0	2.1	10 - 50	0 - 0
SSR-100	128.8	20.0	89.1	9.4	4.6	8.1	0.5	9.9	10 - 50	0 - 0
SSR-101e	34.8	0.0	0.0	0.0	4.3	2.5	0.0	0.0	10 - 50	0 - 0
SSR-101w	12.2	12.9	16.2	5.5	22.9	55.7	0.0	5.5	10 - 50	0 - 0
SSR-102	91.2	29.3	110.2	14.2	9.3	17.6	0.0	14.2	10 - 50	0 - 0
SSR-103	8.0	0.0	0.0	0.0	20.0	20.2	15.0	15.0	10 - 50	0 - 0
SSR-104	236.8	17.3	38.8	8.1	8.5	15.9	0.0	8.1	10 - 50	0 - 0
SSR-105e	87.8	4.0	9.2	1.8	0.0	0.0	0.0	1.8	10 - 50	0 - 0
SSR-105n	7.7	40.0	94.5	21.9	0.0	0.0	0.0	21.9	10 - 50	0 - 0
SSR-105w	148.7	16.8	64.8	6.4	0.9	1.7	0.0	6.4	10 - 50	0 - 0
SSR-106ne	26.5	6.7	40.2	2.4	1.7	3.1	0.0	2.4	10 - 50	0 - 0
SSR-106nw	29.2	12.0	38.4	6.1	0.0	0.0	0.0	6.1	10 - 50	0 - 0
SSR-106se	23.4	30.0	45.8	17.0	0.0	0.0	0.0	17.0	10 - 50	0 - 0
SSR-107	61.9	12.0	19.6	5.5	2.0	3.7	0.0	5.5	10 - 50	0 - 0
SSR-108	71.5	35.4	50.9	22.9	40.0	75.0	1.1	24.0	10 - 50	0 - 0
SSR-109	19.0	37.5	116.6	20.0	17.5	22.5	6.2	26.2	10 - 50	0 - 0
SSR-110*	3.2	--	--	--	--	--	--	--	--	--
SSR-111*	0.1	--	--	--	--	--	--	--	--	--
SSR-121*	0.3	--	--	--	--	--	--	--	--	--
SSR-123*	1.4	--	--	--	--	--	--	--	--	--
SSR-124	14.4	0.0	0.0	0.0	15.0	27.5	0.0	0.0	10 - 50	0 - 0
SSR-126*	0.6	--	--	--	--	--	--	--	--	--
SSR-128	10.4	40.0	85.0	23.0	5.0	9.2	0.0	23.0	10 - 50	0 - 0
SSR-129*	0.7	--	--	--	--	--	--	--	--	--
SSR-130	11.0	10.0	8.3	3.1	87.5	92.2	33.3	36.4	10 - 50	0 - 0
SSR-131*	23.0	--	--	--	--	--	--	--	--	--
SSR-134	35.7	50.0	91.4	23.0	101.7	177.5	4.9	27.9	10 - 50	0 - 0
SSR-136*	0.2	--	--	--	--	--	--	--	--	--
Total	**11,110.4**									

*Un-sampled upland areas are present in this analysis and could require vegetation management in the future.

Sandhill (254.3 acres)

Longleaf pine (*Pinus palustris*) is the preferred overstory pine species in the region. The FNAI reference site in this region for sandhill contains longleaf pine at a basal area (BA) of 20 to 60 square feet per acre with non-pine species at between 0 and 78.8 trees per acre (TPA). The following table shows the overstory condition for this natural community at St. Sebastian and target overstory condition for sandhill in this region.

MZ ID	Sandhill (Acres)	Current Average Overstory Conditions							Target Overstory Conditions	
		Pine BA (ft2/ac)	Pine TPA	Pine Volume (tons/ac)	Non-Pine BA (ft2/ac)	Non-Pine TPA	Non-Pine Volume (tons/ac)	Total Pine and Non-Pine Volume (tons/ac)	FNAI Reference Condition Pine BA Range (ft2/ac)	FNAI Reference Condition Non-Pine TPA Range
SSR-001n	46.5	14.3	30.8	8.6	0.0	0.0	0.0	8.6	20 - 60	0 - 79
SSR-001s	24.4	8.3	36.4	2.2	0.0	0.0	0.0	2.2	20 - 60	0 - 79
SSR-005s	16.2	10.0	18.0	4.6	0.0	0.0	0.0	4.6	20 - 60	0 - 79
SSR-026	74.0	9.3	12.6	5.0	1.4	1.1	0.9	5.9	20 - 60	0 - 79
SSR-050s*	0.4	--	--	--	--	--	--	--	--	--
SSR-051*	0.2	--	--	--	--	--	--	--	--	--
SSR-058w	4.8	13.3	44.4	4.3	23.3	45.6	13.9	18.2	20 - 60	0 - 79
SSR-059n	39.3	7.5	11.4	4.4	17.5	30.8	0.0	4.4	20 - 60	0 - 79
SSR-059sw	7.8	3.3	7.9	0.0	6.7	14.6	0.0	0.0	20 - 60	0 - 79
Total	**213.5**									

*Un-sampled upland areas are present in this analysis and could require vegetation management in the future.

Scrub (300.0 acres)

Sand pine (*Pinus clausa*) is the preferred overstory pine species, if one is present, in the region. The FNAI reference site in this region for scrub contains sand pine at a basal area (BA) of 0 to 20 square feet per acre with non-pine species at between 0 and 13.1 trees per acre (TPA). This natural community is managed for the benefit of the Florida scrub-jay since St. Sebastian River Preserve comprises the largest portion of the south Brevard-Indian River-St. Lucie metapopulation, which is the fourth largest metapopulation in the state. The following table shows the overstory condition for this natural community at St. Sebastian and target overstory condition for scrub in this region. Additional vegetation inventory data collection is needed to further assess the condition of the scrub at SSRPSP.

MZ ID	Scrub (Acres)	Pine BA (ft2/ac)	Pine TPA	Pine Volume (tons/ac)	Non-Pine BA (ft2/ac)	Non-Pine TPA	Non-Pine Volume (tons/ac)	Total Pine and Non-Pine Volume (tons/ac)	FNAI Reference Condition Pine BA Range (ft2/ac)	FNAI Reference Condition Non-Pine TPA Range
SSR-001n*	3.2	--	--	--	--	--	--	--	--	--
SSR-001s*	9.1	--	--	--	--	--	--	--	--	--
SSR-043*	2.4	--	--	--	--	--	--	--	--	--
SSR-045	16.3	5.0	9.7	3.0	22.5	61.0	8.1	11.1	0 - 20	0 - 26
SSR-050n*	0.5	--	--	--	--	--	--	--	--	--
SSR-050s	31.6	1.3	10.4	0.0	0.0	0.0	0.0	0.0	0 - 20	0 - 26
SSR-051*	56.1	--	--	--	--	--	--	--	--	--
MZ ID	**Scrub (Acres)**	**Pine BA (ft2/ac)**	**Pine TPA**	**Pine Volume (tons/ac)**	**Non-Pine BA (ft2/ac)**	**Non-Pine TPA**	**Non-Pine Volume (tons/ac)**	**Total Pine and Non-Pine Volume (tons/ac)**	**FNAI Reference Condition Pine BA Range (ft2/ac)**	**FNAI Reference Condition Non-Pine TPA Range**

SSR-054n*	2.7	--	--	--	--	--	--	--	--	--
SSR-055s*	41.0	--	--	--	--	--	--	--	--	--
SSR-056n*	0.4	--	--	--	--	--	--	--	--	--
SSR-056s	12.4	3.3	10.6	1.0	0.0	0.0	0.0	1.0	0 - 20	0 - 26
SSR-057*	6.0	--	--	--	--	--	--	--	--	--
SSR-058w	6.3	3.3	3.1	0.0	0.0	0.0	0.0	0.0	0 - 20	0 - 26
SSR-073w*	0.3	--	--	--	--	--	--	--	--	--
SSR-077*	7.0	--	--	--	--	--	--	--	--	--
SSR-077se*	8.6	--	--	--	--	--	--	--	--	--
SSR-078e*	2.3	--	--	--	--	--	--	--	--	--
SSR-085*	6.6	--	--	--	--	--	--	--	--	--
SSR-088*	6.8	--	--	--	--	--	--	--	--	--
SSR-095w	15.2	3.3	3.8	1.8	0.0	0.0	0.0	1.8	0 - 20	0 - 26
SSR-096w*	11.0	--	--	--	--	--	--	--	--	--
SSR-097n*	11.8	--	--	--	--	--	--	--	--	--
SSR-097nw*	3.4	--	--	--	--	--	--	--	--	--
SSR-097w*	8.5	--	--	--	--	--	--	--	--	--
SSR-110*	0.7	--	--	--	--	--	--	--	--	--
SSR-126*	1.4	--	--	--	--	--	--	--	--	--
Total	**300.0**									

*Un-sampled upland areas are present in this analysis and could require vegetation management in the future.

Scrubby Flatwoods (1,449.7 acres)

Longleaf (*Pinus palustris*) and south Florida slash pine (*Pinus elliottii var. densa*) are the preferred overstory pine species in the region. The FNAI reference site in this region for mesic flatwoods contains longleaf and south Florida slash pine at a basal area (BA) of 10 to 60 square feet per acre with non-pine at a density of between 0 and 26.2 trees per acre (TPA). At St. Sebastian, scrubby flatwoods are managed to enhance habitat conditions for the federally threatened Florida scrub jay (*Aphelocoma coerulescens*) and red-cockaded woodpeckers (Leuconotopicus borealis), when located within or nearby areas occupied by each species. As such, overstory pine BA may not meet the target overstory conditions found at the FNAI reference site for scrubby flatwoods. The following table shows the overstory condition for this natural community at St. Sebastian and target overstory condition for scrubby flatwoods in this region.

MZ ID	Scrubby Flatwoods	Current Average Overstory Conditions	Target Overstory Conditions

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	(Acres)	Pine BA (ft2/ac)	Pine TPA	Pine Volume (tons/ac)	Non-Pine BA (ft2/ac)	Non-Pine TPA	Non-Pine Volume (tons/ac)	Total Pine and Non-Pine Volume (tons/ac)	FNAI Reference Condition Pine BA Range (ft2/ac)	FNAI Reference Condition Non-Pine TPA Range
SSR-016n	8.9	5.0	4.7	2.4	0.0	0.0	0.0	2.4	20 - 60	0 - 26
SSR-016s	10.0	10.0	12.1	0.0	0.0	0.0	0.0	0.0	20 - 60	0 - 26
SSR-017	26.4	4.0	7.1	0.0	0.0	0.0	0.0	0.0	20 - 60	0 - 26
SSR-018	12.3	50.0	52.5	33.1	0.0	0.0	0.0	33.1	20 - 60	0 - 26
SSR-020e*	27.6	--	--	--	--	--	--	--	--	--
SSR-020w*	60.4	--	--	--	--	--	--	--	--	--
SSR-021e	75.3	10.8	20.0	5.8	0.0	0.0	0.0	5.8	20 - 60	0 - 26
SSR-021w	30.5	8.0	15.0	4.1	0.0	0.0	0.0	4.1	20 - 60	0 - 26
SSR-022	62.1	16.0	37.1	7.7	0.0	0.0	0.0	7.7	20 - 60	0 - 26
SSR-024*	29.3	--	--	--	--	--	--	--	--	--
SSR-025*	58.7	--	--	--	--	--	--	--	--	--
SSR-027	93.8	1.3	1.2	0.0	0.0	0.0	0.0	0.0	20 - 60	0 - 26
SSR-028e*	15.5	--	--	--	--	--	--	--	--	--
SSR-028w*	87.9	--	--	--	--	--	--	--	--	--
SSR-040s	16.5	10.0	21.4	3.6	0.0	0.0	0.0	3.6	20 - 60	0 - 26
SSR-043	16.0	6.7	7.0	3.6	23.3	92.7	5.4	9.0	20 - 60	0 - 26
SSR-044*	1.3	--	--	--	--	--	--	--	--	--
SSR-045	55.3	10.0	20.2	2.5	5.6	10.7	2.2	4.7	20 - 60	0 - 26
SSR-046*	3.2	--	--	--	--	--	--	--	--	--
SSR-048	5.5	0.0	0.0	0.0	5.0	9.2	0.0	0.0	20 - 60	0 - 26
SSR-049e*	2.9	--	--	--	--	--	--	--	--	--
SSR-049w	7.0	10.0	48.2	5.0	0.0	0.0	0.0	5.0	20 - 60	0 - 26
SSR-050n*	1.0	--	--	--	--	--	--	--	--	--
SSR-050s*	5.3	--	--	--	--	--	--	--	--	--
SSR-051	29.8	5.0	31.1	1.3	0.0	0.0	0.0	1.3	20 - 60	0 - 26
SSR-052e	47.9	10.0	13.1	5.9	18.6	61.3	0.0	5.9	20 - 60	0 - 26
SSR-052w	27.7	5.0	42.1	0.0	1.7	3.2	0.0	0.0	20 - 60	0 - 26
SSR-053*	4.8	--	--	--	--	--	--	--	--	--
SSR-055c	32.5	10.0	12.0	0.6	1.1	2.0	0.0	0.6	20 - 60	0 - 26
SSR-055n*	0.4	--	--	--	--	--	--	--	--	--
SSR-055s	129.4	8.6	24.4	3.0	4.3	12.5	0.0	3.0	20 - 60	0 - 26
SSR-056n*	3.3	--	--	--	--	--	--	--	--	--
SSR-057	60.7	7.0	9.6	3.3	1.0	1.5	0.0	3.3	20 - 60	0 - 26
SSR-058e	5.2	0.0	0.0	0.0	160.0	549.7	55.4	55.4	20 - 60	0 - 26
MZ ID	**Scrubby Flatwoods (Acres)**	**Pine BA (ft2/ac)**	**Pine TPA**	**Pine Volume (tons/ac)**	**Non-Pine BA (ft2/ac)**	**Non-Pine TPA**	**Non-Pine Volume (tons/ac)**	**Total Pine and Non-Pine Volume**	**FNAI Reference Condition Pine BA**	**FNAI Reference Condition Non-Pine**

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								(tons/ac)	Range (ft2/ac)	TPA Range
SSR-058w*	1.4	--	--	--	--	--	--	--	--	--
SSR-059sw*	0.2	--	--	--	--	--	--	--	--	--
SSR-061*	8.6	--	--	--	--	--	--	--	--	--
SSR-075*	3.1	--	--	--	--	--	--	--	--	--
SSR-077*	3.0	--	--	--	--	--	--	--	--	--
SSR-077se*	2.5	--	--	--	--	--	--	--	--	--
SSR-078e*	10.3	--	--	--	--	--	--	--	--	--
SSR-078w*	1.6	--	--	--	--	--	--	--	--	--
SSR-081*	7.3	--	--	--	--	--	--	--	--	--
SSR-085*	0.3	--	--	--	--	--	--	--	--	--
SSR-088*	15.7	--	--	--	--	--	--	--	--	--
SSR-090n*	3.2	--	--	--	--	--	--	--	--	--
SSR-090s*	3.2	--	--	--	--	--	--	--	--	--
SSR-091*	1.5	--	--	--	--	--	--	--	--	--
SSR-092*	3.2	--	--	--	--	--	--	--	--	--
SSR-093*	14.7	--	--	--	--	--	--	--	--	--
SSR-094c*	3.8	--	--	--	--	--	--	--	--	--
SSR-094w*	11.6	--	--	--	--	--	--	--	--	--
SSR-095e	23.9	5.0	6.5	2.7	0.0	0.0	0.0	2.7	20 - 60	0 - 26
SSR-095w*	48.8	--	--	--	--	--	--	--	--	--
SSR-096e*	6.7	--	--	--	--	--	--	--	--	--
SSR-096w*	2.4	--	--	--	--	--	--	--	--	--
SSR-097e*	12.1	--	--	--	--	--	--	--	--	--
SSR-097n*	25.9	--	--	--	--	--	--	--	--	--
SSR-097nw*	10.7	--	--	--	--	--	--	--	--	--
SSR-097w*	1.2	--	--	--	--	--	--	--	--	--
SSR-098sw*	0.9	--	--	--	--	--	--	--	--	--
SSR-098w*	3.0	--	--	--	--	--	--	--	--	--
SSR-099*	71.3	--	--	--	--	--	--	--	--	--
SSR-100	51.8	1.0	3.2	0.4	0.0	0.0	0.0	0.4	20 - 60	0 - 26
SSR-110*	4.2	--	--	--	--	--	--	--	--	--
SSR-125*	12.0	--	--	--	--	--	--	--	--	--
SSR-126*	0.7	--	--	--	--	--	--	--	--	--
MZ ID	**Scrubby Flatwoods (Acres)**	**Pine BA (ft2/ac)**	**Pine TPA**	**Pine Volume (tons/ac)**	**Non-Pine BA (ft2/ac)**	**Non-Pine TPA**	**Non-Pine Volume (tons/ac)**	**Total Pine and Non-Pine Volume (tons/ac)**	**FNAI Reference Condition Pine BA Range**	**FNAI Reference Condition Non-Pine TPA**

									(ft2/ac)	Range
SSR-130*	0.2	--	--	--	--	--	--	--	--	--
SSR-131*	13.5	--	--	--	--	--	--	--	--	--
SSR-132*	0.9	--	--	--	--	--	--	--	--	--
Total	**1,449.7**									

*Un-sampled upland areas are present in this analysis and could require vegetation management in the future.

Upland Hardwood Forest (16.1 acres)

This community is characterized, by FNAI, as having a well-developed, closed canopy dominated by deciduous hardwood tree species on mesic soils in areas that are sheltered from fire. At St. Sebastian, overstory tree species include pignut hickory (*Carya glabra*), live oak (*Quercus virginiana*), laurel oak (*Q. laurifolia*), sugarberry (*Celtis laevigata),* and southern magnolia (*Magnolia grandiflora*). Understory species include trees and shrubs such as beautyberry (*Callicarpa americana*), hog plum (*Ximenia americana*), Carolina laurelcherry (*Prunus caroliniana*), American elm (*Ulmus americana*)*,* gum bully (*Sideroxylon lanuginosum*), and red bay (*Persea borbonia*). There are currently no FNAI reference site or recommendations on preferred species or stocking levels for this NatCom. However, during the next 10 years DRP intends to develop a reference site and desired future condition for upland hardwood forest. The following table shows the overstory condition for this natural community at St. Sebastian.

MZ ID	Upland Hardwood Forest (Acres)	Current Average Overstory Conditions							Target Overstory Conditions	
		Pine BA (ft2/ac)	Pine TPA	Pine Volume (tons/ac)	Non-Pine BA (ft2/ac)	Non-Pine TPA	Non-Pine Volume (tons/ac)	Total Pine and Non-Pine Volume (tons/ac)	FNAI Reference Condition Pine BA Range (ft2/ac)	FNAI Reference Condition Non-Pine TPA Range
SSR-052e*	0.9	--	--	--	--	--	--	--	--	--
SSR-058e*	1.1	--	--	--	--	--	--	--	--	--
SSR-073w	14.1	2.5	3.3	1.9	107.5	147.6	43.3	45.3	0 - 0	0 - 0
Total	**16.1**									

*Un-sampled upland areas are present in this analysis and could require vegetation management in the future.

Wet Flatwoods (56.4 acres)

Longleaf (Pinus palustris) and south Florida slash pine (Pinus elliottii var. densa) are the preferred overstory pine species in the region. The FNAI reference site in this region for mesic flatwoods contains longleaf and south Florida slash pine at a basal area (BA) of 10 to 50 square feet per acre with non-pine at a density of 0 trees per acre (TPA). The following table shows the overstory condition for this natural community at St. Sebastian and target overstory condition for wet flatwoods in this region.

St. Sebastian River Preserve State Park Timber Management Analysis

MZ ID	Wet Flatwoods (Acres)	Current Average Overstory Conditions							Target Overstory Conditions	
		Pine BA (ft2/ac)	Pine TPA	Pine Volume (tons/ac)	Non-Pine BA (ft2/ac)	Non-Pine TPA	Non-Pine Volume (tons/ac)	Total Pine and Non-Pine Volume (tons/ac)	FNAI Reference Condition Pine BA Range (ft2/ac)	FNAI Reference Condition Non-Pine TPA Range
SSR-016n	22.3	12.5	27.5	1.9	2.5	4.6	0.0	1.9	10 - 50	0 - 0
SSR-017*	0.7	--	--	--	--	--	--	--	--	--
SSR-064n*	0.4	--	--	--	--	--	--	--	--	--
SSR-098e*	7.6	--	--	--	--	--	--	--	--	--
SSR-104	25.4	35.0	48.7	21.7	30.0	55.0	0.0	21.7	10 - 50	0 - 0
Total	**56.4**									

*Un-sampled upland areas are present in this analysis and could require vegetation management in the future.

Addendum 9 —Land Management Review

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

MEMORANDUM

TO: Aric Larson, Governmental Operations Consultant III
Division of State Lands

FROM: Parks Small, Chief, Bureau of Natural and Cultural Resources
Division of Recreation and Parks

Parks Small Digitally signed by Parks Small
Date: 2015.11.04 14:38:14
-05'00'

Sine Murray, Chief, Office of Park Planning
Division of Recreation and Parks

Murray_SM Digitally signed by Murray_SM
Date: 2015.11.06 13:07:30
-05'00'

SUBJECT: Response to Draft Land Management Review (LMR)
St. Sebastian River Preserve State Park

The Land Management Review draft report provided to Division of Recreation and Parks (DRP) determined that management of St. Sebastian River Preserve State Park by the DRP met the two tests prescribed by law. Namely, the review team concluded that the land is being managed for the purposes for which it was acquired and in accordance with the land management plan.

Attached is DRP's Managing Agency Response to the draft LMR report. The responses were prepared via a coordinated effort of the park, district office, and our offices.

Thank you for your attention.

/ca

1.3. Overview of Land Management Review Results

Is the property managed in accordance with the purposes for which it was acquired?

Yes = 8, No = 0

Are the management practices, including public access, in compliance with the management plan?

Yes = 8, No = 0

Table 1 shows the average scores received for each applicable category of review. *Field Review* scores refer to the adequacy of management actions in the field, while *Management Plan Review* scores refer to adequacy of discussion of these topics in the management plan. Scores range from 1 to 5 with 5 signifying excellence. For a more detailed key to the scores, please see *Appendix A*.

Table 1: Results at a glance.

Major Land Management Categories	Field Review	Management Plan Review
Natural Communities / Forest Management	3.65	3.59
Prescribed Fire / Habitat Restoration	3.96	3.73
Hydrology	1.99	2.81
Imperiled Species	4.63	4.23
Exotic / Invasive Species	3.70	3.48
Cultural Resources	4.56	3.81
Public Access / Education / Law Enforcement	3.67	3.73
Infrastructure / Equipment / Staffing	2.09	N/A

Color Code (See Appendix A for detail)

Excellent	Above Average	Below Average	Poor

1.3.1 Consensus Commendations for the Managing Agency

The following commendations resulted from discussion and vote of the review team members:

1. The team commends the DRP staff for an outstanding job managing the landscape with fire effectively and prudently. (8+, 0-)

2. The team commends the DRP staff for long term restoration of red-cockaded woodpecker and scrub jay populations. (8+, 0-)

3. The team commends the DRP staff for a high level of resource management with limited funding and staff. (8+, 0-)

4. The team commends the DRP staff for the high quality recreational and educational opportunities provided to visitors. (8+, 0-)

5. The team commends the DRP staff for utilizing an interim cattle lease for the management of ruderal lands until restoration is feasible in those areas. (8+, 0-)

1.3.2. Consensus Recommendations to the Managing Agency

The following recommendations resulted from a discussion and vote of review team members. The next management plan update should include information about how these recommendations have been addressed:

1. The team recommends that DRP expand discussion of xeric hammock within the management plan if this natural community is recognized and managed on the park. (8+, 0-)

   Managing Agency Response: *Agree. A discussion of xeric hammock will be added to the next revision of the unit management plan.*

2. The team recommends that DRP conduct an assessment of current and historic acres of functional wet prairie to determine trends in quality and quantity of this natural community. (8+, 0-)

   Managing Agency Response: *Agree. DRP continues to improve on and refine the park's natural community map and descriptions while adding this information to unit management plan. When staffing and funding allow, habitat assessments will be performed as well.*

3. The team recommends that DRP pursue interagency cooperation for implementing long-term monitoring of surface water quality and quantity, pertaining to potential impacts from agricultural, residential, and transportation corridor developments. (8+, 0-)

   Managing Agency Response: *Agree. DRP will continue to work with local, state, and federal agencies to determine the best strategy to monitor surface water quantity and quality. The SJRWMD is a cooperator and joint owner of most of the property and currently monitor surface water on the preserve.*

4. The team recommends that DRP pursue funding for a comprehensive hydrologic assessment so that a hydrologic restoration plan can be developed and implemented. (8+, 0-)

   Managing Agency Response: *Agree. DRP will seek the necessary funding needed to develop the comprehensive hydrologic assessment. Once this task has been performed, a plan will be developed and implemented.*

2. Field Review Details

2.1 Field Review Checklist Findings

The following items received high scores on the review team checklist, which indicates that management actions exceeded expectations.

1. **Natural Communities; specifically mesic flatwoods, sandhill, upland hardwood forest, xeric hammock, basin swamp, baygall, bottomland forest, depression marsh, floodplain marsh,**

floodplain swamp, hydric hammock seepage slope, strand swamp, wet flatwoods, wet prairie, blackwater stream and estuarine tidal swamp:

2. **Listed Species Protection and Preservation; for listed animal species in general, and specifically for red cockaded woodpeckers, scrub jay, and brown-headed nuthatch. Also for listed plant species in general; and specifically for pitcher plant, hand fern and large flower false rosemary:**
3. **Natural Resources Survey/Monitoring Resources; specifically listed species or their habitat monitoring, other non-game species or their habitat monitoring, and invasive species survey and monitoring:**
4. **Cultural Resources; specifically cultural resource survey, and protection and preservation:**
5. **Prescribed Fire; specifically area being burned, frequency and quality:**
6. **Restoration, specifically of mesic flatwoods:**
7. **Non-Native, Invasive & Problems Species, specifically control of plants:**
8. **Resource Protection, specifically boundary survey and signage:**
9. **Adjacent Property Concerns, specifically expanding development, and inholdings and additions:**
10. **Public Access and Education; specifically roads, parking and boat access:**
11. **Environmental Education and Outreach, specifically recreational opportunities and management of visitor impacts:**

2.2. Items Requiring Improvement Actions in the Field

The following items received low scores on the review team checklist, which indicates that management actions noted during the Field Review were not considered sufficient (less than 3.0 score on average). Please note that overall good scores do not preclude specific recommendations by the review team requiring remediation. **The management plan update should include information on how these items have been addressed:**

1. **Restoration, specifically hydrology restoration, received a below average score. The review team is asked to evaluate, based on their perspective, whether restoration efforts are adequate.**

   Managing Agency Response: *Agree. While DRP has enhanced thousands of acres by backfilling and plugging ditches in many areas of the preserve, there are still plenty areas that need to be restored if it determined that restoration is feasible. There are many areas in the preserve where restoring hydrology onsite may cause negative impacts to offsite residential areas. DRP will continue to work with partners to seek funding needed to conduct the park-wide hydrological assessment in order to conduct restoration.*

2. **Forest Management, specifically timber harvesting, received a below average score. The review team is asked to evaluate, based on information provided by the managing agency, whether forest management is sufficient.**

Managing Agency Response: *Agree. DRP has been working on a timber contract with the Florida Forest Service to thin significant portions of the preserve that are currently overstocked with pine. We envision that a contract will be signed within the next several months.*

3. **Hydrologic/Geologic function Hydro-Alteration, specifically ditches and hydro-period alteration, received below average scores. The review team is asked to evaluate, based on information provided by the managing agency, whether consideration of past and present hydrologic and geologic functions are sufficient.**

   Managing Agency Response: *Agree: The current management plan discusses the need for a comprehensive hydrological study, however one has not been completed at this time. It is estimated that this type of study would roughly cost $200,000 or more to assess the entire preserve. Staff continue to seek grant opportunities that will provide funding for this type of study. The hydrological study must be accomplished prior to filling in ditches to prioritize ditches for filling and to avoid any off site impacts.*

4. **Resource Protection, specifically law enforcement presence, received a below average score. The review team is asked to evaluate, based on information provided by the managing agency, whether resources are sufficient to protect the property.**

   Managing Agency Response: *Resource Protection including law enforcement presence, will be discussed with FWC and local authorities. DRP does not have any law enforcement officers within its division. All LE support comes from FWC and local authorities.*

5. **Surface Water Monitoring, specifically water quality and quantity, received a below average score. This is an indication that the management plan does not sufficiently address surface water quality and quantity.**

   Managing Agency Response: *Agree. DRP will continue to work with local, state, and federal agencies to determine the best strategy to monitor surface water quantity and quality. The SJRWMD is a cooperator and joint owner of most of the property and currently monitor surface water on the preserve.*

6. **Adjacent Property Concerns, specifically inholdings/additions, received a below average score. The review team is asked to evaluate, based on information provided by the managing agency, whether adjacent property concerns are sufficiently addressed.**

   Managing Agency Response: *Disagree. The current unit management plan includes a section that discusses inholdings and additions to the park in the optimum boundary section of the plant. Inholdings/additions will also be included in the next plan.*

7. **Management Resources, specifically buildings, equipment, staff and funding, received below average scores. The review team is asked to evaluate, based on information provided by the managing agency, whether management resources are sufficient.**

Managing Agency Response: *Agree. However, no new staff or funding can be assigned to this or any other park unit unless they are appropriated by the Legislature or reassigned from other units. Funding is determined annually by the Florida Legislature.*

2.3. Field Review Checklist and Scores

Field Review Item	Reference #	Anonymous Team Members								Average
		1	2	3	4	5	6	7	8	
Natural Communities (I.A)										
Mesic Flatwoods	I.A.1	4	3	4	4	4	5	4	4	4.00
Sandhill	I.A.3	5	5	5	5	5	5	5	5	5.00
Scrub	I.A.4	4	4	4	4	3		4	4	3.86
Scrubby Flatwoods	I.A.5	4	4	4	4	3	4	4	4	3.88
Upland Hardwood Forest	I.A.6	4	4	4	5	4	4	4	4	4.13
Xeric Hammock	I.A.7	4	5	5	5	5	4	5	5	4.75
Basin Swamp	I.A.8	5	5	4	5	5	4	5	4	4.63
Baygall	I.A.9	4	5	X	4	4	4	4	5	4.29
Bottomland Forest	I.A.10	5	4	4	5	4	4		4	4.29
Depression Marsh	I.A.11	5	5	5	5	5	4	5	5	4.88
Dome Swamp	I.A.12	3	5	3	3	2	4	3	4	3.38
Floodplain Marsh	I.A.13	5	4	5	5	4	4	5	5	4.63
Floodplain Swamp	I.A.14	5	4	5	5	4	4	5	5	4.63
Hydric hammock	I.A.15	4	4	X	4	4	X	4	4	4.00
Seepage Slope	I.A.16	5	4	5	5	5	4	5	5	4.75
Strand Swamp	I.A.17	4	5	4	4	4	X	4	5	4.29
Wet Flatwoods	I.A.18	4	4	5	4	4	4	5	5	4.38
Wet Prairie	I.A.19	4	3	3	5	4	X	5	4	4.00
Blackwater Stream	I.A.20	5	5	5	4	5	4	5	5	4.75
Estuarine Tidal Swamp	I.A.21	5	5	5	5	5	4	5	5	4.88
									Natural Communities Average Score	4.37
Listed Species: Protection & Preservation (I.B)										
Animals (in general)	I.B.1	5	5	5		5	5	5	5	5.00
Red Cockaded Woodpecker	I.B.1.a	5	5	5	5	5	5	5	5	5.00
Scrub Jay	I.B.1.b	5	4	4	5	5	5	5	5	4.75
Brown-headed Nuthatch	I.B.1.c	5	5		4	5		3	5	4.50
Plants (in general)	I.B.2	4	4	5		4		5	5	4.50
Pitcher Plant	I.B.2.a	4	5	5	4	3		5	5	4.43
Hand Fern	I.B.2.b	4	5	4	4	4		5	5	4.43
Large Flower False Rosemary	I.B.2.c	4	5		4	4			5	4.40
									Listed Species Average Score	4.63
Natural Resources Survey/Management Resources (I.C)										
Listed species or their habitat monitoring	I.C.2	5	5	5	5	4	5	4	5	4.75
Other non-game species or their habitat monitoring	I.C.3	3	4	4	5	4	4	5	4	4.13
Fire effects monitoring	I.C.4	4	3	3	5	3	3	5	5	3.88

Boundary survey	III.F.1	3	5	5	3	4	X	4	5	4.14
Gates & fencing	III.F.2	3	4	4	3	4	X	4	4	3.71
Signage	III.F.3	3	4	5	3	4	X	4	5	4.00
Law enforcement presence	III.F.4	1	1	1	1	3	X	1	2	1.43
									Resource Protection Average Score	3.32
Adjacent Property Concerns (III.G)										
Land Use										
Expanding development	III.G.1.a	3	X	3	3	3	4	4	3	3.29
I-95	III.G.1.b	3	X	X	2	3	X	4	3	3.00
Inholdings/additions	III.G.2	1	X	X	2	3	3	4	4	2.83
Public Access & Education (IV.1, IV.2, IV.3, IV.4, IV.5)										
Public Access										
Roads	IV.1.a	4	5	4	4	4	3	5	4	4.13
Parking	IV.1.b	4	5	4	4	3	3	5	4	4.00
Boat Access	IV.1.c	4	5	3	3	4	3	5	5	4.00
Environmental Education & Outreach										
Wildlife	IV.2.a	4	5	2	3	4	3	4	5	3.75
Invasive Species	IV.2.b	4	5	2	3	4	4	4	5	3.88
Habitat Management Activities	IV.2.c	4	5	2	3	4	3	4	5	3.75
Interpretive facilities and signs	IV.3	3	3	4	3	4	4	5	5	3.88
Recreational Opportunities	IV.4	5	4	5	5	4	4	5	5	4.63
Management of Visitor Impacts	IV.5	4	4	4	4	4	4	5	5	4.25
									Public Access & Education Average Score	4.03
Management Resources (V.1, V.2, V.3. V.4)										
Maintenance										
Waste disposal	V.1.a	4	1	5	3	4	X	5	4	3.71
Sanitary facilities	V.1.b	3	1	5	3	4	X	5	4	3.57
Infrastructure										
Buildings	V.2.a	2	4	2	1	1	2	1	2	1.88
Equipment	V.2.b	1	1	1	1	1	2	1	2	1.25
Staff	V.3	1	1	1	1	1	X	1	2	1.14
Funding	V.4	1	1	1	1	1	X	1	1	1.00
									Management Resources Average Score	2.09

Color Code:	Excellent	Above Average	Below Average	Poor	See Appendix A for detail
		Missing Vote	Insufficient Information		

3. Land Management Plan Review Details

3.1 Items Requiring Improvements in the Management Plan

The following items received low scores on the review team checklist, which indicates that the text noted in the Management Plan Review does not sufficiently address this issue (less than 3.0 score on

average.). Please note that overall good scores do not preclude specific recommendations by the review team requiring remediation. The next management plan update should address the checklist items identified below:

1. **Natural Resources Survey and Monitoring Resources, specifically other habitat management effects monitoring, received a below average score. This is an indication that the management plan does not sufficiently address survey or monitoring.**

   ***Managing Agency Response**: Agree: The current management plan discusses the need for a comprehensive hydrological study, however one has not been completed at this time. Much of the restoration funding is acquired through grants which require a project to be "shovel ready" or require matching funds. Very few grants offer agencies funding for research. To date a grant opportunity has not been found that provides funding for this type of study. Furthermore, the comprehensive hydrologic study is estimated to cost $200,000 for the entire preserve. This must be accomplished prior to filling in ditches to prioritize ditches for filling and to avoid any off site impacts. The next management plan will discuss barriers to hydrological survey and monitoring.*

   Surface Water Monitoring, specifically quality and quantity, received a below average score. This is an indication that the management plan does not sufficiently address surface water quality and quantity monitoring.

   ***Managing Agency Response:** Agree. DRP will include a discussion of water quality and quantity in the next revision of the parks plan. The current management plan was reviewed by the relevant agencies and was in full compliance with Chapters 253 and 259, F.S., and Chapter 18-2, F.A.C., when it was approved by ARC. The next update of this plan will be in full compliance with changes made to the statutes noted above by the Florida Legislature in 2008.*

2. **Adjacent Property Concerns, specifically discussion of potential surplus land determination and surplus lands identified, received below average scores. This is an indication that the management plan does not sufficiently address surplus lands.**

   ***Managing Agency Response:** Adjacent Property Concerns including discussion of potential surplus land determination will be more thoroughly addressed in the next management plan update. The current management plan was reviewed by the relevant agencies and was in full compliance with Chapters 253 and 259, F.S., and Chapter 18-2, F.A.C., when it was approved by ARC. The next update of this plan will be in full compliance with changes made to the statutes noted above by the Florida Legislature in 2008.*

3.2 Management Plan Review Checklist and Scores

Plan Review Item	Reference #	Anonymous Team Members	Average

Addendum 10—Local Government Comprehensive Plan Compliance

Brevard County & Indian River County
Comprehensive Plan Compliance

After multiple attempts to reach Brevard and Indian River Counties, formal comments have been received from Indian River county and are expected from Brevard County. There is no anticipation of inconsistencies between the management plan and each Local County Comprehensive Plan. Any comments or edits received from the counties will be assessed and addressed following proper guidelines. The below email strands show the attempts made to reach out to both counties and their comments.

Brevard County Comprehensive Plan Compliance

From:	Allbritton, Joel
To:	"Martin, Peter"; Sterk, Erin
Cc:	Baxley, Demi
Subject:	RE: Brevard County - Request to Review St. Sebastian River Preserve State Park Management Plan for Compliance
Date:	Thursday, August 30, 2018 11:19:00 AM
Attachments:	image001.png image003.png

Mr. Martin,

Thank you so much for reviewing this plan and letting me know this information. I look forward to seeing your review of the UMP.

Thanks and have a great day,

Joel Allbritton
Park Planner
Office of Park Planning
Division of Recreation and Parks
Florida Department of Environmental Protection
3900 Commonwealth Boulevard, MS 500
Tallahassee, FL 32399
Joel.Allbritton@dep.state.fl.us
Office: 850.245.3063

From: Martin, Peter [mailto:Peter.Martin@brevardfl.gov]
Sent: Thursday, August 30, 2018 11:11 AM
To: Allbritton, Joel <Joel.Allbritton@dep.state.fl.us>; Sterk, Erin <Erin.Sterk@brevardfl.gov>
Cc: Baxley, Demi <Demi.Baxley@dep.state.fl.us>
Subject: RE: Brevard County - Request to Review St. Sebastian River Preserve State Park Management Plan for Compliance

Mr. Allbritton,

I completed the research portion of our review yesterday and am scheduled to do the write-up tomorrow. My goal is to have an e-mail out to you by C.O.B. tomorrow, but have a number of non-related tasks with deadlines ahead of that. If I run into a jam, I will provide a revised response estimate.

Peter J. Martin
Peter J. "Pete" Martin, AICP
Board of County Commissioners
Planning & Development Department
Planning & Zoning Division
2725 Judge Fran Jamieson Way
Building A-114
Viera, Florida 32940
321-633-2070 X52215

This office can only provide zoning and comprehensive plan information. You may wish to contact other County agencies to fully determine the development potential of this property. This letter does not establish a right to develop or redevelop the property and does not constitute a waiver to any other

applicable land development regulations. At the time of development, this property will be subject to all such regulations. Under Florida law, e-mail addresses are public records. If you do not want your e-mail address released in response to a public records request, do not send electronic mail to this entity. Instead, contact this office by phone or in writing.

From: Allbritton, Joel [mailto:Joel.Allbritton@dep.state.fl.us]
Sent: Thursday, August 30, 2018 10:25 AM
To: Martin, Peter; Sterk, Erin
Cc: Baxley, Demi
Subject: Brevard County - Request to Review St. Sebastian River Preserve State Park Management Plan for Compliance

Good morning Mr. Martin,

I hope that this email finds you well! I just wanted to reach out to you and see how the review process for the Unit Management Plan for St. Sebastian River Preserve State Park was going. I have now been assigned this park and the plan in replacement of Sine Murray. Please let me know if you have any questions or need anything from me.

Thank you for your time and effort in reviewing this plan,

Joel Allbritton
Park Planner
Office of Park Planning
Division of Recreation and Parks
Florida Department of Environmental Protection
3900 Commonwealth Boulevard, MS 500
Tallahassee, FL 32399
Joel.Allbritton@dep.state.fl.us
Office: 850.245.3063

From: Baxley, Demi
Sent: Wednesday, August 29, 2018 9:15 AM
To: Allbritton, Joel <Joel.Allbritton@dep.state.fl.us>
Subject: Fw: Brevard County - Request to Review St. Sebastian River Preserve State Park Management Plan for Compliance

Here's the last communication I had with Brevard Co. They are supposed to be sending us the review results by 8/31 or sooner.

From: Baxley, Demi
Sent: Tuesday, August 14, 2018 8:20 AM
To: Martin, Peter; Sterk, Erin
Cc: Calkins, Tad; Murray, Sine; Cutshaw, Steven
Subject: RE: Brevard County - Request to Review St. Sebastian River Preserve State Park

Brevard County Comprehensive Plan Compliance

Management Plan for Compliance

Good Morning Mr. Martin,

Thank you for responding so quickly and for taking the time to speak with me regarding the requested review. Your summary of our discussion is correct. I will note yours and Mr. Sterk's contact information for future requests.

We look forward to working with you and your staff. Have a great rest of the day!

Sincerely,

Demi P. Baxley
Government Operations Consultant
OFFICE OF PARK PLANNING
Division of Recreation and Parks
3800 Commonwealth Blvd., MS#525
Tallahassee, FL 32399
Demi.Baxley@floridadep.gov
Office: 850.245.3051
Direct: 850.245.3052
https://floridadep.gov/parks

Recreation and Parks | Florida Department of Environmental ...

floridadep.gov

In-House Graphcs-Florida State Parks Logo.png The first three-time winner of the Gold Medal honoring the nation's best state park system, the Florida Park Service is one of the largest in the country with 175 state parks, trails and historic sites

> spanning nearly 800,000 acres and 100 miles of sandy white beach.

From: Martin, Peter [mailto:Peter.Martin@brevardfl.gov]
Sent: Monday, August 13, 2018 4:08 PM
To: Baxley, Demi <Demi.Baxley@dep.state.fl.us>; Sterk, Erin <Erin.Sterk@brevardfl.gov>
Cc: Calkins, Tad <tad.calkins@brevardfl.gov>; Murray, Sine <Sine.Murray@dep.state.fl.us>; Cutshaw, Steven <Steven.Cutshaw@dep.state.fl.us>
Subject: RE: Brevard County - Request to Review St. Sebastian River Preserve State Park Management Plan for Compliance

Ms. Baxley,

Per our phone call initiated by me, I have commenced review of draft unit management plan for St. Sebastian River Preserve State Park with a goal of getting our comments to you on or before September 1, 2018, which is the date you provided when I asked what turn-around time would work for you. It was a pleasure speaking with you and you may ad me to your review list, but please also copy my Planning & Zoning Manager Erin Sterk on any new requests.

Thank you,

Peter J. Martin
Peter J. "Pete" Martin, AICP
Board of County Commissioners
Planning & Development Department
Planning & Zoning Division
2725 Judge Fran Jamieson Way
Building A-114
Viera, Florida 32940
321-633-2070 X52215

Brevard County Comprehensive Plan Compliance

From: Baxley, Demi [mailto:Demi.Baxley@dep.state.fl.us]
Sent: Friday, August 3, 2018 10:44 AM
To: Sterk, Erin
Cc: Calkins, Tad; Martin, Peter; Murray, Sine; Cutshaw, Steven
Subject: Brevard County - Request to Review St. Sebastian River Preserve State Park Management Plan for Compliance

Good Morning,

Attached is a copy of the draft unit management plan for **St. Sebastian River Preserve State Park**. Please accept this as an official request for review to ensure our park management plan complies with your local comprehensive plan as outlined in my August 1 communication below. Sine Murray, who is copied with this email, is our point of contact regarding management of St. Sebastian River Preserve State Park. If you have any questions or concerns regarding details of the management plan, please direct them to Ms. Murray at Sine.Murray@floridadep.gov or 850.245.3051. As Ms. Murray's assistant, I am also available to you if you need any other information or have any questions.

Once Mr. Martin has had a chance to look through the attached plan, please let us know what you feel will be the approximate turn-around time for the requested review.

Also, as an aside, please note that we have been in touch with Indian River County and they are currently reviewing the park plan.

Thank you Tad for forwarding our request to Erin and Peter.

Thank you Erin for connecting with Peter to review the plan. For future reviewing needs, should I list you as the point of contact for our requests?

Thank you Peter for taking the time to assist.

Hope you all have a great rest of the day!

Demi P. Baxley
Government Operations Consultant
OFFICE OF PARK PLANNING
Division of Recreation and Parks
3800 Commonwealth Blvd., MS#525
Tallahassee, FL 32399
Demi.Baxley@floridadep.gov
Office: 850.245.3051
Direct: 850.245.3052
https://floridadep.gov/parks

Brevard County Comprehensive Plan Compliance

From: Sterk, Erin [mailto:Erin.Sterk@brevardfl.gov]
Sent: Thursday, August 2, 2018 1:00 PM
To: Baxley, Demi <Demi.Baxley@dep.state.fl.us>
Cc: Calkins, Tad <tad.calkins@brevardfl.gov>; Martin, Peter <Peter.Martin@brevardfl.gov>
Subject: RE: Request to Review FL State Park Unit Management Plan for Compliance w/Local Comprehensive Plan

Ms. Baxley,

Mr. Peter Martin can work with you on the request. Go ahead and send the St. Sebastian River Preserve State Park's management plan for our review. We will, of course, only review the portion of the park that lies within Brevard County. You will need to coordinate with Indian River County on the remainder within their jurisdiction.

What is the time frame that you are hoping to have the review conducted within? Without first seeing the plan, I'm not sure how long this effort will take.

Regards,

Erin Sterk
Planning & Zoning Manager
Brevard County
(321) 633-2070 ext. 52640

Begin forwarded message:

> **From:** "Baxley, Demi" <Demi.Baxley@dep.state.fl.us>
> **Date:** August 1, 2018 at 3:52:40 PM EDT
> **To:** "tad.calkins@brevardfl.gov" <tad.calkins@brevardfl.gov>
> **Subject: Request to Review FL State Park Unit Management Plan for Compliance w/Local Comprehensive Plan**
>
> Good Afternoon BREVARD COUNTY,

Brevard County Comprehensive Plan Compliance

The Florida Department of Environmental Protection, Division of Recreation and Parks, Office of Park Planning is responsible for the unit management planning of all Florida State Parks. As part of this planning process, prior to the unit management plan being presented to its Acquisition and Restoration Council for consideration, the Office of Park Planning is now required to connect and communicate with the area's agency that is responsible for the local comprehensive plan to determine if the park unit management plan is in compliance with the comprehensive plan. Specifically, we want to make sure we are accurately citing the future land use and zoning designations for the park, and would like to confirm that our proposed developments in the conceptual land use section comply with those designations. In addition, we would appreciate a review of the existing facilities section of the plan.

We would like to send **St. Sebastian River Preserve State Park's** unit management plan to you for this review. Please let me know who the point of contact is regarding this request, what the process is and what a possible turn-around time would be for your office to conduct a review.

Thank you, in advance, for your time, help and direction!

Demi P. Baxley
Government Operations Consultant
OFFICE OF PARK PLANNING
Division of Recreation and Parks
3800 Commonwealth Blvd., MS#525
Tallahassee, FL 32399
Demi.Baxley@floridadep.gov
Office: 850.245.3051
Direct: 850.245.3052
https://floridadep.gov/parks

Indian River County Comprehensice Plan Compliance

From: Steven Hitt
To: Allbritton, Joel
Cc: Baxley, Demi; Roland Deblois; Stan Boling
Subject: RE: Indian River Co. Fw: Request to Review FL State Park Unit Management Plan
Date: Thursday, August 30, 2018 3:58:09 PM
Attachments: image001.png
SSRPSP_AGDRAFT_052118_reduced.pdf

Good Afternoon Joel,

I have read through the conceptual land use section as requested as well as the majority of the remaining sections of the document and it appears to be consistent with the IRC comprehensive plan, future land use and zoning designations. For clarification the FLU designation is C-1, Conservation-1 (0 Units/Acre) and the Zoning designation is Con-1, Public lands conservation district. Also, one suggestion would be to consider adding the permitted C-1 conservation uses (e.g. Resource management, Conservation education, and Natural resource research) to the last sentence of paragraph 2 on page 115 for consistency with the preceding paragraph.

Thanks,
Steven Hitt
Senior Environmental Planner
1801 27th Street, Bldg. A
Vero Beach, FL 32960-3365
Phone: 772-226-1240

From: Allbritton, Joel [mailto:Joel.Allbritton@dep.state.fl.us]
Sent: Thursday, August 30, 2018 10:32 AM
To: Steven Hitt <shitt@ircgov.com>
Cc: Baxley, Demi <Demi.Baxley@dep.state.fl.us>
Subject: Indian River Co. Fw: Request to Review FL State Park Unit Management Plan

Good morning Steven,

I hope that this email finds you well! I just wanted to reach out to you and see how the review process for the Unit Management Plan for St. Sebastian River Preserve State Park was going. I have now been assigned this park and the plan in replacement of Sine Murray. Please let me know if you have any questions or need anything from me.

Thank you for your time and effort in reviewing this plan,

Joel Allbritton
Park Planner
Office of Park Planning
Division of Recreation and Parks
Florida Department of Environmental Protection
3900 Commonwealth Boulevard, MS 500
Tallahassee, FL 32399
Joel.Allbritton@dep.state.fl.us
Office: 850.245.3063

Indian River County Comprehensice Plan Compliance

From: Baxley, Demi
Sent: Thursday, August 2, 2018 10:08 AM
To: shitt@ircgov.com
Cc: Murray, Sine
Subject: Request to Review FL State Park Unit Management Plan

INDIAN RIVER COUNTY – St. Sebastian River Preserve State Park

Good Morning Steven– It was a pleasure speaking with you this morning. Thank you for allowing me to forward this information to you.

The Florida Department of Environmental Protection, Division of Recreation and Parks, Office of Park Planning is responsible for the unit management planning of all Florida State Parks. As part of this planning process, prior to the unit management plan being presented to its Acquisition and Restoration Council for consideration, the Office of Park Planning is now required to connect and communicate with the area's agency that is responsible for the local comprehensive plan to determine if the park unit management plan is in compliance with the comprehensive plan. Specifically, we want to make sure we are accurately citing the future land use and zoning designations for the park, and would like to confirm that our proposed developments in the conceptual land use section comply with those designations. Please feel free to review the existing facilities section as well.

We would like to have the attached **St. Sebastian River Preserve State Park's** unit management plan reviewed. Please let me know what we can expect regarding an approximate turn-around time for the review. If you need any clarification regarding the attached document or its contents, please contact Sine Murray at Sine.Murray@floridadep.gov or 850.245.3051. Ms. Murray, who has been copied with this communication, is the Planner assigned to handle this park's management planning and will be able to answer any questions regarding the plan. As Ms. Murray's assistant, I am also available to assist if you need any other information or have any questions.

Thank you for your time and help. Have a good rest of the day!

Demi P. Baxley
Government Operations Consultant
OFFICE OF PARK PLANNING
Division of Recreation and Parks
3800 Commonwealth Blvd., MS#525
Tallahassee, FL 32399
Demi.Baxley@floridadep.gov
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https://floridadep.gov/parks

Addendum 11—FWCC Gopher Tortoise Surveys and Population Evaluation

GOPHER TORTOISE (*GOPHERUS POLYPHEMUS*) SURVEYS AND POPULATION EVALUATIONS

FINAL REPORT

Lora L. Smith and Jennifer M. Howze
Joseph W. Jones Ecological Research Center
Contract #13161

To

Florida Fish and Wildlife Conservation Commission

24 June 2016

Abstract

We conducted pilot surveys for gopher tortoises at 35 Florida state conservation lands and used line transect distance sampling (LTDS) to estimate population size and density at 26 of these sites. Gopher tortoise populations at 19 sites clearly met the criteria for minimum viable populations [MVP; ≥250 adult tortoises (within 95% confidence intervals) and >0.40 tortoises/ha; Gopher Tortoise Council 2013] and occurred in high to medium quality habitat. Upper confidence intervals of estimates at four additional sites overlapped the MVP standards and these sites may also support minimum viable populations. Population estimates ranged from 66 (34-125 95% CI) at Joe Budd Wildlife Management Area to 8221 (6308-10,714 95% CI) tortoises at the Withlacoochee State Forest, Croom tract. We trained a total of 58 individuals from the Florida Fish and Wildlife Conservation Commission (FFWCC), Florida Park Service (FPS), Florida Forest Service (FFS), Florida Department of Environmental Protection, Florida Natural Areas Inventory, St. Johns River Water Management District, Hillsborough County, Polk County, and private consultants in LTDS methodology for gopher tortoises.

Introduction

The objective of this project was to provide gopher tortoise population estimates for 35 priority Florida state conservation lands using the standard survey methodology recommended in the Candidate Conservation Agreement for the Gopher Tortoise (2012). In the first phase of the project we conducted site assessments and pilot surveys (March-August 2014). In the second phase, we implemented LTDS on 26 of the sites (August 2014-April 2016). We initiated, but were unable to complete LTDS survey at Platt

Branch Wildlife Environmental Area because of flooding in burrows. We used a rapid assessment method to evaluate habitat structure at the sites during LTDS surveys and used this information, along with tortoise survey results, to rank the sites by habitat quality and to provide recommendations for management of the sites, where appropriate. We trained FFWCC, Florida Park Service, and other staff in LTDS methods for gopher tortoises through training workshops.

Methods

PHASE I- Site Assessments, Pilot Surveys, and Full Survey Designs.

We created ArcGIS (ESRI, Redlands, CA) shape files of potentially suitable gopher tortoise habitat for 35 Florida conservation lands using the following information provided by FFWCC: a potential habitat model, Florida cooperative land cover (CLC) data, and natural community data (Fig.1). We considered the following land cover types as potentially suitable for gopher tortoises: upland pine, sandhill, scrub, scrubby flatwoods, beach dune/coastal grassland, some mesic flatwoods, and pine plantations. Wetlands, rural lands, pasture, hardwood forest, wet flatwoods, and urban land cover types generally were not considered suitable habitat. Mesic flatwoods were excluded from the suitable habitat shape files when signs of inundation were present.

We visited each site to meet area staff, assess the accuracy of the potential habitat maps (hereafter referred to as sampling frames), and to conduct pilot surveys. Pilot surveys were used to determine the overall transect length required to derive a population estimate of a predetermined level of precision (Buckland et al. 1993). During pilot surveys, we sampled transects at points that were randomly distributed across the

sampling frame to capture variability in habitat quality and tortoise occurrence across each site. Transects were generally 200-500 m in length and were distributed across 10-15 random points for a minimum of 2000-3000 m of transect at each site. Additional transects were surveyed at sites with low tortoise densities or at very large sites.

Pilot surveys were conducted with three observers and burrows were searched with a burrow camera scope (Environmental Management Services, Canton, GA) to determine whether or not a tortoise was present (Smith et al. 2009, Stober and Smith 2010). The tortoise encounter rate (length of transect sampled per tortoise observed; L_o/n_o) for each site was calculated based on observations during pilot surveys and was used to estimate the total length of transect (L) needed to obtain a population estimate with a targeted coefficient of variation (< 20% CV). The formula used to calculate L was:

$$\mathbf{L = (b/cv(D)^2) \times (L_o/n_o)}$$

Where L_o is the total length of transects, and n_o is the number of tortoises encountered, D = density, and cv(D) is the desired cv for the density estimate. b is the dispersion parameter (b=3); Buckland et al. 1993.

Following pilot surveys we revised the sampling frames if needed and created survey designs for each site in Program Distance v. 6.2 (http://www.ruwpa.st-and.ac.uk/distance/). We used a systematic-random transect design, which generated evenly spaced parallel transects with a total length that targeted a 15 or 17% CV for each site. In the case of the Citrus and Croom tracts in Withlacoochee State Forest, we designed surveys using a systematic pseudo-circuit design in Program Distance to capture potential spatial variation in tortoise distribution across the very large sampling frames (17899 and 5164 ha, respectively). Because of low encounter rates, several sites (e.g.,

Joe Budd Wildlife Management Area, Watermelon Pond Wildlife Environmental Area) required repeated sampling with two sets of transects oriented perpendicular to one another (Stober and Smith 2010). We were unable to generate LTDS survey designs for sites where no tortoises were observed during pilot surveys: Blackwater River State Forest (Bone Creek, Horse Creek Sweetwater, and Yellow River units), Deer Lake State Park, Grayton Beach State Park, and St. Sebastian River State Park, SW tract. We recommend additional pilot surveys be conducted at these sites to verify low encounter rates.

***PHASE II- LTDS Sampling*:** Line transect distance sampling was initiated in August 2014 following completion of the pilot surveys. We used LTDS methods for gopher tortoises as outlined in the Gopher Tortoise Survey Handbook (Smith et al., 2009) and Stober and Smith (2010). We used three observers and all burrows were scoped using a burrow camera to determine occupancy. Data were collected using a Nomad 900B Hand Held Computer (Trimble Navigation, Ltd., Sunnyvale, CA) with a Hemisphere Crescent A101 smart GPS antenna (CSI Wireless, Calgary, Alberta), which had sub-meter accuracy and real-time data collection.

During surveys, the crew leader navigated the transect center line with the Nomad, which had an ArcPad™ (ESRI, Redland, CA) project containing CLC land cover data, the sample frame, and transects as well as shape files for data collection that included transect start and end points, burrow observations, habitat assessments and field notes. During field surveys, the primary responsibility of the person on the center-line was to navigate with the Nomad and detect all burrows on or close to the center-line; the second

and third observers thoroughly surveyed the area on each side of the centerline, taking care to observe all burrows between themselves and the centerline. GPS locations were taken at the start and endpoints of each transect, which allowed us to calculate the actual transect length surveyed and to correct for minor discrepancies in transect placement in the field. GPS locations were collected for any tortoises observed above ground and at the entrance of all burrows. Burrows were searched for tortoises with a camera equipped with a 6.4 cm diameter head for adult burrows and 2.5 cm diameter camera head for juvenile burrows (Environmental Management Systems, Canton, GA). We categorized each burrow as either: 1) scoped, tortoise observed; 2) scoped, no tortoise observed for entire length of burrow; or 3) scoped, unable to determine if occupied (e.g., burrow was flooded, washed in with sand, or an obstruction was present). Thus, we had a record of the burrow occupancy rate and the number of burrows for which occupancy could not be determined. To minimize risk of spreading pathogens, the burrow camera head and cables were disinfected using Clorox Disinfecting Wipes™ at the end of each day and between sites.

Burrow width was measured (to the nearest 1 cm) 50 cm inside the opening using burrow calipers. We measured straight-line carapace length of tortoises observed above ground and these data, along with the width of occupied tortoise burrows, were used to describe the demographic structure of the populations (adults versus juveniles; Alford, 1980). We also used burrow width and carapace length measurements as a covariate in one set of models to estimate population size because detection probability of burrows/tortoises decreases with size (Ballou, 2013). Distance sampling relies on the assumption that all objects on the transect are detected. However, because of the extreme

difficulty in detecting very small burrows (Ballou, 2013) abundance estimates derived with this survey method should be considered to underestimate juveniles in the populations.

We recorded vertebrate commensal species observed with the camera scope in the "burrow observation" shape file in the Nomad GPS/PDA. Other noteworthy species encountered above ground during surveys including rare vertebrate species, sick, or dead tortoises, were recorded in a "field notes" shape file on the Nomad GPS/PDA.

For the analyses, transect end points and burrow/tortoise observation shape files were downloaded from the Nomad into ArcGIS projects for each site. Transects were created by converting start and end points from a point shape file to a line in ArcGIS and perpendicular distances from the line to burrow openings or tortoises above ground were determined using the NEAR tool in ArcGIS. Final transect lengths, perpendicular distances to occupied burrows and tortoises above ground, and burrow width data for occupied burrows were uploaded into Program Distance ver. 6.2. We ran a series of models to estimate population size and density using both the conventional distance sampling engine (CDS) and the multiple covariate distance sampling engine (MCDS) in Program Distance (Buckland et al., 2001 and 2004). Burrow width was included as a covariate in the MCDS engine (Buckland et al., 2001; Marques et al., 2007). For Blackwater River SF West Boundary Unit, which had an extremely low tortoise density and burrow occupancy rate and Bullfrog Creek WMA, which had a similarly low occupancy rate, we ran CDS models in Distance with a cluster size analysis (Thomas et al. 2010). Cluster size analysis incorporated all "usable" tortoise burrows (occupied, unoccupied, and undetermined) into the models (Stober et al., in review). Usable burrows

(those with a clear opening, i.e., not heavily modified by an armadillo or collapsed) are the primary search objects in surveys and by including all usable burrows in the models, we increased the number of observations used to derive the detection function and encounter rate, thus potentially increasing the precision of our estimates. Occupied burrows were coded as a cluster size of 1, unoccupied burrows had a cluster size of 0, and burrows for which we could not determine occupancy were coded as a -1. An additional benefit of using cluster analysis is that the mean cluster size is used to estimate occupancy of undetermined burrows, thus adjusting for the potential bias associated with scoping (Stober et al. *In review*).

We ran both CDS and MCDS analysis engines for all sites, but report output of the analysis engine that produced estimates with the lowest coefficient of variation [D(CV)]. Within a candidate set of models we used Akaike's Information Criteria (AIC; Akaike, 1974) for model selection (Burnham and Anderson, 2010). When AIC values of two or more models were within <2 AIC units, we selected the model with the lowest coefficient of variation (D CV).

Habitat Assessments: We collected data on habitat structure at randomly selected points (generated in ArcGIS) along transects at each site during full LTDS surveys. Data collected at habitat points included: basal area measured with a 10 factor prism (Forestry Suppliers, Inc., Jackson, MS) held at a height of 4.5 ft and percent canopy cover measured with a concave spherical densiometer (Forestry Suppliers, Inc., Jackson, MS). We estimated percent cover of perennial woody vegetation 1-3 m in height within a 5 m radius of the point. We also categorized the major components of the overstory, midstory and ground cover and recorded the dominant ground cover type within a 1 m radius of the

point (Appendix 1). We summarized data for each of the three strata as the percent of all habitat points for each component. Digital photographs were taken in four cardinal directions at each habitat point. A more detailed description of the habitat assessment methods is included in Appendix 1.

Upon completion of full surveys, we categorized sites as high, medium, or low quality as described below:

1) **High quality**: Likely a viable population in suitable habitat. Site requires continued management, but no population manipulation/augmentation is necessary.
2) **Medium quality- viable:** Likely a viable population, but habitat needs management/restoration of natural vegetation. No population manipulation necessary.
3) **Medium quality- not viable**: Population likely not viable at current size and demographic conditions, but habitat is suitable without need of extensive restoration. Augmentation with translocated tortoises should be considered.
4) **Low quality**- Population likely not viable at current size or demographic conditions and habitat is in need of extensive restoration to support more tortoises. Site should be considered for future augmentation with translocated tortoises.

Results

PHASE I: Pilot survey results including tortoise encounter rates and projected full survey effort data for Florida state conservation lands are presented in Table 1. We created survey designs targeting a CV<20% at all sites where tortoises were observed on

pilot surveys. For large sites, e.g., Goethe State Forest, Lake Wales Ridge State Forest, Lake Wales Ridge Wildlife Environmental Area, St. Sebastian River State Park, and Withlacoochee State Forest, following pilot surveys, we were asked to design surveys for individual tracts of habitat separated by major roads or > 3 km. Because of the patchy distribution of tortoises and low overall encounter rate (2081 m/tortoise) at Blackwater River State Forest, we were asked to provide separate survey designs for individual management units. We did not observe tortoises on pilot surveys at the Sweetwater, Bone Creek, or Horse Creek Units of Blackwater River State Forest, and no pilot surveys were run at the Yellow Creek Unit. We did not observe tortoises at Deer Lake State Park or Grayton Beach State Park despite sampling 3075 m and 5080 m of pilot survey transects, respectively.

PHASE II: We completed LTDS at 26 Florida state conservation lands between August 2014 and February 2016 (Table 2). Population size and density estimates are presented in Table 3; output for all candidate models is included in Appendix 2. Little Talbot Island State Park had the highest population density (4.36 tortoises/ha, 95% CI= 3.80-5.00, CV= 0.07). The lowest density population occurred at Blackwater River State Forest West Boundary Unity (0.10 tortoises/ha, 95% CI= 0.06-0.18, CV= 0.31). Withlacoochee State Forest Croom tract had the largest population size of the sites surveyed (N= 8221 tortoises, 95% CI= 6308-10714, CV= 0.14). Nineteen sites clearly met the criteria for a minimum viable population (Gopher Tortoise Council 2013, Table 3). The upper confidence limits of four sites, Guana River Wildlife Management Area, Hilochee Wildlife Management Area, Lake Wales Ridge Wildlife Environmental Area, and Perry Oldenberg Wildlife Environmental Area, overlapped the density and/or population size of

a minimum viable population and may meet the standards, particularly with additional habitat management.

Burrow occupancy ranged from 20% at Blackwater River State Forest West Boundary Unit to 71% at Hilochee Wildlife Management Area (Table 4). Low burrow occupancy also was observed at Bullfrog Creek Wildlife Environmental Area (21%) and St. Sebastian River State Park- NE tract (24%); we were unable to confirm occupancy at 6.9 and 7.1% of burrows at the two sites, respectively, due to flooding. We were unable to complete full surveys at Platt Branch Wildlife Environmental Area due to flooding in burrows.

Burrow size class histograms indicated a predominance of adult burrows (>23 cm in width) detected in most populations (Figure 2a-y). However, juvenile tortoises (<23 cm burrow width) were observed at all sites except for Joe Budd Wildlife Management Area and Hilochee Wildlife Management Area. Perry Oldenberg Wildlife Environmental Area had very low numbers of juvenile tortoises (3.8% of occupied burrows were ≤23 cm in width). The majority (57%, 8 of 14) of occupied burrows at Blackwater River State Forest West Boundary Unit were between 12 and 23 cm in width.

Habitat assessments revealed that basal area (BA) ranged from as low as 4 ft^2/ac at Lake Wales Ridge Wildlife Environmental Area- Silver Lake tract to as high as 91.1 ft^2/ac at Joe Budd Wildlife Management Area (Table 5). Canopy cover was lowest at Guana River Wildlife Management Area (8%) and highest at Joe Budd Wildlife Management Area (71.8%). Preliminary population evaluations and habitat suitability rankings are presented in Table 6. Based on estimates of population size, density, demographic structure and habitat characteristics, the following sites could be

categorized as of high quality (Ranking 1): Bell Ridge Wildlife Environmental Area, Bullfrog Creek Wildlife Environmental Area, Cayo Costa State Park, Etoniah Creek State Forest, Ft. White Wildlife Environmental Area, Gold Head Branch State Park, Ichetucknee Springs State Park, Little Talbot Island State Park, Moody Branch Wildlife Environmental Area, St. Sebastian River State Park (NE tract), and Withlacoochee State Forest- Citrus and Croom tracts.

An unusually large number of tortoise shells and shell fragments were found during surveys at Lake Louisa State Park the week of 17 August 2015. All shells/shell fragment locations (N= 38) were recorded as field notes in the GPS. Intact shells were from adult tortoises (25-32 cm). Florida Fish and Wildlife Conservation Commission and Florida Park Service staff were notified and followed up with additional surveys the week of August 24th.

Amphibians, reptiles, and mammal species observed in burrows and other noteworthy observations of vertebrate species observed during surveys are listed in Tables 7 and 8. An eastern indigo snake (*Drymarchon corais*) was observed during the pilot survey at Beker State Park. Gopher frogs (*Lithobates capito*) were observed in tortoise burrows at 16 sites and were particularly abundant at Ft. White Wildlife Environmental Area (n = 80), Etoniah Creek State Forest (63), Gold Head Branch State Park (n = 55), Watermelon Pond Wildlife Environmental Area (n = 78), Jonathan Dickinson State Park (n = 23), and St. Sebastian River State Park (NE) (n = 19). Eastern diamond-back rattlesnakes (*Crotalus adamanteus*) were observed at 10 sites: Blackwater River State Forest West Boundary Unit, Bullfrog Creek Wildlife Environmental Area, EB Wakulla Springs State Park, Guana River WMA, Joe Budd Wildlife Management Area, Jonathan Dickinson

State Park, Little Talbot Island State Park, O'Leno SP/River Rise Preserve State Park, Watermelon Pond Wildlife Environmental Area, and Wingate Creek State Park. Florida pine snakes (*Pituophis melanoleucus*) were observed at four sites: Blackwater River State Forest West Boundary Unit, Jonathan Dickinson State Park, Lake Louisa State Park and St. Sebastian River State Park (NE tract).

Three training workshops on the LTDS method for gopher tortoises were completed, the first took place at Goldhead Branch State Park (June 2014), the second was held at Withlacoochee State Forest (May 2015), and the third and final workshop took place on 3-5 May 2016 at Archbold Biological Station in Lake Placid, Florida. Florida. Workshop participants included 58 individuals from the Florida Fish and Wildlife Conservation Commission, Florida Park Service, Florida Forest Service, Florida Department of Environmental Protection, Florida Natural Areas Inventory, St. Johns River Water Management District, Hillsborough County, Polk County, and private consultants. The roster of participants in the May 2016 workshop is included in Appendix 3.

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Literature Cited

Akaike, H. 1974. A new look at the statistical model identification. IEEE Transactions on Automatic Control 19(6):716–723.

Anonymous. 2008. Candidate Conservation Agreement for the Gopher Tortoise (*Gopherus polyphemus*): Eastern populations. Revised 2012.

Alford, R.A. 1980. Population structure of *Gopherus polyphemus* in northern Florida. Journal of Herpetology 14:177-182.

Ballou, A.R. 2013. Aspects of gopher tortoise (*Gopherus polyphemus*) populations in Georgia: status, landscape predictors, juvenile movements and burrow use. Master of Science, University of Georgia, Athens, Georgia.

Buckland, S.T., D.R. Anderson, K.P. Burnham, and J.L. Laake, 1993. Distance Sampling: estimating abundance of biological populations. Chapman & Hall. New York.

Buckland, S.T., D.R. Anderson, K.P. Burnham, J.L. Laake, D.L. Borchers, and L. Thomas. 2001. Introduction to Distance sampling: estimating abundance of biological populations. Oxford University Press, Great Britain. 432 pp.

Buckland, S.T., D.R. Anderson, K.P. Burnham, J.L. Laake, D.L. Borchers, and L. Thomas. 2004. Advanced Distance Sampling: estimating abundance of biological populations. Oxford University Press, Great Britain. 416 pp.

Burnham, K.P., and D.R. Anderson. 2010. Model Selection and Multimodel Inference. Springer Verlag, New York. 488 pp.

Gates, C. A., M. J. Allen, J. E. Diemer Berish, D. M. Stillwaugh, Jr., and S.R. Shattler. 2002. Characterization of a gopher tortoise mortality event in west-central Florida. Florida Scientist 65:185–197.

Gopher Tortoise Council. 2013. Gopher Tortoise Minimum Viable Population and Minimum Reserve Size, Working Group Report. 7 pp.

Marques, T.A., L. Thomas, S.G. Fancy, and S.T. Buckland. 2007. Improving estimates of bird density using multiple-covariate distance sampling. The Auk 124(4):1229-1243.

Smith, L.L., J.M. Stober, H.E. Balbach, and W.D. Meyer. 2009. Gopher Tortoise Survey Handbook. Final report to US Army Corps of Engineers, Engineer Research and Development Center, Construction Engineering Research Laboratory. Report # ERDC/CERL TR-09-7.

Stober, J.M., and L.L. Smith. 2010. Estimating abundance of small gopher tortoise populations: Total counts versus line transect distance sampling. Journal of Wildlife Management 74:1595-1600.

Stober, J.M., R.P. Gonzalez, L.L. Smith, T.A. Marques, and L. Thomas. Techniques for estimating low density gopher tortoise populations. Journal of Wildlife Management. *In review*.

Thomas, L., Buckland, S.T., Rexstad, E.A., Laake, J.L., Strindberg, S., Hedley, S.L., Bishop, J.R., Marques, T.A. and Burnham, K.P., 2010. Distance software: design and analysis of distance sampling surveys for estimating population size. Journal of Applied Ecology 47:5-14.

Table 1. Gopher tortoise pilot survey results for Florida state conservation lands (March –August 2014). Full surveys were conducted at sites in bold.

	Final Sampling Frame	No. Transects	Tortoises Observed	Total Length (m)	Encounter Rate	Estimated Transect Length (km)			Comments
Site	**(ha)**		n_o	L_o	L_o/n_o	**L for 15% CV**	**L for 17% CV**	**L for 20% CV**	
ADB Catfish Creek Preserve SP	998	13	1	2580	2580	344.0	267.8	193.5	
Beker SP	138	4	3	1950	650	86.7	67.5	48.8	Repeated survey design necessary
Bell Ridge WEA	292	10	30	2000	67	8.9	6.9	5.0	
Blackwater River SF:									
Coldwater Unit	3542.7	4	1	1700	1700	226.7	176.5	127.5	
Sweetwater Unit	8660.2	2	0	1000	--	--	--	--	No survey design
Bone Creek Unit	3782.5	3	0	1170	--	--	--	--	No survey design
Rock Creek Unit	7772.0	3	1	1500	1500	200.0	155.7	112.5	
Horse Creek Unit	1964	1	0	500	--	--	--	--	No survey design
West Boundary Unit	2826.5	5	2	1900	950	126.7	98.6	71.3	
Floridale Unit	6399.9	5	2	2500	1250	166.7	129.8	93.8	
Juniper Creek (+ state park) Unit	5799.6	12	5	5185	1037	138.3	107.6	77.8	
Yellow River Unit	90.4	0	0	--	--	--	--	--	No pilot surveys done in this unit
Blackwater River SP	53	3	4	900	225	30.0	23.4	16.9	Design included in Juniper Creek Unit
Bullfrog Creek WEA	185.1	5	6	2500	417	55.6	43.3	31.3	
Cayo Costa SP	163.5	6	9	2400	267	35.6	27.7	20.0	
Deer Lake SP	223.7	16	0	3075	--	--	--	--	Additional pilot surveys needed

	Final Sampling Frame	No. Transects	Tortoises Observed	Total Length (m)	Encounter Rate	Estimated Transect Length (km) Comments			Comments
Site	**(ha)**		n_o	L_o	L_o/n_o	**L for 15% CV**	**L for 17% CV**	**L for 20% CV**	
E.B. Wakulla Springs SP	449.9	11	4	2210	553	73.7	57.4	41.4	
Etoniah Creek SF	1496.1	15	4	2900	725	96.7	75.3	54.4	
Ft. White WEA	327.9	10	11	2000	182	24.2	18.9	13.6	
Goethe SF:									
Watermelon Pond-1 (N 24)	877	2	2	400	200	26.7	20.8	15.0	
Watermelon Pond-2 (S 24)	546	3	0	600	--	--	--	--	No pilot surveys done in this unit
Levy County- Main tract	1912	12	8	2100	262.5	35.0	27.2	19.7	
Goldhead Branch SP	754.8	13	13	2600	200	26.7	20.8	15.0	
Grayton Beach SP	368.1	29	0	5080	--	--	--	--	No survey design
Guana River WMA	381.2	15	3	2585	862	114.9	89.4	64.6	
Hilochee WMA (non-Osprey unit)	526.5	10	14	3450	246	32.9	25.6	18.5	
Ichetucknee Springs SP	319.8	14	37	2800	76	10.1	7.9	5.7	
Joe Budd WMA	258.2	6	8	1100	138	18.3	14.3	10.3	Repeated survey design necessary
Jonathan Dickinson SP	1130.7	14	8	6470	809	107.8	84.0	60.7	
Lake Louisa SP	750.1	9	8	3600	450	60.0	46.7	33.8	
Lake Talquin SF	2273.5	17	2	3370	1685	224.7	174.9	126.4	

Site	Final Sampling Frame (ha)	No. Transects	Tortoises Observed n_o	Total Length (m) L_o	Encounter Rate L_o/n_o	Estimated Transect Length (km) Comments L for 15% CV	L for 17% CV	L for 20% CV	Comments
Lake Wales Ridge WEA:									
Carter Creek Tract	784.8	3	3	600	200	26.7	20.8	15.0	
Clements Tract	No data	2	1	900	900	120.0	93.4	67.5	Too fragmented to delineate sample frame
Lake Placid Scrub & McJunkin Tract	810	6	1	2100	2100	280.0	218.0	157.5	Too fragmented to delineate sample frame
Royce Tract	319	2	1	700	700	93.3	72.7	52.5	Too fragmented to delineate sample frame
Silver Lake Tract	143	2	3	700	233.3	31.1	24.2	17.5	
Lake Wales Ridge SF:									
Arbuckle Tract	986	9	3	3880	1293.3	172.4	134.3	97.0	
Babson Tract	132.2	2	3	1000	333.3	44.4	34.6	25.0	Repeated survey necessary
Boy Scout Tract	65.8	2	2	400	200	26.7	20.8	15.0	Repeated survey necessary
Walk-in-Water Tract	300.6	5	8	1300	162.5	21.7	16.9	12.2	
Little Talbot Island SP	173	12	10	2400	240	32.0	24.9	18.0	
Moody Branch WEA	181.5	4	8	2000	250	33.3	26.0	18.8	
O'Leno/River Rise SP	464.2	23	28	4380	156	20.9	16.2	11.7	
Perry Oldenburg WEA	134.8	4	12	2000	167	22.2	17.3	12.5	

	Final Sampling Frame	No. Transects	Tortoises Observed	Total Length (m)	Encounter Rate	Estimated Transect Length (km) Comments			Comments
Site	**(ha)**		n_o	L_o	L_o/n_o	**L for 15% CV**	**L for 17% CV**	**L for 20% CV**	
Platt Branch WEA	308.5	9	17	3300	194	25.9	20.2	14.6	
Point Washington SF	1785.2	13	1	4300	4300	573.3	446.4	322.5	Repeated survey design necessary
Pumpkin Hill Preserve SP	646.4	16	2	2900	1450	193.3	150.5	108.8	Repeated survey design necessary
Split Oak Forest WEA	194.7	9	2	4500	2250	300.0	233.6	168.8	20%CV design
St. Sebastian River SP:									
NE Tract	1140	4	9	2500	277.8	83.3	37.0	28.8	
SE Tract	1447	4	1	2000	2000.0	266.67	207.61	150.00	
NW Tract	1088	3	1	1500	1500.0	200.0	155.7	112.5	
SW Tract	1273	6	0	2940	--	--	--	--	More pilot surveys needed
Watermelon Pond WEA	133.4	12	7	2400	343	45.7	35.6	25.7	Repeated survey design necessary
Wingate Creek SP	152.2	3	6	1500	250	33.3	26.0	18.8	
Withlacoochee SF:									
Headquarters Tract	350	1	3	200	66.7	8.9	6.9	5.0	Additional pilot surveys needed
Citrus Tract	17899	13	13	4400	338.5	45.1	35.1	25.4	
Croom Tract	5164.4	8	6	1600	266.7	35.6	27.7	20.0	Habitat east of Croom- Nobleton Rd. not included
Two-mile Prairie Tract	758	3	7	1500	214.3	28.6	22.2	16.1	
Richloam Tract	No data	--	--	--	--	--	--	--	Too wet to sample

Table 2. Status of line transect distance sampling (LTDS) surveys at priority Florida state conservation lands as of June 2016.

	Site	Final Sampling Frame (ha)	Date of completion of Full survey
1	Bell Ridge Wildlife Environmental Area	292.0	8/29/14
2	Blackwater River State Forest, West Boundary Unit	2826.5	2/12/16
3	Bullfrog Creek Wildlife Environmental Area	185.1	1/12/16
4	Cayo Costa State Park	163.5	5/8/15
5	Edward Ball Wakulla Springs State Park	449.9	5/19/15
6	Etoniah Creek State Forest	1496.1	11/6/15
7	Ft. White Wildlife Environmental Area	327.9	9/10/14
8	Goethe SF Levy County, Main tract	1912.0	12/31/14
9	Goldhead Branch State Park	754.8	10/2/14
10	Guana River Wildlife Management Area	381.2	5/12/15
11	Hilochee Wildlife Management Area (non-Osprey unit)	526.5	6/23/15
12	Ichetucknee Springs State Park	319.8	9/22/14
13	Joe Budd Wildlife Management Area	258.2	11/21/14
14	Jonathan Dickinson State Park	1130.7	8/13/15
15	Lake Louisa State Park	750.1	8/28/15
16	Lake Wales Ridge Wildlife Environmental Area, Carter Creek	784.8	6/9/15
17	Lake Wales Ridge Wildlife Environmental Are, Silver Lake	143.0	3/27/15
18	Little Talbot Island State Park	173.0	11/14/14
19	Moody Branch Wildlife Environmental Area	181.5	4/23/15
20	O'Leno/River Rise State Park	464.2	12/15/14
21	Perry Oldenburg Wildlife Environmental Area	134.8	2/25/15
22	St. Sebastian River State Park, NE tract	1140.0	7/17/15
23	Watermelon Pond Wildlife Environmental Area	133.4	12/5/14
24	Wingate Creek State Park	152.2	7/29/15
25	Withlacoochee State Forest, Citrus tract	17,899.0	4/24/15
26	Withlacoochee State Forest, Croom tract	5164.4	4/7/16
	Total area surveyed	**38,144.6**	

Table 3. Summary of line transect distance sampling (LTDS) results for gopher tortoise populations on state conservation lands in Florida, August 2014 – April 2016. Analyses were run using Distance software v 6.2 (Buckland et al. 2001). Best fitted models were selected using Akaike's Information Criteria (AIC; Akaike 1974) and consideration of the coefficient of variation (D CV) and detection probability (P). # obs= number of tortoises in burrows or above ground and observed from transects, Effort= total length of transect surveyed, D= Density (tortoises/hectare), N= abundance, LCL= lower confidence limit for D and N, UCL= upper confidence limit for density and abundance estimate. Output for all models is presented in Appendix I. *Cluster analysis was used; number of tortoise burrows observed is indicated parenthetically. †Site meets criteria for a minimum viable population (MVP) based on estimates of density (>0.4 tortoises/ha) and population size (N>250 adult tortoises) (Gopher Tortoise Council 2013). §Sites have D UCL and/or N UCL overlapping MVP thresholds.

Site	Model	# obs	Effort (m)	AIC	D	D LCL	D UCL	D CV	N	N LCL	N UCL	P
Bell Ridge WEA†	HN 5%	118	9516.1	729.499	**4.101**	2.578	6.523	0.182	**1197**	753	1905	0.626
Blackwater River SF West Boundary Unit*	UN cos 5%	14(67)	82516.2	332.52	**0.100**	0.055	0.182	0.308	**284**	156	514	0.577
Bullfrog Creek WEA*†	UN simp 5%	73(323)	21033.5	1529.91	**2.042**	1.584	2.633	0.130	**378**	293	487	0.683
Cayo Costa SP†	HR cos 5%	107	20597.0	637.185	**2.095**	1.597	2.750	0.139	**343**	261	450	0.592
E.B. Wakulla Spring SP	UN 5%	28	50914.9	158.250	**0.163**	0.101	0.264	0.247	**73**	45	119	1.000
Etoniah Creek SF†	HN 5%	127	50591.4	751.134	**1.028**	0.733	1.442	0.173	**1538**	1096	2157	0.521
Ft. White WEA†	HN 5%	142	18444.9	840.957	**2.969**	2.361	3.734	0.116	**974**	774	1224	0.587
Goethe SF Levy Co. Main Tract†	UN cos 5%	99	23393.7	670.292	**1.067**	0.721	1.579	0.198	**2039**	1378	3017	0.607
Goldhead Branch SP†	HN 5%	88	19907.1	565.391	**1.116**	0.783	1.591	0.176	**843**	591	1201	0.769
Guana River§	HN 5%	52	53557.9	261.816	**0.575**	0.403	0.822	0.183	**219**	154	313	0.617
Hilochee WMA§	HN 5%	27	22829.8	182.456	**0.333**	0.191	0.581	0.285	**176**	101	306	0.474
Ichetucknee Springs SP†	HN 5%	121	13561.7	665.481	**3.970**	3.008	5.240	0.138	**1269**	962	1675	0.658
Joe Budd WMA	UN 5%	28	27478.2	167.930	**0.254**	0.133	0.486	0.336	**66**	34	125	1.000
Jonathan Dickinson SP†	HR 5%	141	60288.2	855.485	**0.769**	0.580	1.021	0.144	**870**	656	1154	0.553
Lake Louisa SP†	UN 5%	226	42393.6	1342.853	**2.168**	1.580	2.975	0.161	**1626**	1185	2232	0.497
Lake Wales Ridge WEA Carter Crk§	UN 5%	13	9685.2	80.032	**0.309**	0.173	0.551	0.294	**243**	136	433	1.000
Lake Wales Ridge WEA Silver Lake†	HR 5%	38	21614.6	163.210	**2.068**	1.314	3.255	0.231	**296**	188	465	0.380
Little Talbot Island SP†	HR 5%	301	22252.7	1844.606	**4.356**	3.796	4.999	0.070	**754**	657	865	0.654
Moody Branch WEA†	HN 5%	104	23906.8	517.640	**2.636**	2.030	3.422	0.132	**478**	369	621	0.620
O'Leno River Rise SP†	HN 5%	190	21486.9	1308.974	**2.178**	1.603	2.960	0.155	**1011**	744	1374	0.546
Perry Oldenberg WEA§	HN 5%	75	17370.3	466.449	**1.579**	1.173	2.127	0.149	**213**	158	287	0.469
St. Sebastian River SP NE†	HN 5%	64	33284.0	362.806	**0.857**	0.564	1.301	0.213	**977**	644	1483	0.588
Watermelon Pond WEA†	HN 5%	173	36421.1	1090.596	**1.378**	1.118	1.697	0.106	**184**	149	226	0.706
Wingate Creek SP†	HN 5%	89	21955.9	477.390	**1.994**	1.537	2.586	0.132	**303**	234	394	0.648
Withlacoochee SF- Citrus Tract†	HN 5%	51	29667.6	350.785	**0.401**	0.268	0.601	0.205	**7179**	4789	10761	0.654
Withlacoochee SF- Croom Tract†	HN 5%	125	35083.7	720.950	**1.592**	1.221	2.075	0.135	**8221**	6308	10714	0.498

Table 4. Burrow scoping results during line transect distance sampling surveys (LTDS) at gopher tortoise populations on state conservation lands in Florida, August 2014 – April 2016. Counts do not include collapsed burrows or tortoises observed above ground.

Site	Burrows scoped	Tortoises in burrows	% occupied	No. unknown occupancy	% unknown occupancy
Bell Ridge Wildlife Environmental Area	358	124	35	11	3.1
Blackwater River State Forest West Boundary Unit	70	14	20	1	1.4
Bullfrog Creek Wildlife Environmental Area	340	73	21	24	7.1
Cayo Costa State Park	392	113	29	5	1.3
Edward Ball Wakulla Springs State Park	89	28	31	6	6.7
Etoniah Creek State Forest	368	134	36	18	4.9
Ft. White Wildlife Environmental Area	79	53	67	0	0.0
Goethe State Forest - Levy Co. Main Tract	236	104	44	9	3.8
Goldhead Branch State Park	61	38	62	0	0.0
Guana River Wildlife Management Area	81	55	68	5	6.2
Hilochee Wildlife Management Area	45	32	71	3	6.7
Ichetucknee Springs State Park	291	129	44	2	0.7
Joe Budd Wildlife Management Area	49	17	35	2	4.1
Jonathan Dickinson State Park	367	146	40	10	2.7
Lake Louisa State Park	509	240	47	13	2.6
Lake Wales Ridge Wildlife Environmental Area - Carter Creek Tract	35	13	37	2	5.7
Lake Wales Ridge Wildlife Environmental Area - Silver Lake Tract	98	39	40	3	3.1
Little Talbot Island State Park	502	345	69	7	1.4
Moody Branch Wildlife Environmental Area	275	108	39	11	4.0
Oleno River Rise State Park	354	198	56	9	2.5
Perry Oldenberg Wildlife Environmental Area	120	80	67	3	2.5
St. Sebastian River State Park, NE tract	277	66	24	19	6.9
Watermelon Pond Wildlife Environmental Area	145	76	52	5	3.4
Wingate Creek State Park	331	93	28	6	1.8
Withlacoochee State Forest - Citrus Tract	117	56	48	2	1.7
Withlacoochee State Forest- Croom Tract	268	132	49	2	0.7
Total	**5857**	**2506**			

Table 5. Habitat data for 26 state conservation lands in Florida collected in conjunction with line transect distance surveys (LTDS) for gopher tortoises, August 2014- April 2016.

	Bell Ridge WEA	Blackwater River SF West Boundary Unit	Bullfrog Creek WEA	Cayo Costa SP	EB Wakulla Springs SP
# of Habitat points	5	33	18	48	17
Mean basal area (ft2/ac)	22	44	25	69	63
Canopy cover (%)	33	58	40	13	47
Overstory composition (% of all habitat points)					
pine	60	61	61	0	59
oak	40	0	6	0	6
mixed	0	33	22	0	29
other	0	0	0	6	0
none	0	6	11	94	6
Midstory (%)	19	28	28	23	30
Midstory composition (% of all habitat points)					
pine	0	12	0	0	18
oak	100	21	11	0	18
shrubs	0	30	0	44	24
palmetto	0	0	78	29	0
mixed	0	21	0	2	35
other	0	15	0	4	0
none	0	0	11	21	6
Ground cover composition (% of all habitat points)					
bare ground	0	0	0	58	6
litter	0	33	17	8	71
grass	60	33	44	8	0
woody	0	0	17	4	0
vines	0	0	0	0	0
mixed	40	33	22	21	24

	Etoniah Creek SF	Ft. White WEA	Goethe SF	Goldhead Branch SP	Guana River WMA
# of Habitat points	36	19	28	10	24
Mean basal area (ft2/ac)	51	40	51	47	5
Canopy cover (%)	57	56	57	51	8.0
Overstory composition (% of all habitat points)					
pine	44	63	71	20	4
oak	8	16	7	40	0
mixed	25	16	18	40	0
other	0	0	0	0	0
none	22	5	4	0	96
Midstory (%)	30	26	63	47	22
Midstory composition (% of all habitat points)					
pine	0	0	0	0	0
oak	19	47	25	80	0
shrubs	25	11	0	10	50
palmetto	8	11	4	0	0
mixed	42	26	71	10	8
other	3	5	0	0	8
none	3	0	0	0	33
Ground cover composition (% of all habitat points)					
bare ground	6	16	4	10	8
litter	61	42	75	30	13
grass	14	11	4	10	17
woody	3	0	0	0	17
vines	0	0	0	0	0
mixed	17	32	18	50	46

	Hilochee WMA	Ichetucknee Springs SP	Joe Budd WMA	Jonathan Dickinson SP	Lake Louisa SP
# of Habitat points	34	17	14	47	33
Mean basal area (ft2/ac)	41	41	91	17	25
Canopy cover (%)	31.0	49	72	15	22
Overstory composition (% of all habitat points)					
pine	21	24	64	9	18
oak	3	29	0	0	6
mixed	0	47	36	0	0
other	3	0	0	0	0
none	74	0	0	91	76
Midstory (%)	32	33	34	26	14
Midstory composition (% of all habitat points)					
pine	0	6	0	2	9
oak	0	29	14	2	0
shrubs	41	6	7	51	30
palmetto	21	0	7	19	0
mixed	15	47	64	4	12
other	6	6	0	0	15
none	18	6	7	21	33
Ground cover composition (% of all habitat points)					
bare ground	6	0	0	26	6
litter	35	24	50	21	15
grass	35	53	7	26	39
woody	9	0	0	2	0
vines	0	0	0	0	6
mixed	15	24	43	26	33

	Lake Wales Ridge WEA Carter Creek Tract	Lake Wales Ridge WEA-Silver Lake Tract	Little Talbot Island SP	Moody Branch WEA	O'Leno River Rise SP
# of Habitat points	13	36	84	32	36
Mean basal area (ft2/ac)	6	4	17	8	84
Canopy cover (%)	24	10	22	14	69
Overstory composition (% of all habitat points)					
pine	0	3	1	0	28
oak	8	0	0	6	11
mixed	0	0	19	0	61
other	0	6	24	0	0
none	92	92	56	94	0
Midstory (%)	51	24	30	26	42
Midstory composition (% of all habitat points)					
pine	0	0	0	3	3
oak	0	8	0	0	8
shrubs	77	50	21	44	3
palmetto	0	8	1	19	8
mixed	15	6	48	13	53
other	0	6	11	3	14
none	8	22	19	19	11
Ground cover composition (% of all habitat points)					
bare ground	15	25	42	25	8
litter	54	50	23	44	64
grass	0	11	11	3	17
woody	0	0	0	3	0
vines	0	0	1	0	0
mixed	31	14	24	25	14

	Perry Oldenberg WEA	St. Sebastian SP NE	Watermelon Pond WEA	Wingate Creek SP	Withlacoochee SF Citrus Tract
# of Habitat points	21	14	71	27	24
Mean basal area (ft2/ac)	69	44	41	33	66
Canopy cover (%)	61	22	47	36	56
Overstory composition (% of all habitat points)					
pine	19	21	21	11	42
oak	29	0	37	19	25
mixed	14	0	30	0	4
other	5	0	1	0	0
none	33	79	11	70	29
Midstory (%)	25	15	32	36	15
Midstory composition (% of all habitat points)					
pine	0	14	0	0	4
oak	5	0	61	11	38
shrubs	29	0	0	15	8
palmetto	0	43	0	22	4
mixed	14	0	28	41	8
other	29	0	1	0	0
none	24	43	10	11	38
Ground cover composition (% of all habitat points)					
bare ground	10	0	11	19	13
litter	71	21	59	56	42
grass	14	36	7	11	13
woody	0	0	0	0	0
vines	0	0	0	0	0
mixed	5	43	22	15	33

	Withlacoochee SF Croom Tract
# of Habitat points	40
Mean basal area (ft2/ac)	65
Canopy cover (%)	80
Overstory composition (% of all habitat points)	
pine	30
oak	12
mixed	58
other	0
none	0
Midstory (%)	17
Midstory composition (% of all habitat points)	
pine	0
oak	65
shrubs	10
palmetto	5
mixed	5
other	2
none	12
Ground cover composition (% of all habitat points)	
bare ground	10
litter	68
grass	15
woody	2
vines	0
mixed	5

Table 6. Population evaluation and habitat suitability rankings for gopher tortoise surveys sites in Florida August 2014-April 2016. (1) High quality: Likely a viable population in suitable habitat. Site requires continued management, but no population manipulation/augmentation is necessary; (2) Medium quality- viable: Likely a viable population, but habitat needs management/restoration of natural vegetation. No population manipulation necessary; (3) Medium quality- not viable: Population likely not viable at current size and demographic conditions, but habitat is suitable without need for extensive restoration. Augmentation with translocated tortoises should be considered; (4) Low quality: Population likely not viable at current size or demographic conditions and habitat is in need of extensive restoration to support more tortoises. Site should be considered for future augmentation with translocated tortoises. †Meets MVP criteria (Gopher Tortoise Council 2013). §Sites have D UCL and/or N UCL overlapping MVP thresholds.

Site	Ranking	Comments
Bell Ridge WEA†	1	Open canopy pine habitat with native ground cover dominated by grasses; habitat condition is excellent (Fig. 3a).
Blackwater River SF- West Boundary Unit	3	The low density (0.1 tortoises/ha) and high proportion of subadult tortoises (57%) suggests slow recovery from loss of adults in the population from harvest or another unidentified source of mortality. Habitat includes some open canopy pine with herbaceous understory but few tortoises. Despite the apparently suitable vegetation structure in some areas, soils in some areas may be inappropriate for tortoises. The northwestern and southwestern portions of the unit have a dense midstory. Habitat could be improved in these parcels with increased frequency of prescribed fire.
Bullfrog Creek WEA†	1	Open canopy mesic flatwoods with ground cover dominated by saw palmetto and grasses provide highly suitable tortoise habitat.
Cayo Costa SP†	1	Cabbage palm savanna with patchy shrub cover including sea grapes and abundant grasses. Likely a viable population and juvenile size class burrows were detected.
Edward Ball Wakulla Springs SP	4	Much of the habitat (upland pine and mixed hardwood coniferous land cover) is unsuitable for tortoises in its current condition (Fig. 3b). The habitat will require restoration to reduce the canopy and midstory cover to support a viable population. Additionally, extant tortoises are concentrated in three disparate areas in the park and it is unlikely they can move among these habitat patches.
Etoniah Creek SF†	1	The sandhill habitat is in good condition with an open canopy, and supports a large tortoise population with evidence of recruitment. Tortoise densities are lower in the unburned scrub and mesic pine flatwoods, particularly in the Manning tract.
Ft. White WEA†	1	Open canopy pine habitat with patches of native ground cover dominated by grasses. Habitat is in excellent condition.
Goethe SF Levy Co. Main Tract†		Northeastern parcels within tract contain highly suitable open canopy pine habitat and ground cover dominated by grasses. Parcels in the south and western portion of

	1-2	the site occur on less well-drained soils with greater midstory shrub cover.
Gold Head Branch SP †	1	Open canopy pine habitat with patches of native ground cover dominated by grasses. Habitat is in excellent condition.
Guana River WMA§	3	Observations of tortoises were largely confined to the scrub habitat because the mesic flatwoods are too wet to support tortoises. Increased frequency of prescribed fire or mechanical reduction of scrub canopy would improve habitat for tortoises. The tortoise density at the site (0.575 tortoises/ha) meets the criteria for a minimum viable population, and although the population estimate of 219 tortoises the 95% CI overlapped 250 so this population may be viable. We also saw evidence of recruitment in this population.
Hilochee WMA§	3	Survey area includes thinned pine plantations and mesic flatwoods. Most tortoises were observed in pine plantations, likely as a result of the more appropriate (well drained) soils, herbaceous cover and an open canopy. Continued management with prescribed fire is needed to maintain the habitat. The adult-biased burrow size class distribution suggests recruitment may be low.
Ichetucknee Springs SP†	1	Open canopy pine habitat with patches of native ground cover dominated by grasses. Isolated parcels to the north contain greater midstory hardwood cover.
Joe Budd WMA	3	Habitat varies from open canopy with dense herbaceous ground cover to more closed canopy pine stands with an understory of woody forbs and vines. Portions of the site on more well drained soil types could likely support more tortoises. The population is skewed toward adults (Figure 1m). Given the overall low tortoise density and lack of juveniles this population might benefit from augmentation.
Jonathan Dickinson SP†	1-2	The site is actively managed with prescribed fire, which is reflected in the low basal area (17 ft^2/ac) and abundance of grasses and other herbaceous plants in the understory. While this site supports a large population of tortoises, the overall density is relatively low (0.77 tortoises/ha). Tortoises are clustered in the scrub habitat in the east and the mesic flatwoods in the southwestern part of the Park (Figure 2). These two populations are separated by natural features including distance (5 km), unsuitable habitat (i.e. wetlands and a river) and the railroad tracks.
Lake Louisa SP†	2	Site supports a large, high density tortoise population. However, much of the habitat is in old field with some areas in planted pine and the site would benefit from restoration of native vegetation. A large number of tortoise carcasses were observed during the survey; cause of mortality could not be determined based in remains, which were in various decay states.
Lake Wales Ridge WEA- Carter Creek Tract§		The scrub and scrubby flatwoods habitat will require more frequent prescribed fire to create openings for gopher tortoises to burrow. Very few tortoises were detected

	3	on transects in the interior of the survey area; however, additional tortoises were observed along roadsides and were not represented in the survey. Low density suggests this population may not reach MVP standards, but the upper confidence intervals overlap the MVP standards.
Lake Wales Ridge WEA- Silver Lake Tract†	2	Open canopy scrubby flatwoods and sandhill habitat. Dense patches of shrubs and palmetto in some areas. Tortoise density and population estimate indicates this is a small, but likely viable population.
Little Talbot Island SP†	1	Coastal scrub with numerous openings with bare sand and sparse ground cover vegetation (Fig .3b)
Moody Branch WEA†	1	Open canopy scrub, scrubby flatwoods and mesic flatwoods provide highly suitable tortoise habitat.
O'Leno SP/River Rise Preserve SP†	1-2	Mostly open canopy pine habitat with patches of dense herbaceous ground cover, but many areas have a more closed hardwood canopy and dense midstory of oaks and holly (*Ilex sp.*). Areas with hardwood encroachment could benefit from mechanical removal and more frequent prescribed fire.
Perry Oldenberg WEA§	3	Oak forests and pine stands with relatively open canopy managed with both prescribed fire and mechanical hardwood reduction. The upper confidence interval of the population estimate exceeds the threshold for a minimum viable population of 250 adults and the site has a reasonable tortoise density (1.5 tortoises/ha). However, the very low numbers of juveniles indicate potentially low recruitment. Given the documentation of a mortality event at this site (Gates et al., 2002), translocation is not recommended. Methods to increase recruitment should be explored.
St. Sebastian River SP NE†	1	Open canopy pine flatwoods; frequently burned. Site supports a large tortoise population on suitable to marginally suitable soils.
Watermelon Pond WEA	3	Some open canopy pine with native ground cover vegetation dominated by grasses. But much of the site is under restoration and has an open canopy with dense midstory of oaks. Although the population estimate falls slightly below the MVP threshold (Gopher Tortoise Council 2013), the population density meets the MVP criteria and habitat restoration could enable this population to increase.
Wingate Creek SP†	2	Small site with relatively high tortoise density. Portions of the site are in sand pine and dense palmetto, could benefit from more frequent prescribed fire.
Withlacoochee SF- Citrus tract†	1	Open canopy pine habitat (mostly sandhill) with a hardwood component. The site supports a very large, but low density population.
Withlacoochee SF- Croom Tract†	1	Open canopy pine habitat (mostly sandhill) with a lesser hardwood component. The site supports a very large, robust population.

Table 7. Amphibians and reptiles observed during pilot and full line transect distance sampling (LTDS) surveys for gopher tortoises on Florida state conservation lands from March 2014 –February 2016. Most observations occurred using a burrow camera scope; counts in parentheses indicate individuals observed outside of tortoise burrows.

	Beker SP	Bell Ridge WEA	Blackwater SF WBU	Bullfrog Creek WEA	Cayo Costa SP	EB Wakulla Springs SP	Etoniah Creek SF	Ft. White WEA	Goethe SF Levy Co.	Goldhead Branch SP	Guana River WMA	Hilochee WMA	Ichetucknee Springs SP	Joe Budd WMA	Jonathan Dickinson SP
Acris gryllus												(1)			
Agkistrodon contortrix			(1)												
Agkistrodon piscivorus											(3)				
Anaxyrus quercicus											1				1
Anaxyrus terrestris		5	1				1	6	1	2					1
Anolis carolinensis															
Anolis sagrei					4										
Apalone ferox															
Aspidoscelis sexlineatus		1		(1)	(1)										
Coluber constrictor			(1)		(1)		(3)				(2)	(2)			1(2)
Coluber flagellum					8(3)		(1)								1(2)
Crotalus adamanteus			1	1		3(3)					(1)			3	(1)
Ctenosaura similis					(5)										
Drymarchon corais	1														
Eleutherodactylus planirostris		3		1	4		1	2	1	4			7		
Gastrophryne carolinensis							(1)								
Hyla cinerea											(1)				
Hyla femoralis			(1)	(4)			(3)				(3)				(3)
Lithobates capito							63	80	12	55		1			23
Lithobates sphenocephalus		2										(1)			
Micrurus fulvius															
Opheodrys aestivalis							(2)								
Osteopilus septentrionalis															
Pantherophis alleghaniensis															
Pantherophis guttatus						(1)									
Pituophis melanoleucus			(2)												1
Plestiodon laticeps											(1)				
Pseudacris nigrita															
Sceloporus undulatus												2			
Sceloporus woodi															(1)
Scincella lateralis							(1)								
Sistrurus miliarius							(2)		1		(6)				
Storeria occipitomaculata											(1)				
Terrapene carolina						(1)	(2)								1(1)
Thamnophis sauritus											(1)				
Thamnophis sirtalis											(2)				

	Lake Louisa SP	Lake Wales Ridge SF	LWR WEA Carter Creek	LWR WEA Silver Lake	Little Talbot Island SP	Moody Branch WEA	O'Leno River Rise SP	Perry Oldenberg WEA	St. Sebastian River SP	Watermelon Pond WEA	Wingate Creek SP	Withlacoochee SF	Withlacoochee SF Citrus	Withlacoochee SF Croom
Acris gryllus														
Agkistrodon contortrix														
Agkistrodon piscivorus														
Anaxyrus quercicus													1	
Anaxyrus terrestris	13		(1)											
Anolis carolinensis														(2)
Anolis sagrei														
Apalone ferox	(1)													
Aspidoscelis sexlineatus			(1)	(1)					1					(1)
Coluber constrictor	(1)			(5)					(1)					(1)
Coluber flagellum	(2)			(1)	2	(1)	1 (1)		1					
Crotalus adamanteus					1(2)		11(1)			1	(1)			
Ctenosaura similis														
Drymarchon corais														
Eleutherodactylus planirostris										1				
Gastrophryne carolinensis														
Hyla cinerea	(1)													
Hyla femoralis											(1)			
Lithobates capito		3	4			3		3	19	78	3	1	1	4
Lithobates sphenocephalus														
Micrurus fulvius							(1)				(1)			
Opheodrys aestivalis	(1)													
Osteopilus septentrionalis											(1)			
Pantherophis alleghaniensis				(1)							(1)			
Pantherophis guttatus										(1)				
Pituophis melanoleucus	1								1					
Plestiodon laticeps														
Pseudacris nigrita												2		
Sceloporus undulatus														
Sceloporus woodi			(2)											
Scincella lateralis														
Sistrurus miliarius										(1)				
Storeria occipitomaculata														
Terrapene carolina					(1)									(1)
Thamnophis sauritus														
Thamnophis sirtalis														(1)

Table 8. Mammals observed during pilot and full line transect distance sampling (LTDS) surveys for gopher tortoises on Florida state conservation lands from March 2014 –June 2016. Most observations occurred using a burrow camera scope; counts in parentheses indicate individuals observed outside of tortoise burrows. Black bear, *Ursus americanus,* tracks and a den site were observed at Etoniah Creek SF.

	Bell Ridge WEA	**Bullfrog Creek WEA**	**Cayo Costa SP**	**Etoniah Creek SF**	**Goethe SF Levy Co.**	**Goldhead Branch SP**	**Ichetucknee Springs SP**	**Joe Budd WMA**	**Jonathan Dickinson SP**	**O'Leno River Rise SP**	**St. Sebastian River SP**	**Watermelon Pond WEA**	**Withlacoochee SF Croom**
Canis latrans				2									
Dasypus novemcinctus	1		2								1		1
Didelphis virginianus				1	1		1	1		3		1	1
Mephitis mephitis							1		1	1		2	
Podomys floridanus					3	1				1		1	
Sigmodon hispidus		1											
Sylvilagus sp.	1									1			2
Ursus americanus				(2)									

Figure 1. Location of Florida conservation lands sampled for gopher tortoise population estimates using line transect distance sampling (LTDS).

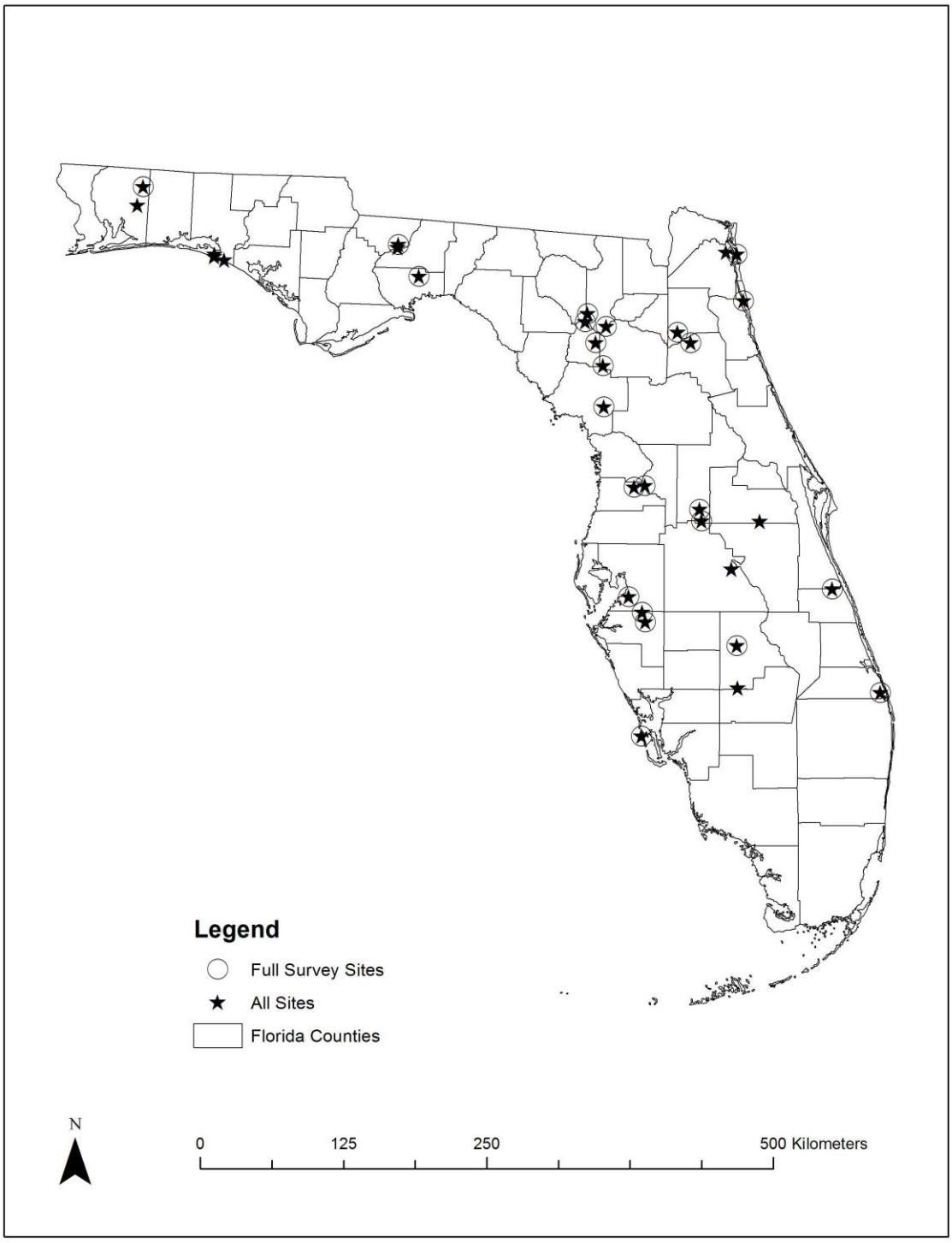
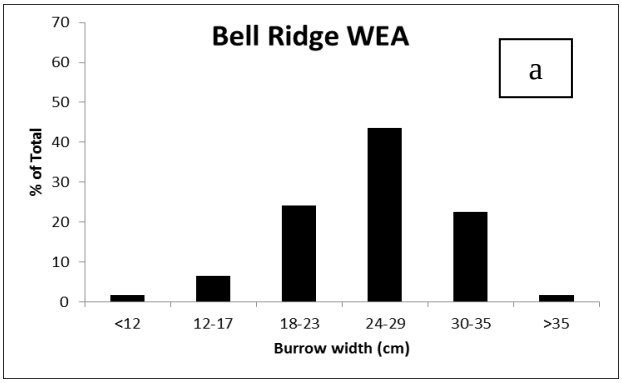
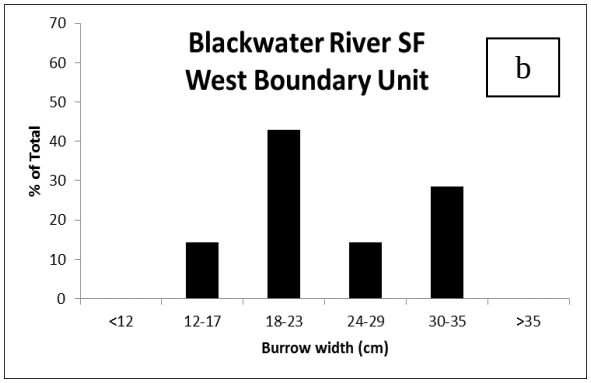
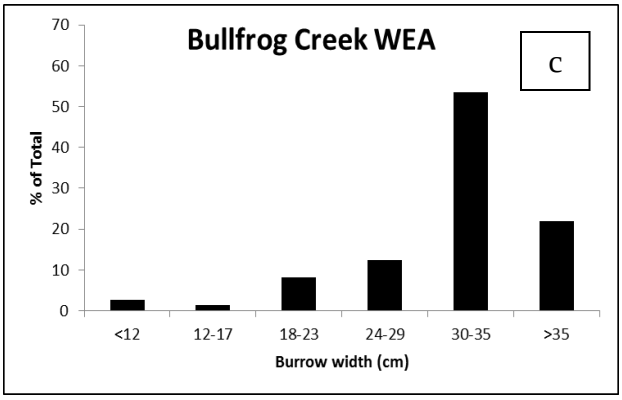
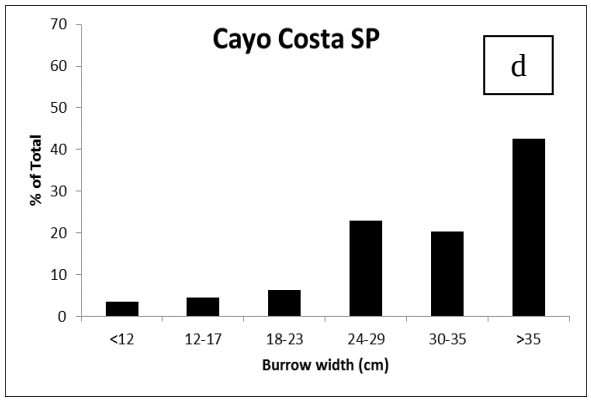


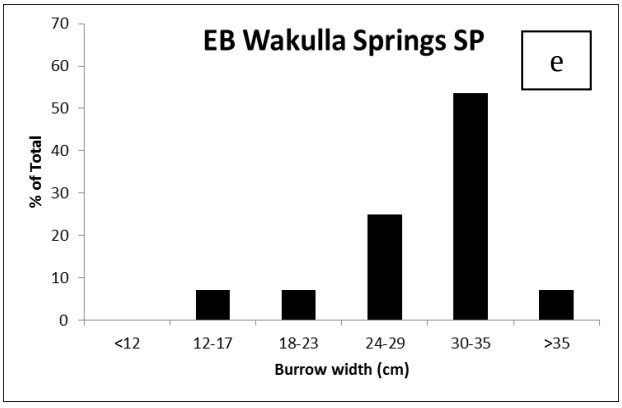
Figure 2a-y. Size class distribution of occupied gopher tortoise burrows at 25 Florida conservation lands surveyed using line transect distance sampling (LTDS) from August 2014-June 2016.

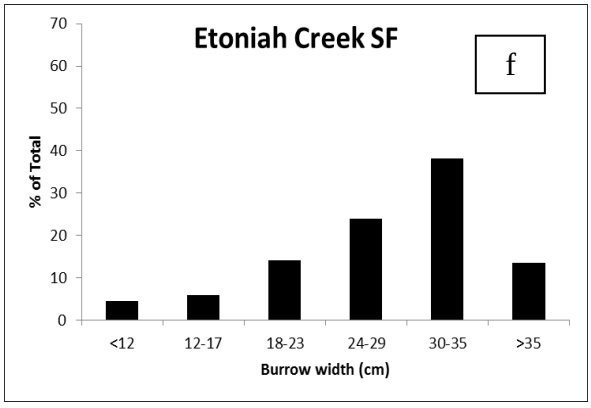


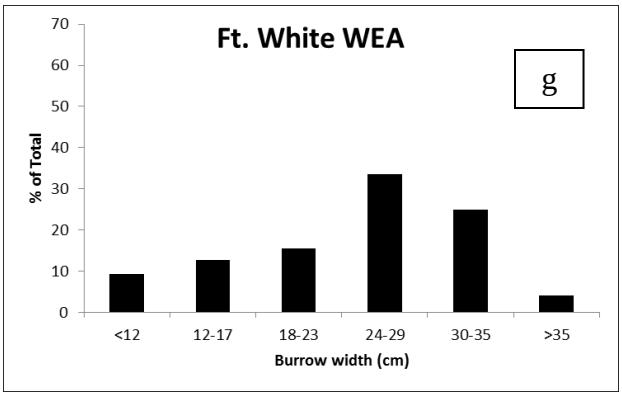


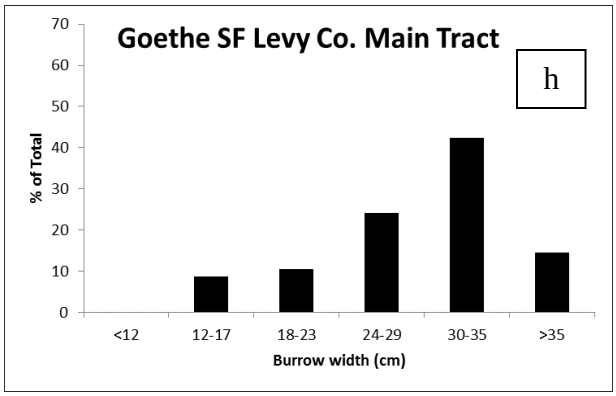









Ft. White WEA
g
% of Total
70
60
50
40
30
20
10
0
<12
12-17
18-23
24-29
30-35
>35
Burrow width (cm)


Goethe SF Levy Co. Main Tract
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% of Total
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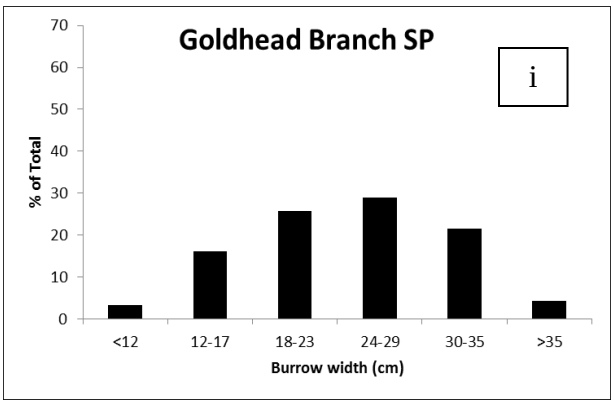
Burrow width (cm)


Goldhead Branch SP
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% of Total
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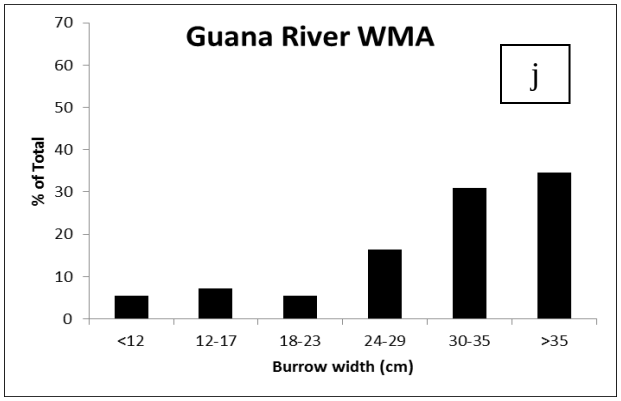
Burrow width (cm)


Guana River WMA
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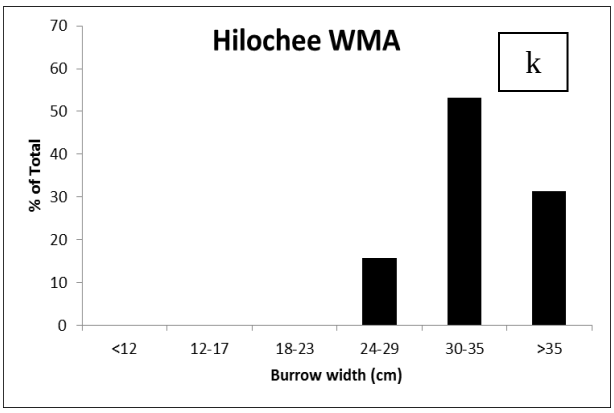
Burrow width (cm)


Hilochee WMA
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% of Total
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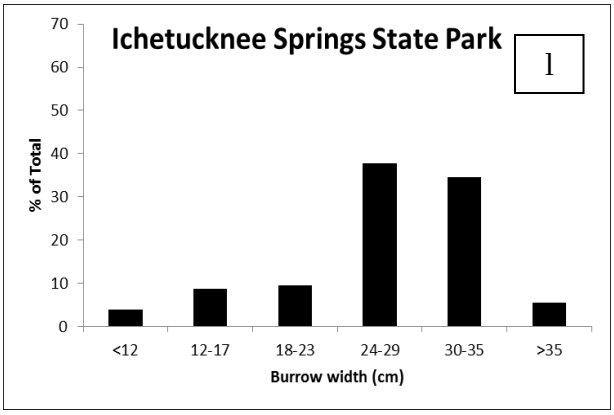
Burrow width (cm)


Ichetucknee Springs State Park
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% of Total
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18-23
24-29
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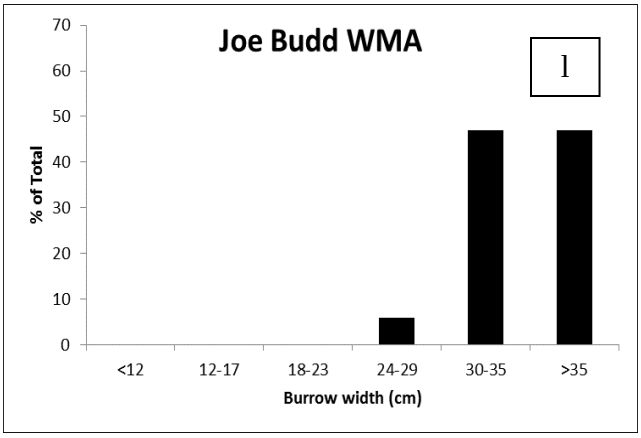
>35
Burrow width (cm)


Joe Budd WMA
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% of Total
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30
20
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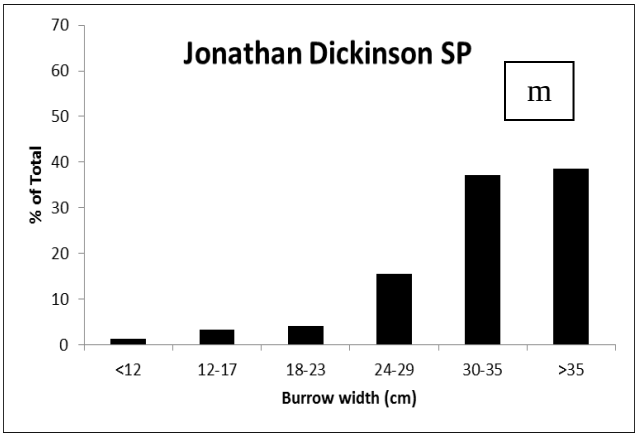
<12
12-17
18-23
24-29
30-35
>35
Burrow width (cm)


Jonathan Dickinson SP
m
% of Total
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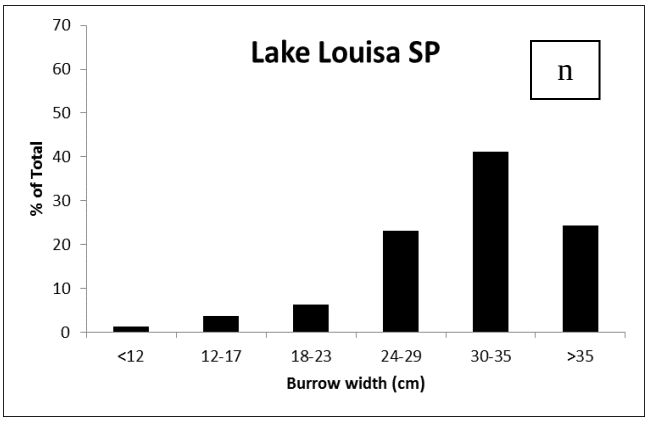
12-17
18-23
24-29
30-35
>35
Burrow width (cm)


Lake Louisa SP
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% of Total
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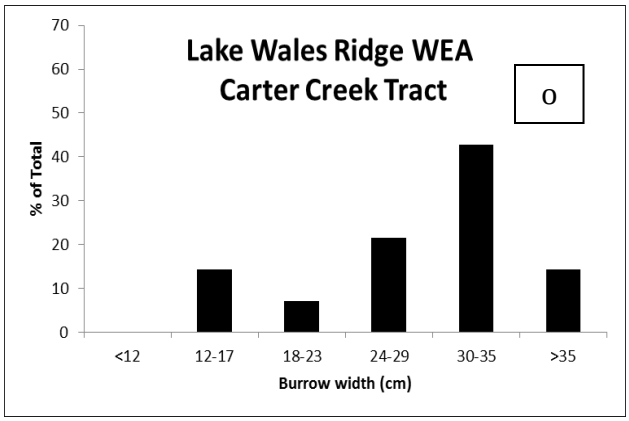
>35
Burrow width (cm)


Lake Wales Ridge WEA
Carter Creek Tract
o
% of Total
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18-23
24-29
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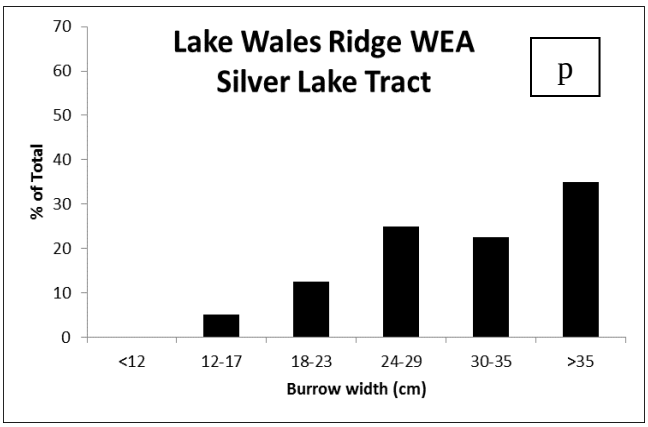
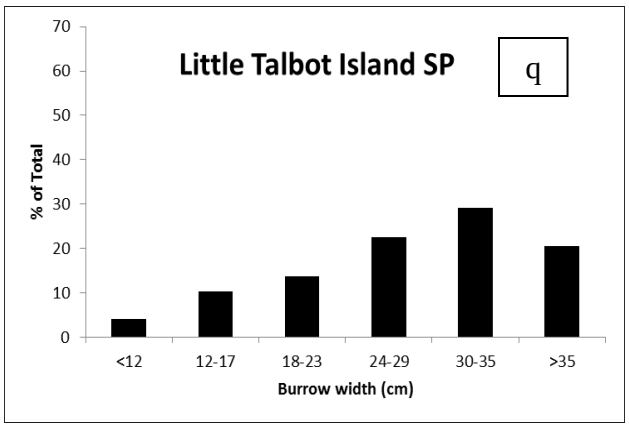
>35
Burrow width (cm)


Lake Wales Ridge WEA
Silver Lake Tract
p
% of Total
70
60
50
40
30
20
10
0
<12
12-17
18-23
24-29
30-35
>35
Burrow width (cm)


Little Talbot Island SP
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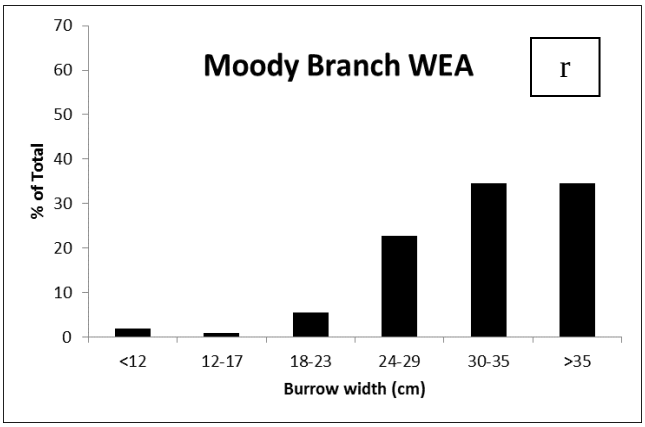
Moody Branch WEA
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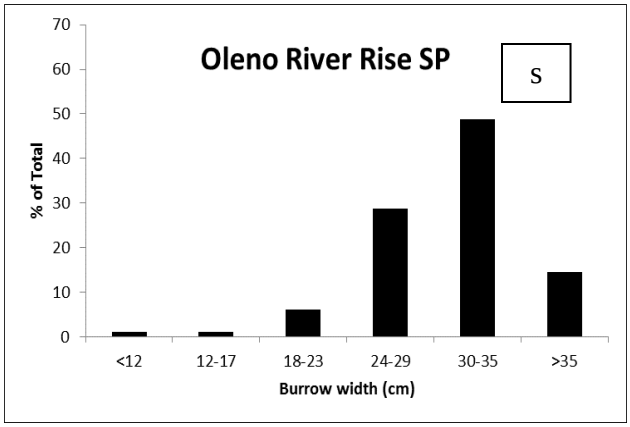
Oleno River Rise SP
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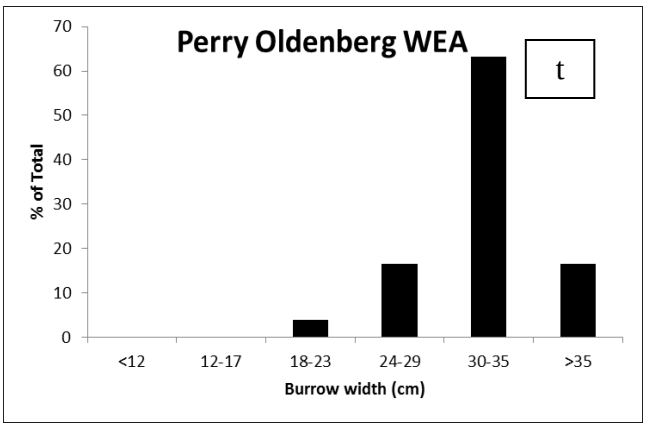
Burrow width (cm)


Perry Oldenberg WEA
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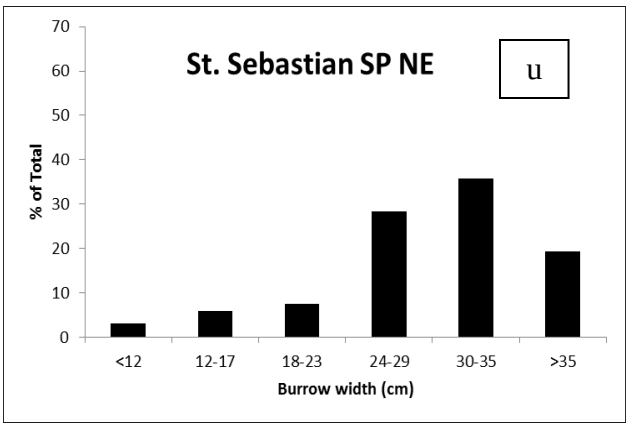
St. Sebastian SP NE
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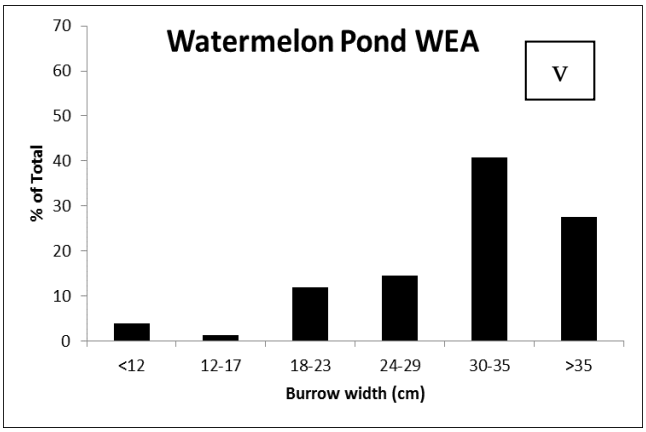
Watermelon Pond WEA
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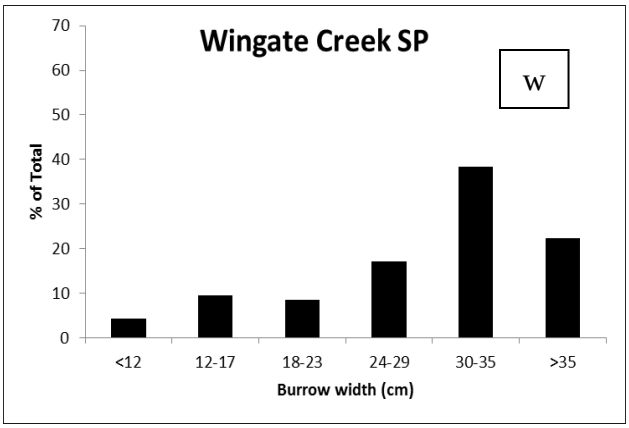
Burrow width (cm)


Wingate Creek SP
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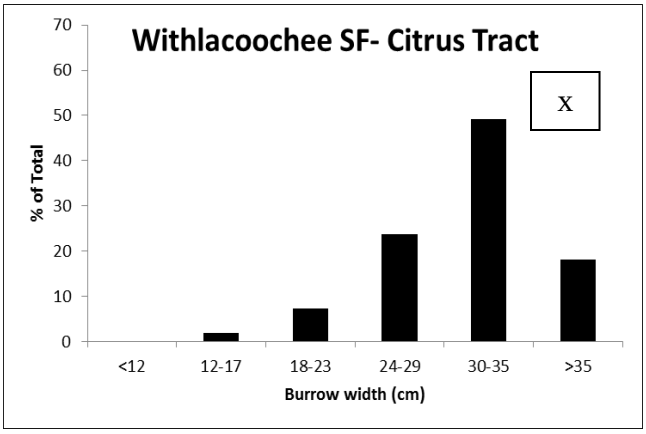
Burrow width (cm)


Withlacoochee SF- Citrus Tract
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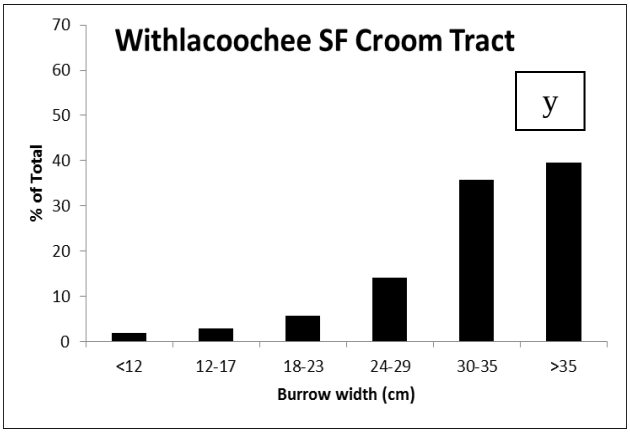
Burrow width (cm)


Withlacoochee SF Croom Tract
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Burrow width (cm)

Figure 3a-c. High quality gopher tortoise habitat at Bell Ridge Wildlife Environmental Area (a), a tortoise burrow on the dunes at Little Talbot Island State Park (b), and fire suppressed habitat at Wakulla Springs State Park (c).

a

b

c

Appendix 1. Florida gopher tortoise survey rapid habitat assessment protocol.

Habitat sampling points were randomly selected (1 per transect) in ArcGIS. At each point, we sampled the following:

Basal Area:

- Collected using a 10 factor prism horizontally at a height of 4.5 ft.
- Trees were counted (referred to as "in") if the displaced part of the trunk overlaped what could be seen above or below.
- Counted trees where just the borderline overlapped as half a tree.
- If the image did not overlap, the tree was out (not counted).
- Reported the raw counts in Nomad (multiplied these by 10 in Excel database for final reporting).

Canopy cover:

- Used a concave spherical densiometer, visualized 4 dots per square (up to 96 potential dots), counted the number of dots that were OPEN (not covered by any forest canopy).
- Took 4 readings, one in each cardinal direction holding the densiometer at the same height and orientation.
- Recorded all 4 readings or the mean of the 4 readings.
- Reported % canopy cover as: The number of open dots multiplied by 1.04 to obtain the percent of overhead area not occupied by canopy. The difference between this percentage and 100% is the estimated overstory density in percent, e.g., 100% (72 open dots x 1.04) = 25.12 or 25% canopy cover.

Overstory composition:

- Selected the dominant overstory type at the point (pine, oak, mixed, other, none).

% Midstory:

- Estimated the % cover of woody perennial vegetation 1-3 m tall within a 5 m radius of point.

Midstory composition:

- Selected the woody perennial vegetation from 1-3 m tall (pine, oak, shrubs, palmetto, mixed, other, none).

% Ground Cover:

- Selected the dominant ground cover type within a 1 m radius of the point (bare ground, litter, grass, woody, vines, mixed).

Photos:

- Took landscape oriented digital photos N, W, S, and E at each point.
- After taking above 4 photos, take photo denoting transect number.

Appendix 2. Model output for distance sampling for gopher tortoise populations on state conservation lands in Florida, August 2014– May 2016. Methods included conventional distance sampling (CDS), CDS with cluster analysis, and multiple covariate distance sampling (MCDS). Analyses were run using Distance software v.6.2 (Buckland et al. 2001). Burrow diameter was used as a covariate in all MCDS models. Best fitted models (highlighted in yellow) were selected using Akaike's Information Criteria (AIC; Akaike 1974) and consideration of the coefficient of variation (D CV) and detection probability (P). # obs= number of tortoises in burrows or at large observed from transects, Effort= total length of transect surveyed, D= Density (tortoises/hectare), N= abundance, LCL= lower confidence limit for D and N, UCL= upper confidence limit for density and abundance estimate.

	Method: MCDS											
Bell Ridge WEA	**Models**	**# obs**	**Effort**	**AIC**	**D**	**D LCL**	**D UCL**	**D CV**	**N**	**N LCL**	**N UCL**	**P**
Survey dates	HN 5%	118	9516.1	729.499	4.101	2.578	6.523	0.182	1197	753	1905	0.626
8/26-8/29/14	HR 5%	118	9516.1	735.258	4.398	2.767	6.991	0.184	1284	808	2041	0.583

	Method: Cluster CDS											
Blackwater River SF West Boundary Unit	**Models**	**# obs**	**Effort**	**AIC**	**D**	**D LCL**	**D UCL**	**D CV**	**N**	**N LCL**	**N UCL**	**P**
Survey dates	UN cos 5%	67(14)	82516.2	332.52	0.100	0.055	0.182	0.308	284	156	514	0.577
9/21-9/25/15, 1/18-2/12/16	HR 5%	67(14)	82516.2	333.17	0.101	0.053	0.193	0.335	286	150	546	0.571
	HN 5%	67(14)	82516.2	333.40	0.101	0.055	0.186	0.314	286	156	525	0.571

	Method: Cluster CDS											
Bullfrog Creek WEA	**Models**	**# obs**	**Effort**	**AIC**	**D**	**D LCL**	**D UCL**	**D CV**	**N**	**N LCL**	**N UCL**	**P**
Survey dates	UN simp 5%	323	21033.5	1529.91	2.042	1.584	2.633	0.130	378	293	487	0.683
9/14-9/16/15, 1/5-1/12/16	HN simp 5%	323	21033.5	1530.55	2.154	1.634	2.839	0.141	399	302	525	0.648
	HR 5%	323	21033.5	1532.32	1.985	1.520	2.594	0.137	367	281	480	0.702

Method: MCDS

Cayo Costa SP	Models	# obs	Effort	AIC	D	D LCL	D UCL	D CV	N	N LCL	N UCL	P
Survey dates	HN 5%	107	20597.0	639.526	1.791	1.374	2.335	0.135	293	225	382	0.693
4/27-5/1/15, 5/4/-5/8/15	HR cos 5%	107	20597.0	637.185	2.095	1.597	2.750	0.139	343	261	450	0.592

Method: CDS

E.B. Wakulla Spring SP	Models	# obs	Effort	AIC	D	D LCL	D UCL	D CV	N	N LCL	N UCL	P
Survey dates	HN 5%	28	50914.9	160.233	0.167	0.090	0.310	0.319	75	41	140	0.973
1/20-1/22/15; 2/10-2/13/15,	UN 5%	28	50914.9	158.250	0.163	0.101	0.264	0.247	73	45	119	1.000
5/19/2015	HR 5%	28	50914.9	162.250	0.163	0.101	0.264	0.247	73	45	119	1.000

Method: MCDS

Etoniah Creek SF	Models	# obs	Effort	AIC	D	D LCL	D UCL	D CV	N	N LCL	N UCL	P
Survey dates	HN 5%	127	50591.45	751.134	1.028	0.733	1.442	0.173	1538	1096	2157	0.521
6/10-6/12/15, 6/25-6/26/16, 8/31-9/4/15, 9/24-/9/25/15, 11/3-11/6/15	HR 5%	127	50591.45	751.530	1.114	0.792	1.566	0.174	1667	1186	2343	0.480

Method: MCDS

Ft. White WEA	Models	# obs	Effort	AIC	D	D LCL	D UCL	D CV	N	N LCL	N UCL	P
Survey dates	HN 5%	142	18444.9	840.957	2.969	2.361	3.735	0.116	974	774	1224	0.587
9/2-9/5/14, 9/9-9/10/14	HR 5%	142	18444.9	842.754	2.684	2.141	3.364	0.114	880	702	1103	0.650

Method: CDS

Goethe SF Levy Co. Main Tract	Models	# obs	Effort	AIC	D	D LCL	D UCL	D CV	N	N LCL	N UCL	P
Survey dates	HN 5%	99	23393.7	670.973	1.042	0.698	1.556	0.203	1991	1333	2974	0.622
12/16-12/19/14, 12/22-12/23/14,	UN cos 5%	99	23393.7	670.292	1.067	0.721	1.579	0.198	2039	1378	3017	0.607
12/29-12/31/14	HR 5%	99	23393.7	673.554	1.114	0.687	1.807	0.248	2129	1312	3454	0.582

Method: MCDS

Goldhead Branch SP	Models	# obs	Effort	AIC	D	D LCL	D UCL	D CV	N	N LCL	N UCL	P
Survey dates	HN 5%	88	19907.1	565.391	1.116	0.783	1.591	0.176	843	591	1201	0.769
9/24-9/26/14, 9/30-10/2/14	HR 5%	88	19907.1	570.169	1.044	0.744	1.463	0.166	788	562	1105	0.822

Method: MCDS

Guana River	Models	# obs	Effort	AIC	D	D LCL	D UCL	D CV	N	N LCL	N UCL	P
Survey dates	HN 5%	52	53557.9	261.816	0.575	0.403	0.822	0.183	219	154	313	0.617
3/16-3/20/15, 4/13-4/17/15,	HR 5%	52	53557.9	263.358	0.667	0.461	0.964	0.189	254	176	368	0.532
5/11-5/12/15												

Method: CDS

Hilochee WMA	Models	# obs	Effort	AIC	D	D LCL	D UCL	D CV	N	N LCL	N UCL	P
Survey dates	HN 5%	27	22829.8	182.456	0.333	0.191	0.581	0.285	176	101	306	0.474
2/26-2/27/15, 3/2-3/4/15,	UN 5%	27	22829.8	182.455	0.374	0.208	0.671	0.301	197	110	353	0.422
6/22-6/23/15	HR 5%	27	22829.8	181.928	0.350	0.180	0.681	0.344	184	95	359	0.451

Method: MCDS

Ichetucknee Springs SP	Models	# obs	Effort	AIC	D	D LCL	D UCL	D CV	N	N LCL	N UCL	P
Survey dates	HN 5%	121	13561.7	665.481	3.970	3.008	5.240	0.138	1269	962	1675	0.658
9/12/14, 9/15-9/16/14,	HR 5%	121	13561.7	670.061	3.878	2.941	5.114	0.137	1240	940	1635	0.673
9/18-9/19/14, 9/22/14												

Method: CDS

Joe Budd WMA	Models	# obs	Effort	AIC	D	D LCL	D UCL	D CV	N	N LCL	N UCL	P
Survey dates	UN 5%	28	27478.2	167.930	0.254	0.133	0.486	0.336	66	34	125	1.00
10/20-10/23/14,	HN 5%	28	27478.2	169.330	0.254	0.120	0.536	0.391	66	31	138	1.00
11/17-11/21/14	HR 5%	28	27478.2	171.930	0.254	0.133	0.486	0.336	66	34	125	1.00

Method: MCDS

Jonathan Dickinson SP	Models	# obs	Effort	AIC	D	D LCL	D UCL	D CV	N	N LCL	N UCL	P
Survey dates	HR 5%	141	60288.2	855.485	0.769	0.580	1.021	0.144	870	656	1154	0.553
3/9-3/13/15, 4/6-4/10/15,	HN 5%	141	60288.2	857.544	0.905	0.680	1.204	0.146	1023	769	1361	0.4704
6/1-6/6/15, 8/10-8/13/15												

Method: MCDS

Lake Louisa SP	Models	# obs	Effort	AIC	D	D LCL	D UCL	D CV	N	N LCL	N UCL	P
8/3-8/7/15, 8/17-8/20/15, 8/24-8/28/15	HN 5%	226	42393.6	1342.853	2.168	1.580	2.975	0.161	1626	1185	2232	0.4974
	HR 5%	226	42393.6	1350.206	1.926	1.406	2.637	0.160	1445	1055	1978	0.5599

Method: CDS

Lake Wales Ridge WEA Carter Creek	Models	# obs	Effort	AIC	D	D LCL	D UCL	D CV	N	N LCL	N UCL	P
Survey dates	HN 5%	13	9685.2	81.633	0.373	0.180	0.775	0.376	293	141	609	0.828
5/13-5/14/15, 6/8-6/9/15	UN 5%	13	9685.2	80.032	0.309	0.173	0.551	0.294	243	136	433	1.000
	HR 5%	13	9685.2	82.964	0.517	0.139	1.922	0.685	406	109	1509	0.598

Method: MCDS

Lake Wales Ridge WEA Silver Lake	Models	# obs	Effort	AIC	D	D LCL	D UCL	D CV	N	N LCL	N UCL	P
Survey dates	HN 5%	38	21614.6	164.590	1.700	1.093	2.645	0.225	243	156	378	0.460
3/23-3/27/15	HR 5%	38	21614.6	163.210	2.068	1.314	3.255	0.231	296	188	465	0.380

Method: MCDS

Little Talbot Island SP	Models	# obs	Effort	AIC	D	D LCL	D UCL	D CV	N	N LCL	N UCL	P
Survey dates	HN 5%	301	22252.7	1846.763	4.504	3.924	5.169	0.070	779	679	894	0.632
10/6-10/10/14, 11/10-11/14/14	HR 5%	301	22252.7	1844.606	4.356	3.796	4.999	0.070	754	657	865	0.654

Method: MCDS

Moody Branch WEA	Models	# obs	Effort	AIC	D	D LCL	D UCL	D CV	N	N LCL	N UCL	P
Survey dates	HN 5%	104	23906.8	517.640	2.636	2.030	3.422	0.132	478	369	621	0.620
3/30-4/3/15, 4/20-4/23/15	HR 5%	104	23906.8	519.140	2.977	2.280	3.888	0.135	540	414	706	0.550

Method: MCDS

O'Leno River Rise SP	Models	# obs	Effort	AIC	D	D LCL	D UCL	D CV	N	N LCL	N UCL	P
Survey dates	HN 5%	190	21486.9	1308.974	2.178	1.603	2.960	0.155	1011	744	1374	0.546
11/24/14, 12/8-12/12/14, 10/13-10/17/14, 12/15/2014	HR 5%	190	21486.9	1311.508	2.318	1.703	3.154	0.156	1076	791	1464	0.513

Method: MCDS

Perry Oldenberg WEA	Models	# obs	Effort	AIC	D	D LCL	D UCL	D CV	N	N LCL	N UCL	P
Survey dates	HN 5%	75	17370.31	466.449	1.579	1.173	2.127	0.149	213	158	287	0.469
2/23-2/25/15	HR 5%	75	17370.31	466.601	2.130	1.553	2.921	0.159	287	209	394	0.348

Method: MCDS

St. Sebastian SP	Models	# obs	Effort	AIC	D	D LCL	D UCL	D CV	N	N LCL	N UCL	P
Survey dates	HN 5%	64	33284.0	362.806	0.857	0.564	1.301	0.213	977	644	1483	0.588
6/29-7/3/15, 7/13-7/17/15	HR 5%	64	33284.0	368.083	0.928	0.608	1.415	0.216	1058	694	1614	0.543

Method: MCDS

Watermelon Pond WEA	Models	# obs	Effort	AIC	D	D LCL	D UCL	D CV	N	N LCL	N UCL	P
Survey dates	HN 5%	173	36421.06	1090.596	1.378	1.118	1.697	0.106	184	149	226	0.706
10/27-10/28/14, 11/3-11/7/14, 12/1/14, 12/4-12/5/14	HR 5%	173	36421.06	1092.987	1.218	0.993	1.493	0.104	162	132	199	0.799

Method: MCDS

Wingate SP	Models	# obs	Effort	AIC	D	D LCL	D UCL	D CV	N	N LCL	N UCL	P
Survey dates	HN 5%	89	21955.85	477.390	1.9938	1.537	2.586	0.132	303	234	394	0.648
7/20-7/24/15, 7/27-7/29/15	HR 5%	89	21955.85	479.368	2.2742	1.735	2.981	0.137	346	264	454	0.568

Method: MCDS

Withlacoochee SF Citrus Tract*	Models	# obs	Effort	AIC	D	D LCL	D UCL	D CV	N	N LCL	N UCL	P
Survey dates	HN 5%	51	29667.61	350.785	0.4011	0.268	0.601	0.205	7179	4789	10761	0.654
2/16-2/20/15, 4/24/15	HR 5%	51	29667.61	352.005	0.3688	0.248	0.548	0.201	6600	4440	9813	0.711

Method: MCDS

Withlacoochee SF Croom Tract	Models	# obs	Effort	AIC	D	D LCL	D UCL	D CV	N	N LCL	N UCL	P
Survey dates	HN 5%	125	35083.7	720.950	1.592	1.221	2.075	0.135	8221	6308	10714	0.498
2/24-2/26/16, 4/4-4/7/16	HR 5%	125	35083.7	722.232	1.537	1.182	1.998	0.134	7938	6106	10320	0.516

Appendix 3. Roster of participants in the Gopher Tortoise Line Transect Distance Sampling Workshop held at Archbold Biological Station, Lake Placid, Florida on 5-7 May 2016.

Name	Agency/location
Rachel King	FWC GT biologist/South Region
Samantha Dupree	FWC GT Biologist/NE Region
Eric Seckinger	FWC GT Biologist/NC & NW Region
Mehan Harris	FPS District 2
Andi Christman	FPS District 2
Chris Becker	FPS District 4
Rosalind Rowe	FPS District 4
Allegra Buyer	FPS District 3
Bernie Kaiser	Hillsborough County
Candace Donato	DEP/GTMNERR NE Region
Joe Burgess	DEP/GTMNERR NE Region
Matt Corby	Camp Blanding
Tabitha Biehl	Polk County
Alex Kalfin	FWC GT Local Government Coordinator
Michelina Dziadzio	FWC GT GIS and Monitoring Coordinator
Tyler Mosteller	St. Johns River Water Mgmt District
Betsie Rothermel	Archbold
Instructors	
Eric Sievers	FWC GT Biologist/SW Region
Lora Smith	JWJERC
Jennifer Howze	JWJERC
Workshop organizer	
Deborah Burr	FWC