A Plan for the Use and Management of the Chassahowitzka Riverine Swamp Sanctuary

August 30, 2005

Southwest Florida Water Management District
Brooksville, Florida

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EXECUTIVE SUMMARY

The 5,679-acre Chassahowitzka Riverine Swamp Sanctuary (Sanctuary) is located 2 miles south of Homosassa Springs, Florida, and approximately 10 miles north of Weeki Wachee, Florida. It is part of a large block of publicly owned lands that collectively total over 110,700 contiguous acres of estuary and forested swamp. An imperiled population of Florida black bear resides in the Greater Chassahowitzka Ecosystem that includes both the Chassahowitzka and Weekiwachee Swamps. This plan is designed to guide future management and public use of the Sanctuary in a manner that will ensure an appropriate balance between public use and resource protection needs.

The dominant land cover type on the Sanctuary is hydric hammock. Other community types include pine flatwoods, long-leaf pine-xeric oak, and mesic hammock forest. The site encompasses the protected, first magnitude headwater springs of the Chassahowitzka River and the northern heart of the Chassahowitzka Swamp's hydric hammock forest.

The District's acquisition of lands in the Chassahowitzka Swamp began in 1990 and was substantially completed in 1991. The Chassahowitzka Swamp is a 15-mile corridor of hydric hammock that borders the coastal marshes of the Hernando County and Citrus County shorelines. Water management benefits associated with the property include flood protection, water quality protection and enhancement, and natural systems protection. With the exception of the most eastern uplands (~80 acres), the entire site is in the 100-year floodplain, as delineated by the Federal Emergency Management Agency.

A number of sites within the Sanctuary have been designated Special Protection Areas (SPA). These include the Chassahowitzka River (an Outstanding Florida Water), the Johnson Creek Salt Marsh, 40 acres of long-leaf pine-xeric oak, bald eagle nests, archaeological sites, and Section 10 mining pits. Incompatible land uses will generally be directed away from the SPAs to other portions of the Sanctuary. Management activities such as security, prescribed burning, and control of nuisance exotic species will be tailored to meet the site-specific needs of each SPA.

Permitted recreational uses at the Sanctuary include hiking, fishing, boating, canoeing/kayaking, birding, picnicking and nature study. The facilities to support recreational use are managed by Citrus County and include restrooms, a boat ramp, and a campground and camp store. The entire Sanctuary is available to the

public through foot access. However, there are few opportunities for providing foot access directly from public right-of-ways. Nearly the entire property line is bordered by privately owned lands through which the public cannot gain access, or by other publicly held tracts where access is regulated or controlled by other agencies. Despite these unavoidable constraints, there are several modes of legal access that are adequate to accommodate public usage.

Major management needs and actions for the Sanctuary include continued implementation of the prescribed burning program, and management and monitoring of resident wildlife, including the Florida black bear and bald eagle. The resource management objective is to sustain or enhance the Sanctuary's water resource values and biological diversity. Ongoing efforts to control invasive, exotic (non-native) plant species will be continued as needed.

INTRODUCTION

LOCATION

The Chassahowitzka Riverine Swamp Sanctuary (Sanctuary) is located 2 miles south of Homosassa Springs, Florida, and approximately 10 miles north of Weeki Wachee, Florida. The Sanctuary is encompassed within the larger Chassahowitzka Swamp Ecosystem and is bounded generally by SR 50 to the south, U.S. Highway 19 to the east, CR 490 to the north, and the Gulf of Mexico to the west (Figure 1).

GENERAL DESCRIPTION

The Sanctuary is 5,679 acres in size and encompasses the headwater springs of the Chassahowitzka River and the northern heart of the Chassahowitzka Swamp's hydric hammock forest. The District's acquisition of lands in the Chassahowitzka Swamp began in 1990 and was substantially completed in 1991.

The Chassahowitzka Swamp is a 15-mile corridor of hydric hammock that borders the coastal marshes of the Hernando County and Citrus County shorelines. It accounts for a total land area of approximately 25,000 acres, or nearly 40 square miles. When combined with the coastal marshes on the west, and the swath of flatwoods and other upland communities that border it on the east, the Chassahowitzka Swamp ecosystem more than doubles in size to encompass an area exceeding 110,700 acres in size. Nearly the entire Chassahowitzka ecosystem, including most of the spring-fed Chassahowitzka River, is now protected through public ownership of four individual, adjoining tracts including Chassahowitzka National Wildlife Refuge (NWR), Chassahowitzka Wildlife Management Area (WMA), the Homosassa Tract of the Withlacoochee State Forest, and the Sanctuary itself (Figure 2).

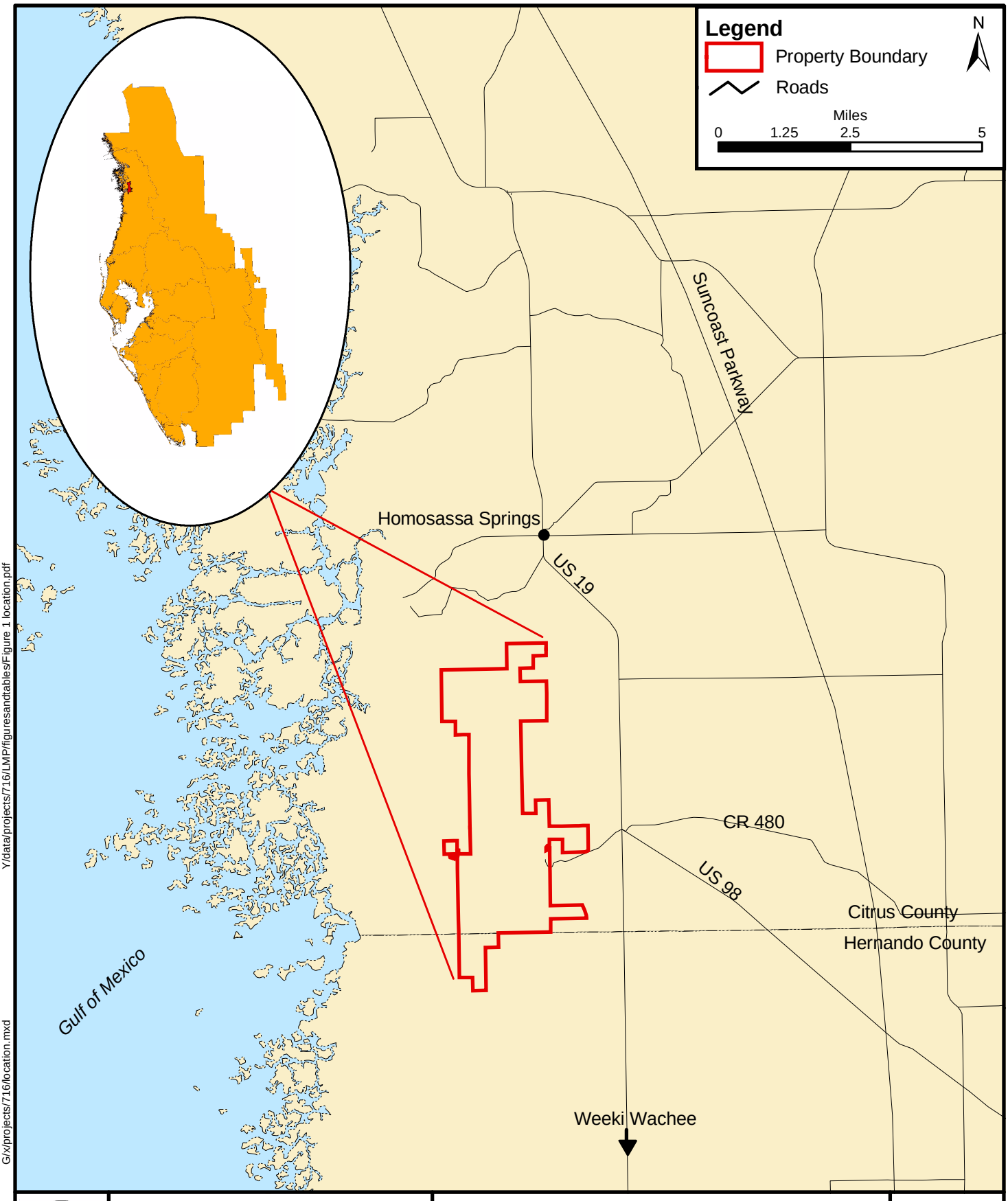
PROPERTY ATTRIBUTES

Chassahowitzka Riverine Swamp Sanctuary and Other Conservation Lands

The Sanctuary adds approximately 5,679 acres to the regional conservation land network. Approximately 300,000 acres are protected in conservation areas in the surrounding region within Citrus, Hernando, Sumter, and Pasco Counties (Table 1).

Protected Species

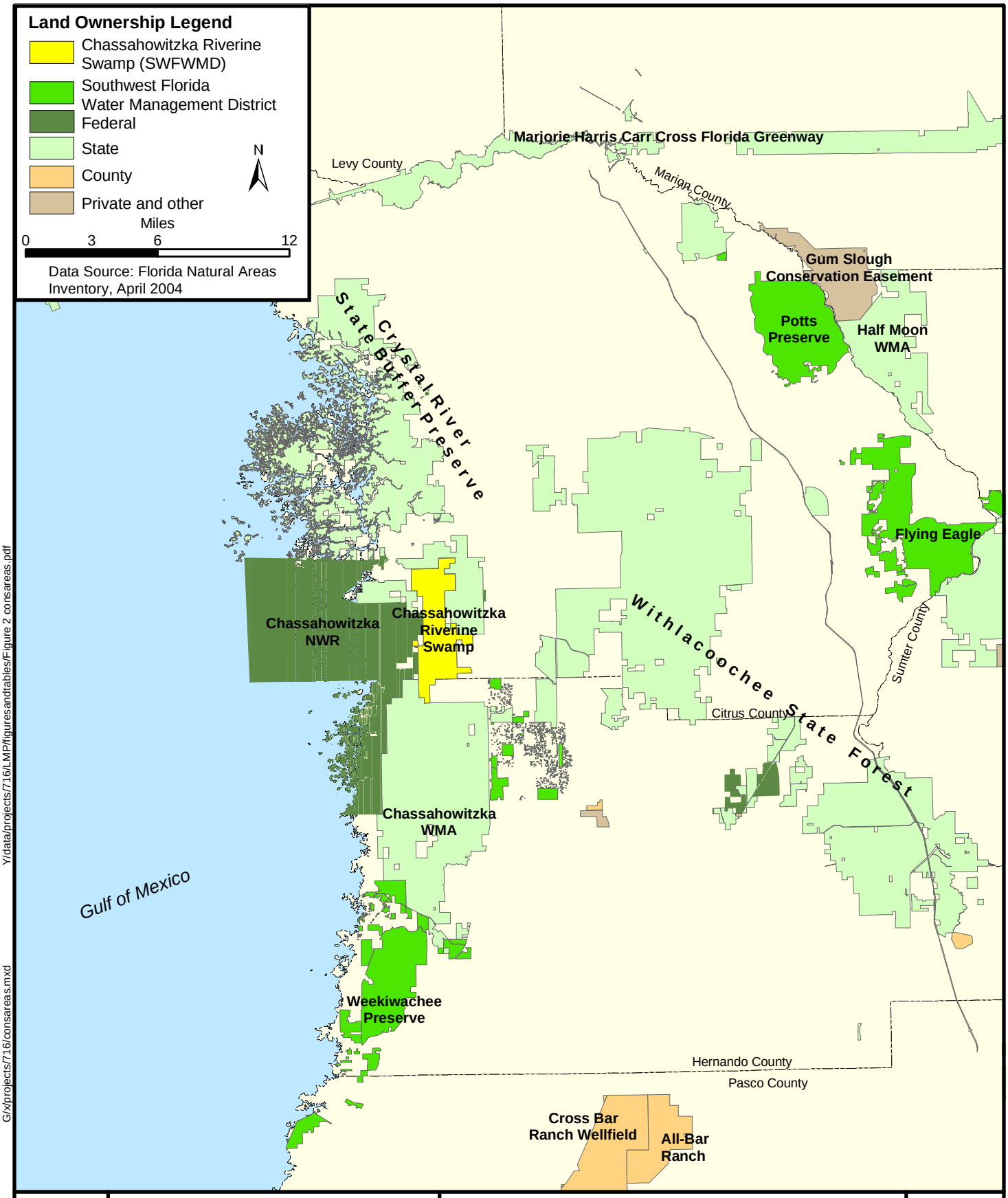
Protected wildlife species that occur or potentially occur on the Property include the federally Endangered wood stork and West Indian manatee. Federally threatened species include the bald eagle and eastern indigo snake. State listed wildlife include the threatened



CHASSAHOWITZKA RIVERINE SWAMP
LAND MANAGEMENT PLAN
Citrus & Hernando Counties, Florida

LOCATION MAP

Figure 1



CHASSAHOWITZKA RIVERINE SWAMP LAND MANAGEMENT PLAN
Citrus & Hernando Counties, Florida

REGIONAL CONSERVATION LAND NETWORK

Figure 2

Table 1 Regional Conservation Land Network

Name	Owner	Manager	County	Acreage
Chassahowitzka Riverine Swamp	SWFWMD	SWFWMD	Citruso	5,679
Weekiwachee Preserve	SWFWMD	SWFWMD	Hernando	10,837
Potts Preserve	SWFWMD	SWFWMD	Citrus	9,432
Flying Eagle Ranch and Boy Scout Camp	SWFWMD	SWFWMD	Citrus	16,807
Fort Cooper State Park	State/Citrus	FDEP	Citrus	742
Chassahowitzka WMA	State	FWC	Hernando	27,183
Crystal River State Buffer Preserve	State	FDEP	Citrus	27.295
Withlcoochee State Trail	State	FDEP	Citrus/Hernando/Pasco	760
Withlcoochee State Forest	State/SWFWMD	Div. Forestry	Citrus/Hernando/Pasco	157,481
Homosassa Springs Wildlife State Park	State	FDEP	Citrus	197
Half Moon WMA	State/SWFWMD	FWC	Sumter	9,479
Chisegut Nature Center	State/USDOE	FWC	Hernando	1,179
Janet Butterfield Brooks Preserve	TNC	TNC	Hernando	335
All-Bar Ranch	Pinellas	Pinellas	Pasco	4,092
Cypress Lakes Preserve	Hernando	Hernando	Hernando	322
Crystal River NWR	USFWS	USFWS	Citrus	80
Chassahowitzka NWR	USFWS	USFWS	Citrus/Hernando	279,831

SWFWMD - Southwest Florida Water Management District
State – State of Florida
FDEP - Florida Department of Environmental Protection
USDOE – United States Department of Energy
FWC – Florida Fish and Wildlife Conservation Commission
USFWS - United States Fish and Wildlife Service
TNC – The Nature Conservancy

southeastern American kestrel, Florida black bear, and short-tailed snake, and Species of Special Concern include the gopher frog, limpkin, little blue heron, tricolored heron, snowy egret, white ibis, Florida mouse, Sherman's fox squirrel, Marian's marsh wren, Scott's seaside sparrow, gopher tortoise, and Florida pine snake (Table 2). An experimental migratory whooping crane population that winters in the Chassahowitzka National Wildlife Refuge may use or potentially use the salt marsh that exists in the Sanctuary as well as the adjoining freshwater wetland systems. The whooping crane has been considered extirpated in the state of Florida and the experimental population is an attempt to re-establish a migratory whooping crane population in Florida. For management concerns associated with wildlife see the Wildlife Management section.

Protected plant species include the commercially exploited green-fly orchid, cinnamon fern, royal fern and needle palm (Table 3). Commercially exploited plants are those species native to the state which are subject to being removed in significant numbers from native habitats in the state and sold or transported for sale.

Archaeological

Archaeological surveys have identified three sites within the boundaries of the Sanctuary (Weisman and Marquardt, 1988). One site has yielded artifacts that suggest an extended period of occupation by both aboriginal Indians and 19th century homesteaders and has been characterized as a significant site. The other two sites, which consist of a shell midden and a lithic scatter, are of undetermined significance. Most of the sites that have been discovered in the Chassahowitzka area are located in the NWR. Thorough investigation of the area by archaeologists indicates a low probability of discovering other significant sites. All sites discovered thus far are closely associated with the river and other waterfront areas, or with the inland sand ridges.

LAND COVER

The Sanctuary lies in the Chassahowitzka Coastal Strip subdivision of the Big Bend Karst physiographic region where elevations range from 0 to 80 feet. The Chassahowitzka Coastal strip is in the western part of central Florida's Ocala Uplift District (Brooks, 1981). The predominant landform is a flat, weakly dissected alluvial plain formed by deposition of continental sediments onto submerged, shallow continental shelf, which was later exposed by sea level subsidence. Along the coast, fluvial deposition and shore zone processes are active in developing and maintaining beaches, swamps, and mud flats.

Table 2 Listed Wildlife Species Known or Likely to Occur

Verified	Species	FWC	US FWS	Management Recommendations
◆	Gopher frog *Rana capito*	SSC	-	Maintain hydroperiod in isolated wetlands.
◆	American alligator *Alligator mississipiensis*	SSC	T (S/A)	Protect from illegal take; maintain wetlands.
◆	Eastern indigo snake *Drymarchon corais couperi*	T	T	Manage as prescribed for gopher tortoise.
	Florida pine snake *Pituophis melanoleucus*	SSC	-	Manage as prescribed for gopher tortoise.
◆	Short-tailed snake *Stilosoma extenuatum*	T	-	Manage as prescribed for gopher tortoise.
◆	Gopher tortoise *Gopherus polyphemus*	SSC	-	Manage areas with dense tortoise populations and/or xeric soils to maintain open canopy.
◆	Bald eagle *Haliaeetus leucocephalus*	T	T	Maintain primary and secondary zones consistent with guidelines established by USFWS.
◆	Listed wading birds*	See Below	-	Protect rookeries and foraging sites with appropriate buffers.
◆	Southeastern American kestrel *Falco sparverius paulus*	T	-	Maintain pyrogenic communities on appropriate burn frequency cycle; preserve snags.
	Whooping crane *Grus americana*	XN**	SSC	Preserve salt marsh habitat.
	Scott's seaside sparrow *Ammodramus maritimus peninsulae*	-	SSC	Preserve salt marsh habitat.
	Marian's marsh wren *Cistothorus palustris marianae*	SSC	-	Preserve salt marsh habitat.
	Florida mouse *Podomys floridanus*	SSC	-	Manage as prescribed for gopher tortoise.
◆	Sherman's fox squirrel *Sciurus niger shermani*	SSC	-	Maintain pyrogenic communities on appropriate burn frequency cycle.
◆	Florida black bear *Ursus americanus floridanus*	T	-	Documented on site; work with local acquisition programs to enlarge and link conservation land. Encourage wildlife crossings.
◆	West Indian manatee *Trichechus manatus*	E	E	Enforce manatee protection zones in waterways (see text).

*Listed wading birds = limpkin (SSC), snowy egret (SSC), tricolored heron (SSC), white ibis (SSC), little blue heron (SSC), and wood stork (E – FWC; E – USFWS)
**XN – Experimental non-essential population
E – Endangered
T – Threatened
SSC – Species of Special Concern
T(S/A) – Threatened due to Similarity of Appearance

Table 3 Listed and Commercially Exploited Plant Species

Species	FDA	Habitat/Management Recommendations
Green-fly orchid *Epindrum conopseum*	CE	Protect mesic and hydric hammock. Prevent commercial exploitation.
Cinnamon fern *Osmunda cinnamomea*	CE	Protect forested wetlands. Prevent commercial exploitation.
Royal fern *Osmunda regalis*	CE	Protect forested wetlands. Prevent commercial exploitation.
Needle palm *Rhapidophyllum hystrix*	CE	Protect hydric hammock. Prevent commercial exploitation.

FDA Florida Department of Agriculture
CE Commercially Exploited

Generally, soils in this region are poorly drained, deep, and moderately textured.

Wetland communities including stream and lake swamps, forested wetlands, saltwater marshes, and freshwater marshes dominate (92%) the Sanctuary. A small percentage (5%) of the Sanctuary contains upland communities including pine flatwoods, shrub and brushland (oak scrub), longleaf pine-xeric oak (sandhill), and mixed hardwood/conifer forest. Open-water surfaces that consist primarily of the Chassahowitzka River and its tributary creeks are sovereign lands of the State of Florida, and occupy approximately 130 acres within the Sanctuary. The river system supports most of the recreational usage on the property.

The following discussion provides a brief description of the natural vegetation and other land cover types occurring within the Sanctuary.

Wetlands

Stream and lake swamps (Bottomland) and mixed wetland forest, commonly referred to as hydric hammock, dominate the Sanctuary and occupy 5,058 acres (89%) of the total land area. The dense canopy of this forested wetland community supports a diverse mixture of tree species including bald cypress, cabbage palm, live oak, laurel oak, water oak, sweetgum, American elm, red cedar, pignut hickory, basswood, red maple, slash pine, and sweet bay magnolia. Although the canopy of the hydric hammock appears to be fairly uniform in composition, there is a tendency for some species to vary in their distribution. Cabbage palm, live oak, and red cedar are more salt-tolerant than the other tree species (Vince, et al., 1989) and they dominate the overstory in portions of the hydric hammock that adjoin the salt marsh. Occasional old-growth cypress also punctuates the forest canopy.

The understory of the hydric hammock forest supports a large population of needle palm. This relatively uncommon, diminutive palm species has been designated a “Commercially Exploited” species by the Florida Department of Agriculture (FDA) in response to its widespread collection from natural populations. Shrub and herbaceous species include wax myrtle, beautyberry, saltbush, buttonbush, persimmon, winged sumac, swamp fern, cinnamon fern, sawgrass, flatsedge, royal fern, and pennywort. Several unusual epiphytic plants occur in the hydric hammock including the golden polypody, shoestring fern and green-fly orchid, which have all been designated as threatened by the State of Florida.

Approximately 88 acres (~2%) of the Sanctuary is salt marsh, which is an extremely productive natural community.

Salt marsh contributes substantially to the overall productivity of estuarine systems. Salt marsh may be described as a transitional community interposed between terrestrial and marine ecosystems. It is restricted to the inter-tidal zone and occurs only on coastlines subjected to waves of very low energy.

Approximately 60 acres of the Sanctuary salt marsh border the channel of Johnson Creek along the western edge of the property and are continuous with the marshes of the Chassahowitzka NWR (Figure 3). The most upstream segments of the marsh are dominated by sawgrass as a result of freshwater inflow from Johnson Creek. An increase in the degree of tidal influence and a corresponding increase in salinity levels produce marsh that is dominated by black needle rush in the downstream reaches. The transitional nature of this stand of marsh increases its significance in terms of contributions to habitat diversity and landscape heterogeneity within the relatively uniform and monospecific vegetation of the salt marsh community. The remainder of the Sanctuary salt marsh occurs as small, discontinuous stands of sawgrass associated with the tributary spring run streams, including Baird Creek and Blue Run.

The open-water surfaces encompassed within the Sanctuary consist of the Chassahowitzka River and its tributary creeks and are sovereign lands of the state. The river and tributaries account for a total surface area of approximately 130 acres and derive the vast majority of their stream flow from artesian springs and represent true spring run communities. District-owned open-water surfaces include approximately 7 acres of water-filled pits near the northern end of the Sanctuary and are remnants of an old limerock mining operation.

Uplands

Upland communities within the Sanctuary account for less than 5 percent of the total land area. The overwhelming predominance of wetland communities severely limits the opportunities for on-site improvements designed to facilitate recreational usage and enhanced access. It also increases the overall significance of the scant uplands, which are a relative rarity within the local landscape and which may fulfill critical habitat needs for a number of animal species.

Small stands of mixed hardwood/conifer forest (mesic hammock) have colonized a number of slightly elevated ridges within the expanse of hydric hammock and account for a total land area of approximately 177 acres (3%). The composition of the overstory in these areas is similar to that of the hydric hammock, but includes a larger

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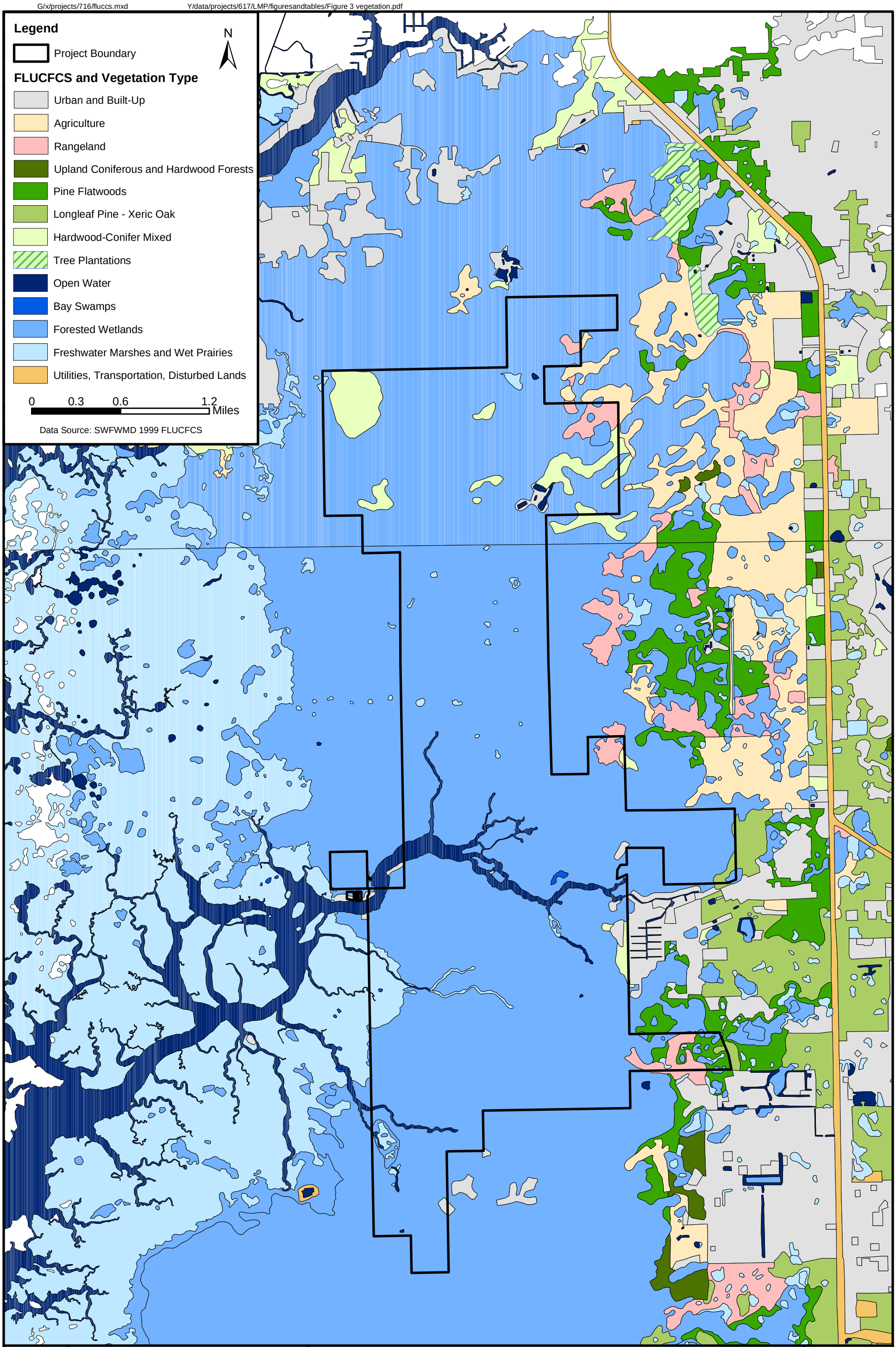


CHASSAHOWITZKA RIVERINE SWAMP
LAND MANAGEMENT PLAN
Citrus & Hernando Counties, Florida

VEGETATION MAP

Figure 3

component of hickories and basswoods. These areas also support southern magnolia and an understory that includes saw palmetto and bracken fern.

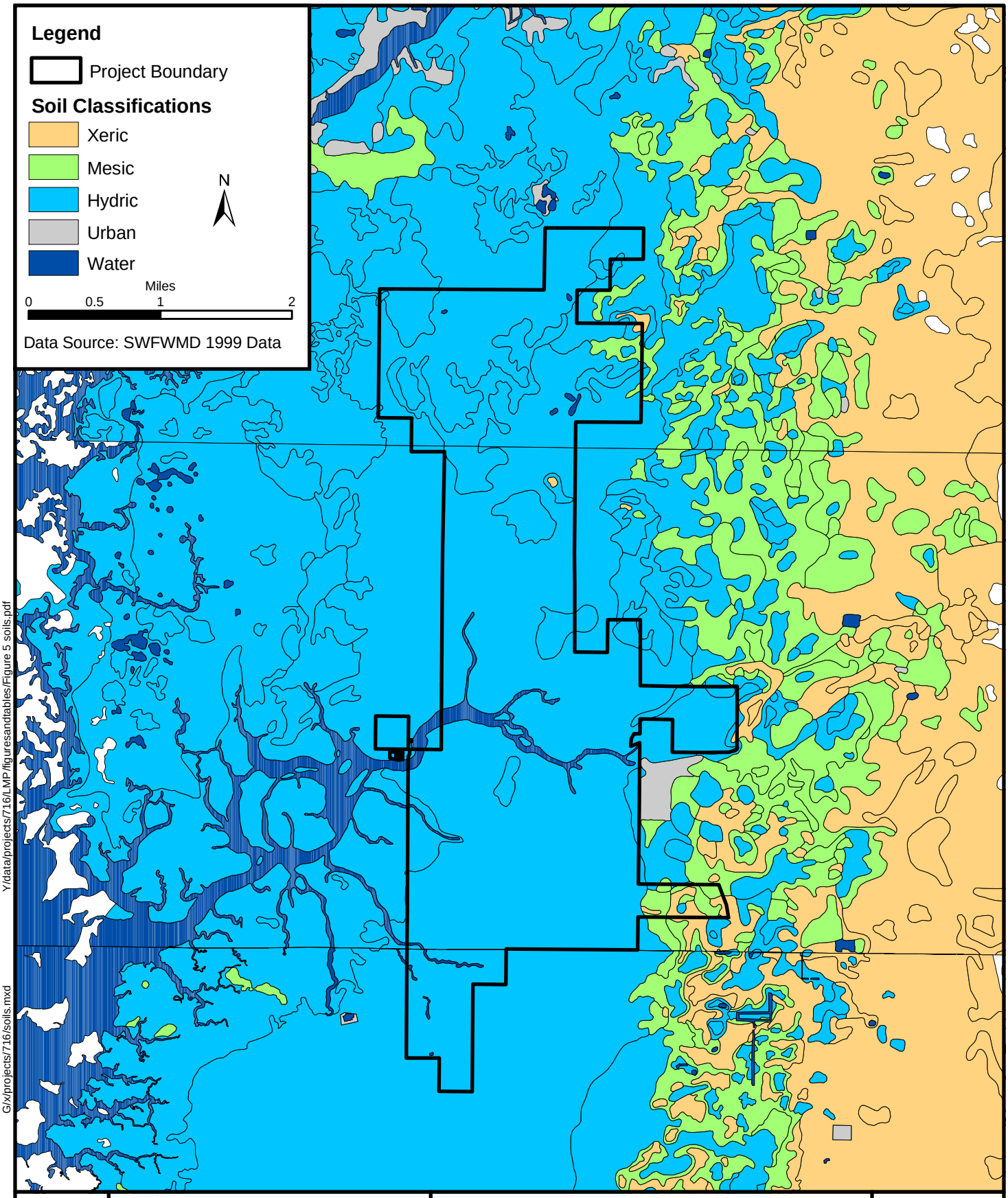
Pine flatwoods constitute 32 acres or less than 1% of the total land area of the Sanctuary. The pine flatwoods are open-canopy forests of widely spaced slash pine with little or no subcanopy, but a dense groundcover of herbs and shrubs. The shrub layer is composed of saw palmetto, gallberry, fetterbush, coastal plain staggerbush, wax myrtle, shiny blueberry, dwarf huckleberry, and sand live oak. Mesic flatwoods are noted for their herbaceous diversity, including many rare species (Hardin and White 1989). Herbaceous species include wiregrass, lopsided Indiangrass, little bluestem, grass-leaved silkgrass, bracken fern, tall elephantfoot, witchgrasses, blue maidencane, yucca, prickly pear, paw paw, black root, meadow beauty, white top aster, cat briar, Bahiagrass, and milkworts, among others.

Other upland communities in the Sanctuary include sandhill (32 acres) and oak scrub (40 acres) designated as Shrub and Brush Lands (FLUCFCS). The majority of sandhill and scrub oak areas were over grown or degraded when the Sanctuary was acquired in the early 1990s. Forty acres of oak scrub/sandhill area were restored via prescribed fire and mechanical reduction in 2000. The scrub/sandhills are forests of widely spaced, low-canopied sand live oaks, longleaf pine, turkey oak, and myrtle oak. The shrub layer includes shiny blueberry, saw palmetto, wax myrtle, and sand live oaks. The herbaceous layer includes partridge pea, wiregrass, goldenrod, bracken fern, blazing star, yellow button, white aster, and lichen, including cladonia, among other species. The oak scrub sites occur only at the Sanctuary's higher elevations (ca. 10 feet above sea level). Saw palmetto and cabbage palm serve as an important food source, and mast produced by shrubby oaks that dominates these upland areas and may serve as an important supplemental food source for the local black bear population.

SOILS

Soils at the Sanctuary are divided into three distinct groupings based on soil moisture: xeric, mesic, and hydric. Xeric soils typically support scrub, sandhill, scrubby flatwoods, and xeric hammock (Figure 4). Mesic soils favor the development of pine flatwoods and mesic hammock. Hydric soils support hydric flatwoods and all wetland communities.

Predominant soil types in the Sanctuary belong to the hydric group of soils. These soils include the Okeelanta-



CHASSAHOWITZKA RIVERINE SWAMP
LAND MANAGEMENT PLAN
Citrus & Hernando Counties, Florida

SOIL MAP

Figure 4

Lauderhill-Terra Ceia complex, which occurs on a majority of the Sanctuary. Other hydric soils include Weekiwachee Durbin mucks, Pompano fine sand, Pompano fine sand (depressional), and EauGallie fine sand. Hydric soils are high in organic content and are very poorly drained. They are inundated during wet periods, typically by rainfall, and may be ponded for 3-12 months per year. Limestone bedrock is usually located within 3-20 inches of the soil surface and is occasionally exposed. The above listed hydric soils, with the exception of Weekiwachee Durbin mucks, are associated with the extensive hydric hammock community. The high fertility of these soils renders them capable of supporting the dense, lush canopy that characterizes the hydric hammock. The Weekiwachee Durbin mucks occur in the broad, flat, tidal salt marshes at the western side of the Sanctuary. This soil area is a transition zone between freshwater and marine water. This soil type is flooded daily at normal high tides and remains nearly saturated between high tides.

Scattered stands of upland mesic hammock that interrupt the nearly continuous hydric hammock distinguish pockets of the mesic Hallendale-Rock outcrop complex. This complex of soils is also poorly drained, but is more rarely flooded than the soils of the hydric hammock. These soils occur on low ridges and are subject to flooding only following heavy rains, or more rarely, by severe tidal surges. Like the soils of the hydric hammock, they are underlain by limerock at a depth of 20 inches or less.

The Sanctuary's pine flatwoods, sandhill, and oak scrub communities are confined to the highest elevations. The Sanctuary's pine flatwoods are underlain by mesic soils including 1) Myakka, limestone substratum-EauGallie, limestone substratum complex, and 2) Myakka fine sand. These are poorly draining soils where the water table is usually less than 10 inches below the surface for 1 to 4 months of the year. In dryer times the water table could be as much as 40 inches below the surface. The xeric Tavares fine sands or Candler fine sands characterize the sandhill and oak scrub areas. Both soils are moderately well drained with rapid permeability and tend to become droughty during periods of low rainfall. These two communities are typically restricted to sites that are higher and dryer than flatwood sites.

All of the Sanctuary's soils have severe limitations in terms of potential to support development or intensive recreational uses. The soils of the hydric and mesic hammocks are too wet and mucky to support development. Tavares and Candler fine sands are subject to erosion and are not capable of supporting regular vehicular traffic, or

such uses as horseback riding and off-road bicycling.

AREAS OF RESPONSIBILITY

The acquisition of land is an important element in the District's efforts to meet its four primary Areas of Responsibility (AORs). These AORs are flood protection, water supply, water quality, and natural systems protection. The following discussion describes the hydrology and natural systems of the Sanctuary, its role in regional water management, and the benefits resulting from its protection.

Flood Protection

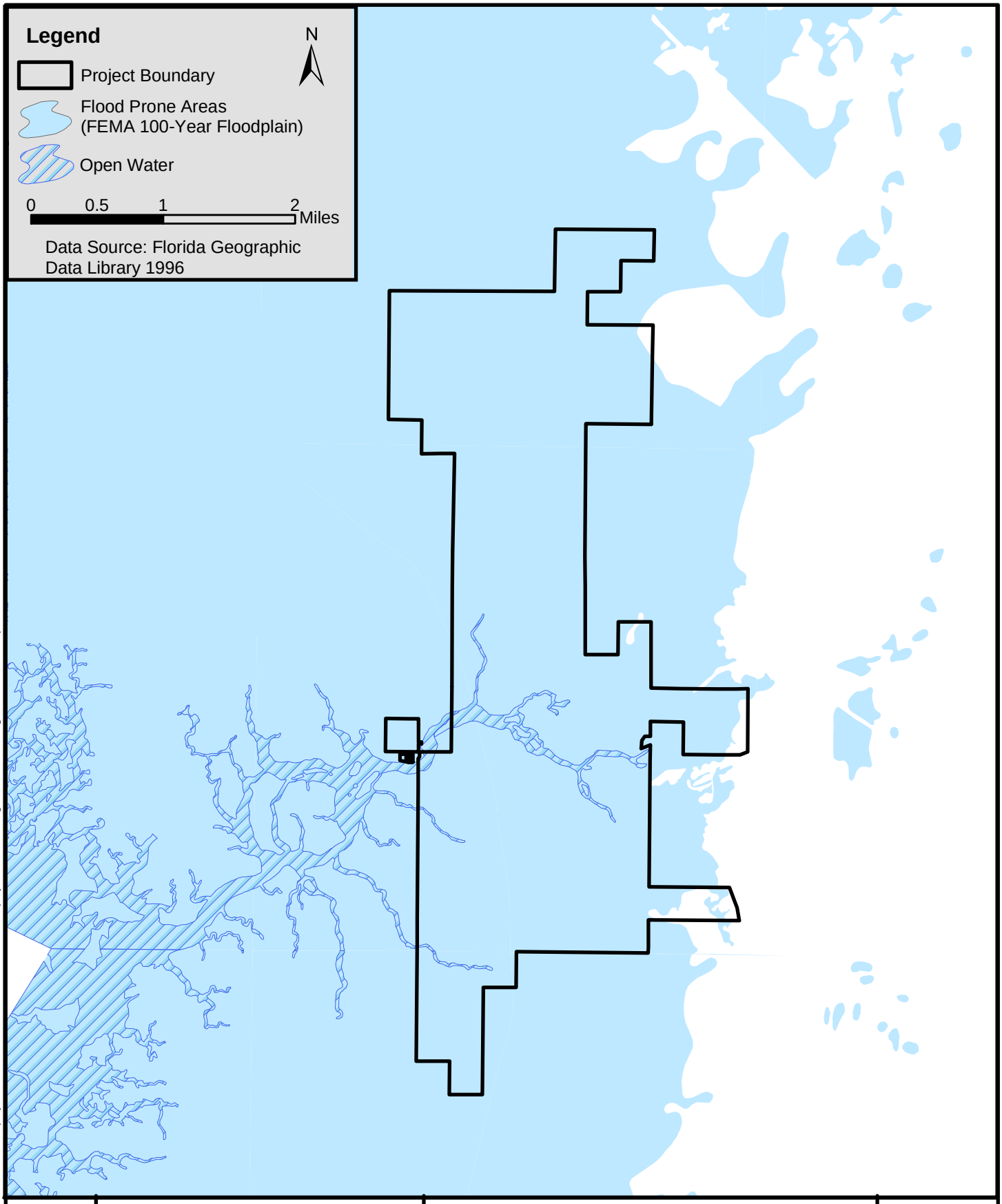
Flood protection depended historically upon structural approaches to provide for the storage and controlled conveyance of floodwater. A non-structural approach has since been adopted as a more environmentally benign, cost effective method in areas where such an approach is feasible. The District's primary flood protection strategy depends upon identifying and preserving natural floodplains and other land that can serve as storage areas for storm-generated floodwater.

The floodplain of the Chassahowitzka Swamp is somewhat unusual among floodplains (Figure 5). Although it is associated with the Chassahowitzka River, it is not a typical riverine floodplain. The spring-fed nature of the river produces a system with a relatively constant base flow that does not experience flooding as a result of rising stages in the river. The coastal location and low elevation of the swamp make it susceptible to floods generated by tidal surges in the Gulf of Mexico.

Flood protection values of the Sanctuary are related to its natural ability to act as a buffer between the coast and inland development, in contrast to floodplains that store large volumes of storm-generated water. Most of the coastline of Hernando and Citrus Counties can experience destructive tidal flooding and property damage during severe storm events. Natural lands of the Chassahowitzka Swamp serve as a buffer to tidal flooding in surrounding developed areas.

Water Supply Protection

Ensuring adequate water supplies for humans and for the environment is central to the District's mission. A variety of effective water supply programs, including a water use-permitting program, regulate the amount of water taken from surface and groundwater sources. The District's regulatory efforts are balanced with incentives such as the New Water Sources Initiative and other Cooperative Funding projects that encourage development and use of reclaimed water, desalination, aquifer storage and



CHASSAHOWITZKA RIVERINE SWAMP
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FLOOD PRONE AREAS

Figure 5

recovery, and other non-traditional sources.

The complex of springs that is commonly referred to as Chassahowitzka Springs forms the headwaters of the Chassahowitzka River and is located just inside the eastern boundary of the Sanctuary. It is one of 27 first-magnitude springs located in Florida. The volume of water discharged from such springs must average at least 100 cubic feet per second (cfs). The average discharge from Chassahowitzka Springs is estimated to be 139 cfs, with a range of 32-197 cfs (Rosenau et al., 1977). Water temperature hovers closely around an average of 74 degrees Fahrenheit.

On-site tributaries of the Chassahowitzka River include Baird Creek, Crab Creek, Salt Creek, Potter Creek, Johnson Creek, and Crawford Creek, and are produced by artesian spring flow and contribute substantially to the total flow of the river. The springs that serve as the origins of these tributaries range from the relatively large Ruth Spring, which lies at the head of Potter Creek and produces an average discharge of approximately 20 cfs, to the numerous small, undescribed springs that produce diffuse flows along the middle reaches of the streams. Chemical characteristics of these spring discharges vary considerably from spring to spring. Salinity levels, expressed as chloride concentrations, range from a low of approximately 52 parts per million (ppm) at Chassahowitzka Springs to a high of 2,120 ppm in the Blue Run branch of Crawford Creek.

The continuous freshwater discharge provided by the river and its tributaries is a critical element in the creation and maintenance of its surrounding floodplain and the downstream Chassahowitzka estuary. The build up of water in these systems creates a hydraulic head, which protects against salt-water intrusion from the Gulf of Mexico, thereby protecting and maintaining inland groundwater that serves as a source of public supply.

Water Quality Protection and Enhancement

Protection or enhancement of water quality is an important element of the District's land acquisition and conservation program. Although natural agents sometimes cause contamination of surface water and groundwater, such contamination is usually associated with human activities. As the demands placed upon water supply sources have intensified, issues of contamination and the treatment necessitated have likewise intensified. The ability of natural systems, particularly wetlands, to improve water quality has become an

important consideration in water quality related issues.

The Chassahowitzka River system remains in an almost entirely natural state and may ultimately be one of the few spring run streams in Florida that will retain its wilderness character. The District's Surface Water Improvement and Management Program (SWIM), which was established by the State of Florida in the SWIM act of 1987, has identified the Chassahowitzka River as a "priority water body" on the basis of its pristine condition and outstanding natural values. It has been placed in SWIM's Conservation/Preservation subcategory, which distinguishes significant water bodies that are in good condition but which may be degraded by future actions unless protective measures are implemented. In addition, the State of Florida has designated it as an Outstanding Florida Water. The intent of this designation, which was conferred in 1992, is to ensure that existing water quality conditions will be maintained. The District's management of the Sanctuary will be designed to remain in compliance with these designations and to achieve the preservation objectives implied by such recognition.

Ground water discharging at the Chassahowitzka Springs group may be fresh or brackish, depending on the tides and water levels in the Floridan aquifer. At low tide, water quality varies across the spring group with total dissolved solids (TDS) concentrations increasing from less than 500 milligrams per liter (mg/l) to greater than 5,000 mg/l in springs nearest the Gulf of Mexico. Chloride concentrations across the spring group may range from less than 150 mg/l to greater than 3,000 mg/l, indicating that water quality at the springs is strongly influenced by the coastal transition zone even at low tide (SWFWMD, 2001).

Nitrate concentrations at the Chassahowitzka Springs group are typically below 0.6 mg/l. Concentrations vary among the individual springs of the group, possibly in response to mixing in the coastal transition zone and variations in nitrate in Floridan aquifer ground water. Research conducted by the Water Quality Monitoring Program (WQMP) group indicates that the nitrate discharging from the Chassahowitzka Springs group is most likely derived from fertilizers applied to residential and golf course turf grass inland of the springs (SWFWMD, 2001). Nitrates in the water are readily uptaken by the surrounding wetlands (David DeWitt, SWFWMD personal communication).

Water quality trends suggest that the Chassahowitzka spring run stream discharges have been exhibiting greatly increased levels of nitrate (SWFWMD, 2001). Slow travel time of groundwater

contaminants has important implications for any future effort to control or manage the effects of elevated nitrate levels upon the Sanctuary's spring run systems. First, it suggests that the sources of nitrates in present spring discharges are of local origin, the source being nitrate-inorganic fertilizers. Second, it demonstrates that the successful control or reduction of nitrate inputs from surficial sources will not provide a quick fix or result in a rapid reduction of spring run nitrate levels. Since the primary sources of nitrate input have been identified as inorganic turf fertilizers, an educational campaign of the appropriate industries and homeowners has been implemented. However, given the extended time interval that will be required for nitrate-tainted ground waters to be flushed from the underlying aquifer, it is unrealistic to expect that the long-term environmental consequences of elevated nitrates in spring run systems can be immediately halted or short-circuited.

Natural Systems Protection

With the acquisition of the Sanctuary, all natural systems are enhanced through preservation and/or management activities. As was previously discussed, over 95 percent of the property lies within the 100-year floodplain. Preservation of these natural wetland and upland systems provides flood and water quality protection while preserving natural habitat for wildlife. There are many notable species of wildlife and plant life inhabiting the Preserve including bald eagles, Florida black bears, gopher tortoises, Florida manatees, needle palms and green-fly orchids (Tables 2 and 3). Some of these species are protected by the state and/or the USFWS on the basis of imperilment. The continued presence of these species can be assured most effectively through preservation and the implementation of land management actions (see Land Management section). The appropriate application of prescribed fire in the uplands and the control of invasive, non-native species will be especially important measures in maintaining outstanding habitat values.

The Chassahowitzka River and associated spring run streams provide clear water and relatively constant flow and temperature which combine to produce an exceptionally stable environment that is capable of supporting an abundance of aquatic plants and wildlife. Many species of wildlife, particularly wading birds, raptors, and waterfowl depend upon the Chassahowitzka spring runs as foraging areas. Osprey, great blue herons, little blue herons, snowy egrets, wood ducks, cormorants, and anhinga are commonly sighted foraging in the river. Many critically imperiled species of wildlife also depend upon habitat provided by spring run systems, including the bald

eagle, wood stork, and West Indian manatee.

Grass beds of the Chassahowitzka spring runs are dominated by eelgrass, pondweed, and widgeon grass. Together with the attached algae and invertebrates that occur in these areas, the freshwater grass beds provide protective cover and serve as important feeding areas for many species of wildlife. They form the base of a complex aquatic food chain that supports many fish species of commercial and recreational value including redfish, snook, and mullet. They also provide forage for the local manatee population. The root mass under these lush mats of aquatic vegetation stabilizes the sandy bottom sediments and helps to maintain the clarity and quality of the water. Preservation of these grass beds will be an essential ingredient in any effort to successfully preserve the wildlife and recreational values of the river system. Currently, the seagrass beds are being impacted by boat traffic causing prop scars and destruction of grass beds. Protection of these resources is discussed in the Special Protection Area section.

The water conveyance role of the Chassahowitzka River is critical to the maintenance of the Chassahowitzka Bay estuary, and the extremely productive habitat that it represents, which begins a short distance downstream from the Sanctuary. Many fish and other aquatic species in the Sanctuary are generated in the estuary, and the freshwater flow conveyed to Chassahowitzka Bay through the channel of the Chassahowitzka River sustains the estuary. An estimated 90 to 97 percent of all commercially valuable fisheries species are dependent upon habitat provided by estuaries. For many of these species, estuarine grass beds and marshes provide foraging areas and protective cover, and serve as nursery areas during the early stages of their life cycle. Many other species are restricted entirely to estuarine habitats. The long-term protection of the estuary will be dependent upon maintaining the freshwater input produced by Chassahowitzka Springs and other springs associated with the river and its tributaries. Groundwater pumpage around Chassahowitzka Springs and along the entire Springs Coast of Hernando and Citrus Counties must be carefully controlled to ensure that freshwater inputs to this extensive coastal estuary are preserved.

CONCEPTUAL LAND USE PLAN

LAND USE

District Board Policy 610-3 directs that appropriate public recreational usage of District lands be permitted, provided that the usage is compatible with natural resource management and protection needs. Recreational activities that are not "resource based" will not normally be allowed. Resource-based activities generally consist of those outdoor recreational or educational pursuits in which natural surroundings are a fundamental requirement for engaging in the activity.

Recreation

Recreational activities permitted at the Sanctuary include hiking, fishing, boating, canoeing/kayaking, birding, picnicking, and nature study. Camping and boating are available at the Chassahowitzka River Campground and Recreation Area, which is a developed facility operated by the Citrus County Parks and Recreation Department through a lease agreement with the District. Prohibited uses include horseback riding, off-road bicycling, and scuba diving. The preponderance of wetlands in the Sanctuary makes it incapable of supporting horseback riding or off-road bicycling, and the springs and spring run streams are unsafe for scuba diving. Swimming is prohibited in the Section 10 mining pits to reduce potential hazards associated with the pits, and to promote the ongoing reestablishment of native vegetation on the banks of the pits.

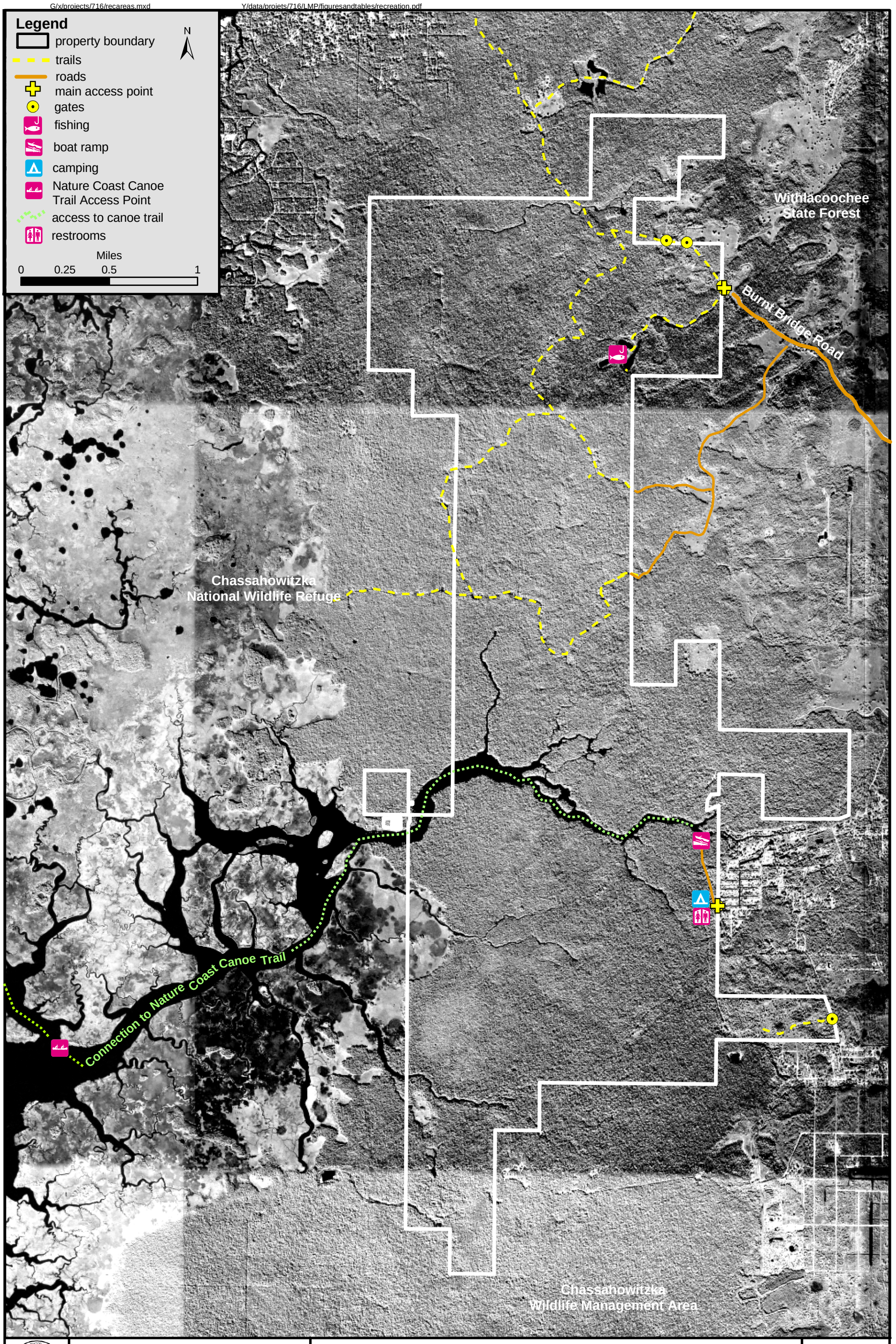
Public Access

The entire Sanctuary is available to the public through foot access. However, there are few opportunities for providing recreational access directly from public right-of-ways. Nearly the entire property line is bordered by privately owned lands through which the public cannot gain access, or by other publicly held tracts where access is regulated or controlled by other agencies. Despite these unavoidable constraints on access to the Sanctuary, there are several modes of legal access that are adequate to accommodate public usage.

The boat ramp and other facilities of the Chassahowitzka River Campground and Recreation Area provide convenient access to the water and serve as the primary gateway to the property (Figure 6). Historically, the public's use of the Chassahowitzka area has emphasized water-related activities and has centered on the river, its tributaries, and downstream estuary.

A second access point serves the northern half of the Sanctuary. The public's vehicular access, via Burnt

G/x/projects/716/recareas.mxd Y/data/projets/716/LMP/figuresandtables/recreation.pdf



SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT	CHASSAHOWITZKA RIVERINE SWAMP LAND MANAGEMENT PLAN Citrus & Hernando Counties, Florida	**RECREATION AREAS**	Figure 6

Bridge Road through the Homosassa Tract of the Withlacoochee State Forest, terminates at a parking area located adjacent to the Sanctuary's property line (Figure 6). The parking area serves as a staging area for use of the northern portion of the Sanctuary, which includes a network of hiking trails and a fishing area at the borrow pits. A walk-through pedestrian entrance to the Sanctuary is provided from the parking area.

Access from the west must generally be by boat and may occur via the Chassahowitzka River or the tributary creeks that enter the property in the downstream reaches of the river, including Crawford Creek, Potter Creek and Johnson Creek. Entry from the west requires passage across the NWR, and the US Fish and Wildlife Service (USFWS) enforce several restrictions on the use of boats in that area. These restrictions include limitations on the use of airboats and prohibit entry into a designated Migratory Bird Sanctuary (MBS) from October 15 through February 15. The MBS adjoins much of the western property line north of the Chassahowitzka River and would, therefore, preclude foot access from the west during the period of closure. In addition, all waters of the NWR from the mouth of the Chassahowitzka River northward have been designated a Manatee Protection Area. Boat speeds in excess of 25 miles per hour are prohibited year-round, and the main channel of the river is a slow-speed, minimum-wake zone from August 31 through April 1.

Access from the south will be limited to foot traffic entering from the NWR or from the Chassahowitzka WMA (Figure 6). Vehicular traffic on the Sanctuary property is restricted to road surfaces of the Chassahowitzka River Campground and Recreation Area and to motorized boat traffic in navigable waters of the Chassahowitzka River and its tributaries. Private points of access to District lands are not permitted, and property lines that adjoin private lands will be monitored to ensure that fence lines remain intact.

Access Easements

An easement granting rights of vehicular ingress and egress over District lands has been conveyed to allow access to a private residence located at the northern terminus of Crab Creek. This is an exclusive easement and does not extend access privileges to the public-at-large.

Hiking

An old system of above-grade tram roads dissects the northern half of the Sanctuary and provides a convenient system of trails for hikers. Most of this portion of the Sanctuary is densely forested by stands of hydric hammock. Remnant tram roads have not been

maintained to support continued vehicular usage and have been breached by washouts. A natural re-growth of tree cover and other native vegetation along the margins of the roadways and in the adjoining forest has reclaimed much of the formerly open throughway and reduced it to the status of a trail network that will be closed to vehicular use. The natural regeneration by native vegetation on the roadways, and their above-grade elevation, makes them ideal for hiking. The wet, swampy forests are not otherwise suited for hiking and would be inaccessible during much of the year. Portions of the trails extend beyond the boundary of the Sanctuary and onto adjoining public lands of the Homosassa Tract and the NWR forming a multi-property network.

Camping

Existing facilities of the Chassahowitzka River Campground and Recreation Area include 88 individual campsites, with 36 sites that provide full hook-ups for recreational vehicles and a site that is reserved for youth groups. Restrooms, showers, a camp store, laundry facilities, a shuffleboard court, and a picnic pavilion are available.

Black bears are frequently attracted to campgrounds and other areas where food may be easily obtained, and this poses a management concern. Educational signage concerning the presence and habits of the black bear is posted for the general public, and bear-proof trash receptacles are provided at the campground to dissuade bears and other wildlife from associating the campground with food.

Canoeing and Boating

Canoeing and kayaking represent one of the most innocuous and compatible uses of the Sanctuary property. The quiet, unobtrusive nature of canoeing/kayaking usually results in minimal disturbance of resident wildlife and is unlikely to conflict with other passive uses. The Chassahowitzka River Campground and Recreation Area provide rental canoes for day-use and serves as the most convenient on-site location for launching privately owned canoes or kayaks. Use of the river is necessarily limited to day trips due to the absence of waterfront campsites in the Sanctuary and on adjoining public lands, unless the Recreation Area is used as an overnight stop for users of the Nature Coast Canoe and Kayak Trail. The Nature Coast Canoe and Kayak Trail begins on the Salt River off Crystal River, and extends southward along the Salt River to the Homosassa River and then into Battle Creek. The southern leg of the trail, the Michael Byer Memorial Trail, continues from Homosassa and Battle Creek, going south through Seven Cabbage Cut to the mouth of the Chassahowitzka River.

Boating is permitted on the Chassahowitzka River and associated navigable tributaries although the river is shallow with no defined channels. As a consequence extensive scarring of the river bottom and submerged aquatic vegetation has occurred from boat propellers in shallow areas (for further discussion refer to the SPA section). As discussed in the access section, entry by boat from west of the Sanctuary requires passage through the NWR and restrictions by the USFWS limit the use of airboats and prohibit entry into the MBS from October 15 through February 15. In addition, all waters of the NWR from the mouth of the Chassahowitzka River northward are designated Manatee Protection Areas. Boat speeds in excess of 25 miles per hour are prohibited year-round, and the main channel of the river is a slow-speed, minimum-wake zone from April 1 through August 31.

Fishing

Fishing is permitted (with proper permits issued by the FWC) in the Section 10 mining pits on the northeastern portion of the Sanctuary and accessed from the Burnt Bridge Road access point and parking lot. Fishing is also permitted within the Chassahowitzka River and its tributaries.

Hunting

Managed hunting generally requires large, remote tracts of land that are able to support self-sustaining populations of wildlife species typically sought as game. Superficially, the Sanctuary would appear to be suitable for managed hunting. However, year-round public usage of the river and spring run tributaries renders the southern half of the property unsuitable for hunting. Although the northern half of the Sanctuary is more isolated and may be adequately buffered from any high-use areas, it abuts the 7,600-acre MBS that has been established within the boundaries of the NWR. The public is prohibited from entering the MBS during a four-month period extending from October 15 through February 15 of each year. This period coincides with the peak of the normal Florida hunting season. Hunting on adjoining District lands could negate much of the protection afforded by the MBS. Conversely, forested areas of the Sanctuary provide additional nesting and foraging habitat for migratory bird species. Allowing only passive, non-consumptive uses in that portion of the property helps to maintain the habitat value of the Sanctuary for migratory birds and effectively expand the MBS.

Another factor that supports continued closure to hunting on the Sanctuary is the extremely imperiled status of the

local black bear population. The Sanctuary offers a haven where black bears can retreat from the intensive seasonal infusion of hunters in the WMA portions of the Chassahowitzka Swamp. Publicly owned natural areas that place an emphasis on use by non-hunters are scarce in the Chassahowitzka region.

Hunting will continue to be prohibited in the Sanctuary in recognition of the imperiled status of the local black bear population, the presence of so many non-hunting users and the configuration of the Sanctuary as an extension of the MBS.

Birding

The sub-tropical climate and mixture of natural communities present on the property, and its occurrence along the migratory path of many neotropical bird species, results in the presence of a great diversity of birds. Encompassed within the Sanctuary are portions of the FWC's Great Florida Birding Trail, which is a 2,000-mile network of roads, which allows access to and unifies existing and new birding trails and sites throughout Florida. Along the trail is a collection of sites selected for their excellent bird watching or bird education opportunites. Bird watching sites in the Sanctuary include the Chassahowitzka River Trail (canoe/kayak) that begins at the Chassahowitzka River Campground and Recreation Area and extends to the Gulf of Mexico. The trail winds through hydric hammock, salt marsh and mudflats of the Sanctuary and extends to the barrier islands along the coast. A diversity of wading birds and shorebirds can be seen along this trail. The Chassahowitzka River Trail (canoe/kayak) connects with the Nature Coast Canoe and Kayak Trail, which extends to Ft. Island Trail Park. On the northern end of the Sanctuary the Rooks Trail traverses a portion of the property and extends into the Homosassa Tract of the Withlacoochee State Forest. This 3-mile roundtrip trail runs primarily through improved pasture, ponds, hardwood swamp and an area of sandhill habitat. Turkeys, meadowlarks, northern bobwhites and a diversity of migratory songbirds can be seen along this trail. Two other Great Florida Birding trails exist around the Sanctuary including Blue Bird Springs and Homosassa Springs Wildlife State Park.

Scientific Research

The use of District-owned lands for bona fide scientific research projects is promoted as an appropriate use of these lands, provided that the projects will not result in long-term impacts to the property's resources. The District will continue to make the Sanctuary available for scientific research. Proposals to conduct research of these lands will be considered on a case-by-case basis. Typically the District will

require interim and/or final reports that summarize the results or information generated by the research and copies of any associated articles or other publications.

Opportunities for Environmental Education

The absence of appropriate sites for the construction of facilities to support structured environmental education programs renders the Sanctuary unsuitable for such purposes. Environmental education programs are currently accommodated at other nearby sites, including a program at the District-held Potts Preserve. A center for the study of coastal ecosystems has also been established in Citrus County. Although the Sanctuary does not provide an opportunity for an intensive, highly structured program, it does provide an outstanding setting for passive or informal forms of nature study and environmental education and these will be permitted.

Multiple Use Potential

In 1996, the District began to evaluate various alternatives for generating revenue on District-held lands in order to assure a continuous source of funding to support land management. Legislative constraints on the use of lands held in trust by the District limited the range of options to those that would be compatible with resource protection needs. As a result, the District considered only those alternatives that would capitalize on existing resources and not result in the alteration of natural, undisturbed lands. The Sanctuary consists of natural, undisturbed lands with a preponderance of wetlands and exists within 110,700 acres of conservation lands, therefore there are no revenue generating activities on site.

Utilities and Other Public Facilities

Consistent with legislation that was adopted by the State of Florida in 1999, lands acquired through state funded acquisition programs can be used for a variety of public facilities. These include utility lines and other linear facilities; stormwater management projects; and water supply development projects. Approval of such uses is contingent upon a number of criteria, including: the use must be compatible with the natural resource values of the property; reasonable compensation must be provided to the titleholder of said lands; the proposed use must be in the public interest; the use must be located appropriately on the lands, with due consideration given to use of other lands; and the proposed use must not be inconsistent with the management plan for the property.

Currently, there are no large-scale uses accommodated on the property,

although the future installation of such facilities cannot be ruled out. The District will ensure that any future proposal to construct utility lines or other public infrastructure on the Preserve complies with statutory directives.

The only utility lines located within the boundaries of the Sanctuary are lines that service a private residence off of Lakes Trail Road (private in-holding), that can only be approached by way of the Sanctuary property, and the utilities which serve the Chassahowitzka River Campground and Recreational Area.

SECURITY

District staff and local law enforcement provide security on the Sanctuary. District staff secure the property boundary by maintaining all fence lines, removing unauthorized access gates, posting appropriate boundary signs, identifying frequent points of unauthorized access, documenting evidence of illegal activities, and placing entry barriers at designated points to prevent unauthorized vehicular access. The security presence maintained on surrounding public lands helps to buffer the Sanctuary from unauthorized vehicular entry and various other prohibited uses of the property and reduces the need for active security measures.

The Chassahowitzka Campground and Recreation Area provides security through two resident campground hosts. One host resides on the backside of the campground and all persons entering the primitive tent camping area must register with the host. Another host resides near the main entrance to the campground. Any illegal entrance or activities are reported to the local police department.

The greatest security concern for the Sanctuary is unauthorized hunting. Evidence of poaching is common, and staff of the USFWS report that gunfire originating in the Sanctuary is frequently heard in neighboring Chassahowitzka NWR. Another security concern is the poaching of palmetto berries, which are a favored seasonal food of the black bear.

Poachers of animals and plants alike tend to disregard property lines and the managers of the NWR are working with the District to apprehend and prosecute whenever possible pursuant to Section 810.09, Florida Statutes.

SPECIAL PROTECTION AREAS

Certain areas within the Sanctuary will warrant special protection efforts in order to more effectively preserve water management functions and/or other outstanding natural values. Any areas that are extremely sensitive to

disturbance; that harbor unique or regionally significant natural features; or that play a critical role in maintenance of the water management values attributed to the property will merit designation as a Special Protection Area (SPA). Typically, SPAs must be discrete features that can be readily defined. Protective measures in these areas must take precedence over other land use and management considerations.

SPAs designated for the Sanctuary include the on-site length of the Chassahowitzka River, including all tributary streams and associated springheads, the Johnson Creek salt marsh, protection zones around all active bald eagle nesting sites, several islands of oak scrub vegetation, a cluster of old mining pits, and known archaeological sites.

Chassahowitzka River

The Chassahowitzka River is the dominant physical feature of the Sanctuary. It has historically served as the hub around which public usage has revolved. The river and riverfront areas will continue to be the focal point for most public usage of the property. The open water of the river and its tributary streams accounts for a total surface area of 130 acres, and are sovereign lands of the State of Florida encompassed within the Sanctuary. Although not District-owned, the concentration of public usage within this narrowly confined area provides a potential for adverse impacts. Therefore, the Chassahowitzka River and its on-site tributaries will be managed as a SPA.

The Chassahowitzka River and associated tributaries are spring run streams. These systems are watercourses that derive all, or most, of their flow from artesian springs. Generally, they are very clear and tend to be slightly alkaline as a result of extended contact with the limestone aquifer. The FNAI has classified spring run streams as an imperiled natural community on both a statewide and global scale (FNAI and Florida Department of Natural Resources-FDNR, 1990).

Protection of the spring run systems will focus primarily upon preventing physical disturbance. Heavy motorized boat traffic along the shallow channel of the Chassahowitzka River has resulted in extensive scarring of the river bottom and of the dense carpet of the submerged aquatic vegetation (SAV). Similar ‘prop scarring’ has been observed in marine grass beds and research suggests that the recovery or re-growth of vegetation in the marine systems can take up to five years if at all (Dawes, et al., 1994; Durako, et al., 1992). Recovery of the grass beds may be especially difficult given the proximity

of bedrock to the surface. In many areas within the River the grass bed exist on a thin covering of sand over the limestone bedrock. Preservation of grass beds will be an essential ingredient in any effort to successfully preserve the wildlife and recreational values of the river system. The best method of protection would be to delineate a corridor of navigation within the river to limit prop-scarring activities.

The District, perhaps in concert with Citrus County and the FWS, will petition the FDEP to work with the United States Coast Guard (USCG) to install private aids-to-navigation in a corridor of the Chassahowitzka River. Although no portion of the River would be closed to access, the aids-to-navigation would concentrate thru-traffic to protect more shallow grass beds. These could consist of unobtrusive floating buoys that would be more compatible with the natural landscape of the river. The buoys would be used to mark a pathway through the deepest portions of the river. Appropriate informational signage should be posted at the upstream and downstream ends of the marked route, and educational or interpretive displays on SAV values could be erected near the boat ramp of the on-site Chassahowitzka River Campground and Recreation Area.

A monitoring program could be implemented to gauge the successfulness of a channel-marking program. If the monitoring program indicated that the aides-to-navigation were not successful in routing boat traffic away from the shallow grass beds, then a more stringent approach, including the identification of temporary exclusion zones, could be considered. Such an approach has been implemented at the Cockroach Bay Aquatic Preserve (Dawes, et al., 1994) with successful results.

Management Actions

- Coordinate with Citrus County and the FWS to petition the FDEP to work with the USCG to install aids-to-navigation and appropriate signage in a corridor of the Chassahowitzka River to limit impacts to SAV communities.

- Monitor the effectiveness of the channel-marking program to assess whether it is reducing prop scarring within the Chassahowitzka River.

Johnson Creek Salt Marsh

Salt marsh communities are transitional habitats between terrestrial and marine ecosystems. This community type is relatively rare within the Sanctuary property and accounts for a total land area of only 88 acres (less than 2 percent of total land area). The salt marsh areas of the Sanctuary have been designated SPAs on the basis of

their rarity within the property, importance to productivity of the estuary, potential use by the experimental population of whooping cranes and current pristine condition.

The Chassahowitzka / Nature Coast salt marshes are used by many of the wading bird species that have been discussed previously. Other wildlife species that depend strongly on habitat provided by salt marshes of the Springs Coast include the threatened (federal and state) bald eagle, Species of Special Concern (state) including Marian's marsh wren and Scott's seaside sparrow, and rare (Florida Committee on Rare and Endangered Plants and Animals) or endemic species such as the Florida clapper rail, black rail and Gulf salt marsh snake. The Endangered West Indian manatee is an occasional visitor to these areas, entering via the tidal creeks.

An experimental, migratory population of Whooping cranes that over-winter in the Chassahowitzka National Wildlife Refuge (NWR) may potentially make use of the salt marsh existing on the property. The newly migrated juvenile birds rarely leave the fenced area of salt marsh (pen), which is a feeding area set up for the new birds, on the NWR. First year juveniles and older birds make use of the salt marsh in the NWR and surrounding areas, which potentially includes the salt marsh of the Sanctuary, and also range further inland to freshwater wetland areas and prairies (Joyce Kleen, FWS personal communication).

The Florida migratory whooping crane population is designated an experimental, non-essential (NX) population by the USFWS, but is protected as threatened with provisions for managing wild populations. The State of Florida considers the cranes a Species of Special Concern that is intentionally introduced and experimentally managed. The whooping crane was extirpated from the State of Florida and this experimental population is an attempt to reestablish a migratory population in Florida. These whooping cranes typically arrive in the NWR in early December and migrate to Wisconsin in April. The cranes over-winter in the Refuge and surrounding coastal wetlands where they forage for blue crabs and clams. Whooping cranes also make use of upland areas where they forage for acorns, snails, crayfish and insects. The protection of the salt marsh and other wetlands of the Sanctuary will help preserve habitat for the whooping crane.

Approximately 60 acres of the Sanctuary's salt marsh border the channel of Johnson Creek along the western property line. The most upstream segments of the marsh are dominated by sawgrass as a result of

freshwater inflow from Johnson's Creek. An increase in the degree of tidal influence, and a corresponding increase in salinity levels, produced a marsh that is dominated by black needlerush in the downstream reaches. The remainder of the Sanctuary salt marsh occurs as small, discontinuous stands of sawgrass associated with the tributary spring run streams, including Baird Creek and Blue Run.

Management of the Sanctuary's salt marsh habitats will focus primarily upon preventing disturbance. Disturbance of the marshes can be manifested in either of two forms: as physical disturbance of the vegetation, or as disturbance of resident wildlife. Prohibiting the placement of any physical structures within the marsh area, and prohibiting any dredging or filling in adjoining open-water areas will prevent physical disturbances. Disturbances associated with noise can be minimized by prohibiting dredging in surrounding waters and by restricting usage by airboats.

Management Action

- Continue to exclude physical structures or dredging activities within the marsh area.

Oak Scrub Community

There are three small stands of oak scrub occurring within the Sanctuary. These stands account for a total land area of approximately 40 acres (less than 1 percent of total). Like the salt marsh areas discussed above, oak scrub sites are a rarity within the property. On this basis, the oak scrub communities will be managed as a SPA.

Although the extensive, densely forested coastal swamp and hammock serves as the primary habitat for the local black bear population, these forests alone cannot provide for the long-term habitat needs of the population. Areas that support resident populations of the Florida black bear usually consist of large tracts that support several different types of forested communities (Maehr and Wooding, 1992). It is suspected that the Chassahowitzka oak scrub sites provide essential habitat for the local bear population (Simons, 1990). This species has been described as an opportunistic feeder that frequently depends on fall mast production as an important seasonal food source (Maehr and DeFazio, 1985). Bears have reportedly been observed feeding on acorns at one of the scrub sites, and localized physical damage to the oak subcanopy corroborates this reported use. Other highly favored food items including palmetto berries, blueberries, and armadillos also occur in greater abundance in the oak scrub sites than in the adjoining forests. In addition, the high, well-drained scrub stands may

provide important areas of refuge for bears and other wildlife during storm-related tidal flooding of the low-lying coastal swamp. In addition to benefiting the black bear, scrub habitat supports a unique community. The gopher tortoise and its commensal species such as the threatened eastern indigo snake and Species of Special Concern including the gopher frog, short-tailed snake and Florida mouse, (the latter three species being endemic to xeric uplands), are supported on the Sanctuary's uplands.

Oak scrub is a fire-maintained community and the primary management need for these sites will be a periodic application of prescribed fire. Natural fire frequencies for scrub communities have been estimated to range from 20-80 years (FNAI and FDNR, 1990). Soils associated with areas of limestone outcropping are often highly productive and post-fire re-growth of these on-site scrub stands may occur quite rapidly. Accordingly, natural fire frequencies for the Sanctuary scrub stands probably tend toward the low end of the estimated frequency and may even occur more frequently than once every 10 years. A return fire interval of 8-15 years should maintain the existing community and promote higher levels of acorn production to the benefit of bears and other wildlife species (Barnwell, personal communication). It would also reduce the potential for excessive accumulations of fuel, thereby minimizing the likelihood of extremely hot fires that would spread into the canopy of the adjoining swamp forest (see Prescribed Fire narrative in Land Management section).

Bald Eagle Nesting Sites

Florida supports the largest population of the bald eagle remaining in the contiguous United States. Populations of the Southern bald eagle, a recognized subspecies that originally ranged of much over the southern United States, have rebounded considerably since the species was originally designated an endangered species by the USFWS. The USFWS has downgraded the bald eagle from its endangered status to that of threatened throughout the species range, and on the basis of its relatively secure status in Florida, the FWC has designated the species as threatened within the State. Management actions related to the bald eagle are discussed subsequently (see Wildlife Management section).

Archaeological Sites

Any future structures or recreational improvements, including foot trails, will be directed away from known archaeological sites. Management priorities for these sites will focus primarily on the prevention of looting. Although the District does not generally provide funding to support

archaeological investigations and assessments, the Sanctuary's sites will be made available for supervised study by professional archaeological researchers. All archeological research must be approved by the Florida Department of State, Bureau of Archeological Research.

Management Actions

- Continue to prevent looting of archaeological sites within the Sanctuary.
- Looters will be prosecuted for trespass, and/or criminal penalties (capital felony) now imposed upon those looting Master Site File sites according to Florida Statutes Chapters 775.082 and 775.083.

Section 10 Mining Pits

A cluster of 3 water-filled pits totaling 7.0 acres are remnants of limerock mining operations conducted on the property prior to District acquisition, and have been designated as SPAs due to potential hazards. The sites are proximate to and readily accessible from the Burnt Bridge Road parking area (Figure 6). The depth and clarity of the water in the pits may entice re-creators to swim in them, and may also make them attractive to fishermen. However, the depth of the water and the steep side slopes pose a potential hazard to public safety.

LAND MANAGEMENT

The District engages in a variety of land management activities designed to protect or enhance the natural resource values of its properties and to ensure public safety. The following is a discussion of some of the management practices and resource protection measures to be employed at the Sanctuary.

Prescribed Fire

Approximately 104 acres of the Sanctuary's 5,679 acres, or 5 percent of the total land area, supports vegetation that will benefit from regular controlled applications of fire. The mesic pine flatwoods, oak scrub, and sandhill communities at the Sanctuary are fire-maintained systems that are dependent upon recurring fire for their long-term maintenance and viability. In the prolonged absence of fire, the vegetative structure and species composition of these communities would gradually change and be of reduced value to wildlife. Given the degree to which the natural Florida landscape has been altered and the need to prevent fires from escaping to adjoining private lands, the natural mechanism of lightning-induced fires cannot be expected to fulfill the fire needs of these communities. The use of prescribed fire will be necessary to achieve some of the land management objectives

established for this property. Long-term fire management will be critical to preserving the fire-dependent communities in a natural, biologically productive state and to maintaining low fuel loads that will pose less risk of spawning catastrophic wildfires.

The inclusion of a detailed prescribed burning plan is beyond the scope of this management plan. Burn plans are developed for each District-held property individually and independently of site-specific land management plans such as this. The District's land management staff has extensive experience in the use of prescribed fire and a burn program has already been implemented on the property. Generally, prescribed fires at the Sanctuary will be designed to mimic natural lightning-induced fires. Appropriate burn seasons and fire return frequencies will be established for each fire-maintained community and will be adhered to whenever possible. Additional details on the use of prescribed fire at the Sanctuary are included in some of the discussions related to wildlife management issues.

Management Actions

- Continue the application of prescribed fire to the Sanctuary's fire-dependent natural communities using prescription parameters designed to (1) prevent the escape of fire to adjoining properties, (2) minimize the potential for placement of fire-generated smoke over sensitive areas, and (3) restore/maintain appropriate and diversified fire frequencies.

- Continue with a preponderance of growing season burns, which more closely mimic conditions resulting from lightning-initiated wildfire.

Habitat Restoration

Habitat restoration does not represent an important land management need at the Sanctuary. Altered lands in the Sanctuary are very limited in overall extent and the process of natural succession is effectively restoring native plant cover in these areas. The District has also stopped maintaining former tram roads that extend into the swamp. The abandonment of these roads has promoted the recovery of surface hydrology.

Habitat restoration in the Sanctuary will consist of implementing the other land management measures discussed in this plan, most notably prescribed burning, and the investigation of enhancement of the mining pits, as discussed in the Special Protection Area section.

Management Action

- Continue to allow the natural revegetation of the tram roads that extend into the swamp.

Wildlife Management

Fauna

Seventeen listed (federally and/or state protected) species are known to occur or potentially occur at the Sanctuary (Figure 7). Additional listed species potentially occur because suitable habitat exists and the Sanctuary is within the species' known range. It is important to note that exhaustive surveys to document the occurrence of threatened and endangered species have not been conducted. There is a high likelihood that additional species meriting special attention and consideration in land management planning will be documented on the property (Figure 8). The District employs an adaptive approach to land management that will be responsive to the presence of any additional species documented to occur on the Sanctuary, and that is consistent with an overall management approach that seeks to maintain healthy ecosystems as the fundamental basis for meeting the needs of the greatest number of native species. Management recommendations for listed species that are likely to occur on the Sanctuary are presented in Table 2. Three of these species are discussed in more detail below because they require special management consideration. If the Sanctuary is managed to promote conditions suitable for these wildlife species, conditions will be favorable for most other desirable wildlife species native to the region (see figure 8 for wildlife occurrence record). These species are:

- Florida black bear, which requires vast expanses of undisturbed forest habitat with a diverse array of natural community types;

- Gopher tortoise, which provides fossorial cover and shelter (burrows) to many other listed and desirable native species; and

- Florida manatees, which require unrestricted, safe access to springs and suitable foraging areas.

Management actions prescribed for these three species promote characteristics that are favorable for many other desirable wildlife species. A fourth listed species, the southeastern bald eagle, requires special management consideration due to specific habitat management guidelines set forth by the USFWS.

A small population of **Florida black bear** is supported in the "Greater Chassahowitzka Ecosystem" (GCE), the

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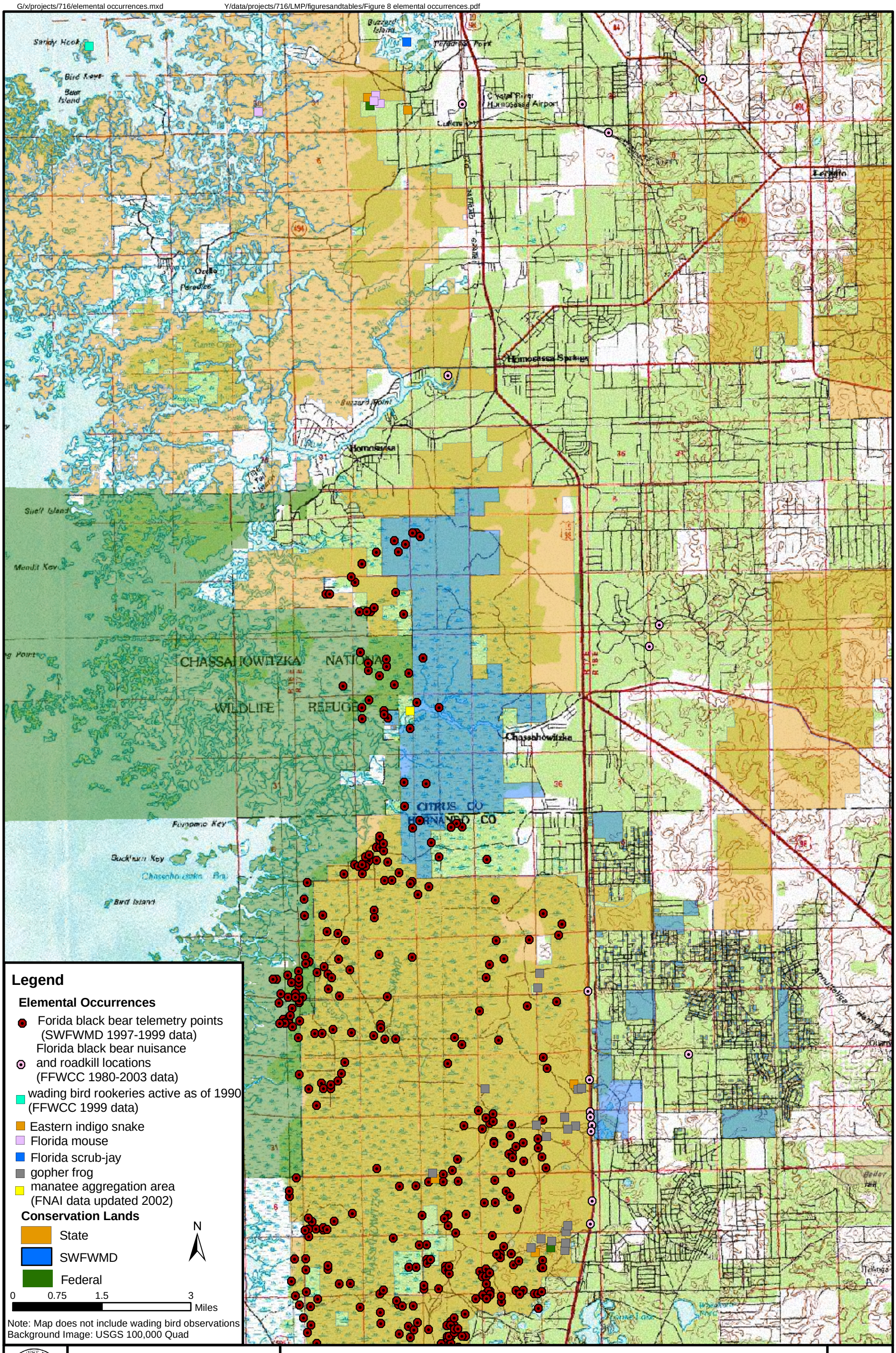
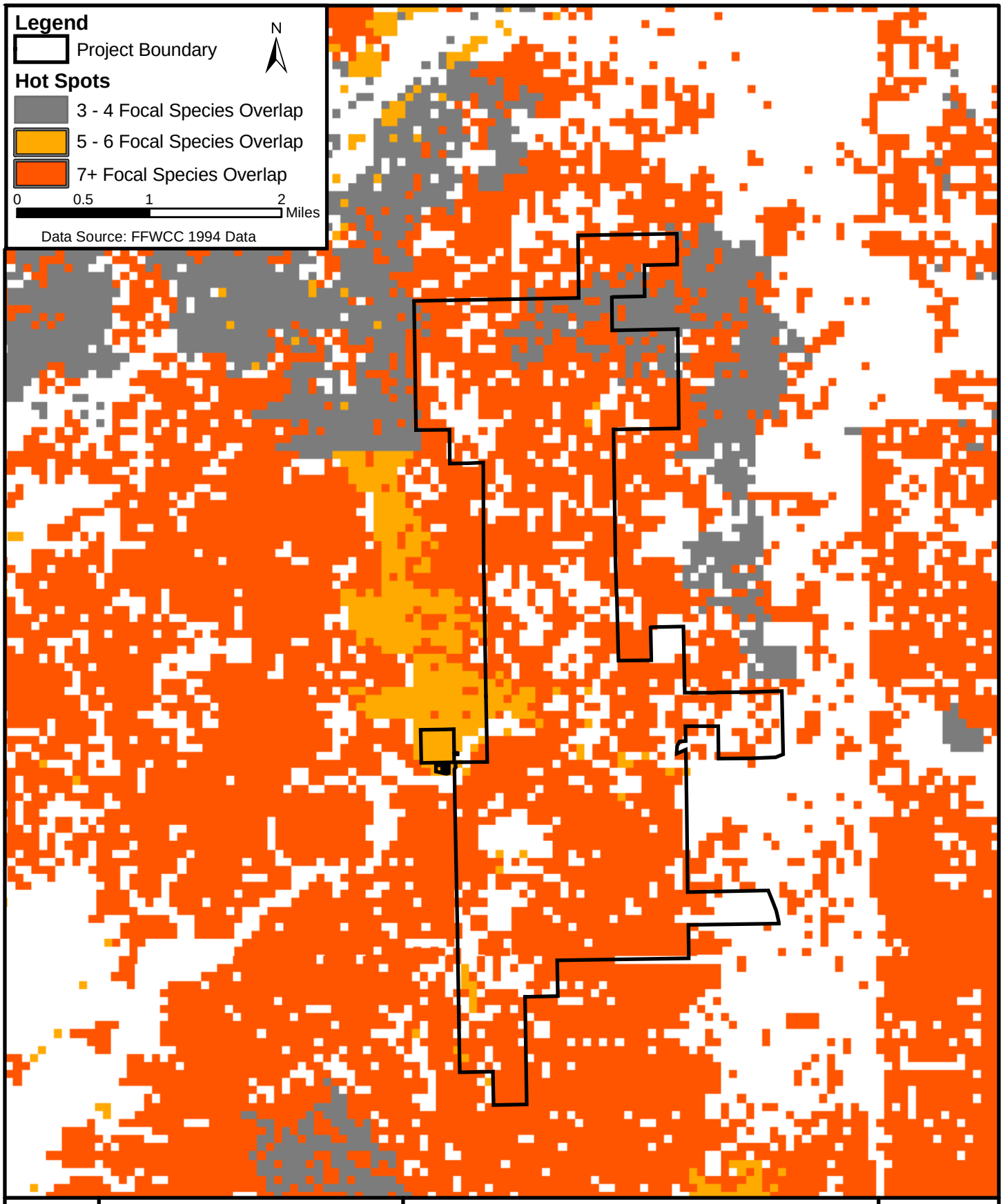


CHASSAHOWITZKA RIVERINE SWAMP LAND MANAGEMENT PLAN
Citrus & Hernando Counties, Florida

WILDLIFE SPECIES ELEMENTAL OCCURRENCES

Figure 7



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CHASSAHOWITZKA
RIVERINE SWAMP
LAND MANAGEMENT PLAN
Citrus & Hernando Counties, Florida

HOT SPOTS OF BIOLOGICAL RESOURCES

Figure 8

large block of Preserve lands that extend along the coast of Citrus and Hernando Counties. A recent study conducted by the University of Kentucky, and funded by the District suggests that the GCE population of black bears spends a large amount of time in the Bottomland Hardwoods (Forested Wetlands) of the GCE that comprise over 90% of the Sanctuary. Furthermore, the study confirms the bear's affinity for isolation and remoteness.

Since the FWC study in 1994 (Cox et al.), leading bear biologists have suggested that the GCE population is doomed unless it is effectively linked to a larger viable population. The University of Kentucky study (Maehr, et al., 2003) essentially recommends three actions that need to be taken to increase chances of survival of the GCE black bear population:

1. **Restore landscapes to provide cover**. The Sanctuary itself is comprised entirely of natural plant communities. The predominant habitat type provides a mature, forested community that is isolated and suitable for black bear.

2. **Work to complete demographic linkages**. The best opportunity for linkage to other viable bear populations is northward, where bear populations are expanding southward from the Big Bend region.

3. **Sustain the remote and isolated character of core habitat blocks (forested wetlands).**

The Sanctuary plays a vital role in fulfilling these needs by providing a "refuge of isolation and remoteness" during the somewhat intrusive hunting season (hunting for birds and pigs) that occurs on most of the adjacent publicly owned conservation lands. Furthermore, the Sanctuary's main latitudinal trails that extend deep into the swamps are being allowed to re-vegetate naturally. This contributes to increasing the remote character of the Sanctuary.

These three recommendations are the basis for the bear-related management actions.

<u>Management Actions</u>

- Continue to promote and encourage the acquisition of lands to the north and east for the purpose of securing a linkage between the GCE and the black bear populations to the north and east. This has been recommended by several studies specifically relating to the GCE bear population (Cox et al., 1994, Maehr et al., 2003, Larkin et al., 2004).

- Restore barge canal to promote connections to the north. The canal is wide, open and highly visible which creates a fragmenting influence since bears are reluctant to cross.

- Continue to prohibit hunting in the Sanctuary to provide refuge for the bear population of the GCE.

- Continue to work with adjacent land managers towards meeting the recommendations of the District/USFWS-sponsored study that encourages "the maintenance of quality existing habitat and facilitating connectivity with other black bear populations".

- Continue to monitor the status of bears using exiting hair snare/remote photography stations.

Gopher tortoises inhabit the limited upland communities located along the eastern edges of the Sanctuary. Gopher tortoises prefer sandhill habitat. They also use other onsite plant communities including: pine flatwoods and scrub. Gopher tortoise habitat and potential habitat will be managed to maintain habitat characteristics preferred by gopher tortoise including an open canopy cover and dense, herbaceous groundcover (Cox et al., 1987).

There are many listed species that rely on gopher tortoise burrows for cover, food (snakes often prey on frogs and mice that are in the burrow, for example), and/or shelter. Tortoise burrow associates that are known to occur on site include the gopher frog, eastern indigo snake, and Florida mouse. The pine snake may also occur within the Sanctuary. Management of upland areas as gopher tortoise habitat also is favorable to other desirable indigenous species including Bachman's sparrow, brown-headed nuthatch, eastern towhee, eastern spadefoot toad, eastern coachwhip, and cotton mouse.

<u>Management Actions</u>

- Use prescribed fire and/or mechanical methods to maintain:
    - A canopy of less than 60% coverage.
    - Herbaceous groundcover approaching 80% coverage.

- Collect baseline data on tortoise populations by surveying for burrow activity (active, inactive, abandoned), and burrow size (measure burrow width as per Alford, 1980). From this information, population density and demographics may be calculated and the health of the tortoise population may be assessed.

Florida manatees occupy coastal, estuarine, and some riverine habitats, and must have access to vascular aquatic plants, freshwater sources, proximity to channels 1-2 meters deep, and access to natural springs or man-made warm-water refugia during winter (Hartman, 1978). The many springs and vegetated waterways of the Chassahowitzka River system are favored by manatees for food and shelter during the summer months. Typically manatees make use of warm-water refugia such as springs during the winter months but the Chassahowitzka River is tidally influenced and subject to an extremely low tide from December-February. Manatees cannot navigate the River in these months except at high tide. Manatees make use of the entire Chassahowitzka River system during the summer months and winter out of the region, although there have been occasional sightings of manatees at the Chassahowitzka River Campground and Recreation Area during the winter (Joyce Kleen, FWS personal communication). Manatees wide-ranging seasonal movements require safe, unimpeded access between their winter and summer grounds (O'Shea and Ludlow, 1992), which includes the entire Chassahowitzka River corridor. Protection of these travel corridors requires the establishment of aides to navigation and manatee protection zones along the rivers length through the Sanctuary.

Management Action

- Continue to support and enforce the Manatee Protection Area designation from the mouth of the Chassahowitzka River northward. This designation restricts boat traffic to low speeds from August 31 through April 1.

Guidelines established for the **southern bald eagle** by the USFWS recommend the establishment of primary and secondary protection zones around bald eagle nest sites (USFWS, 1987). Within the primary zone, which typically extends 750 to 1,500 feet from the nest tree, no land clearing or use of chemicals toxic to wildlife is allowed at any time. Flyovers within the primary zone should be prohibited during the nesting season (October 1 through May 15) and recreational usage should be restricted to prevent human intrusion around the nest site.

The secondary zone extends from the outside of the primary zone from 750 feet to a distance of one mile from the nest. Restrictions within this zone apply during the nesting season and preclude intensive land development activities.

There are three southern bald eagle nests on the property and three others close enough that their protection zones

are overlapping the Sanctuary. Management of these areas will conform to habitat management guidelines developed by the USFWS (USFWS, 1987).

Management Action

- Adhere to the management recommendations outlined in the Habitat Management Guidelines for the Bald Eagle in the Southeast Region (USFWS, 1987).

CONTROL OF EXOTIC SPECIES

Plants

Four invasive exotic plant species have been documented on the Sanctuary property (Table 3). Three have been ranked Category I Invasive Exotics by the Florida Exotic Pest Plant Council (FLEPPC), which are defined as exotics that are altering native communities by displacing native species, changing community structure or ecological functions, or hybridizing with natives (FLEPPC, 2003). The Category I invasive exotics include skunk vine, air potato, and cogongrass which occur in the campground and around the southeast corner of the property. Category II invasive exotics are defined as those that have increased in abundance or frequency, but have not yet altered Florida plant communities to the extent shown by Category I species. Category II species include Chinese ladder brake fern, which is associated with the limerock substrate, and occurs around the borrow pits. These species and their rankings are listed in Table 4.

These problematic invasive exotic species disperse through a variety of mechanisms. For example, cogongrass is predominantly dispersed by wind, skunk vine through avian dispersal and Chinese ladder brake fern through the spread of spores. Perhaps the most common dispersal mechanism for both exotic plants and animals is transport by humans. Trails and public areas can serve as conduits for the dissemination of exotic species.

Recognition of dispersal mechanisms allows managers to focus their vigilance on areas most susceptible to invasion. The Sanctuary interfaces with developed areas and public use areas along its eastern boundary. The District will remain alert for the appearance of any Category I or Category II species and will implement suitable eradication or control measures when these species are encountered.

These control measures can involve a combination of techniques depending on species and degree of infestation. These techniques include applications of herbicide (with appropriate herbicides), often in combination with mowing and/or prescribed fire. District staff is highly experienced in the

Table 4 Exotic Species Documented

Common Name	Scientific Name	FLEPPC Rank*
Air potato	*Dioscorea bulbifera*	I
Chinese ladder brake	*Pteris vittata*	II
Cogongrass	***Imperata cylindrica***	**I**
Skunk vine	***Paederia foetida***	**I**

(Nuisance Exotic Species are listed in bold)
*FLEPPC (Florida Exotic Pest Plant Council Rankings:
I = Category I: Species that are invading and disrupting native plant communities in Florida.
II = Category II: species that have shown a potential to disrupt native plant communities.

application of the latest eradication techniques. Control methods utilized are based on the latest techniques as detailed by the FDEP's Bureau of Invasive Species and other local, regional, and federal management agencies.

Management Action

- Monitor the property, particularly along interior trails, the campground, borrow pits, and coordinate control with private landowners adjacent to the property for new occurrences of exotic species. Eradicate Category I and II exotic species to prevent establishment consistent with the direction provided in Board Procedure 61-9.

Animals

Non-native animal species also pose a threat to Florida's natural communities. The only such animal that has been noted on the property is the feral hog. Feral hogs have been in Florida since the Spaniards brought them in the 16th century. Unchecked, hog populations can result in major alterations to a landscape. They forage primarily by "rooting". This results in severe damage to vegetation, microtopographical changes that affect sheet flow drainage, and an increase in siltation. Hogs also compete for hard mast (acorns), an integral part of the diet of the Florida black bear and other native wildlife.

To eliminate hogs from a Preserve this large is difficult. The management objective is to minimize damage through vigilant control. In the absence of hunting this is most effectively achieved with trapping. Contract hog trapping will be employed as required to manage hog numbers and minimize associated damage to acceptable levels.

Management Action

- Monitor for evidence of feral hog damage and control with trapping program.

Preparation of Mosquito Control Plan

The Sanctuary has been declared an environmentally sensitive and biologically highly productive public land pursuant to Section 388.4111, Florida Statutes, which states "It is declared to be in the best interests of the state that certain environmentally sensitive and biologically highly productive public lands owned by the state or any political subdivision thereof where arthropods incubate, hatch, or occur so as to constitute a public health or nuisance problem may be subject to arthropod control measures."

A Mosquito Control Management Plan (MCMP) for the Sanctuary, referred to as the Chassahowitzka Preserve by the

Citrus County Mosquito Control District (CCMCD) management plan, was finalized November 15, 1999. This plan outlines an agreement between the CCMCD and the District. The CCMCD was established in 1952 when mosquito control activities began in the county.

This agreement authorizes the CCMCD to conduct surveillance (according to Florida Administrative Code 5E-13) of mosquito populations using a variety of techniques including (1) adult sampling traps (light traps) that check species richness (diversity), amount, and sex over populated portions of its service area; (2) landing rate evaluations to determine the number of mosquitoes that land on a human per unit time; and (3) larval sampling by dipping or aspirating a quantity of water and visually identifying species richness, amount, and larval developmental stages.

According to the agreement, larval control will be conducted if 10 percent of the dips are positive for the larva of six targeted mosquito species. Larviciding could consist of biological controls such as the use of predacious mosquito fish or a non-biting native mosquito species whose larvae are predacious, or the use of a naturally occurring bacterium (*Bacillus thuringiensis*) that kills mosquito larvae. Adulticiding in residential areas around the Sanctuary will be done on an as needed basis, and the decision to do so will be based on surveillance information and citizen's complaints in the area. Adulticiding would only be extended into the Sanctuary if surveillance shows it to be a necessity for the health and safety of county residents, or if a health alert for arthropod-borne diseases is issued by the Department of Health.

Since the 1999 MCMP was adopted, there have been new advancements in control technology related to application techniques, application equipment, and an understanding of the target mosquito populations. As a consequence of these well-researched advancements, chemical applications have been reduced as much as 75% while achieving the same results. Consequently, the District will coordinate with the CCMCD to discuss amendments to the MCMP to better protect the site's ecological integrity while meeting mosquito control objectives.

<u>Management Action</u>

- Coordinate with CCMCD to revise the MCMP to incorporate new advancements in mosquito control.

PROJECTED COST OF MANAGEMENT

Costs of management include costs related specifically to prescription burn events, staff time to coordinate

externally, and monitoring of key ecological resources.

Management costs may be grouped into two categories: recurring and non-recurring costs.

Recurring costs may include:

Facilities operation costs, which include recreational infrastructure maintenance (trails, signage, emptying garbage cans, etc.), site security, fence maintenance, and maintenance of access areas. Costs associated with ecological management include firebreak maintenance, exotic species removal, prescribed burns, floral and faunal monitoring, and restoration. The average annual recurring land management costs spent by the District on the Sanctuary between 2002-2004 was $11,900.

Non-recurring costs identified in the plan are:

1. The implementation of the black bear study recommendations – staff commitment to external coordination and land acquisition prioritization strategy.

ADMINISTRATION

External Coordination

The District coordinates with many outside public agencies and private interest groups to effectively manage its properties. This section identifies those management and land use activities that cross, or potentially cross, the limits of jurisdictional authority and interest and will require outside coordination.

United States Coast Guard (USCG)

As dictated by federal law, the USCG must approve any structures or navigational aids placed in navigable waters of the United States. The District, perhaps in association with Citrus County and the USFWS, will petition the FDEP to work with the USCG to installation private aids-to-navigation and associated informational signage in the Chassahowitzka River.

USFWS

The USFWS is the agency with primary responsibility for protecting the nation's wildlife resources. This responsibility includes the administration of the Endangered Species Act (ESA). The USFWS will be consulted regarding special management needs of any species protected under provisions of the ESA that is known to occur on the property, or that colonizes the site in the future. Management for the bald eagle, West Indian manatee and whooping crane have been noted previously in this plan and are consistent with federal guidelines for the protection of these species.

The District will coordinate with the USFWS staff of the adjacent NWR concerning issues of management, public use, and other issues as necessary.

FWC

The FWC is the agency with primary responsibility for protecting and managing Florida's wildlife resources. As such, the District will coordinate closely with the FWC in the management and monitoring of state-listed wildlife, critical habitat areas and poaching issues. In addition, the District will coordinate with the FWC staff of the adjacent WMA concerning issues of management, public use, and other issues as necessary.

Florida Division of Forestry (DOF)

All prescribed burns receive an authorization number from DOF prior to implementation. This authorization requires the prescribed burn to be in compliance with the written prescriptions. Access to the northern portion of the Sanctuary occurs via Burnt Bridge Road, which crosses the Homosassa Tract managed by the DOF. The District will coordinate with the DOF

staff of the adjacent Homosassa Tract concerning issues of management, public use, and other issues as necessary.

FDEP

The FDEP administers many of the State of Florida's environmental regulations, including many that are designed to protect water quality. The District will work closely with the FDEP to resolve any threats to water quality in the Sanctuary, including those associated with observed increases in nitrates discharged from Chassahowitzka Spring.

The District, perhaps in concert with Citrus County and the USFWS, will petition the FDEP to work with the USCG to install private aids-to-navigation in a corridor through the Chassahowitzka River.

Local Governments

The Sanctuary encompasses lands lying within two different counties: Citrus County, which accounts for 5,316 acres of the total land area, and Hernando County, in which the southernmost 442 acres are located. Each of these local governments exercises land use authority over all lands located within their area of jurisdiction. As such, the District must work cooperatively with each county government to exclude land uses that may contaminate groundwater or surface water resources of the Sanctuary, or that are otherwise incompatible with the Sanctuary's status as a regionally significant haven for wildlife and passive recreationists.

The Citrus County Parks and Recreation Department manages the facilities of the Chassahowitzka River Campground and Recreation Area per a lease agreement executed with the District in 1991. The lease is effective until 2011, at which time it may be renewed for an additional 20-year term through mutual agreement.

Internal Coordination

District staff from the Land Resources Department will coordinate various aspects of management plan implementation with other departments of the District. The effective implementation of the plan will require coordination and the continued cooperation of these departments.

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