Wet Woods Preserve
Land Management Plan

Managed by:

Conservation Collier Program

Collier County

May 2020 –May 2030 (10 yr plan)

Updated: December 2020

Prepared by:

Collier County Parks and Recreation Division

Conservation Collier Staff

Wet Woods Preserve
Land Management Plan Executive Summary

Lead Agency: Collier County Board of County Commissioners, Conservation Collier Program
Property included in this Plan: Wet Woods Preserve (Folio #: 00154880008)

Acreage Breakdown:

General Vegetative Communities	Acreage
Wetlands (58%)	15.53
Uplands (42%)	11.24
TOTAL	**26.77**

Management Responsibilities:
Agency: Collier County - Conservation Collier Program

Designated Land Use: Conservation and natural resource-based recreation

Unique Features: saltwater and freshwater marshes, mangrove forests, pine flatwoods, active bald eagle nest, seven listed plant and two listed animal species detected to date

Management Goals:

Goal 1: Significantly reduce human impacts to indigenous flora and fauna

Goal 2: Continue monitoring of vegetation

Goal 3: Control populations of invasive, exotic or problematic flora and fauna to restore and maintain natural habitats

Goal 4: Use mechanical treatments to decrease woody invasion resulting from fire exclusion

Goal 5: Restore native vegetation

Goal 6: Facilitate uses of the site for educational purposes

Goal 7: Provide a plan for security and disaster preparedness

Public Involvement: Public meeting(s) were held in the summer of 2020 with invitations being sent to residents and businesses from surrounding lands.

Table of Contents

List of Tables

List of Figures

List of Appendices

1.0 Introduction

The Wet Woods Preserve is a 26.77-acre natural area within the urban boundary of Collier County, Florida. The preserve contains various native plant communities, including pine flatwoods, mangrove forests, and both saltwater and freshwater marshes.

A site assessment to determine compliance with the Conservation Collier initial screening criteria was conducted in July 2004 and the Conservation Collier Program purchased the property on August 19, 2005. Previously known as the "Watkins-Jones" property, for the previous owners, it was renamed Wet Woods Preserve by local schoolchildren in November 2006. The County holds fee simple title to the Wet Woods Preserve. The Conservation Collier program manages these lands under authority granted by the Conservation Collier Ordinance 2002-63 as amended (2007-65) and Ordinance 2011-38 (available from www.municode.com). Initial acquisition activities are summarized in Table 1.

Table 1: Acquisition History and Status of Wet Woods Preserve

Year	Benchmark
2003	Environmental Assessment Report prepared by Southern Biomes, Inc.
2004	Property nominated to the Conservation Collier Program
2004	Initial Site Assessment by Conservation Collier Staff
2004	Acceptance of Initial Criteria Screening Report by the Conservation Collier Land Acquisition Advisory Committee
2005	Phase I Environmental Assessment Conducted by ASC geosciences for Collier County
2005	Approved for purchase by the Board of County Commissioners (BCC)
2005	Purchase of the Watkins-Jones Property
2005	Developed Interim Management Plan
2006	BCC approved the Interim Management Plan
2006	Watkins-Jones property renamed ***Wet Woods Preserve***
2007	Conducted Initial exotic plant treatment and removal (grant funded)
2008	Completed Final Management Plan
2015	Updated Final Management Plan
2020	Updated Final Management Plan

The preserve consists of approximately 58% (±15.53 acres) wetland habitats and approximately 42% (±11.24 acres) upland habitat. Conservation, restoration and natural resource-based recreation are the designated uses of this property. Management activities allowed include those necessary to preserve, restore, secure and maintain this environmentally sensitive land for the benefit of present and future generations. Public use of the site must be consistent with these management goals.

This is the Final Management Plan for the Wet Woods Preserve. This 10-year management plan will be submitted to the Collier County Board of County Commissioners (BCC) for its approval. When approved, this plan will replace the Final Management Plan that was approved by the BCC on December 8, 2015.

1.1 Conservation Collier: Land Acquisition Program and Management Authority

The Conservation Collier program was originally approved by voters in November 2002 and subsequently confirmed in the November 2006 ballot referendum. Both voter-approved referendums enable the program to acquire environmentally sensitive conservation lands within Collier County, Florida (Ordinance 2002-63, as amended). Properties must support at least two of the following qualities to qualify for further consideration: rare habitat, aquifer recharge, flood control, water quality protection, and listed species habitat. The Collier County Board of County Commissioners (BCC) appointed a Land Acquisition Advisory Committee to consider any selected or nominated properties that an owner has indicated a willingness to sell. The committee recommends property purchases for final approval by the BCC.

Lands acquired with Conservation Collier funds are titled to "COLLIER COUNTY, a political subdivision of the State of Florida, by and through its Conservation Collier program." The Board of County Commissioners of Collier County established the Conservation Collier program to implement the program and to manage acquired lands. As such, Conservation Collier holds management authority for the Wet Woods Preserve.

1.2 Purpose and Scope of Plan

The purpose of the plan is to provide management direction for Wet Woods Preserve by identifying the goals and objectives necessary to eliminate or minimize any threats to the resources and integrity of the preserve. This text is a working document that establishes the foundation of the ten-year plan by identifying the appropriate management techniques necessary to preserve and/or restore the resource.

This plan will balance resource restoration and protection with natural resource-based recreational and educational use while looking at restoration needs, listed species protection and maintenance of the site free of invasive, exotic plant and animal species. This plan is divided into sections that incorporate an introduction, descriptions of the natural and cultural resources, projected uses of the property, management issues, and goals and objectives.

1.3 Location of the Wet Woods Preserve

Wet Woods Preserve is located at 12815 Tamiami Trail N. in Naples, Florida (See Figure 1; legal description in Appendix 1). It is in Collier County's northwest corner, immediately west of U.S. Highway 41, south of Wiggins Pass Road in Section 16 Township 48 Range 25.

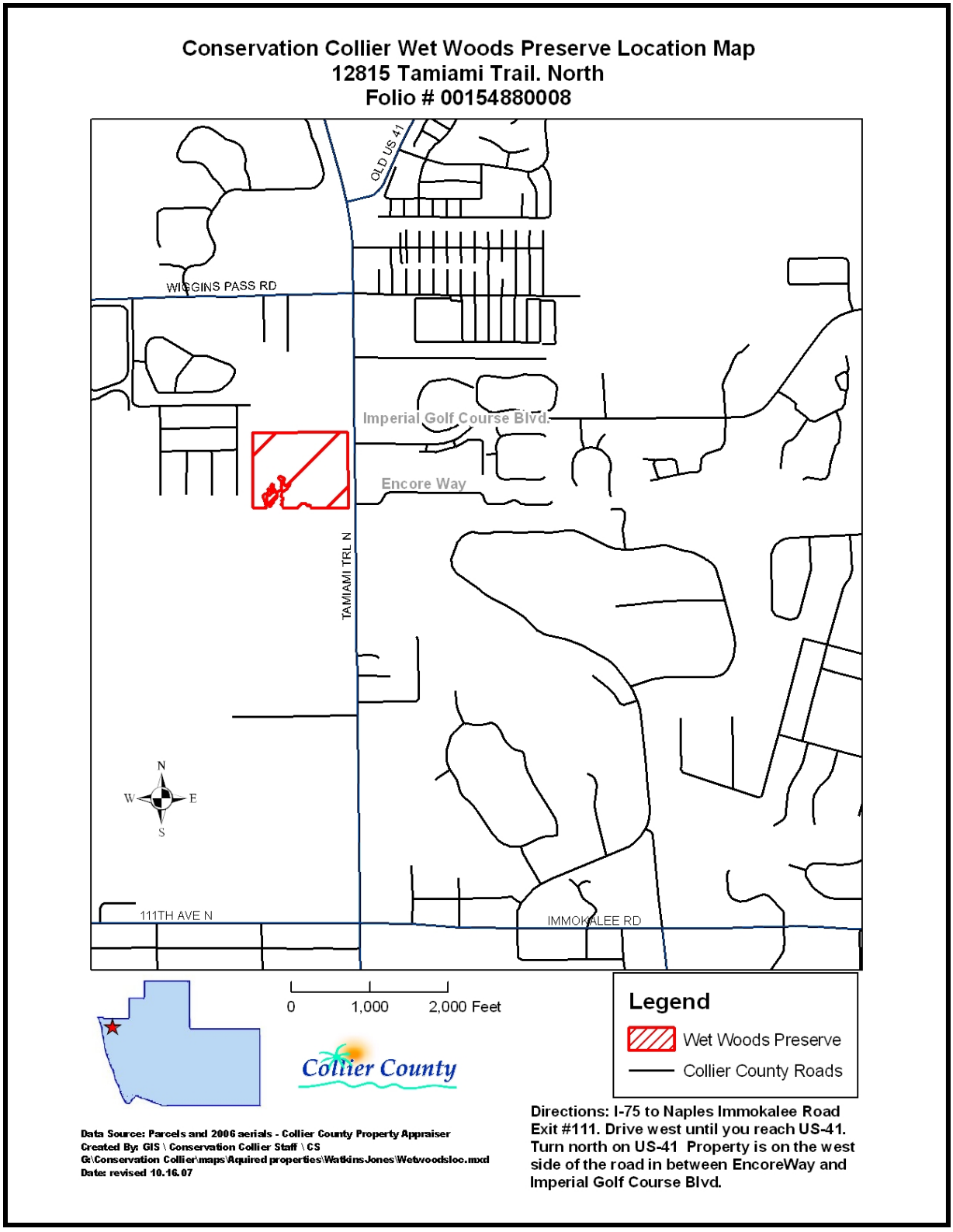


Figure 1: General Location of and Directions to Wet Woods Preserve.

1.4 Regional Significance of the Wet Woods Preserve

To date, approximately 67% (more than 868,040 acres) of Collier County is protected in conservation areas (Figure 2) and managed by private organizations and by local, state and federal agencies. Collier County's Conservation Collier Program manages the 26.77-acre Wet Woods Preserve. This natural area contains saltwater and freshwater marshes, mangrove forests, and pine flatwoods. The wetlands buffer and protect the Wiggins Pass Estuarine System, designated as an Outstanding Florida Water, and support two listed plant and animal species. The uplands support an active Bald Eagle (*Haliaeetus leucocephalus*) nest and five listed plant and animal species. Specific information on the wetlands and uplands found on the Wet Woods Preserve may be found in section 2.3 (Natural Plant Communities) of this document.

1.5 Nearby Public Lands and Designated Water Resources

Currently, the closest preserved, natural area to Wet Woods Preserve is Railhead Scrub Preserve, another Conservation Collier Program property approximately 0.69 miles to the northeast. Other preserves, in order of increasing distance, are provided in Table 2. Figure 3 shows the locations of these preserves.

Table 2: Public Lands Located near the Wet Woods Preserve

Name	Distance (miles)	Direction	Type
Railhead Scrub Preserve	0.69	NE	Conservation Collier
Delnor-Wiggins State Park	1.28	W	State
Barefoot Beach Preserve	1.36	W/NW	County
Cocohatchee Creek Preserve	1.70	SE	Conservation Collier
Milano Property	5.81	SE	Conservation Collier
Corkscrew Regional Ecosystem Watershed	9.00	N/NW	State

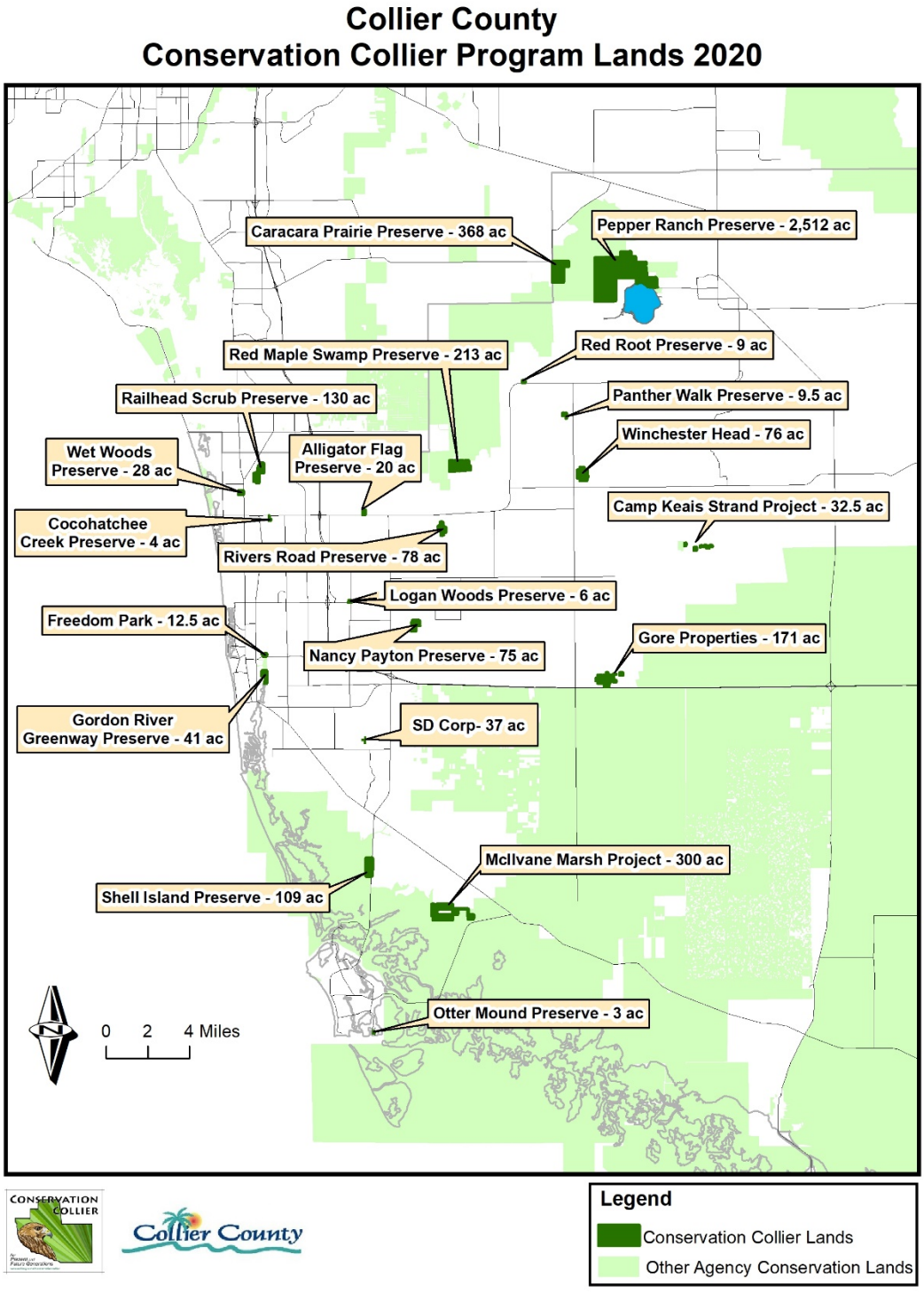
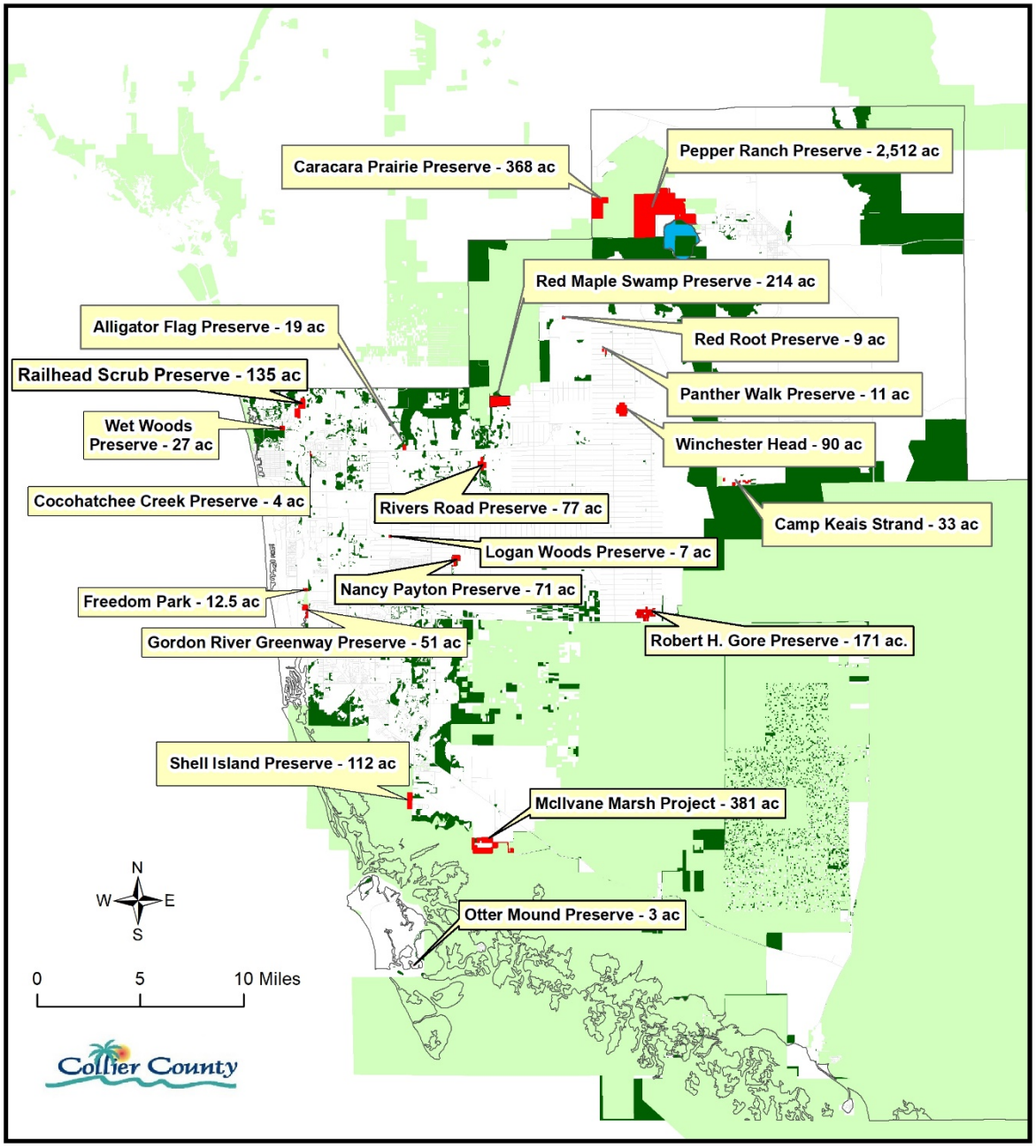


Figure 2: Conservation Collier Preserves and Designated State and Federal Land or Conservation Easements Existing in Collier County

Conservation Collier Preserves 2020



Data Source:Parcels - Collier County Property Appraiser
Created By: Conservation Collier
G:\Conservation Collier\maps\Acquired properties\
Acquired and Approved 2020.mxd and .jpg
March 2020

Legend

- Conservation Collier Preserves
- Mitigation / Conservation Easements
- Other Agency Conservation Lands

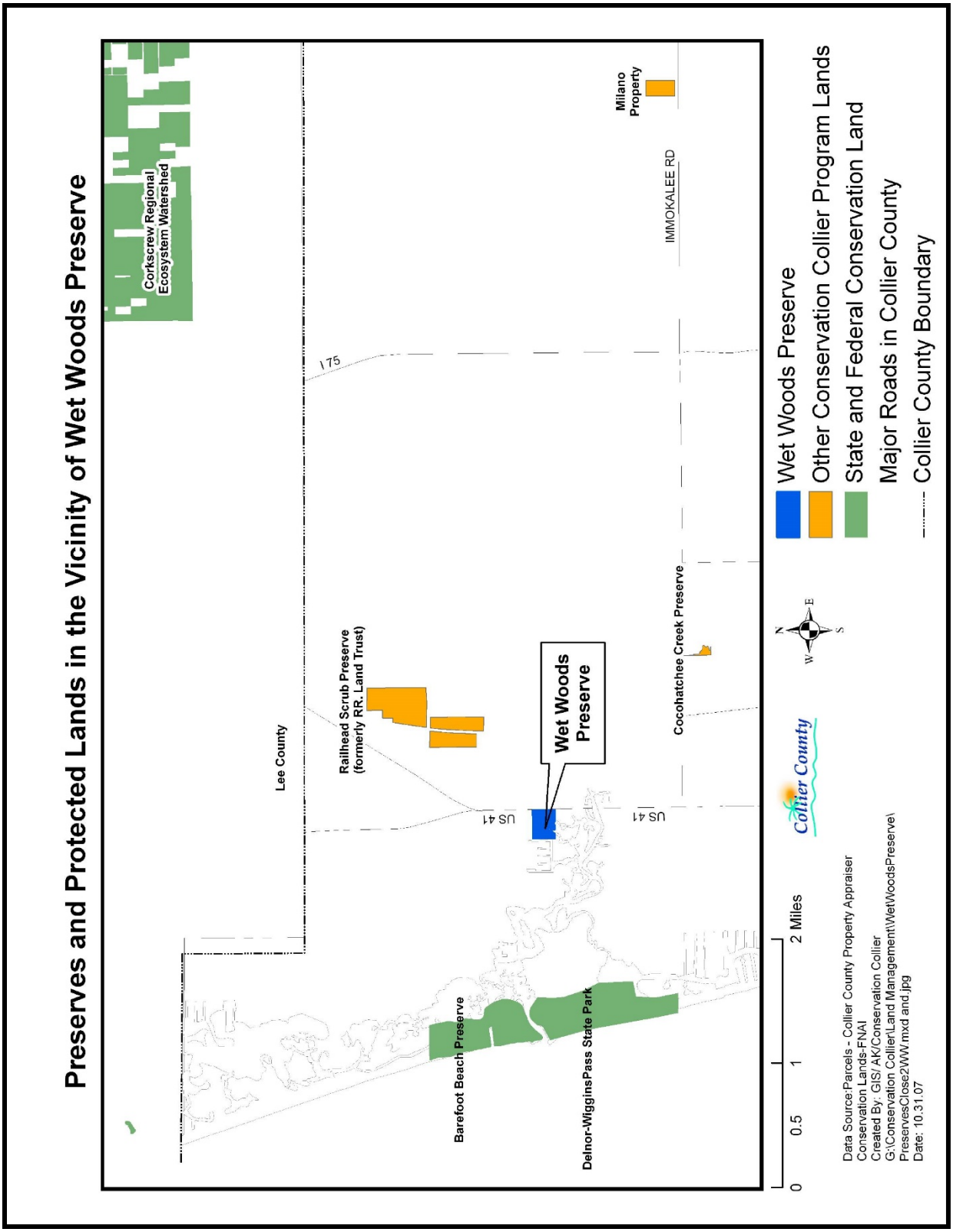


Figure 3: Preserves and Protected Lands in the Vicinity of Wet Woods Preserve

1.6 Public Involvement

Neighborhood involvement will be sought through direct mailing notices for public meetings to residents and businesses within the surrounding area and to owners of properties that border the preserve; official public notices will be posted on the County website. Staff will seek to coordinate management actions, such as exotic removal and prescribed fires with owners of adjoining lands. Staff will also involve the North Naples Civic Association and the Boy and Girl Scout groups from within the County. Additionally, volunteers will be sought from all contacts listed above.

2.0 Natural Resources

2.1 Physiography

Wet Woods Preserve lies within the Floridian section of the Coastal Plain. The Coastal Plain extends from New Jersey to Texas and was formed mainly from sedimentary rocks deposited in marine environments (USGS 2004).

2.1.1 Topography and Geomorphology

The site is located in the Southwestern Slope region of the South Florida Water Management District. According to the Bonita Springs, Florida USGS Topographic Map, the topography of the area is relatively level with an average elevation of five feet above sea level and slopes gently westward toward the Gulf of Mexico. Surface water percolates directly into the uncovered ground or it collects in natural depressions and manmade ponds on adjacent properties.

2.1.2 Geology

The geology of northern Collier County, where the Wet Woods Preserve is located, is characterized by complex sequences of interbeded sands, clays, and limestone. Closest to the surface is the Holocene aged Pamlico Sand Formation, approximately ten feet thick and composed primarily of unconsolidated quartz sand and some silt. The Pamlico Sand unconformably overlies the Pleistocene aged Fort Thompson and Caloosahatchee Formations, which vary from a few feet to more than twenty feet in thickness and are characterized by shelly and sandy limestone with vugs and solution cavities (Miller 1986).

Below the Fort Thompson and Caloosahatchee Formations are the Ochopee and Buckingham Members of the Pliocene aged Tamiami Formation, which are at least 200 feet thick in the surrounding areas (Oaks & Dunbar 1974). The Ochopee Limestone unconformably overlies the Buckingham Limestone and/or the equivalent Cape Coral Clay. This unconformity marks the bottom of the surficial aquifer separating it from the brackish underlying aquifer below. Then the Hawthorn Formation, rich in phosphate and other heavy minerals (Scott 1988), overlies the Oligocene age Suwannee Limestone and Eocene age Ocala Limestone that form the Floridan Aquifer System in Southwestern Florida. Figure 4 provides a current aerial view of the Wet Woods Preserve.

2.1.3 Soils

According to Liudahl et al. (1990), soils mapped at the Wet Woods Preserve include (in descending order by extent) Durbin and Wulfert Mucks, Basinger Fine Sand, and Immokalee Fine Sand (Figure 5).

Durbin and Wulfert Mucks are level, very poorly drained hydric soils that are found in tidal mangrove swamps. They are very permeable and have a water capacity availability that is moderate to high. The water table beneath the soils fluctuates with the tide and is within a depth of twelve inches for most of the year (Liudahl et al. 1990).

Basinger Fine Sand is a nearly level and poorly drained hydric soil. It is found in sloughs and poorly defined drainage ways. Under natural conditions, the seasonal high water table is within a depth of twelve inches for 3-6 months during most years. During the other months, the water table is below a depth of twelve inches, and it recedes to a depth of more than forty inches during extended dry periods. During periods of high rainfall, this soil is typically covered by shallow, slow-moving water (Liudahl et al. 1990).

Immokalee Fine Sand is non-hydric, nearly level and poorly drained. It is typically found in pine flatwoods. Under natural conditions, the seasonal high water table is at a depth of 6-18 inches for 1-6 months during most years. During the other months, the water table is below a depth of eighteen inches, and it recedes to a depth of more than forty inches during extended dry periods (Liudahl et al. 1990).

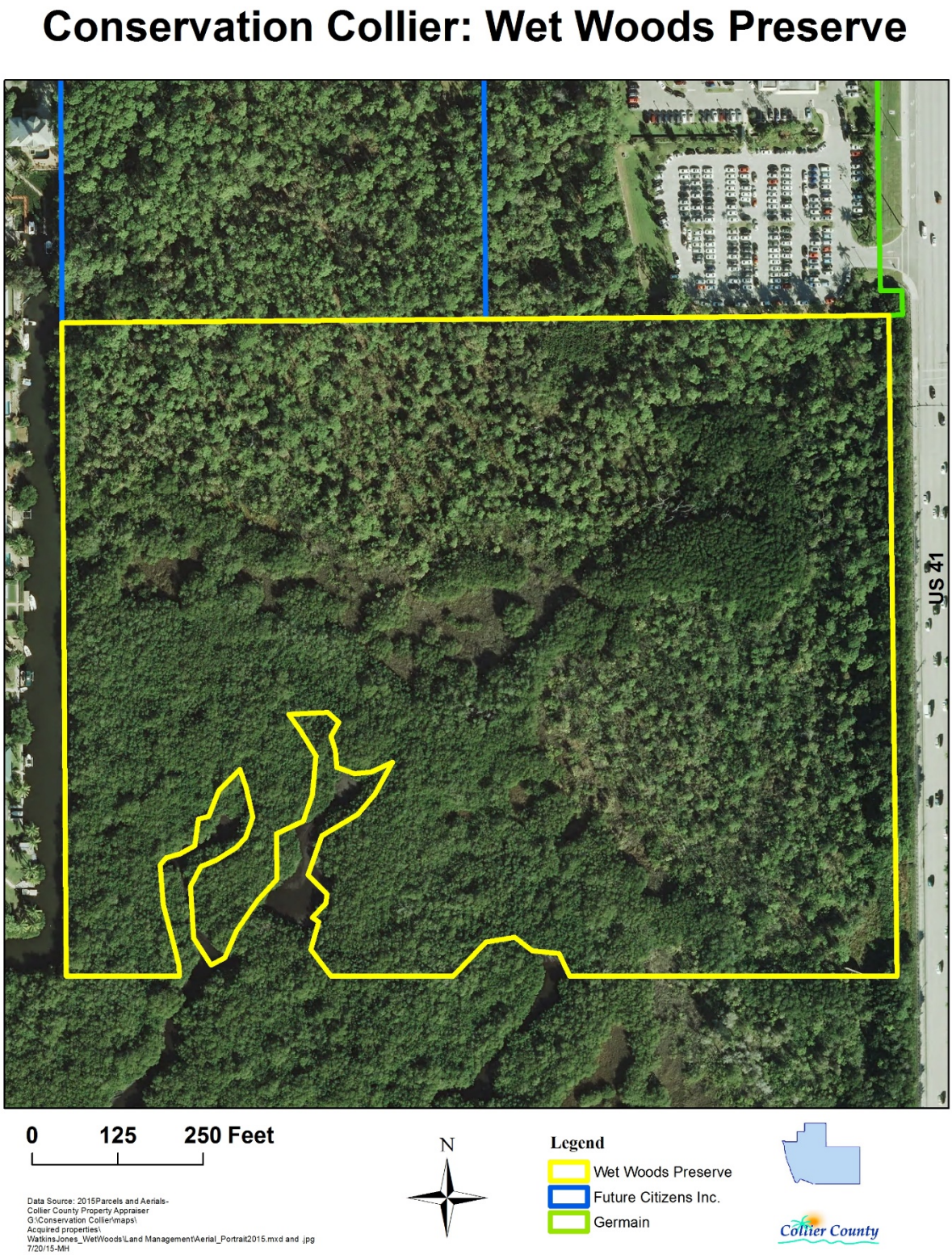


Figure 4: General View of the Wet Woods Preserve - Existing Conditions

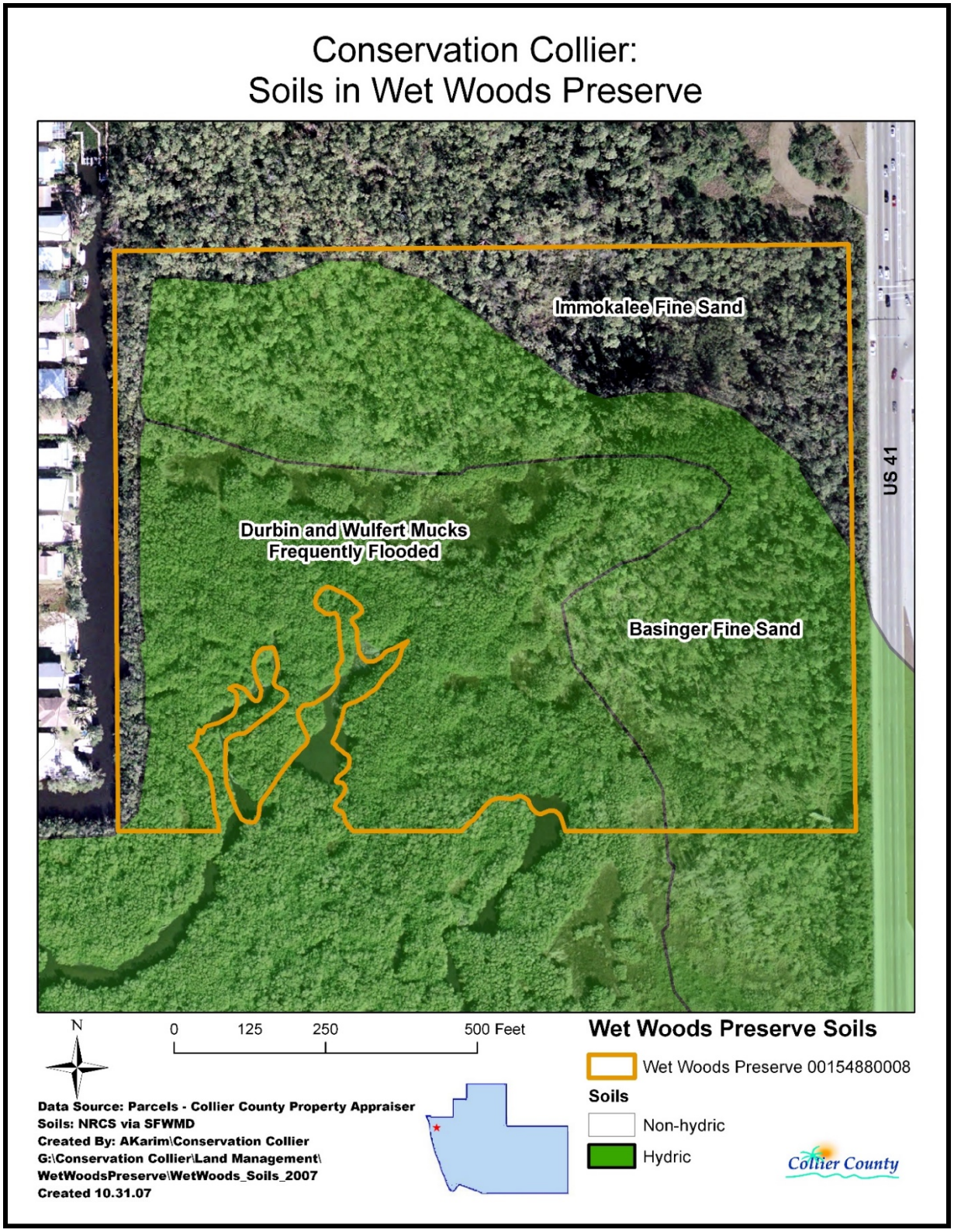


Figure 5: Soil Units at the Wet Woods Preserve

2.1.4 Hydrology/Water Management

Near the surface, the aquifer is highly permeable and the groundwater flows toward the west. However, permeability decreases downward from a porous limestone into poorly indurated sandstone cemented by micrite. The aquifer grades from freshwater downward into brackish water due to the proximity of the Gulf of Mexico to the west and the brackish water in the intermediate aquifer made primarily of Miocene aged sediments. Below that, the Hawthorne formation typically marks the upper boundary of the Floridian aquifer, which is contained within the underlying Oligocene age Suwannee Limestone (Lodge 2005).

Groundwater levels have gone down during the recent decades due to drainage on a regional scale and water management for development purposes. This trend may be very difficult to control and will gradually reduce the extent of the preserve that floods during the summer months and reduce the period of time the preserve wetlands are flooded during the year.

2.2 Climate

The Wet Woods Preserve is located in an area of Florida where humid subtropical and tropical savanna climatic patterns overlap, with temperatures moderated by winds from the Gulf of Mexico and the Atlantic Ocean. Sharply delineated wet and dry seasons and average monthly temperatures greater than 64º Fahrenheit characterize a tropical savanna climate. Monthly rainfalls may exceed ten inches during the wet season. On the other hand, humid subtropical climates typically show less extreme rainfall fluctuations between wet and dry seasons and average monthly temperatures is less than 64º Fahrenheit in some months.

The average annual temperature for the coastal portion of Collier County is approximately 75º Fahrenheit. The warmest months are usually July and August. The humidity is high during these months but frequent afternoon thunderstorms prevent excessively high temperatures.

Two-thirds of the annual rainfall occurs in the wet season from May to October. Thunderstorms are frequent during the wet season, occurring every two out of three days between June and September. Rainfall records for the area indicate that there is not significant variation in the annual rainfall throughout much of the county; however, large variations often occur during a single year. The hurricane season extends from June through November with peak activity occurring in September and October when ocean temperatures are highest.

2.3 Natural Plant Communities

A plant community refers to the suite of plant species that form the natural vegetation of any place. In addition to anthropogenic influence, the combination of factors such as geology, topography, hydrology, underlying soils and climate determine the types of plants found in an area. These plants, in turn determine the animal species that may be found in an area.

The Florida Land Use, Land Cover Classification System (FLUCCS) notes two plant communities on the preserve: mangrove swamps and pine flatwoods. A site visit by Southern Biomes in September of 2003 revealed that the Wet Woods Preserve consists of approximately 58% (±15.53 acres) wetland habitat and approximately 42% (±11.24 acres) upland habitat. Collier County Staff noted that freshwater marshes and tidal marshes made up portions of the wetland habitat. Therefore, the wetland habitats extant on the Wet Woods Preserve consist of mangrove swamps,

tidal marshes and freshwater marshes. The upland habitat may be characterized as mesic pine flatwoods. See Figure 6. The vegetation classification scheme of the Florida Natural Areas Inventory (FNAI) and the Florida Department of Natural Resources (FDNR) (1990) are presented in table 3. This table is based on the plant communities observed and mapped on the Wet Woods Preserve.

Table 3: Summary of Natural Communities in the Wet Woods Preserve

FNAI Natural Community Type	Acres	Global Rank	State Rank	Comments
Mangrove Swamps	11.85	G3	S3	Also called Tidal Swamp
Tidal Marsh	3.02	G4	S4	Also called Saltwater Marsh
Freshwater Marsh	0.66	G4	S4	
Pine Flatwoods	11.24	G4	S4	Also called Mesic Flatwoods

G3: Either very rare and local throughout its range (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction from other factors;
G4: Apparently secure globally (may be rare in parts of range);
S3: Imperiled in Florida;
S4: Apparently secure in Florida (may be rare in parts of range).

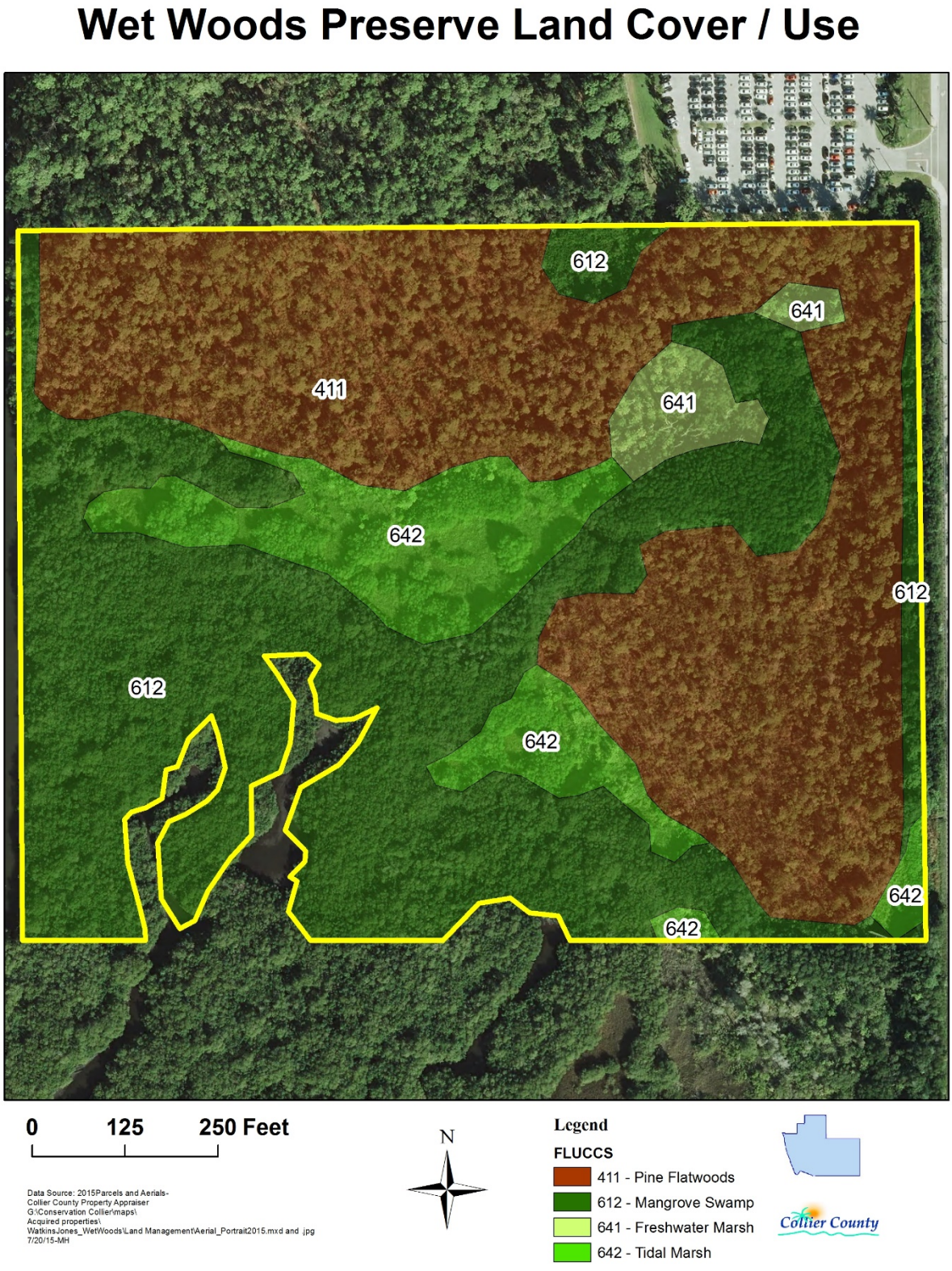


Figure 6: Distribution of Main Natural Communities (based on SFWMD FLUCCS Codes) in the Wet Woods Preserve

2.3.1 Wetlands: Mangrove Swamps

Mangrove Swamps are also called tidal forests, tidal swamp forests, mangrove communities, and mangrove ecosystems (FNAI & FDNR 1990). This plant community primarily occurs in the central and southern portions of the Wet Woods Preserve (Figure 6) and contains small areas of tidal marsh. The mangrove swamps on the preserve are dominated by native canopy species including red mangrove *(Rhizophora mangle),* black mangrove *(Avicennia germinans),* white mangrove *(Laguncularia racemosa)* and buttonwood *(Conocarpus erectus)*. Native midstory species include saltbush (*Baccharis angustifolia*) and indigo berry (*Randia aculeata*) while ground cover species include: giant leather fern (*Acrostichum danaeifolium*) and black needle rush (*Juncus roemerianus*). Durbin and Wulfert Mucks comprise the majority of the substrate for this community on the Wet Woods Preserve.

True mangrove species are viviparous (i.e., "live birth" - in the case of mangroves, the seed germinates within the fruit, producing within the plant an established seedling that then falls into the sediments) and have some physiological degree of root modification (such as aerial roots) to deal with saturated, saline soils (Tomlinson 1986). Based on these definitions, three species of true mangroves exist within the Wet Woods Preserve: red mangrove, black mangrove and white mangrove. The buttonwood is often referred to as a "mangrove associate" because it is associated with these species along the upland fringe of the mangrove ecosystem, but it lacks root modification and viviparity.

Mangroves are facultative halophytes; they are able to grow in freshwater environments but because of their inability to compete well with other flora found in freshwater systems, they grow in brackish waters. In addition to the saline environments in which they are found, the tidal fluctuation enables mangroves to dominate shorelines. Not only do the roots of these tropical species protect shorelines from erosion, they trap sediments and recycle nutrients from upland areas and tidal import. This is part of the succession process of island formation in south Florida (FNAI & FDNR 1990).

Mangrove Swamp just south of the Wet Woods Preserve.
Photo by Christal Segura.

Mangroves are valued for their high productivity and serve as important nursery and refuge areas for a wide variety of terrestrial and aquatic organisms including mammals, birds, reptiles, fish, and invertebrates. Consequently, these forests are extremely important to the nutrient budgets of adjoining estuaries and other coastal waters (Rey & Rutledge 2006). In fact, mangrove species shed so many leaves and other plant parts that they can produce up to 80% of the total organic material available in the aquatic food web (FNAI & FDNR 1990).

2.3.2 Wetlands: Tidal Marsh


Tidal Marsh found in the Wet Woods Preserve. Photo by Christal Segura.

Tidal Marshes are interspersed within the mangrove swamps of the Wet Woods Preserve. Also known as a salt marsh, brackish marsh, coastal wetland, coastal marsh and tidal wetland (FNAI & FDNR 1990), this plant community thrives in areas of low wave energy that are at least occasionally inundated with saltwater. Herbaceous, salt-tolerant plants characterize these marshes. The salt marshes within the Wet Woods Preserve are dominated by sea oxy daisy (*Borrichia frutescens*), Christmas berry (*Lycium carolinianum*), black needle rush (*Juncus roemerianus*) and cord grass (*Spartina* spp.). Buttonwood is scattered among the herbaceous plants. Durbin and Wulfert Mucks comprise the substrate for this community on the Wet Woods Preserve.

Just as in mangrove swamps, tidal fluctuation in tidal marsh communities is an extremely important ecological factor and makes this community one of the most biologically productive systems on earth. A wide array of invertebrates and fish rely on these areas for parts or all of their lives. A number of mammals, reptiles and avian species also rely on this plant community. Additionally, tidal marshes are valued by humans for their ability to buffer storms and to filter pollutants within them. While tidal marshes do not compose a large portion of the Wet Woods Preserve, their presence is an essential component to the landscape.

2.3.3 Wetlands: Freshwater Marsh

The freshwater marsh is the third type of wetland plant community found within the Wet Woods Preserve. These marshes are scattered among the upland, pine flatwoods community and may therefore be referred to as flatwoods marshes. Saw grass (*Cladium jamaicense*), swamp lily (*Crinum americanum*), giant leather fern (*Acrostichum danaeifolium*), and native wetland grasses dominate the freshwater marshes; Basinger Fine Sand comprises the substrate of these marshes in the preserve. Pond apple *(Annona glabra)* was also detected within these marshes.

Like tidal marshes, freshwater marshes are wetlands dominated by herbaceous flora. In Florida, these marshes are influenced by their subtropical location, fluctuating water levels, frequency and intensity of fire, organic matter accumulation and hard water (Kushlan 1990). These factors, combined with the dominant species found within a marsh, dictate the category within which the marsh is placed. Six major categories of freshwater marshes are recognized in Florida. The marshes in the Wet Woods Preserve are within the “saw grass marsh” category. These marshes usually have a moderate (flooded for 6-9 months) hydroperiod, a moderate (about once in ten years) frequency of fire and moderate to high (< 1 meter to > 1 meter) accumulation of organic material (Kushlan 1990).

Many animal species may be found within or around the perimeter of marshes. Invertebrates make up an important part of the food web and many avian species, especially wading birds, rely on the invertebrates as a primary source of food. The freshwater marshes within the preserve make-up a small portion of the total area but are valuable for the suite of species found there.

2.3.4 Uplands: Mesic Pine Flatwoods

Pine flatwoods are one of the most wide-ranging terrestrial plant communities in Florida and consequently one of the most influenced by anthropogenic activities (Abrahamson & Hartnett 1990). Fire strongly influences the community structure and composition of these communities.

Mesic pine flatwoods in the Wet Woods Preserve. Photo by Christal Segura.

The term pine flatwoods is a general categorization of areas that are dominated by various species of pine (*Pinus* spp.) trees. Pine flatwoods may be found in mesic flatlands where the landscape is made up of flat, moderately well drained sandy substrates with a mixture of organic material, often with an underlying hardpan layer. An open canopy forest of widely spaced pine trees with little or no understory but a dense ground cover of herbs and shrubs characterize natural, mesic flatwoods that have been burned regularly (FNAI & FDNR 1990). The USDA Soil Conservation Service classification system refers to these areas as South Florida flatwoods. South Florida flatwoods are typically savannas, a type of plant community intermediate between forest and grassland.

Mesic pine flatwoods are also called mesic flatwoods, pine savanna, cabbage palm savanna, and pine barrens. On the Wet Woods Preserve, mesic pine flatwoods occupy the northern and eastern portions of the property (Figure 6) and contain small areas of freshwater marshes. Immokalee Fine Sand comprises the majority of the substrate and Basinger Fine Sand is a minor component of the flatwoods areas on the preserve. Native canopy species in the mesic pine flatwoods areas of the preserve are dominated by South Florida slash pine (*Pinus elliotti var. densa*) and cabbage palm (*Sabal palmetto*); native midstory species include: saw palmetto (*Serenoa repens*), galberry (*Ilex glabra*), sumac (*Rhus copallinum*), wax myrtle (*Myrica cerifera*) and rusty lyonia (*Lyonia* fruticosa.). Native grasses and herbaceous plants dominate the understory.

Mesic flatwoods provide essential forested habitat for a variety of wildlife species including Neotropical migratory birds, wide-ranging large carnivores, mid-sized carnivores, ground-nesting vertebrates, tree-cavity dependent species, tree-nesting species and non-aquatic plant life. “At the current rate of habitat conversion, the mesic pine flatwoods, once the most abundant upland habitat

in South Florida, is in danger of becoming one of the rarest habitats in South Florida" (USFWS 1999).

2.4 Native Plant and Animal Species

Mangrove swamps and mesic flatwoods comprise the majority of the 26.77 acre Wet Woods Preserve. Small pockets of tidal marshes and freshwater marshes are also located within the preserve. This section discusses the flora and fauna found within and close to the preserve. The next section (2.5) discusses all listed species in more detail.

2.4.1 Plant Species

To date, 188 plant species have been recorded at the preserve (Appendix 2). A comprehensive plant survey was conducted in 2008 by botanist Keith A. Bradley of the Institute of Regional Conservation. Of these 188 species, 163 (87%) are native to the site and 25 are exotic (13%). Of the 25 exotic species, 14 are listed by the Florida Exotic Pest Plant Council (13 Category I and 1 Category II).

2.4.2 Animal Species

Due to the dearth of specific surveys for the occurrence of animal species (in contrast to plants) and the lack of on-site staffing, little is recorded for actual occurrences of animals at the Wet Woods Preserve. Occurrences of fauna at the preserve are based on direct visual and aural observations by staff during site visits or evidence of activity such as spoor, scat, or burrows, and from the site information available in documents such as:

- the site's initial criteria screening report;
- the property's interim management plan;
- anecdotal information from persons with knowledge of the site.

Mammal species known to occur or individuals and/or evidence of activity directly observed within the preserve include: Virginia opossum (*Didelphis virginiana*), nine-banded armadillo (*Dasypus novemcinctus*), marsh rabbit (*Sylvilagus palustris*), and raccoon (*Procyon lotor*).

Reptile and amphibian species observed at the preserve include: brown anole (*Anolis sagrei*), southern black racer (*Coluber constrictor priapus*), ring-necked snake *(Diadophis punctatus)*, box turtle (*Terrapene carolina)* and the green treefrog (*Hyla cinerea*).

Invertebrates observed include the following butterfly species: the gulf fritillary (*Agraulis vanillae*), the white peacock (*Anartia jatrophae*), the zebra long wing (*Heliconius charitonius*), and the cloudless sulphur (*Phoebis sennae*).

Several different bird species have been observed perching, foraging, or exhibiting nesting behavior at the preserve (See Table 4).

Table 4: Bird Species Recorded at the Wet Woods Preserve			
Common Name	**Scientific Name**	**Common Name**	**Scientific Name**
Hooded Merganser	*Lophodytes cucullatus*	Reddish Egret	*Egretta rufescens*
Double-crested Cormorant	*Phalacrocorax auritus*	Yellow-crowned Night Heron	*Nyctanassa violacea*
Brown Pelican	*Pelecanus occidentalis*	Spotted Sandpiper	*Actitis macularius*
Red-shouldered Hawk	*Buteo lineatus*	Mourning Dove	*Zenaidura macroura*
Osprey	*Pandion heliaetus*	Red-bellied Woodpecker	*Melanerpes carolinus*
Bald Eagle	*Haliaeetus leucocephalus*	Tree Swallow	*Tachycineta bicolor*
Black Vulture	*Coragyps atratus*	Gray Catbird	*Dumetella carolinensis*
White Ibis	*Eudocimus albus*	Northern Mockingbird	*Mimus polyglottos*
Great Blue Heron	*Ardea herodias*	Blue Jay	*Cyanocitta cristata*
Great Egret	*Ardea alba*	Blue-gray Gnatcatcher	*Polioptila caerulea*
Snowy Egret	*Egretta thula*	Yellow-rumped Warbler	*Dendroica coronata*
Little Blue Heron	*Egretta caerulea*	Palm Warbler	*Dendroica palmarum*
Tricolored Heron	*Egretta tricolor*	Northern Cardinal	*Cardinalis cardinalis*
Green Heron	*Butorides striatus*		

The Florida Breeding Bird Atlas lists 26 bird species that have been recorded as confirmed, probable, or possible breeding in the vicinity of the site (in the Bonita Springs USGS quadrangle Block 6; Table 5). The Breeding Bird Atlas documents breeding distributions of all bird species in Florida between 2011 and 2016. Some of these species may breed at the Wet Woods Preserve.

Table 5: Breeding Bird Species Recorded in the Bonita Springs Quadrangle Block 6 in the Vicinity of the Wet Woods Preserve

Common Name	Scientific Name
Muscovy Duck	*Cairina moschata*
Mottled Duck	*Anas fulvigula*
Eurasian Collared-Dove	*Streptopelia decaocto*
Mourning Dove	*Zenaida macroura*
Common Gallinule	*Gallinula galeata*
Killdeer	*Charadrius vociferus*
Least Tern	*Sternula antillarum*
Green Heron	*Butorides virescens*
Osprey	*Pandion haliaetus*
Swallow-tailed Kite	*Elanoides forficatus*
Bald Eagle	*Haliaeetus leucocephalus*
Red-shouldered Hawk	*Buteo lineatus*
Red-tailed Hawk	*Buteo jamaicensis*
Red-bellied woodpecker	*Melanerpes carolinus*
Loggerhead Shrike	*Loggerhead Shrike*
Blue Jay	*Cyanocitta cristata*
American Crow	*Corvus brachyrhynchos*
Fish Crow	*Corvus ossifragus*
Carolina Wren	*Thryothorus ludovicianus*
Northern Mockingbird	*Mimus polyglottos*
European Starling	*Sturnus vulgaris*
House Sparrow	*Passer domesticus*
Red-winged Blackbird	*Agelaius phoeniceus*
Common Grackle	*Quiscalus quiscula*
Boat-tailed Grackle	*Quiscalus major*
Northern Cardinal	*Cardinalis cardinalis*

Source:
Second Florida Breeding Bird Atlas (BBAII),
https://www.pwrc.usgs.gov/bba/index.cfm?fa=explore.ProjectHome&BBA_ID=FL2011

Other wildlife species that have not yet been recorded undoubtedly occur at the Wet Woods Preserve. During migration periods, transient bird species would be expected to utilize this area for short periods of time. The developed character of the adjacent areas may inhibit transient use by many mammal, reptile, and amphibian species, thus limiting the utilization of the preserve to resident individuals or inhibiting the dispersal of many species to and from the preserve.

2.5 Listed Species

Official lists of rare and endangered species are produced at the federal level by the United States Fish and Wildlife Service and the National Marine Fisheries Service and at the State level by the Florida Fish and Wildlife Conservation Commission and the Florida Department of Agriculture and Consumer Services. FNAI produces a list of rare and endangered species and maintains a database of occurrences of these species in Florida. The Institute for Regional Conservation (IRC) also ranks native plant species by conservation status in the 10-county area of South Florida. The following subsections (2.5.1 and 2.5.2) discuss the listed, rare and protected plant and animal species found within and close to the Wet Woods Preserve in detail.

2.5.1 Listed Plant Species

There are seven (7) listed plant species at Wet Woods Preserve that are listed by the Florida Department of Agriculture and Consumer Services (FDACS), two (2) as Endangered, four (4) as Threatened, and one (1) as Commercially Exploited. There are no species listed as Endangered or Threatened by the United States Fish and Wildlife Service within Wet Woods. In total there are seven (7) plant species listed by FDACS at Wet Woods Preserve (Table 6). A brief description of these species and their status is included in the following paragraphs.

Table 6: Listed Plant Species Detected at the Wet Woods Preserve

Scientific Name	Common Name(s)	State
Acrostichum aureum	Golden leather fern	T
Lilium catesbaei	Catesby's Lily	T
Osmunda regalis var. *spectabilis*	Royal fern	C
Tillandsia balbisiana	Reflexed wild-pine, Northern needleleaf	T
Tillandsia fasciculata var. *densispica*	Stiff-leaved wild-pine, Cardinal airplant	E
Tillandsia flexuosa	Banded wild-pine, Twisted airplant	T
Tillandsia utriculata	Giant wild-pine, Giant airplant	E

E: Endangered, T: Threatened, C: Commercially Exploited

Cardinal Airplant Photo by Rodger L. Hammer Courtesy of the Institute for

The Cardinal Airplant, also known as the Common Wild Pine or Stiff-leaved Wild Pine (*Tillandsia fasciculata*), is an epiphytic bromeliad recognized by many common names and is listed as an endangered plant by the State of Florida. Wunderlin and Hansen reported this species in 24 counties throughout Florida as of 2004 (Wunderlin & Hansen 2004). Like most of the other bromeliads in Florida, this species is often referred to as a "tank" bromeliad because the leaf axils and central stems form a "tank" or reservoir at the base of the plant. These reservoirs capture and hold water, dead and decaying plant matter (leaves, seeds twigs, etc.), and dead and drowning non-aquatic insects; these trapped items provide nutrients for the plant (Larson et al. 2006).

The Giant wild pine (*Tillandsia utriculata*) is the largest epiphyte and is relatively common in hammocks and swamps in South Florida. It can reach 12-30 inches in height and its flower spike may be more than six feet in height. It is also listed by the State of Florida as endangered.

Giant Wild Pine
Photo by Rodger Hammer
courtesy of the Institute for
Regional Conservation website

Reflexed Wild Pine
Photo by Melissa E. Abdo
Courtesy of the Institute for
Regional Conservation

The **Reflexed wild pine (*Tillandsia balbisiana*)** and the **Banded wild-pine *(Tillandsia flexuosa)*** are also fairly common epiphytes in South Florida. Both species prefer moist forests and swamps and are state listed as threatened. The reflexed wild pine is equally well-adjusted to deep shade where leaves grow long or to bright sunlight where they are contorted and highly colored from gray-green to blue-bronze or red. The banded wild pine usually grows in the tops of trees in fairy sunny situations. They can grow up to sixteen inches in length and are strongly recurved and twisted (www.corkscrew.audubon.org).

Banded wild-pine
Photo courtesy of
www.corkscrew.audubon.org

Even though the four species listed above are fairly common in the state they are listed due to illegal collecting and the destruction of the habitats in which they are found. Additionally, infestation by the introduced Mexican bromeliad weevil (*Metamasius callizona*) has been implicated in the decline of many air plant populations around the state. Currently, there are no control measures in place however, close research and monitoring is taking place.

Golden Leather Fern
Photo by Shirley Denton courtesy of the
Institute of Regional Conservation

Golden Leather Fern (*Acrostichum aureum*)
This large fern grows in wet areas along the coast of Florida in tidal swamps and marshes. The fronds can reach about six feet long and can be as broad as it is tall. It prefers wet to moist, poorly drained to inundated organic brackish soils. It can be found in the wet, marshy areas in the Wet Woods Preserve that surround the mangrove swamps.

Catesby's Lily (*Lilium catesbaei*)

This herb is endemic to the U.S. southeastern coastal plain and is listed as a threatened species in the State of Florida. It is found nearly throughout Florida and has been recorded in 50 counties (Wunderlin & Hansen 2004). In Collier County, it has only been recorded at Wet Woods Preserve, Railhead Scrub Preserve, Big Cypress National Preserve, Collier Seminole State Park, Florida Panther National Wildlife Refuge, and Picayune Strand State Forest. Christal Segura and Annisa Karim found it on the preserve on September 13, 2007. Christal Segura also detected this species in two different locations on the property in late September of 2007. All specimens were sighted in mesic pine flatwoods areas of the Wet Woods Preserve.

Lilium catesbaei, an endemic lily detected on the Wet Woods Preserve.
Photo by Christal Segura.

Photo by George D. Gann courtesy of the Institute for Regional Conservation Website

Royal Fern (*Osmunda regalis* var. *spectabilis)*

The royal fern can be found in the eastern US and throughout Florida. It grows in swamps and similar moist to wet sites. It can reach heights of up to six feet and grows with a thick creeping rhizome. The roots can form a mass up to 60 cm tall. It is listed by the State of Florida due to its commercial exploitation.

FNAI maintains a database of occurrences of rare, threatened, and endangered species in Florida. An element is any exemplary or rare component of the natural environment, such as a species, natural community, bird rookery, spring, sinkhole, cave, or other ecological feature. An element occurrence is a single, extant habitat that sustains or otherwise contributes to the survival of a population or a distinct, self-sustaining example of a particular element.

These element occurrence data are built into biodiversity matrices. Each matrix encompasses one (1) square mile and includes all species and natural communities tracked by FNAI, including all federal listed species. None of the plant species reported by FNAI have been detected within the preserve. The golden leather fern (*Acrostichum aureum*) was documented within FNAI's Biodiversity Matrix Unit 38350 and four (4) species were reported within FNAI's Biodiversity Matrices 38350 and 38351 as likely (rare species likely to occur on the site based on suitable habitat and/or known occurrences in the vicinity) including the nodding pineweed (*Lechea cernua*) and pine-woods bluestem (*Andropogon arctatus*). Twelve (12) species were reported within FNAI's Biodiversity Matrices 38350 and 38351 as potential occurrences (site lies within the known or predicted range of species) including the many-flowered grass-pink (*Calopogon multiflorus*) and the Celestial lily (*Nemastylis floridana*). Appendix 3 provides the FNAI Managed Area Tracking Record and Element Occurrence Summary as well as the Biodiversity Matrix

Report. Global and state rankings are provided for each species as well as their federal and state status.

2.5.2 Listed Animal Species

Listed wildlife species observed onsite or immediately adjacent include wood stork (*Mycteria Americana),* brown pelican (*Pelecanus occidentalis*) and gopher tortoise (*Gopherus polyphemus)*. A bald eagle *(Haliaeetus leucocephalus)* nest is also present within the preserve.

The Wood stork *(Mycteria americana)*

This bird species, sighted on the property by Southern Biomes, Inc. in 2003 and by staff in 2007, is listed as endangered by the Florida Fish and Wildlife Conservation Commission and by the United States Fish and Wildlife Service. Also known as the wood ibis or flint head, this species is one of the largest wading birds found in Florida and the only stork in the United States. The wood stork is a tactile feeder and may be found in fresh, brackish, and saltwater habitats. Because of its dependence on naturally functioning hydrologic systems, the National Audubon Society refers to this wading bird as the "barometer of the Everglades". For this reason, the wood stork is an excellent environmental indicator of wetland health (Mazziotti 2002).

The Bald eagle (*Haliaeetus leucocephalus*)

Currently, there is an inactive bald eagle nest in the northwest corner of the property. The nest is located within a large, leaning slash pine that died in 2018. According to Florida Fish and Wildlife Conservation Commission, it was active for many years including 2003- 2006, 2008, 2010, 2014, 2016, and 2018. The nest is designated by the agencies as nest Co-0001. In the 2006-2007 nesting season, the eagle pair built a new nest on the adjacent property to the northeast and fledged three young. In late 2007, a pair was observed back on the Wet Woods Preserve nest tree building up the nest; and the active nest was verified in February 2008, 2010, 2014, 2016, and 2018. EagleWatch reported that a vulture killed an eaglet in 2018. No nesting activity has been observed at the nest since 2018. It is unknown if the new Germain parking lot that was built on the adjacent lot has had an impact on where the pair chooses to nest.

This species was reported within FNAI's Biodiversity Matrices 38350 and 38351. On June 29, 2007, the Bald Eagle was officially delisted and removed from the Endangered Species List in the lower 48 states. However, according to the USFWS Division of Migratory Bird Management, this bird of prey will continue to be protected by the Bald and Golden Eagle Protection Act, the Lacey Act and the Migratory Bird Treaty Act (See Appendix 4 for a fact sheet on remaining levels of protection).

Juvenile Bald Eagle on the
Wet Woods Preserve Nest
Photo taken by:
R. L Caron on 3-23-08

Brown Pelican (Pelecanus occidentalis)
Photo by Christal Segura

Brown pelican *(Pelecanus occidentalis)*
This bird – a species of Special Concern in Florida - is a permanent resident of the coastal marine environment from central North America southward to northern South America. Brown Pelicans are found in shallow, warm coastal marine and estuarine waters, particularly on sheltered bays (Shields 2002). These birds were observed just south of the site along the mangrove edge and most likely frequent the canal along the western boundary of the preserve.

Gopher tortoise (*Gopherus polyphemus*)
Photo by Valerie Chartier, URS

Gopher tortoise (*Gopherus polyphemus*) This medium-sized, native land turtle is listed by the State as a Threatened Species. Gopher tortoises are typically found in dry, upland habitats including scrub, xeric oak hammock, sandhills, and dry pine flatwoods. Burrows are created for protection from weather, fire, and predators; they also provide refugia for more than 300 other species of animals. Active burrows exist within the preserveand on the adjacent property to the north. County staff, with input from Florida Forest Service staff, has determined that it would not be safe to burn the site due to its close proximity to the urban area and US 41.

Nine (9) species were reported within FNAI's Biodiversity Matrices 38350 and 38351 as likely (rare species likely to occur on the site based on suitable habitat and/or known occurrences in the vicinity) including: black-whiskered vireo (*Vireo altiloquus*) – a bird of conservation concern, the mangrove fox squirrel *(Sciurus niger avicennia*), and the gopher tortoise (*Gopherus polyphemus*). Seventeen (17) species were reported within FNAI's Biodiversity Matrices 38350 and 38351 as potential occurrences (site lies within the known or predicted range of species) including: the eastern indigo snake (*Drymarchon couperi*), the gopher frog (*Rana capito*), the red-cockaded woodpecker (*Picoides borealis*), and the Florida bonneted bat (*Eumpos floridanus*). Appendix 3 provides the FNAI Managed Area Tracking Record and Element Occurrence Summary as well as the Biodiversity Matrix Report. Global and state rankings are provided for each species as well as their federal and state status.

2.6 Invasive, Non-native and Problem Species

In an ecological context, an invasive species is one that is aggressive in growth and expansion of range and tends to dominate others; its establishment and dominance can cause widespread harm to an ecological system by altering the species composition, susceptibility to fire and hydrology of an area. Non-indigenous species (a.k.a. non-native species, exotic species) are those that have been purposefully or accidentally introduced to an area outside their normal range. The characteristics of some of these species (high rate of growth/reproduction, no natural predators, easily dispersed, able to out-compete native species) make them invasive. Some indigenous

species (a species whose natural range included Florida at the time of European contact circa 1500 AD or a species which has naturally expanded or changed its range to include Florida) may also become invasive. Invasions by native and non-native species often follow an alteration to ecosystem function, disruption of the food web, large scale fragmentation of an ecosystem and/or disturbance (e.g., clearing, fire, drought, etc) of an area. While some native species may become invasive, the establishment and dominance of non-native species is of particular concern.

The Florida Exotic Pest Plant Council (FLEPPC) maintains a list of exotic plants that have been documented to (1) have adverse effects on Florida's biodiversity and plant communities, (2) cause habitat loss due to infestations and (3) impact endangered species via habitat loss and alteration. To date, twenty-five invasive, non-indigenous plant species are known to occur within Wet Woods Preserve. Although Florida does not have an official exotic, invasive animal species list, at least 400 exotic fish and wildlife animal species have been reported in Florida, and approximately 125 species are established. While only two invasive, non-indigenous animal species have been documented within the preserve, other species also have a potential to occur in Wet Woods and will be discussed in section 2.6.2.

.

2.6.1 Invasive and Problem Plant Species

To date, twenty-five (25) introduced plant species have been found at the Wet Woods Preserve, accounting for 13% of the plant species recorded there (Table 7). Twelve (13) of the twenty-five exotic, invasive species are considered Category I exotic, invasive species by FLEPPC and one (1) is listed as Category II. FLEPPC defines Category I plants as those that alter native plant communities by displacing native species, change community structures or ecological functions, or hybridize with natives. Category II plants have increased in abundance or frequency but have not yet altered Florida plant communities to the extent shown by Category I species. These definitions do not rely on the economic severity or geographic range of the problem, but on the documented ecological damage caused (FLEPPC 2007).

Table 7: Invasive Plant Species at Wet Woods Preserve

Scientific Name	Common Names	FLEPPC Category
Acacia auriculiformis	Earleaf Acacia	I
Ardisia elliptica	Shoebutton Ardesia	I
Bischofia javanica	Bishopwood	I
Casuarina equisetifolia	Australian Pine	I
Colocasia esculenta	Wild taro, Dasheen, Coco-yam	I
Dioscorea bulbifera	Air-potato	I
Ficus microcarpa	Laurel fig, Indian laurel	I
Lygodium microphyllum	Old World Climbing Fern	I
Melaleuca quinquenervia	Melaleuca, Punk Tree, Paper Bark	I
Momordica charantia	Balsam Apple	II
Nephrolepis multiflora	Asian Sword Fern	I
Rhodomyrtus tomentosa	Downy Rose Myrtle	I

Schinus terebinthifolius	Brazilian Pepper	I
Syzygium cumini	Java Plum, Jambolan	I
Urena lobata	Caesarweed	I

The most problematic exotic, invasive plant species at Wet Woods Preserve are earleaf acacia (*Acacia auriculiformis*), downy rose myrtle (*Rhodomyrtus tomentosa*) and old world climbing fern (*Lygodium microphyllum).* Downy rose myrtle and earleaf acacia are the most prevalent in the upland area in the northwest quadrant. Old world climbing fern is prevelant throughout the preserve..

In September 2007, all invasive species received initial treatment. The dense exotic vegetation along the eastern boundary that is visible from U.S. 41 was cut, stumps treated and the debris was removed. Because the remainder of the site is difficult to access, the remaining exotic vegetation throughout the property was treated in place using foliar, basal bark or frill and girdle herbicide treatment techniques. The majority of the exotics in the upland area in the northwest quadrant were cut up into small pieces and the bases were treated with herbicide. The entire removal project was funded by the DEP Bureau of Invasive Plant Management ($57,000).

Following initial treatment, contractors returned to the site twice to retreat the remaining exotics. County approved contractors treated the preserve bi-annually from 2008 – 2010. The most recent treatment occurred in March 2020. Treatment will continue to occur every 2 years, or as needed.

Under certain conditions, especially following soil disturbance or drainage, some native plant species can become invasive. There are no native plant species at Wet Woods Preserve that are currently a management problem on the site. Management actions may cause some species to become problematic (see section 4.5.7).

2.6.2 Invasive and Problem Animal Species

Two (2) non-indigenous, invasive animal species have been documented on the preserve: red imported fire ants and brown anoles. Based on the natural communities found within the preserve, proximity to residential areas and geographic location, several more species (native and non-native) have the potential to impact the Wet Woods Preserve to varying degrees. Brief descriptions of documented and undocumented but potentially problematic species are provided in the following paragraphs.

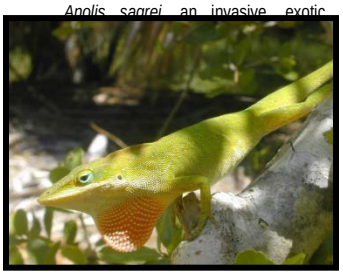
Red imported fire ant (*Solenopsis invicta*): documented within the Wet Woods Preserve

Solenopsis invicta, an invasive, non-indigenous arthropod documented within the Wet Woods Preserve. Photo courtesy of the USDA.

These social insects were introduced into the U.S. from Brazil into either Mobile, Alabama or Pensacola, Florida between 1933 and 1945 (Collins & Scheffrahn 2005) and have been detected in the Wet Woods Preserve. Red imported fire ants (RIFA) have been documented to cause harm to humans and wildlife as well as economic harm (Stimac & Alves 1994; Collins & Scheffrahn 2005; Willcox & Giuliano, 2006). RIFAs are omnivorous, but they prefer insects as their primary food source (Willcox & Guiliano 2006). RIFAs have a number of impacts on wildlife; in many areas, they have eliminated native ant populations through competition and predation and have eradicated food sources utilized by some wildlife species. Ground-nesting wildlife is especially susceptible to RIFAs. Within the Wet Woods Preserve, RIFAs have the potential to affect ground-nesting birds; small mammals; reptiles such as gopher tortoise, native lizard and snake species, and native invertebrates (Willcox & Giuliano 2006). Additionally, members of the public that come into contact with RIFAs may be harmed if stung. Many people have anaphylactic reactions to the toxins released from RIFA stings.

Brown Anole (*Anolis sagrei*): documented within the Wet Woods Preserve

Anolis sagrei, an invasive, exotic



Anolis carolinensiis, an ***indigenous*** reptile documented in the Wet Woods Preserve. Photo courtesy of the USGS.

Also known as the Cuban anole, the brown anole is native to Cuba, the Bahamas, and neighboring islands (Schwartz & Henderson 1991). Like other anoles from the islands, this species is a small, tropical, diurnal, arboreal, territorial, and insectivorous lizard (Campbell 2001). The brown anole was first documented in the Florida Keys in the late 1800s (Lee 1985) and has since spread throughout Florida, into Georgia and into two other southeastern states (Campbell 1996). The brown anole is a habitat generalist and generally prefers the fairly open areas of disturbed sites. In Florida; it feeds on a wide variety of insects, amphipods, and isopods. Brown anoles also prey on other small vertebrates including the hatchlings of the native green anole (*Anolis carolinensiis;* Campbell 2000). Campbell (2000) showed that, in the absence of the exotic brown anoles, native green anoles occupy perches from ground to the canopy of vegetation. However, in the presence of the exotic anole, native anoles move higher in trees, occupying only the trunk and crown of trees. Dietary overlap is high between both species, but the overall affects of the brown anole on the green anole are still undetermined.

Coyote (*Canis latrans*): undocumented within the Wet Woods Preserve

Coyotes were introduced in very small numbers to Florida during the 1920's for sport hunting with domestic dogs. This introduction did not lead to the establishment of coyote populations in

Florida. Concurrently, these canids expanded their range eastward across the United States and Canada as a result of nonspecific needs in habitat and food, decreased competition from other predators, large litter sizes and anthropogenic changes to the landscape. Since many species naturally expand or change their home ranges in response to climate and resource availability, the coyote may be considered native to Florida. This crepuscular (active mostly at dawn and dusk) species is elusive and may travel individually or in groups of two or three (Coates et al. 1998). Evidence of the presence of coyotes has been observed at the nearby Railhead Scrub Preserve. Coyotes commonly enlarge burrows made by other animals such as armadillos or gopher tortoises to use as dens or use dense vegetation for cover. Coyotes may have a negative influence on indigenous wildlife as direct predators or as potential competitors with predators that may occur at the preserve such as foxes (*Urocyon cinereoargenteus)* or bobcats (*lynx rufus floridanus)***;** however, this species may prove beneficial in controlling potential problem species such as feral cats.

Osteopilus septentrionalis, an invasive, exotic reptile that has the potential to occur at the Wet Woods Preserve. Photo courtesy of the USGS.

Cuban tree frog (*Osteopilus septentrionalis*): undocumented within the Wet Woods Preserve

Like the Cuban anole, the Cuban tree frog is native to Cuba, the Bahamas, and neighboring islands. The first Cuban tree frogs probably arrived in the Florida Keys as stowaways in shipping crates originating from the Caribbean in the 1920's. Today, they have established breeding populations as far north as Cedar Key on Florida's Gulf Coast, Jacksonville on the Atlantic Coast, and Gainesville in north-central Florida. These hylids are the largest tree frog found in Florida and because of their ability to invade natural areas and prey on native invertebrates and small vertebrates (including native tree frogs) they are considered an invasive species. Additionally, the tadpoles of this species inhibit the growth and development of the tadpoles of the native southern toad (*Bufo terrestris*) and green tree frog (*Hyla cinerea*). Cuban tree frogs thrive in residential and natural areas such as pine forests, hardwood hammocks, and swamps. In residential settings, they are most commonly found on and around homes and buildings, and in gardens and landscape plants. They are known to get into transformer boxes and electrical switches causing power outages (Johnson 2007). Due to the natural communities that are found within the Wet Woods Preserve and its proximity to residential areas, this species has the potential of occurring in the preserve.

Giant Marine Toad or Cane Toad (*Bufo marinus*): undocumented within the Preserve

The cane toad is a tropical species native to the Amazon basin in South America, and its range extends through Central America to extreme southern Texas along the Rio Grande River. They are used as a as a control agent for insects that damage sugarcane and consequently, are one of the most introduced amphibian species in the world. In 1936, an attempt was made to introduce this species into Palm Beach County, FL. This attempt failed as did two subsequent efforts. Ironically, in 1955, an accidental release by an importer at the Miami International Airport in Miami-Dade County, FL proved successful. They have since been deemed an invasive species in Florida and are currently found in urban areas of south and central Florida, and are rapidly expanding northward (Brandt & Mazziotti 2005). Many of this species' characteristics enable it to do well in south Florida. Beetles, bees, ants, winged termites, crickets and bugs are a large part of the diet of the adult marine toad. Additionally, they consume arthropods, mollusks, small vertebrates, plant matter, pet food, carrion, household scraps, marine snails, smaller toads and native frogs, small snakes, and even small mammals. Marine toads are prolific breeders and females can lay tens of thousands of eggs in a single breeding season. They prefer forested areas with semi permanent water nearby (Churchill 2003). The cane toad looks very similar to the native, southern toad, but there are some distinct differences. The most obvious distinction is adult body size (length of body not counting the legs). Adult marine toads can reach lengths of 6 -9 inches while the native southern toads only reach a length of 3.6 inches. Like other true toads, both possess poisonous, parotid glands. The ***parotid glands*** of the cane toad are angled downward behind their head to their shoulders. The southern toad has a kidney-shaped parotid gland behind each eye positioned close to the spine. The southern toad also possesses ***cranial crests*** that start between the eyes and often end in big knobs. While the parotid glands of all toads contain bufotoxins (poisonous, milky fluids exuded as a defense mechanism), the chemicals released by the exotic, cane toad are much more harmful to wildlife, pets and people (Brandt & Mazziotti 2005). Due to the natural communities that are found within the Wet Woods Preserve and its proximity to residential areas, this species has the potential of occurring within the preserve. Adjoining residents of the preserve should be encouraged to keep pet food and water containers indoors or empty at night.

Bufo marinus, an invasive, exotic amphibian that has the potential to occur at the Wet Woods Preserve. Photo courtesy of the USGS.

Bufo terrestris, a native toad that looks similar to the exotic, invasive cane toad. Photo courtesy of the USGS.

Feral domestic cat *(Felis catus):* undocumented within the Wet Woods Preserve

Domestic cats originated from an ancestral wild species, the European and African wildcat (*Felis silvestris*). Humans facilitated the global distribution of cats due to their highly efficient predatory skills. Egyptians took cats with them on shipping vessels to keep rodent populations down, and they likely introduced domestic cats to Europe. Subsequently the expansion of the Roman Empire and European missionary missions facilitated the spread of domestic cats into Asia and beyond

(Masterson 2007). Today, the impact of feral cats on wildlife is difficult to quantify; however, literature (FFWCC 2001; Karim 2007; Masterson 2007) strongly indicates that they are a significant factor in the mortality of small mammals, birds (including migratory birds), reptiles, and amphibians in Florida. Because free-ranging cats often receive food from humans, they may reach abnormally high numbers. An increase in the population of feral cats may lead to increased predation rates on native wildlife. While no cats have yet been observed on the Wet Woods Preserve, there exists a high probability of their future presence on the preserve due to the proximity of Wet Woods to human residential areas. Adjoining residents of the preserve should be encouraged to keep their cats indoors and staff should monitor the preserve for the presence of feral cats.

Feral pig *(Sus scrofa):* undocumented within the Wet Woods Preserve

Hogs were first brought to Florida in the mid 1500's to provision settlements of early explorers. Over the next four centuries, these animals were raised in semi-wild conditions and rounded up only when needed. Their high rate of reproduction and their ability to adapt to Florida's natural areas has led them to populate every county in the state. Today, Florida is second only to Texas in its feral hog population (Giuliano & Tanner 2005*a*; 2005*b*). While feral pigs are able to survive in a variety of habitats, they prefer large forested areas interspersed with marshes, hammocks, ponds, and drainages; cover in the form of dense brush; and limited human disturbance (Giuliano & Tanner 2005*b*). Dense cover is used as bedding areas and provides protection from predators and hunters. Feral pigs are omnivorous, opportunistic feeders consuming grasses, forbs, and woody plant stems, roots, tubers, leaves, seeds, fruits, fungi, and a variety of animals including worms, insects, crustaceans, mollusks, fish, small birds, mammals, reptiles, amphibians, and carrion. Their propensity for digging for foods below the surface of the ground (rooting) destabilizes the soil surface, resulting in erosion and exotic plant establishment. Additionally, this behavior uproots or weakens native vegetation (Giuliano & Tanner 2005*a*; 2005*b*). Due to the natural communities that are found within the Wet Woods Preserve, this species has the potential of occurring within the boundaries. As these animals are highly visible outside of natural plant communities, adjoining residents of the preserve may be useful in the early detection of this nuisance animal. Given the location of the preserve and its proximity to residential areas, trapping would be the only viable solution if feral hogs were to invade Wet Woods.

Burmese python *(Python bivittatus):* undocumented within the Wet Woods Preserve

The Burmese python is a large nonvenomous constrictor that is an invasive species in Florida. Burmese pythons have heavily impacted the wildlife and the food chain in South Florida. These predators have contributed to major declines in animal populations and pose a major threat to endangered species. Although pythons have not been observed within Wet Woods Preserve, its natural communities could support their presence. If a python is identified within the preserve, efforts should be taken to remove it for humane euthanization. The presence of a python should be reported to FWC with the following information: a photo identifying the snake as a python, the date of capture, and the gps location of capture.

3.0 Previous and Current Use of the Preserve; Adjacent Land Uses

3.1 Previous and Current Use

Aerial photography taken in 1944, 1953, 1962, 1975, 1985, 1994 and recent physical visits to the site show that development has never occurred on the site. The photographs are available in the public records and available at the Collier County Property Appraisers Office and online from the State University System of Florida website (see Figure 7). A Phase I Environmental Site Assessment was conducted on the site by ASC geosciences dated May 25, 2005, before the property was purchased by the Conservation Collier Program. This report revealed that no evidence of recognized adverse environmental conditions exist on the property and is this report is available as public county record.

Currently, there is no sanctioned public use of the site. The closest public road to the property is US Hwy 41 (Tamiami Trail North). A drainage ditch running north and south is located on the eastern edge of the property and separates the preserve from US Hwy 41. This ditch makes the preserve virtually inaccessible from US 41.

3.2 Cultural, Historical and Archeological Resource Protection

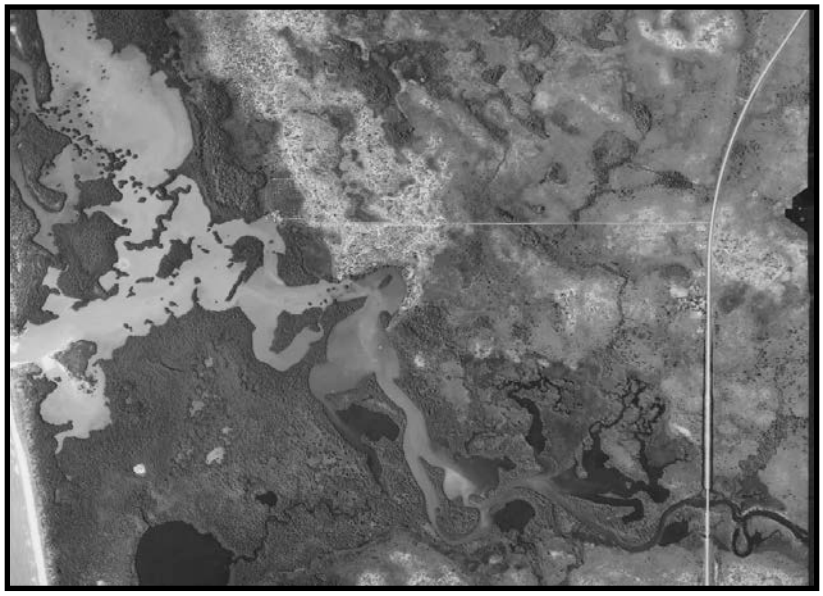
The Wet Woods Preserve is not within an area of historical and archaeological probability, and no historical or archaeological sites appear to be present on the property. The County will notify the Division of Historical Resources immediately if evidence is found to suggest any archaeological or historic resources are discovered. If such resources are identified on-site, staff shall cordon off the area, and a professional survey and assessment shall be instituted. The archaeologist shall prepare a report outlining results of the assessments and issue recommendations to County staff about management of any sites discovered, per provisions of the Land Development Code Section 2.2.25. This report shall be sent to the Division of Historical Resources. The County shall cooperate fully with direction from the Division of Historical Resources on the protection and management of archaeological and historical resources. The management of these resources will comply with the provisions of Chapter 267, Florida Statutes, specifically Sections 267.061 2 (a) and (b).

3.3 Adjacent Land Uses

The Wet Woods Preserve is adjacent to residential areas, undeveloped areas, commercial lands, conservation easement lands, a canal, and a major thoroughfare- U.S. Highway 41 (Figure 8). Two parcels are located along the northern boundary of the preserve. The Future Citizens, Inc. parcel is located along the western portion of the northern border, while the Germain car dealership lot is located along the eastern portion of the northern border. Currently, the Future Citizens, Inc. parcel is largely undeveloped pine flatwoods used as a camping area for a number of youth organizations including girl scouts and boy scouts. The Germain parcel was developed in 2007 into a paved parking lot and a small conservation easement mapped as pine flatwoods was preserved along the western boundary of the Germain property. A drainage ditch running north and south is located along the eastern edge of the preserve property and separates it from US Hwy 41. Mangrove swamps, under conservation easement, are located along the southern border of the preserve and are owned by the Old Collier Golf Club. The Cocohatchee Nature Center is located just south of

the conservation easement lands. The Gulf Harbor canal, running north and south, is located along the western boundary of the property and separates the preserve from the Gulf Harbor Moorings subdivision.

Figure 7: Historical Aerial Photographs courtesy of the State of Florida University System of Florida website



1944 aerial-

Land remained natural wooded & undeveloped

1962 aerial –

Development started to occur on the land surrounding the preserve. Canal to the west was constructed.

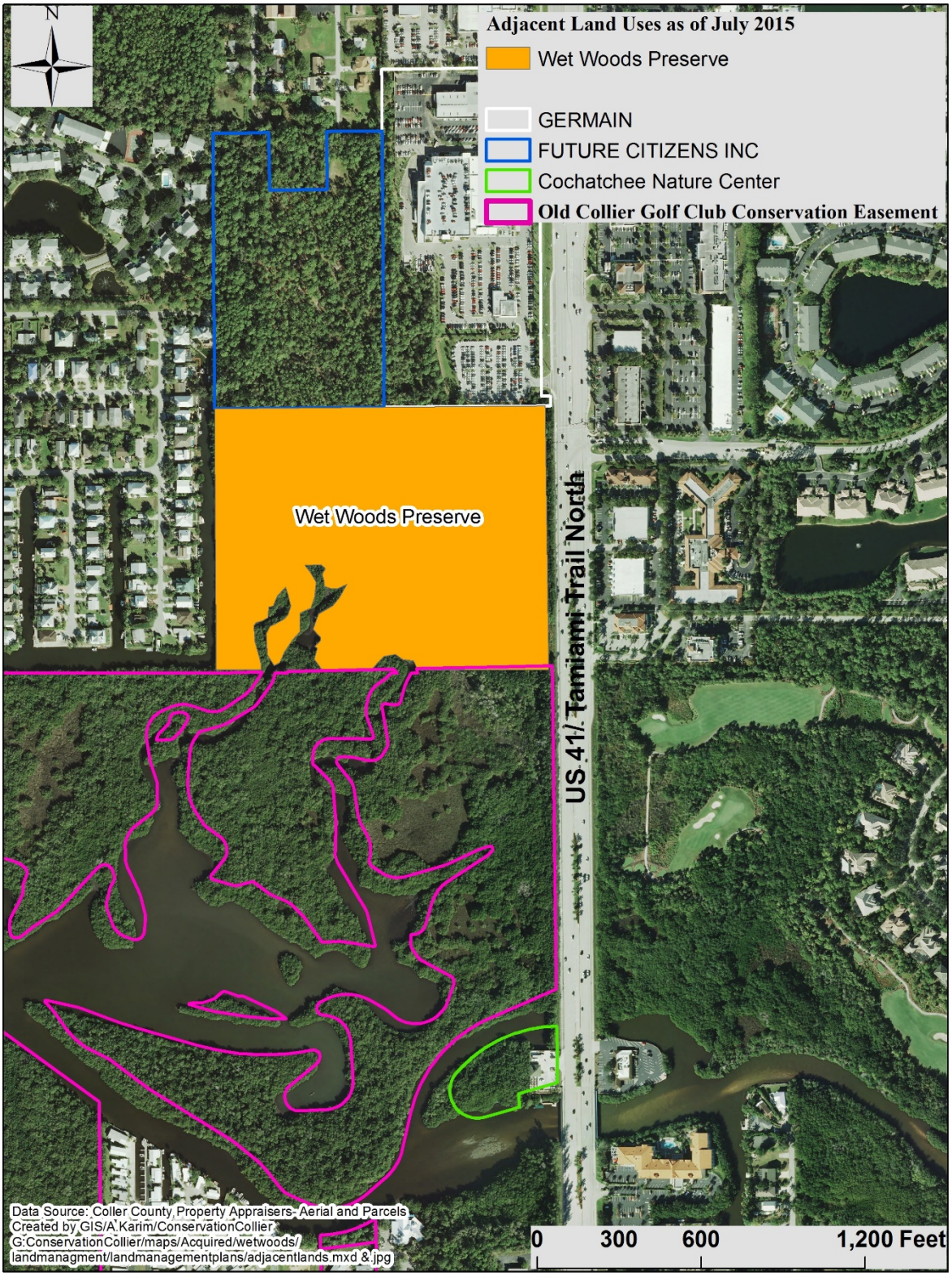


Figure 8: Areas Contiguous to the Wet Woods Preserve

3.4 Major Accomplishments during Previous Years

Since the acquisition of the Wet Woods Preserve in August 2005, key accomplishments have been achieved (Table 8). The facilitation of a partnership between the Partners for Wildlife Program (USFWS) and Future Citizens, Inc. for the removal and treatment of invasive, exotic plant species on the Future Citizens, Inc. parcel furthered the relationship between Collier County and the owners of this parcel while taking steps to eradicate the potential seed sources of invasive, exotics from adjacent lands. Staff also facilitated a relationship between USFWS and the Fire Department to help fund the exotic removal on a one-acre piece of land embedded in the northern portion of the Future Citizens Property. Staff will also work with the County Stormwater Department to assist them in exotic removal on their properties that exist along Wiggins-Pass Road including removal of exotics along a small creek flowing into the Future Citizens Property (Figure 9).

Table 8: Major Accomplishments Since the Acquisition of the Wet Woods Preserve

Accomplishment	Year(s)
Developed an Informal Partnership with Future Citizens, Inc.	2006 - 2007
Acquired grant from the Bureau of Invasive Plant Management (BIPM)(FDEP) for the initial removal and treatment of invasive exotic plant species	2006
Removed and treated the invasive exotic plants species from 14 acres of the site- (implemented the BIPM Grant)	2007
Facilitated a Partnership Between U. S. Fish and Wildlife, Future Citizens, Inc., and the Collier County Fire Department for the Removal and Treatment of Exotic Invasive Plant Species on adjacent properties to the north	2007
Contracted Services of Keith Bradley for a Complete Plant Inventory	2008
Acquired grant from the Invasive Plant Management Section (IPMS)(FWC) for the maintenance of invasive exotic plant species	2015

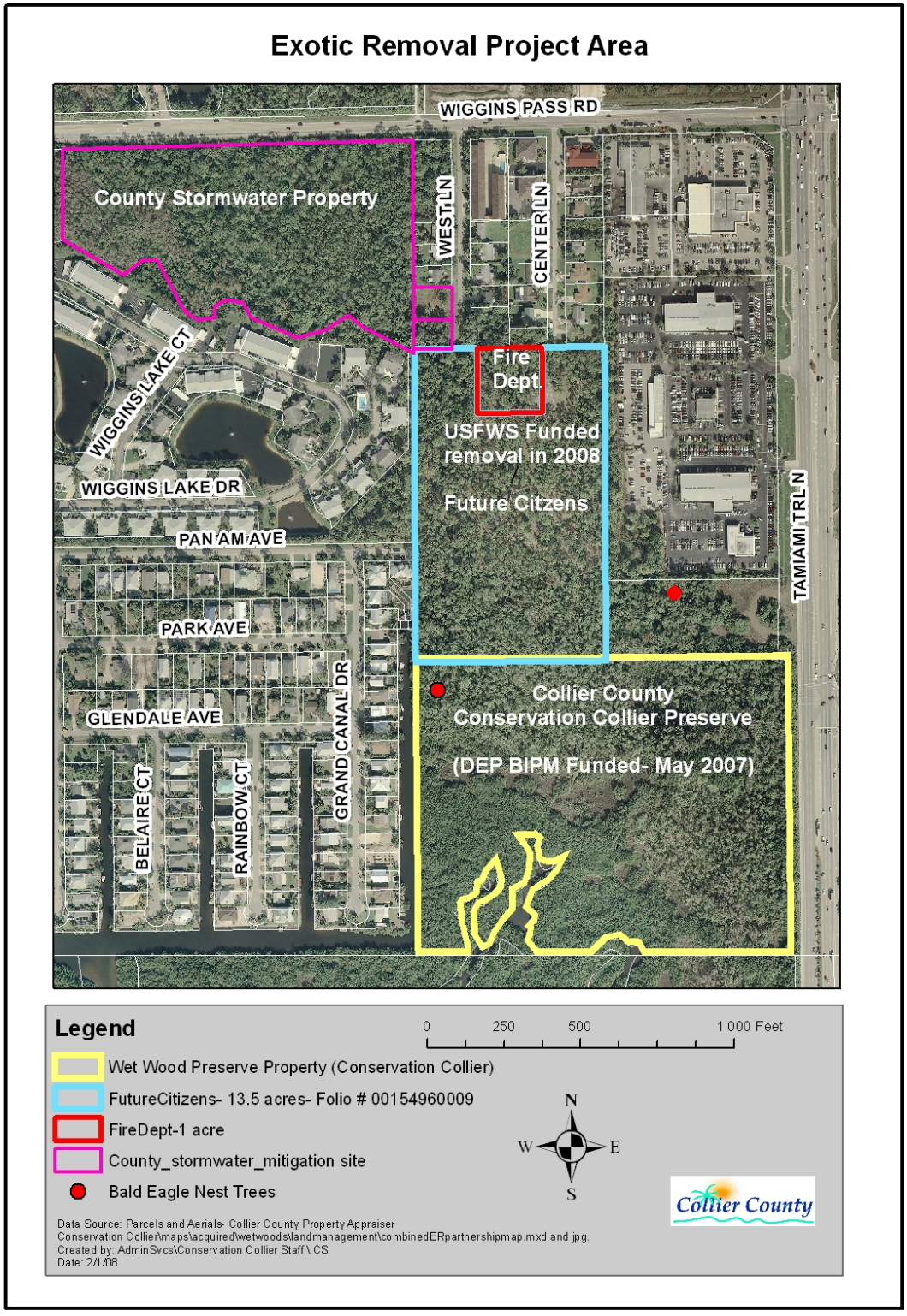


Figure 9: Exotic Removal Partnership Areas

4.0 Future Use of the Wet Woods Preserve including Management Issues, Goals and Objectives

This section describes the main management issues, goals, and objectives for Wet Woods Preserve as well as the overall management framework. Central to the management of the Preserve is the mission of the Conservation Collier Program, and the goals and objectives set forth in this management plan.

4.1 Management Plan Framework

Each property purchased by Conservation Collier shall have its own management plan. The Conservation Collier Ordinance at the time the property was purchased required that an "Interim" Management Plan be developed within 60 days of closing. Interim plans include basic items such as removal of invasive exotics and trash, establishing site security, developing management partnerships and planning for public access. The interim plan for this site was officially approved in January 2006. The ordinance then requires a "Final" management plan covering 10 years be developed within two years. Subsequently, the property management plan must then be reviewed every five years. Final management plans, however, are considered living documents and can be updated at any time. Review of all management plans start in the Lands Evaluation and Management subcommittee and must be approved by both the Conservation Collier Land Acquisition Advisory Committee (CCLAAC) and the Board of County Commissioners (BCC).

4.1.1 Preserve Manager: Contact Information

The Site Manager for Wet Woods Preserve will be a designated Collier County Environmental Specialist who may be contacted through electronic mail: ConservationCollier@Colliergov.net.

4.2 Planned Uses and Assessment of their Impacts

Future planned use will be consistent with the primary goals of conservation, preservation, restoration and maintenance of the resource. Official public use of the site will not be possible because there is no current access points. However, citizens that desire to visit, can do so by signing a waiver which will allow them access at their own risk and releases the liability of the County. Details of planned uses for the Wet Woods Preserve and an assessment of their potential impacts are provided in the following sections.

4.2.1 Identification of Public Uses Consistent with Preservation, Enhancement, Restoration, Conservation and Maintenance of the Resources

The Conservation Collier Ordinance 2002-63 constrains the use of this property to "primary objectives of managing and preserving natural resource values and providing appropriate natural resource-based recreational & educational opportunities." Natural resource-based recreation shall mean all forms of uses, which are consistent with the goals of this program, and are compatible with the specific parcel. Such uses may include, but are not limited to: hiking, nature photography, bird watching, kayaking, canoeing, swimming, hunting and fishing (Ord. No. 02-63, as amended§ 5, 12-3-02). Additionally, no dumping, use of unauthorized vehicles, or removal or destruction of natural or historical/archaeological resources will be permitted within the preserve. The goal is to

allow limited, non-destructive public access to native plant communities and animal species. The preserve rules are those identified in Collier County Ordinance 2011-38 (available from www.municode.com).

The following are ***consistent*** uses for this particular site: hiking, nature photography, bird watching, kayaking / canoeing and fishing. ***Inconsistent*** uses include swimming, hunting and off-road vehicle use (ORV).

In addition, there are no existing easements, concessions, or leases at the Wet Woods Preserve. In accordance with the management goals of the preserve, no future easements, concessions, or leases are appropriate in association with this site, other than conservation related easements.

4.3 Desired Conditions

This section includes a description of the proposed conditions for the site's natural areas. Management techniques to achieve these conditions are outlined in section 4.4.

After managers complete recommended management actions, Wet Woods Preserve will consist of mangrove forests interspersed with tidal marshes and mesic pine flatwood habitats interspersed with freshwater marshes; these communities will have a similar structure and composition to those that existed before non-indigenous people settled the region and before the exclusion of fire. The site will be vegetated with appropriate native flora that will provide suitable cover for a variety of wildlife species.

- ***Mangrove forests interspersed with tidal marshes*** will be comprised of native canopy species such as red mangrove, black mangrove, white mangrove, and buttonwood. Native midstory will include: saltbush while ground cover species will include marsh elder, sea oxy daisy, Christmas berry, black needle rush, cordgrass, giant leather fern, and swamp fern.
- ***Mesic pine flatwood habitats interspersed with freshwater marshes*** will be comprised of native canopy species such as slash pine and cabbage palm. Native midstory species will include: saw palmetto, galberry, sumac, wax myrtle, rusty lyonia, and tarflower (*Befaria racemosa*). The understory will be comprised of saw grass, swamp lily, giant leather fern, umbrella sedge (*Fuirena* spp.), a wide variety of grasses (*Agrostis*, *Andropogon*, *Aristida*, *Dichanthelium*, *Eragrostis*, and *Panicum* spp., *etc*.), pawpaws (*Asimina* spp.), gopher apple (*Licania michauxii*), legumes (*Cassia*, *Crotalaria*, *Galactia*, *Rhynchosia*, *Tephrosia* spp., *etc*.), milkworts (*Polygala* spp.), blueberries (*Vaccinium* spp.), milkweeds (*Asclepias* spp.), composites (*Aster, Chrysopsis, Emilia, Eupatorium, Liatris,* and *Solidago* spp., *etc*.) and native wetland grasses that dominate the freshwater marshes (*Distichlis* spp. & *Paspalum* spp.).

4.4 Goals for the 10 year period 2020-2030

A set of goals and objectives for Wet Woods Preserve were developed in conjunction with the drafting of this Management Plan. The goals and objectives in this plan are tailored specifically for Wet Woods Preserve based on the purposes for which the lands were acquired, the condition of the resources present, and the management issues for the property. On-site managers should be familiar with this entire Management Plan. Goals and objectives from the first 10-year land

management plan for the Wet Woods Preserve were reviewed to determine whether they should be included in this plan. The goals and objectives presented here reflect programmatic goals and ideas of Conservation Collier personnel in charge of managing and protecting the area. These goals shall not be modified, but specific application of management techniques may take into consideration input by user groups and other stakeholders from outside the program, accommodating user needs and desires where practicable and where overarching management goals are not violated.

Management issues are discussed below in separate sections. Within each section, approaches for dealing with these issues are described. The ability to implement the specific goals and objectives identified in this plan is dependent upon the availability of funding sources. The following goals have been identified for Wet Woods Preserve:

Goal 1: Significantly reduce human impacts to indigenous flora and fauna

Goal 2: Continue monitoring of vegetation

Goal 3: Control populations of invasive, exotic or problematic flora and fauna to restore and maintain natural habitats

Goal 4: Use mechanical treatments to decrease woody invasion resulting from fire exclusion

Goal 5: Restore native vegetation

Goal 6: Continue to explore options for public access

Goal 7: Provide a plan for security and disaster preparedness

GOAL 1: *SIGNIFICANTLY REDUCE HUMAN IMPACTS TO INDIGENOUS FLORA AND FAUNA*

Action Item 1.1 Identify locations of rare and listed native plant species.

The location of these species will be identified using a global positioning system (GPS) device and mapped to allow staff to monitor them. Future public trails will be constructed to avoid areas where rare and listed species exist.

Action Item 1.2 Enforce regulations prohibiting trash in or near the preserve.

Staff will monitor the preserve on a regular basis and if excessive dumping or littering start to occur, enforcement actions will be sought through the County Sheriff's Department.

Action Item 1.3 Identify actual and potential locations of resident animal life and take steps such as locating future visitor amenities away from animal nesting sites.

Action Item 1.4 Avoid non-target damage to native plants and animals, especially rare species, during invasive exotic plant treatments.

Staff will prohibit the use of Imazapyr containing herbicides such as Arsenal. This type of herbicide has potentially caused a great deal of non-target damage throughout the state. Licensed County or State contractors will be monitored closely to ensure the proper herbicide applications are being utilized while treating the site. Also, close attention will be taken to look for Tillandsia sp. (listed in Table 6) that may be attached to invasive trees being cut down or removed. Plants of these species should be relocated prior to removal.

Action Item 1.5 Note and research all site development occurring adjacent to Wet Woods Preserve to determine that the proper site development permits have been obtained and that the site development complies with the permits.

Activities on adjacent lands may have an impact on the indigenous plant and animal life on the Wet Woods Preserve. As such, all existing local, state, and federal regulations should be strictly followed and enforced during any site development adjacent to the Preserve. It shall be the responsibility of the developer to establish erosion control measures and vegetation protection measures (i.e., protective fencing or barriers). If any site developer working in areas adjacent to the preserve does not take the necessary control measures, construction shall be immediately halted until control measures are put into place and mitigation and/or remediation will be the sole responsibility of the developer.

GOAL 2: *CONTINUE MONITORING OF VEGETATION*

Action Item 2.1 Continue long-term vegetation monitoring program and conduct additional wildlife surveys.

Long-term management of the preserve should be based on biological data. Changes following baseline conditions should be assessed as negative or positive, and management strategies changed appropriately. This section discusses information needs and long-term monitoring needs.

Keith Bradley from the Institute for Regional Conservation (IRC) conducted a thorough floristic inventory of the Wet Woods Preserve in 2008. His findings along with those of Conservation Collier staff comprise the baseline floristic data on which future actions will be based. The site should be inspected by Conservation Collier Staff at least twice a year and thoroughly inventoried at regular intervals (ca. 5-10 years) to detect new invasions (by natives or exotics) and extinctionsAreas undergoing extreme restoration should be assessed more frequently. While some wildlife data has been collected, additional baseline data should be collected when possible, especially on invertebrates, small mammals, reptiles, and amphibians. The site manager may contract this work out or enlist the assistance of local educators to coordinate student research projects. Wildlife sampling, like plant sampling, should take place at regular intervals (ca. 5-10 years) to detect long-term trends.

Currently, four (4) photo points have been established within upland portions of the preserve, and four (4) photo points have been established within the mangrove fringe portions of the preserve, (Figure 10). Locations of photo points have been recorded with a GPS and all photographs taken at these locations have been taken at a standard height and angle of view. During photo documentations, one photo is taken in each of the cardinal directions (north, east, south and west) and a 360-degree panoramic photo is taken. These photos will help to monitor exotic plant removal and native plant recruitment over time. Additionally, the four photo points located within the mangrove fringe will assist with documentation of the effects of sea level rise to the vegetation within the preserve. If necessary, more photo points will be established to aid in management decision activities.

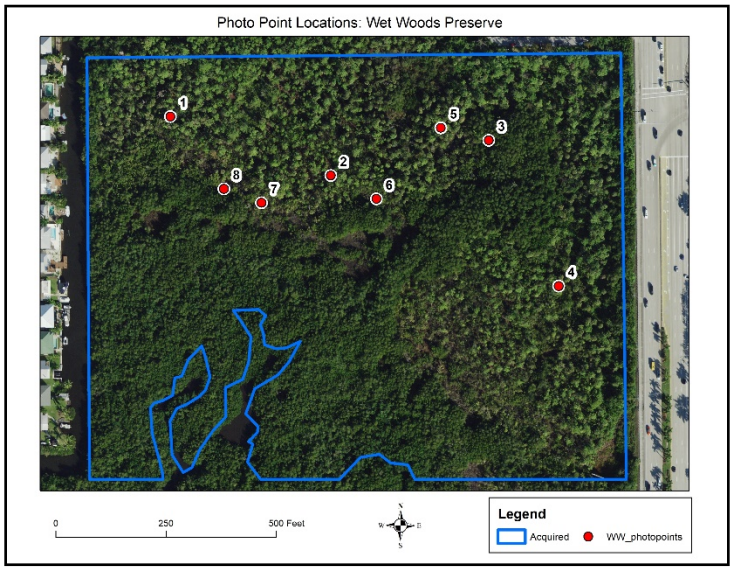


Figure 12: Photo Point Locations Within Wet Woods Preserve

GOAL 3: *REMOVE OR CONTROL POPULATIONS OF INVASIVE, EXOTIC OR PROBLEMATIC FLORA AND FAUNA TO RESTORE AND MAINTAIN NATURAL HABITATS*

Action Item 3.1 Acquire services of licensed and qualified contractor(s) for the removal of invasive, exotic or problematic plant species.

The following (Table 9) describes recommended controls of the majority of the Category I, invasive, exotics by Langeland and Stocker (2001) as well as staff recommendations. These recommended control methods may be altered by site managers dependent on new information and products available on the control of these species.

Table 9: Invasive, Exotic Plant Species Control Plan for the Wet Woods Preserve Category I species

Scientific Name	Common Name(s)	Description and Recommended Control(s)[a]
Acacia auriculiformis	Earleaf acacia	Basal bark application of 10% Garlon 4 or cut-stump treatment with 50% Garlon 3A.
Ardisia elliptica	Shoebutton ardesia	Basal bark treatment with 10% Garlon 4 or cut stump application of 50% Garlon 3A. Hand pull seedlings.

Bischofia javanica	Bishopwood	Basal bark treatment with 10% Garlon 4 or cut stump application of 50% Garlon 3A. Hand pull seedlings.
Casuarina equisetifolia	Australian pine	Basal bark treatment with 10% Garlon 4 is very effective, as is a cut-stump treatment with 50% Garlon 3A or 10% Garlon 4. When basal bark treatment is used on trees greater than 1 foot in diameter it may be necessary to slough off loose bark in the application area to prevent the bark from trapping the herbicide. Broadcut or 4-6 lb Velpar ULW may be used when appropriate.
Colocasia esculenta	Wild taro	Usually found in aquatic habitats where only aquatic herbicides should be used. Large corms make control really difficult. Less than 2 feet tall resembles alligator flag and elephant ear. Has a large tuberous root. Can manually dig up root and remove from site or treat with foliar application 1-1.5% aquatic glyphsate (Rodeo) with an aquatic approved surfactant
Dioscorea bulbifera	Air-potato	A basal stem application of Garlon 4 is recommended although cut-stem treatments with 50% Garlon 3A or 10% Garlon 4 are also effective. If bulbils are present on vines, a basal bark treatment should be used because it will translocate into the bulbils. Collect bulbils from the ground and remove from site. Apply 10% Garlon 4 to stems emerging from tubers. Hand pulling followed by treatment of re-sprouts has also been effective. For foliar applications, use Garlon 1%-2% 3A. Several applications throughout the growing season may be necessary.
Ficus microcarpa	Laurel Fig	Basal bark application of 10% Garlon 4. Invade the interior and ensure herbicide doesn't come into contact with host tree or plant.
Lygodium microphyllum	Old world climbing fern	The most serious natural area weed in Florida. Control immediately upon sighting. Thoroughly spray foliage to wet with 1.25% Garlon 4 (4 pt per acre), 0.6% Roundup Pro (maximum 5 pt/acre), 1.0%-3.0% Rodeo (maximum 7 pt per acre). Only Rodeo can be used if plants are growing in aquatic site. Plants growing high into trees cut vines and treat lower portions. Do not apply when plants are under environmental stress. The poodle cut method may also be used.
Melaleuca quinquenervia	Melaleuca, Punk tree, Paper bark	For seedlings and saplings: (1) hand pull, being sure not to break plant off of root system and remove or place in piles to help reduce the chance that they will re-root or; (2) Treat with foliar, low volume spot application of 5% Rodeo. For mature trees: (1) Fell large trees with chain saw leaving a level surface, or fell small trees with machete and treat with triclopyr or glyphosate products according to frill and girdle directions on SLN. Use aquatic versions where standing water is present. Monitor for resprouting and retreat as necessary. (3) Mature trees are very difficult to control with foliar applications.
Nephrolepis multiflora	Asian Sword Fern	Foliar treatment of 1.5% glysophate
Rhodomyrtus tomentosa	Downy rose myrtle	Basal bark application of 10%-20% Garlon 4.
Schinus terebinthifolius	Brazilian pepper	Cut-stump treatment with 50% Garlon 3A, 10% Garlon 4 or a basal bark application of 10% Garlon 4. Foliar application of Garlon 4, Garlon 3A, Roundup Pro, Roundup Super Concentrate, or Rodeo, according label directions may be used where appropriate. Glyphosate products are less effective when

		used alone in spring and early summer. Use Rodeo where plants are growing in aquatic sites.
Syzygium cumini	Java plum, Jambolan	Mature trees may take up to 9 months to die. Cut-stump treatment with 50% Garlon 3A or 10% Garlon 4, or use a basal bark treatment with 10% Garlon 4.
Urena lobata	Caesarweed	1-2% Garlon 3A + .25% surfactant foliar treatment quarterly

In mesic pine flatwoods, vines - particularly muscadine (*Vitis rotundifolia)* - may become abundant after mechanical treatments or exotic plant removal. This native vine, already present in mesic flatwoods in low densities, can become invasive after disturbances - forming dense colonies, killing hardwoods and palms, climbing into pines, and persisting for years. *Vitis* sp. should be controlled with herbicides if its populations start to grow.

Action Item 3.2 Acquire services of licensed or qualified contractor(s) for the removal of invasive, exotic or problematic animal species.

To date, two (2) introduced animal species have been documented on the Wet Woods Preserve, the RIFA and the brown anole. It is doubtful that the total eradication of these species can be achieved. However, staff and/or contractors should take measures to remove RIFA populations close to or on any future public access trails.

If feral cat colonies are found near the preserve, the elements that sustain the undesirable population(s) should be identified and efforts made to ask property owners to eliminate them (i.e., refuse bins, dumpsters, and supplementary feeding by humans). If any feral cats remain, they will be trapped and taken to Collier County Domestic Animal Services.

If feral hog populations are found on the preserve, services of licensed or qualified contractor(s) will be acquired to trap and remove these populations. If pythons are found on the preserve, their presence will be reported to FWC and staff, with the assistance of partner agencies, will attempt to remove them.

GOAL 4: *UTILIZE MECHANICAL TREATMENTS TO DECREASE WOODY INVASION RESULTING FROM FIRE EXCLUSION.*

Action Item 4.1 Utilize mechanical treatment to mimic natural fires within upland areas of the Preserve, when possible.

Much of Collier County is comprised of plants that are dependent on fire to maintain species composition and diversity. These species are the same ones that are prone to lightning strike wildfires, and the controlled reduction of those fuels will prevent catastrophic wildfire damage. Prescribed fires: reduce fuel loads and consequently decrease the threat of wildfires; create open areas for wildlife to travel within; stimulate food and seed production; recycle nutrients; alter the composition and density of forested areas; and aid in the control of invasive plant species.

The structure and composition of the ***mesic pine flatwood*** community is dependent on periodic fires. Fire probably occurred every 1 to 8 years during pre-Columbian times. A majority of the flora and fauna found within this community are adapted to periodic fires; several species depend on fire for their continued existence. Without relatively frequent fires, mesic pine flatwoods succeed into hardwood-dominated forests whose closed canopy can essentially

eliminate herbaceous groundcover and shrubs. Additionally, the dense layer of litter that accumulates on unburned sites can eliminate the reproduction of pine trees that require a mineral soil substrate for proper germination (FWC 2002).

Fire is the ideal ecological tool for achieving a sustainable mesic pine flatwood community. However, due to the proximity of the Wet Woods Preserve to residential and commercial areas, access issues, and the size of the parcel, alternate manual or mechanical treatments will be used in lieu of managing the lands through the use of fire. Heavy machinery access will be limited due to inundation in some areas. When possible, and if funds allow, one half of the uplands should be mechanically mulched every 2 years, so that all uplands will be treated every 4 years. Mechanical treatment must occur outside of eagle nesting season, after the nest is deemed inactive, or after any known eaglets fledge. A gopher tortoise burrow survey should be conducted prior to any mechanical treatment. Burrows should be flagged and avoided during treatment.

GOAL 5: *RESTORE NATIVE VEGETATION*

Action Item 5.1 Maintain a revised GIS map and description of FNAI natural communities and disturbed areas on the property.

Maintaining updated maps will help to guide restoration efforts

Action Item 5.2 Plant native plant species in their appropriate habitats

Periods following exotic removal are essential to the recruitment of native plants. If native plant recruitment is not sufficient from the surrounding, intact seed source, efforts will be made to plant indigenous flora in appropriate habitats. Natural area restoration of Wet Woods Preserve should include only site-specific native plant material that has been determined to be non-problematic at the site and whenever possible, site-specific seed sources should be utilized. In addition, hardwoods that may invade the natural areas (unforested wetlands: freshwater marsh, tidal marsh) should not be planted.

GOAL 6: *DEVELOP A PLAN FOR PUBLIC USE*

Action Item 6.1 Develop access and required facilities for intended public uses

Staff will work closely with adjoining property owners to negotiate areas for the general public to access the preserve. A parking lot is not planned to be constructed on the site due to the amount of wetlands present. Three options are listed below that would facilitate public access and use.

Option 1: A trail network access point could be created off of U.S. 41.

A trailhead into the preserve off of US 41 could be created. A few options have potential to facilitate access from this area. The first is a footbridge connecting the sidewalk from US 41, across the drainage ditch and into the preserve. This option of access into the preserve would lead citizens into a trail network that would start with an information kiosk and a raised

boardwalk leading to a hiking trail through the upland area in the northwest corner. A bike rack will be placed at the entrance to the trail-head off of US 41.

Figure 11 is based on FLUCCS and soil information from the South Florida Water Management District. While this information is generally reliable, a site-specific wetland survey will need to be done before the installation of any trail system. Permits from the County, State and Federal Government would have to be obtained. The Wet Woods Preserve contains uplands, jurisdictional wetlands, hydric soils and non-hydric soils (See Figure 11). The upland areas with non-hydric soils would be the first choice for a trail or a boardwalk. Upland areas with hydric soils may accommodate a walking trail to provide visitors a view of the wetland areas. A raised boardwalk over some wetland areas similar to the Corkscrew Swamp Sanctuary may be appealing to many; however, this would also be the most ecologically impactful and costly.

Potential access features are depicted in the conceptual level master plan (Figure 12). The site shall adhere to guidelines and standards set forth by the Americans with Disabilities Act (ADA) for the footbridge and the raised boardwalk. As permitting for each component of the preserve goes forward, a review of ADA compliance should be done by the County. The proposed raised boardwalk in the conceptual plan is approximately 550 ft-long and it would follow existing trails and cleared areas previously infested with exotics to the extent possible. The elevation of the boardwalk would allow for fluctuation of water levels within the upland marshes and the movement of small animals. Additionally, the end of the boardwalk and the beginning of the walking trail will include benches for wildlife viewing.

The proposed walking trail is approximately 1,100 ft-long. Portions of this upland hiking trail may have to be closed to public access during times of high water. The property also contains one bald eagle nest, and any future trail system would have to take associated rules and regulations (buffer zone, etc.) into account when designing and installing any public access system. USFWS and Florida Fish and Wildlife Conservation Commission (FFWCC) would have to be consulted in regard to the bald eagle nest tree(s) in the vicinity. Any and all trails must comply with the National Bald Eagle Management Guidelines. The following has been taken from these guidelines:

> ***"Category F. Non-motorized recreation and human entry*** *(e.g., hiking, camping, fishing, hunting, birdwatching, kayaking, canoeing). No buffer is necessary around nest sites outside the breeding season. If the activity will be visible or highly audible from the nest, maintain a* ***330-foot buffer*** *during the breeding season, particularly where eagles are unaccustomed to such activity."* (USFWS 2007)

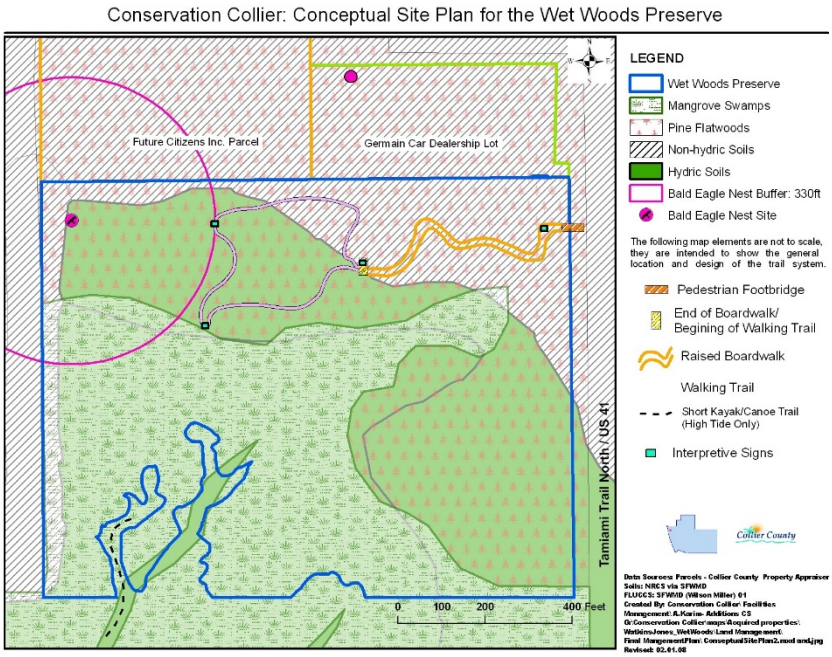


Figure 11: Option 1 - Conceptual Site Plan

To date, one bald eagle nest has been documented on the preserve; a 330-ft buffer will be maintained around this nest. As the nest continues to be active, portions of the trail system within a 330-ft buffer of the nest(s) will be cordoned off during breeding season. The breeding season for these raptors in Florida is defined by the USFWS (2007) as September through May.

An engineering firm would be contracted to plan the design and would be requested to do so in the least impactful way possible. The consulting, planning and permitting would be very expensive as well as the costs to build a boardwalk. This process will also be very time consuming. It is estimated that at least a year will be needed to complete the planning and permitting process. Option 1 is currently not a valid option because of budget constraints. Should matching funds become available, grants could be applied for to assist in the costs associated with this option.

Attempts were made to possibly lease a few parking spots from the Germain dealership or from a parking lot across of U.S. 41 however, the Collier County Planning Division had confirmed that his would not be a legal option per County Land Development Code.

Option 2: Develop a partnership with the Cocohatchee Nature Center for Canoe and Kayak Access

The Cocohatchee Nature Center has expressed interest in partnering with the Conservation Collier Program. The Nature Center is located immediately to the west of US 41, south of the Wet Woods Preserve at 12345 Tamiami Trail N. (See Figure 8). Their lot has 22 parking spaces, and the Nature Center has a parking agreement with the Pewter Mug Restaurant located directly to the east of U.S. 41. The Pewter Mug property can accommodate parking for approximately 84 vehicles and allows Nature Center patrons to utilize their lot anytime before 4 pm everyday. A walkway exists under the adjacent U.S. 41 bridge which connects the Pewter Mug property to the Nature Center. The Nature Center rents out canoes and kayaks to citizens and tourists. Staff will develop a working agreement with the Nature Center to assist citizens who wish to access the preserve via

canoe or kayak. The Nature Center would facilitate them by renting equipment, and they would receive information about the preserve and the program and a brochure and map on how to access the site from the center. The Nature Center is currently for sale however, so the future owners will have to agree with the partnership as well.

There is one access point to the Wet Woods Preserve from the Nature Center (See Figure 11). This area is only easily accessible at high tide. This access point would lead people into the mangrove wetland area. Due to the sensitivity of the mangrove wetlands, no trailheads will be constructed, people will be able to view the property from their kayaks or canoes only. There is great opportunity for bird-watching and nature photography while using this access option.

If Option 1 above were to ever occur, the public would also be able to walk from the Nature Center to the boardwalk area via the sidewalk on the west side of U.S. 41; however, this highway is very busy and this may not be the safest option. There would be an approximate 0.4 mile walk to the boardwalk.

A kayak trail was initially proposed that would allow citizens to paddle up into the canal system that exists around the Gulf Harbor Moorings Community, which would lead paddlers along the western border of the preserve property. A public meeting was held on March 20, 2008, and a number of citizens from the Gulf Harbor Moorings Community attended to give their concerns with this option. The concerns expressed included safety issues such as there is only one way out of their canal system and paddlers have almost been hit by boats on several occasions. The canal is also very narrow and it is hard for them to navigate around paddlers who already use their canal. Also, the amount of crime has already increased in their neighborhood and encouraging additional paddlers to come in would increase the amount of people who would be able to see into the back of their homes. One other legal issue discussed at this meeting and later verified by County staff is that the tidally influenced water of the canal is controlled by the State; however, the land on both canal banks is owned by the Gulf Harbor Moorings Community. If a person were to step off his/her watercraft onto either canal bank that the water touches, he/she would be trespassing. The County would most likely need to obtain an easement in order to pursue any type of dock or haul out area in this canal. The CCLAAC Lands Evaluation and Management Subcommittee met on March 26, 2008 to discuss the results of the public meeting and voted unanimously not to pursue the paddling trail into the canal system or for any type of haul out area.

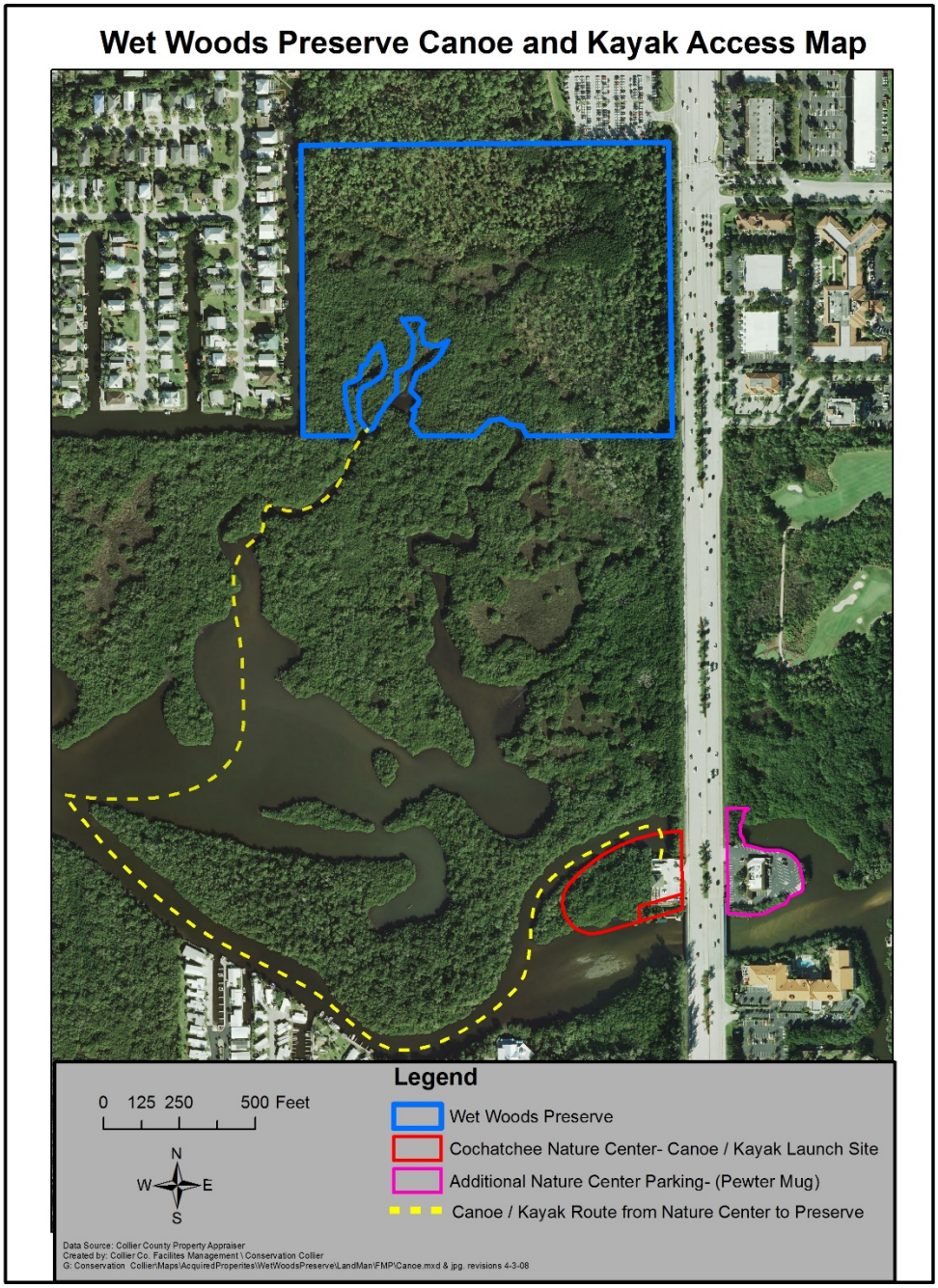


Figure 12: Option 2 - Wet Woods Canoe and Kayak Access Points

Option 3: Create a partnership agreement to schedule tours/nature walks

An agreement could be created between Collier County and the Future Citizens Inc. property owners that would allow Collier County staff to utilize their property to facilitate tours of the Wet Woods Preserve. Citizens or school groups scheduled for tours could park on the Future Citizens

Property and could be lead by Collier County staff or designated volunteers to the established trails on the preserve property. All tours would be scheduled to avoid any conflicts with the Scout Program schedules. Tours would be scheduled during the week or during non-camping season. Access waivers may be required in advance to eliminate any liability issues concerning the Future Citizens Property use. The County Attorney's office will be consulted as to the legality of this option. If access option #1 is ever developed then this option could be utilized mainly for school groups. Staff will continue to maintain a working relationship with the owners of the Future Citizens Property to keep all possible access options open. See Figure 12.

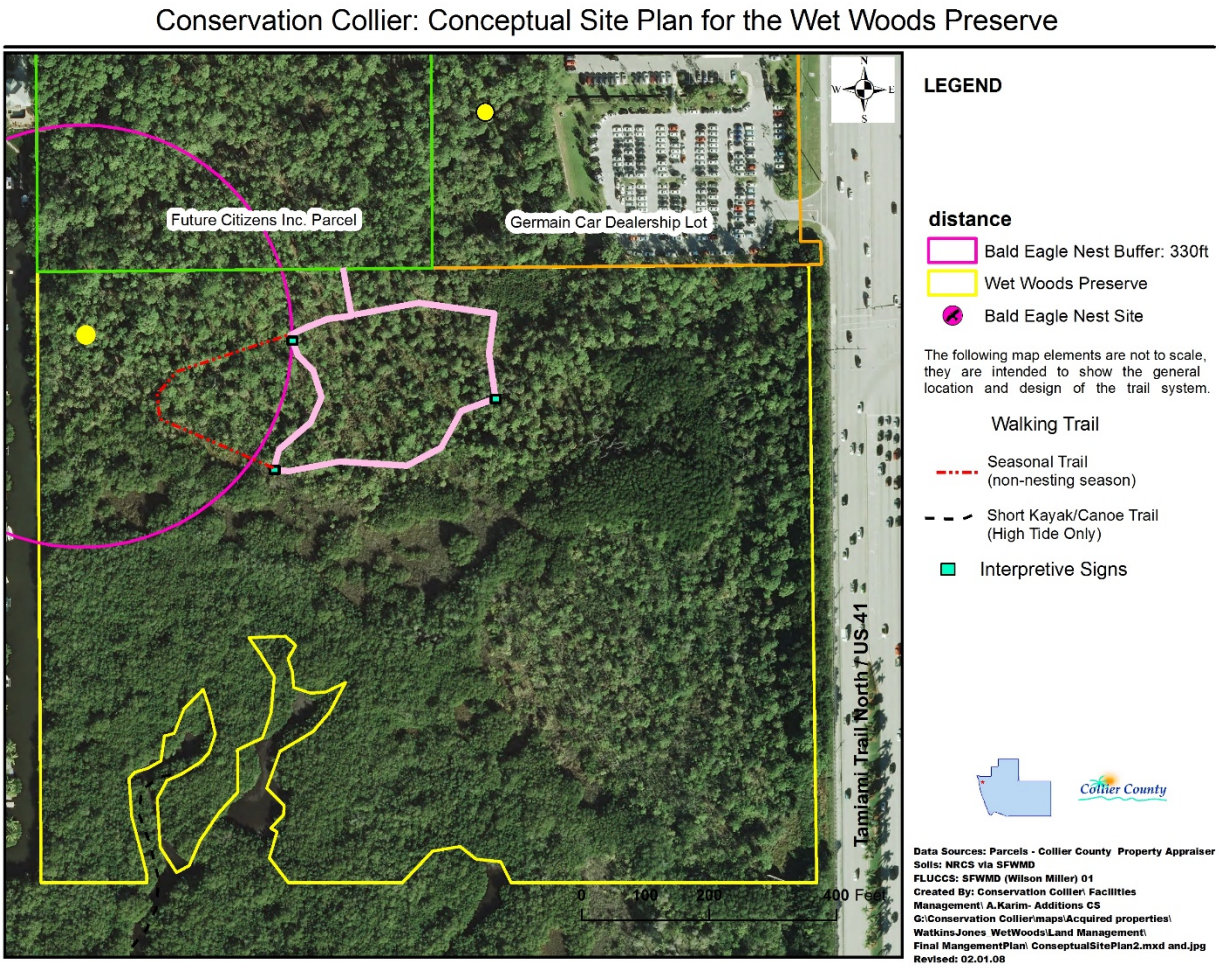


Figure 12: Option 3 - Wet Woods Conceptual Site Plan

***GOAL 7**: PROVIDE A PLAN FOR SECURITY AND DISASTER PREPAREDNESS*

Action Item 7.1 Enforce regulations prohibiting trash and landscape debris dumping in or near the preserve.

Currently, there is no vehicular access and dumping is not a problem. Monthly inspections will determine if dumping becomes a problem. Staff will work with the Collier County Sheriff's Office to address dumping if it becomes a problem.

Action Item 7.2 Survey trees along the perimeter of the property annually for damage

Staff, or a certified arborist will survey the perimeter of the property to determine whether there are any diseased, weak, or damaged trees/limbs that should be removed for safety reasons and prior to hurricane season.

Action Item 7.3 Visit preserve within 48 hours after a storm event to assess damage.

Staff will take photos of damage and fill out appropriate Collier County Risk Management Division forms.

Action Item 7.4 Promptly clear storm debris from preserve.

If necessary, a Collier County emergency debris removal contractor will be contracted as soon as possible after the storm to schedule clean-up. Downed trees and limbs that do not appear to be a public safety hazard will be cleared at the discretion of the Preserve Manager.

4.5 Establish an Operational Plan for the Wet Woods Preserve

This section provides management recommendations for operation of the Wet Woods Preserve. It discusses maintenance and budgeting needs, the possibilities for contracting the restoration activities, coordination, and other management issues.

4.5.1 Maintenance

The primary maintenance activities for the preserve will include control of dumping and littering within and around the preserve. Particularly important are the security measures to keep intruders out and the fencing and signage in good conditions. Signs that effectively convey the desired message provide an opportunity for increasing environmental education and awareness.

4.5.2 Estimated Annual Costs and Funding Sources

Preliminary budget estimates for Wet Woods Preserve include cost breakdowns associated with resource restoration and management. The funding source identified for the restoration and management activities is the Conservation Collier Program Management Trust Fund. Table 10 shows the activities planned for the next ten years and the annual cost estimate of each activity. Private conservation organizations may also provide funding for specific projects.

Funding already secured for management activities at Wet Woods Preserve includes a grant from the state FDEP Bureau of Invasive Plant Management ($57,500) to conduct the initial exotic removal and/or treatment and a grant from FWC Invasive Plant Management Section ($7,000) to conduct exotic plant maintenance in 2015. Additional grants will be sought to supplement existing management funding to possibly fund trail construction and signage. Staff will also utilize the Collier County Sheriffs' Office weekenders program for certain labor projects and may also separately involve the County Scout programs for trail creation and enhancement. Sheriff's workers will be limited to the eastern two-thirds of the property along the trail system and right-of-way and will be kept out of the bald eagle nesting buffer area and especially in areas where children may be present.

The budget in Table 10 represents the actual and unmet budgetary needs for managing the lands and resources of the preserve. This budget was developed using data from Conservation Collier and other cooperating entities and is based on actual costs for land management activities, equipment purchase and maintenance, and for development of fixed capital facilities. The budget below considers available funding and is consistent with the direction necessary to achieve the goals and objectives for Wet Woods Preserve.

Table 10: Annual Land Management Budget (Amounts in $)														
			YEARS											
Item	**QTY**	**Cost ($)**	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	**Total**
Resource Restoration/Monitoring														
Establish photo points	recurring	n/a												
Remove exotics (acres)	6	$7,000	$4,766		$7,000		$7,000		$7,000		$7,000		$7,000	$39,766
Plant survey [2/]	2	$3,100		$3,100									$3,100	$6,200
Regular Maintenance														
Reduce Fuel Loads [3/]	4	$4,500				$4,500		$4,500		$4,500		$4,500		$18,000
Grand Total			$4,766	$3,100	$7,000	$4,500	$7,000	$4,500	$7,000	$4,500	$7,000	$4,500	$10,100	$63,966

Table 10: Annual Land Management Budget

Assumptions for Cost Estimates:

1. Remove exotics - $7,000 per treatment; FY19-20 cost was lower than usual
2. Plant survey- $3,100 total for each survey
3. Reduce fuel loads: mechanical fuel reduction in pineland if no fire is used, access is available, and funds allowed

4.5.3 Potential for Contracting Restoration and Management Activities by Private Vendors

A significant number of Wet Woods Preserve management operations and restoration activities can be considered for outsourcing. Restoration and management activities that can be considered for outsourcing to private entities are listed in Table 11.

Table 11: Potential Contracting for Restoration and Management Activities

Activity	Approved	Conditional	Rejected
Prescribed fire and/ or mechanical treatment application	X		
Minor fireline installation	X		
Fireline, fence, and trail maintenance	X		
Fence installation	X		
Plant and wildlife inventory and monitoring		X	
Listed species mapping and needs assessment		X	
Restore/enhance encroachment and ruderal areas		X	
Reduce exotic species	X		
Law enforcement and patrol	X		

5.0 Literature Cited

Abrahamson, W. G., and D. C Hartnett. 1990. Pine flatwoods and dry prairies. Pages 103-149 in R. L. Myers and J. J. Ewel editors. Ecosystems of Florida. University of Central Florida Press; Orlando, Florida.

Brandt, L. A. and F. J. Mazziotti. 2005. Marine toads (*Bufo marinus*). University of Florida Cooperative Extension Service Document WEC11. 4pp. University of Florida, UF/IFAS Extension Digital Information Source (EDIS) Database. Available from http://edis.ifas.ufl.edu/pdffiles/UW/UW04600.pdf (accessed November 2007).

Campbell, T. 2001. The brown anole. Institute for Biological Invaders: Invader of the Month. University of Tennessee, Knoxville, TN. Available from http://invasions.bio.utk.edu/invaders/sagrei.html (accessed November 2007).

Campbell, T. S. 1996. Northern range expansion of the brown anole, *Anolis sagrei*, in Florida and Georgia. Herp. Review 27:155-157.

Campbell, T. S. 2000. Analyses of the effects of an exotic lizard (*Anolis sagrei*) on a native lizard (*Anolis carolinensis*) in Florida, using islands as experimental units. Ph.D. Dissertation, University of Tennessee, Knoxville, TN.

Churchill, M. 2003. Giant marine toad (*Bufo marinus*) - Introduced Species Summary Project. Columbia University, New York, NY. Available from http://www.columbia.edu/itc/cerc/danoff-burg/invasion_bio/inv_spp_summ/Bufo_marinus.html (accessed December 2007).

Coates, S. F., M. B. Main, J. J. Mullahey, J. M. Schaefer, G. W. Tanner, M. E. Sunquist, and M. D. Fanning. 1998. The coyote (*Canis latrans*): Florida's newest predator. University of Florida Cooperative Extension Service Document WEC124. 5pp. University of Florida, UF/IFAS Extension Digital Information Source (EDIS) Database. Available from http://edis.ifas.ufl.edu/pdffiles/UW/UW12700.pdf (accessed November 2007).

Collier County Environmental Services Department. January, 2006. Conservation Collier Watkins-Jones Interim Management Plan

Collins, L. and R. H. Scheffrahn. 2005. Red Imported Fire Ant, *Solenopsis invicta* Buren (Insecta: Hymenoptera: Formicidae: Myrmicinae). 9pp. Featured Creatures from the Entomology and Nematology Department, Florida Cooperative Extension Service Document EENY-195. Institute of Food and Agricultural Sciences, University of Florida. Available from http://edis.ifas.ufl.edu/IN352

Florida Exotic Pest Plant Council (FLEPPC). 2007. List of Florida's invasive plant species. Florida Exotic Pest Plant Council. Available from http://www.fleppc.org/list/07list_ctrfld.pdf (accessed October 2007).

Florida Fish and Wildlife Conservation Commission (FFWCC). 2001. Impacts of feral and free-ranging domestic cats on wildlife in Florida. Tallahassee, FL. Available from http://www.floridaconservation.org/viewing/articles/cat.pdf (accessed October 2007)

Florida Fish and Wildlife Conservation Commission (FFWCC). 2002. A conceptual management plan for Caravelle Ranch Wildlife Management Area: 2002 – 2007. Tallahassee, FL. 218 pp. Available from http://myfwc.com/wma-

planning/CMP/Caravelle%20Ranch%20WMA/Caravelle%20Ranch%20CMP%202002-2007.pdf (accessed December 2007)

Florida Natural Areas Inventory (FNAI) and Florida Department of Natural Resources (FDNR) 1990. Guide to the Natural Communities of Florida. Florida Natural Areas Inventory and Florida Department of Natural Resources.

Florida Natural Areas Inventory (FNAI). 2006. Managed Area Tracking Record and Element Occurrence Summary for Trailhead Scrub Preserve. FNAI, Tallahassee, Florida.

Gann, G. D., K. A. Bradley, and S. W. Woodmansee. 2002. Rare Plants of South Florida: Their History, Conservation, and Restoration. The Institute for Regional Conservation, Miami, Florida.

Giuliano, W. M., and G. W. Tanner. 2005. Control and management of wild hogs in Florida. Department of Wildlife Ecology and Conservation Publication WEC 192. 7pp. Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences (IFAS), University of Florida. Available from http://edis.ifas.ufl.edu/UW221 (accessed December 2007).

Giuliano, W. M., and G. W. Tanner. 2005. Ecology of wild hogs in Florida. Department of Wildlife Ecology and Conservation Publication WEC 191. 7pp. Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences (IFAS), University of Florida. Available from http://edis.ifas.ufl.edu/UW220 (accessed December 2007).

Johnson, S. 2007. The Cuban treefrog (*Osteopilus septentrionalis*) in Florida. Department of Wildlife Ecology and Conservation Publication WEC218. 8pp. Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences (IFAS), University of Florida. Available from http://edis.ifas.ufl.edu/UW259 (accessed December 2007)

Karim, A. 2007. Status and use of tropical hardwood hammocks and forested residential areas as habitat for resident and Neotropical migratory birds in the Florida Keys. Master of Science Thesis. University of Florida, Gainesville, FL. 61pp.

Kline, W. N. and J. G. Duquesnel. 1996. Management of invasive exotic plants with herbicides in Florida. Down to Earth 51(2):22-28. http://www.fleppc.org/Misc/trtguide.pdf

Kushlan, J. A. 1990. Freshwater marshes. Pages 324-363 in R. L. Myers and J. J. Ewel editors. Ecosystems of Florida. University of Central Florida Press; Orlando, Florida.

Langeland, K. A., and R. K. Stocker. 2001. Control of non-native plants in natural areas of Florida. University of Florida Cooperative Extension Service Document SP 242. 34pp. University of Florida, UF/IFAS Extension Digital Information Source (EDIS) Database. Available from http://edis.ifas.ufl.edu/pdffiles/WG/WG20900.pdf (accessed December 2007).

Larson, B. C., J. H. Frank, G. M. Allen, M. B. Main. 2006. Florida's native bromeliads. University of Florida Cooperative Extension Service Circular 1466. 10pp. University of Florida, UF/IFAS Extension Digital Information Source (EDIS) Database. Available from http://edis.ifas.ufl.edu/UW205 (accessed November 2007).

Lee, J. C. 1985. *Anolis sagrei* in Florida: Phenetics of a colonizing species I. Meristic characters. Copeia 1985:182-194.

Lodge, T. E. 2005. The Everglades handbook - Understanding the Ecosystem. 2nd edition. CRC Press, Boca Raton, FL.

Luidahl, K., D.J. Belz, L. Carey, R.W. Drew, S. Fisher, and R. Pate. 1990. Soil survey of Collier County area Florida. USDA, Natural Resources Conservation Service; Washington, D.C.

Masterson, J. 2007. *Felis catus*. Smithsonian Marine Station at Fort Pierce. Fort Pierce, Florida. Available from http://www.sms.si.edu/IRLspec/Felis_catus.htm (accessed November 2007).

Mazziotti, F. J. 2002. Wood Storks (*Mycteria americana*). Wildlife Ecology and Conservation Department, Florida Cooperative Extension Service document SSWIS12. 2pp. University of Florida, UF/IFAS Extension Digital Information Source (EDIS) Database. Available from http://edis.ifas.ufl.edu/UW065 (accessed November 2007).

Miller J. A. 1986. Hydrogeologic Framework of the Floridan Aquifer System in Florida and in parts of Georgia, Alabama, and South Carolina. United States Geological Survey Professional Paper 1403-B. United States Government Printing Office, Washington, D.C.

Oaks, R. Q. and J. R. Dunbar. 1974. Post Miocene Stratigraphy of the Central and Southern Atlantic Coastal Plain. Utah State University Press, Logan, Utah.

Odum, W. E. and C. C. McIvor. 1990. Mangroves. Pages 517-548 in R. L. Myers and J. J. Ewel editors. Ecosystems of Florida. University of Central Florida Press; Orlando, Florida.

Odum, W. E., C. C. McIvor, and T. J. Smith III. 1982. The ecology of mangroves of South Florida: a community profile. United States Fish and Wildlife Service Off. Biol. Serv. Technical Report OBS 81-24.

Rey, J. R., and C. R. Rutledge. 2006. Mangroves. Entomology and Nematology Department, Florida Cooperative Extension Service document ENY-660 (IN195). 5pp. University of Florida/IFAS, Extension Digital Information Source (EDIS) Database. Available from http://edis.ifas.ufl.edu/in195 (accessed October 2007).

Schwartz, A. and R. W. Henderson. 1991. Amphibians and reptiles of the West Indies: descriptions, distributions, and natural history. University of Florida Press, Gainesville.

Scott, T. M. 1988. Lithostratigraphy of the Hawthorne Group (Miocene). Florida Geological Survey Bulletin No. 59, Tallahassee, Florida.

Shields, M. 2002. Brown Pelican (*Pelecanus occidentalis*). The Birds of North America, No. 609 in A. Poole and F. Gill editors The Birds of North America, Inc., Philadelphia, PA.

Stimac J. L., and S. B. Alves. 1994. Pest Management in the Subtropics: Biological Control A Florida Perspective. (Rosen D, Bennett FD, Capinera JL, Ed.) pp. 353-380. Intercept Limited, Andover, Hants SP10 1 YG, UK.

State University System of Florida. 2004 Publication of Archival Library and Museum materials. Aerial Photography of Florida. http://www.uflib.ufl.edu/digital/collections/flap/ accesed January 2008.

Tomlinson, P. B. 1986. The botany of mangroves. Cambridge University Press, London.

United States Fish and Wildlife Service (USFWS). 1999. Mesic pine flatwoods. South Florida multi-species recovery plan – a species plan…an ecosystem approach. USFWS Southeast Region, Compact Disk.

United States Fish and Wildlife Service (USFWS). 2007. National Bald Eagle Management Guidelines. 23pp. Available from http://www.fws.gov/pacific/eagle/NationalBaldEagleManagementGuidelines.pdf

United States Geological Survey (USGS). 1958. Bonita Springs, Florida 7.5Minute Series Topographic Quadrangle.

URS. 2007. Railhead Scrub Preserve Land Management Plan: managed by Conservation Collier Program Collier County, FL. June 2007 – March 2017.

Willcox, E. and W. M. Giuliano. 2006. Red Imported Fire Ants and Their Impacts on Wildlife. Department of Wildlife Ecology and Conservation Publication WEC 207. Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences (IFAS), University of Florida . Available http://edis.ifas.ufl.edu/UW242

Wunderlin, R. P., and B. F. Hansen. 2004. Atlas of Florida vascular plants. [S.M. Landry and K.N. Campbell (application development), Floirda Center for Community Design and Research]. Institute for Systematic Botany, University of South Florida, Tampa. Available from http.//www.plantatlas.usf.edu/.

Appendix 1. Legal Description of the Property

OR: 3871 PG: 3156

EXHIBIT "A"

PROPERTY IDENTIFICATION NUMBER: 00154880008

LEGAL DESCRIPTION:

COMMENCING AT THE EAST 1/4 CORNER OF SECTION 16, TOWNSHIP 48 SOUTH, RANGE 25 EAST, COLLIER COUNTY, FLORIDA; THENCE ALONG THE EAST AND WEST 1/4 LINE OF SAID SECTION 16, SOUTH 88°07'17" WEST, 3.14 FEET TO THE INTERSECTION OF SAID 1/4 LINE WITH THE TANGENT TO THE CURVE OF THE EAST RIGHT-OF-WAY LINE OF U.S. 41 (SR-90-TAMAIMI TRAIL); THENCE ALONG SAID TANGENT AND ALONG SAID EAST RIGHT-OF-WAY LINE, SOUTH 01°00'30" EAST, 1744.3 FEET; THENCE SOUTH 88°59'30" WEST, 150 .0 FEET TO THE WEST RIGHT-OF-WAY LINE OF SAID U.S. 41 FOR A PLACE OF BEGINNING:

THENCE ALONG SAID WEST RIGHT-OF-WAY LINE SOUTH 01°00'30" EAST, 945.85 FEET TO THE SOUTH LINE OF SAID SECTION 16; THENCE ALONG SAID SOUTH LINE SOUTH 89°13'26" WEST, 1238.41 FEET TO THE SOUTHEAST CORNER OF GULF HARBOR AS RECORDED IN PLAT BOOK 4, PAGE 31 OF THE PUBLIC RECORDS OF COLLIER COUNTY, FLORIDA; THENCE ALONG THE EAST LINE OF SAID GULF HARBOR NORTH 00°42'36" WEST, 940.84 FEET; THENCE NORTH 88°59'30" EAST, 1233.52 FEET TO THE PLACE OF BEGINNING BEING PART OF THE SOUTHEAST 1/4 OF THE SOUTHEAST 1/4 OF SAID SECTION 16, CONTAINING 26.77 ACRES MORE OR LESS

Appendix 2. Floristic Inventory Conducted by Keith Bradley, Institute for Regional Conservation January and August, 2008 and Maureen S. Bonness September 2020.

2008	2020	Scientific Name (prior name)	Common Names	Native	Not Native	State	FNAI	FLEPPC
x	x	*Acacia auriculiformis*	Earleaf acacia		√			I
	x	*Acer rubrum*	Red maple	N				
x	x	*Acrostichum aureum*	Golden leather fern	N		T	S3	
x	x	*Acrostichum danaeifolium*	Giant leather fern	N				
x		*Aletris lutea*	Yellow colicroot	N				
x		*Alternanthera philoxeroides*	Alligatorweed		√			II
	x	*Ammannia latifolia*	Pink redstem, Toothcups	N				
	x	*Amphicarpum muhlenbergianum*	Blue maidencane	N				
x	x	*Andropogon glomeratus* var. *glaucopsis*	Purple bluestem	N				
x	x	*Andropogon glomeratus* var. *pumilus*	Bushy bluestem	N				
x	x	*Annona glabra*	Pond-apple	N				
x	x	*Ardisia elliptica*	Shoe-button ardisia		√			I
x		*Aristida stricta (=A. beyrichiana)*	Southern wiregrass	N				
x	x	*Avicennia germinans*	Black mangrove	N				
	x	*Baccharis angustifolia*	Saltwater falsewillow	N				
x	x	*Baccharis glomeruliflora*	Saltbush	N				
x	x	*Bacopa monnieri*	Water hyssop, Herb-of-grace	N				
x	x	*Boehmeria cylindrica*	False nettle, Bog hemp	N				
x	x	*Callicarpa americana*	American beautyberry	N				
x		*Canavalia rosea*	Baybean, Seaside jackbean	N				
x		*Carphephorus corymbosus*	Florida paintbrush, Coastalplain chaffhead	N				
x	x	*Cassytha filiformis*	Lovevine, Devil's gut	N				
x	x	*Casuarina equisetifolia*	Australian-pine, Horsetail casuarina		√			I
	x	*Centella asiatica*	Coinwort, Spadeleaf	N				
	x	*Ceratopteris thalictroides*	Watersprite		√			
	x	*Chamaecrista nictitans* var. *nictitans*	Sensitive-pea	N				
x	x	*Chiococca alba (=C. parvifolia)*	Pineland snowberry	N				
	x	*Chromolaena odorata*	Jack-in-the-bush	N				
	x	*Chrysobalanus icaco*	Coco plum	N				
	x	*Cissus verticillata (=C. sicyoides)*	Possum grape	N				
x	x	*Cladium jamaicense*	Sawgrass	N				
x	x	*Colocasia esculenta*	Wild taro, Dasheen, coco-yam		√			I
	x	*Commelina diffusa*	Common dayflower		√			
x	x	*Conocarpus erectus*	Buttonwood	N				
x	x	*Crinum americanum*	Swamp lily	N				

	x	*Crotalaria pallida* var. *obovata*	Smooth rattlebox		√			
	x	*Crotalaria rotundifolia*	Rabbitbells	N				
	x	*Cupaniopsis anacardioides*	Carrotwood		√			I
x		*Cynodon dactylon*	Bermuda grass		√			
	x	*Cyperus brevifolius (=Kyllinga pumila)*	Shortleaf spikesedge		√			
x		*Cyperus odoratus*	Fragrant flatsedge	N				
x		*Cyperus ovatus (=C. retrorsus)*	Pinebarren flatsedge	N				
	x	*Cyperus polystachyos*	Manyspike flatsedge, Texas sedge	N				
x		*Dactyloctenium aegyptium*	Crow's-foot grass, Durban crowfootgrass		√			II
x	x	*Dalbergia ecastaphyllum*	Coinvine	N				
	x	*Desmodium incanum*	Beggar's-ticks		√			
x	x	*Dichanthelium ensifolium* var. *unciphyllum*	Cypress witchgrass	N				
x	x	*Dichanthelium portoricense*	Hemlock witchgrass	N				
x	x	*Dichanthelium strigosum* var. *glabrescens*	Roughhair witchgrass	N				
x	x	*Dioscorea bulbifera*	Air potato		√			I
	x	*Diospyros virginiana*	Common persimmon	N				
x		*Drosera capillaris*	Pink sundew	N				
x		*Eclipta prostrata*	False daisy	N				
x		*Edrastima uniflora (=Hedyotis uniflora)*	Clustered mille graine	N				
x	x	*Eleocharis baldwinii*	Baldwin's spikerush, Roadgrass, Hairsedge	N				
	x	*Eleocharis cellulosa*	Gulf coast spikerush	N				
	x	*Eleocharis geniculata*	Canada spikerush	N				
	x	*Emilia fosbergii*	Florida tasselflower		√			
x		*Eragrostis elliottii*	Elliott's lovegrass	N				
x	x	*Erechtites hieraciifolius*	Fireweed, American burnweed	N				
x		*Erigeron vernus*	Early whitetop fleabane	N				
x	x	*Eugenia axillaris*	White stopper	N				
x	x	*Eupatorium capillifolium*	Dogfennel	N				
	x	*Eupatorium serotinum*	Lateflowering thoroughwort	N				
x	x	*Eustachys petraea*	Pinewoods fingergrass	N				
x	x	*Euthamia caroliniana*	Slender flattop goldenrod	N				
x	x	*Ficus aurea*	Strangler fig, Golden fig	N				
x		*Ficus microcarpa*	Indian laurel		√			I
x	x	*Fimbristylis cymosa*	Hurricanegrass		√			
	x	*Fimbristylis spadicea*	Marsh fimbry	N				
	x	*Fuirena scirpoidea*	Southern umbrellasedge	N				
x		*Funastrum clausum (=Sarcostemma clausum)*	Whitevine, White twinevine	N				
	x	*Hamelia patens*	Firebush	N				
x		*Hydrocotyle verticillata*	Whorled marshpennywort	N				
	x	*Hydrocotyle* sp.	Marshpennywort	N				

	x	*Hypericum cistifolium*	Roundpod St. John's-wort	N				
x	x	*Hypericum tetrapetalum*	Fourpetal St. John's-wort	N				
x	x	*Ilex cassine*	Dahoon holly, Dahoon	N				
x	x	*Ilex glabra*	Gallberry, Inkberry	N				
	x	*Imperata cylindrica*	Cogongrass		√			I
	x	*Ipomoea alba*	Moonflower; Tropical white morning-glory	N				
	x	*Ipomoea sagittata*	Glades morning-glory	N				
x	x	*Juncus roemerianus*	Needle rush, Black rush	N				
	x	*Kosteletzkya pentacarpos (=K. virginica)*	Virginia saltmarsh willow	N				
x	x	*Lachnocaulon anceps*	Whitehead bogbutton	N				
x	x	*Laguncularia racemosa*	White mangrove	N				
*		*Lilium catesbaei**	Catesby's Lily	N		T		
x		*Limonium carolinianum*	Saltmarsh-rosemary, Carolina sealavender	N				
	x	*Ludwigia maritima*	Seaside primrosewillow	N				
	x	*Ludwigia microcarpa*	Smallfruit primrosewillow	N				
	x	*Ludwigia octovalvis*	Mexican primrosewillow	N				
	x	*Ludwigia peruviana*	Peruvian primrosewillow		√			I
x	x	*Ludwigia repens*	Creeping primrosewillow	N				
x	x	*Lycium carolinianum*	Christmasberry, Carolina desertthorn	N				
x	x	*Lygodium microphyllum*	Small-leaf climbing fern		√			I
x	x	*Lyonia fruticosa*	Coastalplain staggerbush	N				
	x	*Macroptilium lathyroides*	Wild bushbean		√			II
x	x	*Magnolia virginiana*	Sweetbay	N				
x	x	*Melaleuca quinquenervia*	Punktree		√			I
	x	*Melothria pendula*	Creeping-cucumber	N				
x	x	*Mikania scandens*	Climbing hempweed, Climbing hempvine	N				
	x	*Mitreola sessilifolia*	Swamp hornpod	N				
x		*Mollugo verticillata*	Indian-chickweed, Green carpetweed		√			
	x	*Momordica charantia*	Wild balsam-apple, Balsampear		√			
x	x	*Morella cerifera (=Myrica cerifera)*	Wax myrtle, Southern Bayberry	N				
x	x	*Myrsine cubana (=Rapanea punctata)*	Myrsine, Colicwood	N				
	x	*Nephrolepis biserrata*	Giant boston fern	N		T		
x	x	*Nephrolepis brownii (=N. multiflora)*	Asian sword fern		√			I
	x	*Nephrolepis cordifolia*	Tuberous sword fern		√			I
x		*Oeceoclades maculata*	African ground orchid, Monk orchid		√			
x	x	*Osmunda regalis* var. *spectabilis*	Royal fern	N				
x		*Panicum hemitomon*	Maidencane	N				
x	x	*Panicum virgatum*	Switchgrass	N				
x	x	*Parthenocissus quinquefolia*	Virginia-creeper, Woodbine	N				

	x	*Passiflora suberosa*	Corkystem passionflower	N				
x	x	*Persea palustris*	Swamp bay	N				
	x	*Persicaria hydropiperoides (=Polygonum hydropiperoides)*	Mild waterpepper; Swamp smartweed	N				
x	x	*Phlebodium aureum*	Golden polypody	N				
	x	*Phyllanthus urinaria*	Chamber bitter		√			
x		*Physalis angustifolia*	Coastal groundcherry	N				
	x	*Pilea microphylla*	Artillery plant	N				
x		*Piloblephis rigida*	Wild pennyroyal	N				
x	x	*Pinus elliottii* var. *densa*	South Florida slash pine	N				
	x	*Pleopeltis michauxiana (=Pleopeltis polypodioides* var. *michauxiana)*	Resurrection fern	N				
x	x	*Pluchea baccharis (=Pluchea rosea)*	Rosy camphorweed	N				
	x	*Pluchea carolinensis*	Cure-for-all	N				
x	x	*Pluchea odorata*	Sweetscent	N				
	x	*Pouzolzia zeylanica*	Poulzolz's bush		√			
x	x	*Psilotum nudum*	Whisk fern	N				
	x	*Pteridium aquilinum* var. *pseudocaudatum*	Tailed bracken fern	N				
x		*Pterocaulon pycnostachyum*	Blackroot	N				
x		*Ptilimnium capillaceum*	Mock bishopsweed, Herbwilliam	N				
	x	*Ptychosperma elegans (=Archontophoenix elegans)*	Alexandra palm		√			II
x	x	*Quercus laurifolia*	Laurel oak, Diamond oak	N				
x	x	*Quercus minima*	Dwarf live oak	N				
x	x	*Quercus pumila (=Quercus elliottii)*	Running oak	N				
x	x	*Quercus virginiana*	Virginia live oak	N				
x	x	*Randia aculeata*	White indigoberry	N				
x	x	*Rhabdadenia biflora*	Rubbervine, Mangrovevine	N				
x	x	*Rhizophora mangle*	Red mangrove	N				
x	x	*Rhodomyrtus tomentosa*	Downy rose myrtle		√			I
x	x	*Rhus copallinum*	Winged sumac	N				
	x	*Rhynchospora colorata*	Starrush whitetop	N				
	x	*Rhynchospora divergens*	Spreading beaksedge	N				
x		*Rhynchospora fascicularis*	Fascicled beaksedge	N				
	x	*Rhynchospora globularis*	Globe beaksedge	N				
	x	*Rhynchospora microcarpa*	Southern beaksedge	N				
	x	*Ruellia blechum (=Blechumn pyramidatum)*	Green shrimp-plant, Browne's blechum		√			
x	x	*Sabal palmetto*	Cabbage palm	N				
	x	*Sacciolepis indica*	Indian cupscale		√			
	x	*Sagittaria lancifolia*	Bulltongue arrowhead	N				
x		*Salicornia ambigua (=Salicornia perennis)*	Perennial glasswoart	N				
	x	*Salix caroliniana*	Coastal Plain willow	N				

	x	*Sambucus nigra subsp. canadensis*	American elderberry	N				
	x	*Samolus valerandi* subsp. p*arviflorus*	Pineland pimpernel	N				
x	x	*Schinus terebinthifolia*	Brazilian pepper		√			I
	x	*Schizachyrium rhizomatum*	Rhizomatous bluestem	N				
x	x	*Scleria ciliata*	Fringed nutrush	N				
	x	*Scleria reticularis*	Netted nutrush	N				
x	x	*Serenoa repens*	Saw palmetto	N				
	x	*Setaria parviflora (=S. geniculata)*	Knotroot foxtail, Yellow bristlegrass	N				
x	x	*Sideroxylon celastrinum*	Saffron plum, Bumelia	N				
x	x	*Sideroxylon salicifolium*	Willow-bustic, White bully	N				
x	x	*Smilax auriculata*	Earleaf greenbrier	N				
x	x	*Smilax bona-nox*	Saw greenbrier	N				
	x	*Solanum americanum*	American black nightshade	N				
	x	*Solidago sempervirens*	Seaside goldenrod	N				
x		*Solidago stricta*	Narrow-leaved goldenrod, Wand goldenrod	N				
x	x	*Spartina patens*	Marshhay cordgrass, Saltmeadow cordgrass	N				
	x	*Spermacoce remota (=Spermacoce assurgens)*	Woodland false buttonweed	N				
x	x	*Spermacoce verticillata*	Shrubby false buttonweed		√			II
x	x	*Spirodela polyrhiza*	Common duckweed	N				
	x	*Swietenia mahagoni*	West Indian mahogany	N		T	S3	
x		*Symphyotrichum tenuifolium (=Aster tenuifolius)*	Perennial saltmarsh aster	N				
x	x	*Syzygium cumini*	Java plum		√			I
x	x	*Telmatoblechnum serrulatum (=Blechnum serrulatum)*	Swamp fern	N				
	x	*Thelypteris interrupta*	Interrupted maiden fern, Hottentot fern	N				
x	x	*Thelypteris kunthii*	Southern shield fern	N				
x	x	*Tillandsia balbisiana*	Reflexed wild-pine, Northern needleleaf	N		T		
x	x	*Tillandsia fasciculata*	Stiff-leaved wild-pine, Cardinal airplant	N		E		
x	x	*Tillandsia flexuosa*	Banded wild-pine, Twisted airplant	N		T	S3	
x	x	*Tillandsia recurvata*	Ball-moss	N				
	x	*Tillandsia setacea*	Thin-leaved wild-pine, Southern needleleaf	N				
x	x	*Tillandsia usneoides*	Spanish-moss	N				
x	x	*Toxicodendron radicans*	Eastern poison-ivy	N				
x	x	*Triglochin striata*	Arrowgrass	N				
	x	*Typha domingensis*	Southern cat-tail	N				
x	x	*Urena lobata*	Caesarweed		√			I
x		*Vaccinium myrsinites*	Shiny blueberry	N				

x	x	*Verbesina virginica*	Frostweed, White crownbeard	N				
	x	*Vigna luteola*	Cow-pea, Hairypod cowpea	N				
x	x	*Vitis rotundifolia*	Muscadine, Muscadine grape	N				
	x	*Vittaria lineata*	Shoestring fern	N				
	x	*Ximenia americana*	Hog-plum, Tallowwood	N				
x		*Xyris ambigua*	Coastalplain yelloweyed grass	N				
x		*Xyris brevifolia*	Shortleaf yelloweyed grass	N				
x		*Xyris elliottii*	Elliott's yelloweyed grass	N				
x		*Xyris jupicai*	Richard's yelloweyed grass		√			
x		*Zeuxine strateumatica*	Soldier's orchid, Lawn orchid		√			
Count								
126	**163**			**160**	**39**	**7**	**3**	**22**

* found by Conservation Collier staff

State Codes: E=Endangered, T=Threatened

FNAI Codes: S1=critically imperiled; S2=imperiled because of rarity; S3=very rare in Florida or restricted range

FLEPPC Codes: Category I = species has altered native plant communities; Category II = species with increasing abundance or frequency

Appendix 3. FNAI Report

FLORIDA
Natural Areas
INVENTORY

1018 Thomasville Road
Suite 200-C
Tallahassee, FL 32303
850-224-8207
fax 850-681-9364
www.fnai.org

October 29, 2007

Christal Segura
Collier County Conservation Program
2201 Tamiami Trail Building W
Naples, FL 34112

Dear Ms. Segura,

Thank you for your request for information from the Florida Natural Areas Inventory (FNAI). We have compiled the following information for your project area.

Project: Wet Woods Preserve

Date Received: October 22, 2007

Location: Collier County

Element Occurrences
A search of our maps and database indicates that currently we have several Element Occurrences mapped within the vicinity of the study area (see enclosed map and element occurrence table). Please be advised that a lack of element occurrences in the FNAI database is not a sufficient indication of the absence of rare or endangered species on a site.

The Element Occurrences data layer includes occurrences of rare species and natural communities. The map legend indicates that some element occurrences occur in the general vicinity of the label point. This may be due to lack of precision of the source data, or an element that occurs over an extended area (such as a wide ranging species or large natural community). For animals and plants, Element Occurrences generally refer to more than a casual sighting; they usually indicate a viable population of the species. Note that some element occurrences represent historically documented observations which may no longer be extant.

Likely and Potential Rare Species
In addition to documented occurrences, other rare species and natural communities may be identified on or near the site based on habitat models and species range models (see enclosed Biodiversity Matrix Report). These species should be taken into consideration in field surveys, land management, and impact avoidance and mitigation.

FNAI habitat models indicate areas, which based on land cover type, offer suitable habitat for one or more rare species that is known to occur in the vicinity. Habitat models have been developed for approximately 300 of the rarest species tracked by the Inventory, including all federally listed species.

FNAI species range models indicate areas that are within the known or predicted range of a species, based on climate variables, soils, vegetation, and/or slope. Species range models have been developed for approximately 340 species, including all federally listed species.

Florida Resources
and Environmental
Analysis Center

Institute of Science
and Public Affairs

The Florida State University

Tracking Florida's Biodiversity

The FNAI Biodiversity Matrix Geodatabase compiles Documented, Likely, and Potential species and natural communities for each square mile Matrix Unit statewide.

The Inventory always recommends that professionals familiar with Florida's flora and fauna should conduct a site-specific survey to determine the current presence or absence of rare, threatened, or endangered species.

Please visit www.fnai.org/trackinglist.cfm for county or statewide element occurrence distributions and links to more element information.

The database maintained by the Florida Natural Areas Inventory is the single most comprehensive source of information available on the locations of rare species and other significant ecological resources. However, the data are not always based on comprehensive or site-specific field surveys. Therefore, this information should not be regarded as a final statement on the biological resources of the site being considered, nor should it be substituted for on-site surveys. Inventory data are designed for the purposes of conservation planning and scientific research, and are not intended for use as the primary criteria for regulatory decisions.

Information provided by this database may not be published without prior written notification to the Florida Natural Areas Inventory, and the Inventory must be credited as an information source in these publications. FNAI data may not be resold for profit.

Thank you for your use of FNAI services. If I can be of further assistance, please give me a call at (850) 224-8207.

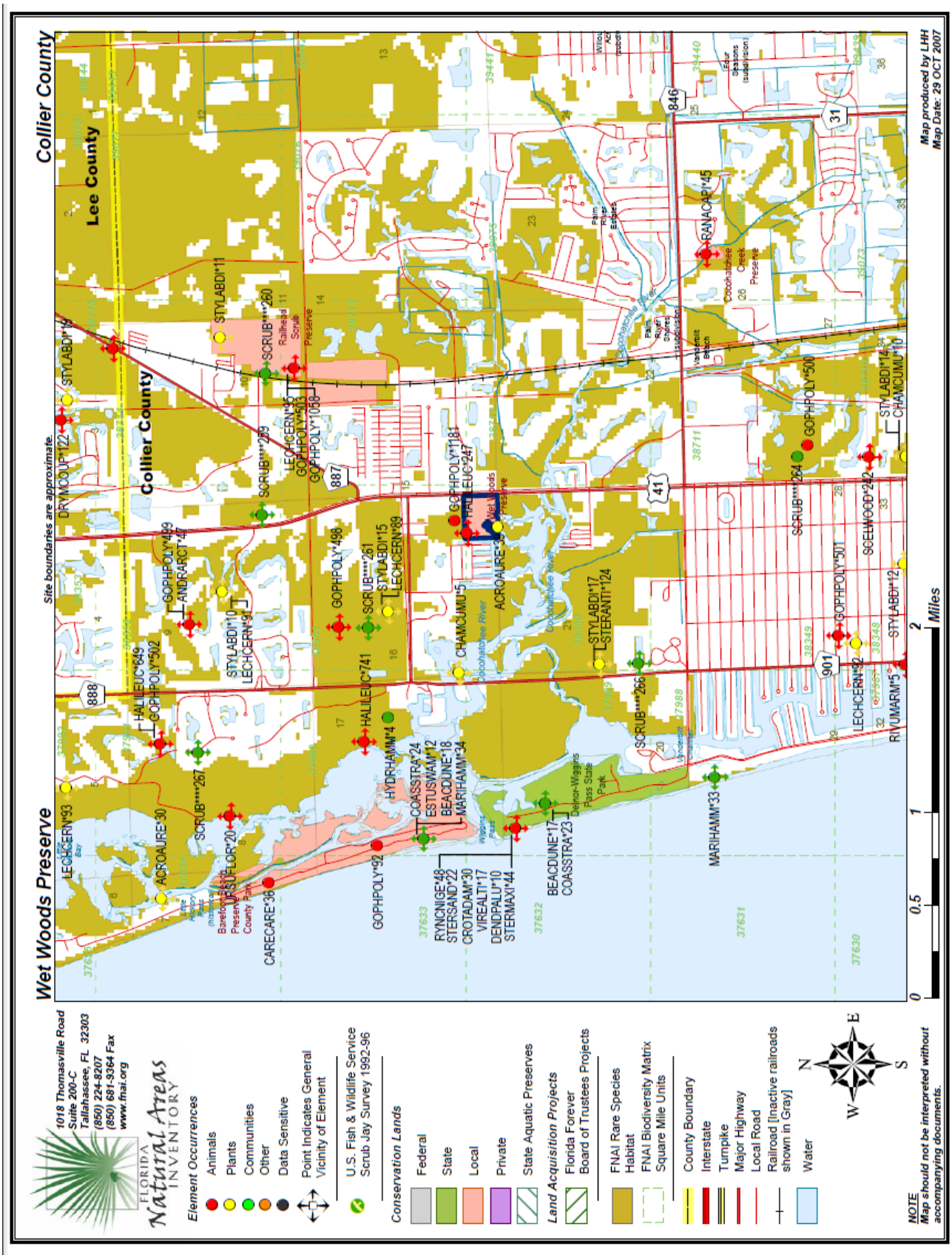
Sincerely,

Lindsay Horton

Lindsay Horton
Data Services Coordinator

Encl

Tracking Florida's Biodiversity


Wet Woods Preserve
Collier County
Lee County
Collier County
Site boundaries are approximate.
Map produced by LHH
Map Date: 29 OCT 2007
0 0.5 1 2 Miles
N
S
E
W
1018 Thomasville Road
Suite 200-C
Tallahassee, FL 32303
(850) 224-8207
(850) 681-9364 Fax
www.fnai.org
FLORIDA Natural Areas INVENTORY
Element Occurrences
Animals
Plants
Communities
Other
Data Sensitive
Point Indicates General Vicinity of Element
U.S. Fish & Wildlife Service Scrub Jay Survey 1992-96
Conservation Lands
Federal
State
Local
Private
State Aquatic Preserves
Land Acquisition Projects
Florida Forever
Board of Trustees Projects
FNAI Rare Species Habitat
FNAI Biodiversity Matrix Square Mile Units
County Boundary
Interstate
Turnpike
Major Highway
Local Road
Railroad [inactive railroads shown in Gray]
Water
NOTE
Map should not be interpreted without accompanying documents.

1018 Thomasville Road
Suite 200-C
Tallahassee, FL 32303
(850) 224-8207
(850) 681-9364 Fax
www.fnai.org

FLORIDA Natural Areas INVENTORY

Florida Natural Areas Inventory

ELEMENT OCCURRENCES DOCUMENTED ON OR NEAR *PROJECT SITE*

Map Label	Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listing	Observation Date	Description	EO Comments
STYLABDI*14	Stylisma abdita	Scrub Stylisma	G3	S3	N	LE	1992	No general description given	BURCH (221) COLLECTED SPECIMEN.
STYLABDI*12	Stylisma abdita	Scrub Stylisma	G3	S3	N	LE	1990-10-28	No general description given	BURCH (NO #) COLLECTED SPECIMEN.
COASSTRA*24	Coastal strand		G3	S2	N	N	1999	BEHIND BEACH DUNE ZONE.	1999: Update to last obs date was based on interpretation of aerial photography (previous value was 1983) (U05FNA02FLUS). SEAGRAPE, SAW PALMETTO, SPANISH-BAYONET, PRICKLY PEAR (O. STRICTA), COIN VINE, CATCLAW, AGAVE, GRAY NICKER, LANTANA SP., SOPHORA TOM
GOPHPOLY*498	Gopherus polyphemus	Gopher Tortoise	G3	S3	N	LS	1986-03-29	HAS OPEN SCRUB WITH MINIMAL GROUND COVER.	No EO data given
STYLABDI*10	Stylisma abdita	Scrub Stylisma	G3	S3	N	LE	1990-12-24	No general description given	BURCH (326-328) COLLECTED SPECIMENS.
LECHCERN*95	Lechea cernua	Nodding Pinweed	G3	S3	N	LT	1986-03-28	1986-03-28: ROSEMARY SCRUB(U88CHR01FLUS).	No EO data given
LECHCERN*92	Lechea cernua	Nodding Pinweed	G3	S3	N	LT	1986-03-29	1986-03-29: "SCRUBBY"(U88CHR01FLUS).	No EO data given
COASSTRA*23	Coastal strand		G3	S2	N	N	1999	BEHIND BEACH DUNE ZONE.	1999: Update to last obs date was based on interpretation of aerial photography (previous value was 1983) (U05FNA02FLUS). SEAGRAPE, SAW PALMETTO, SPANISH-BAYONET, PRICKLY PEAR (O. STRICTA), COIN VINE, CATCLAW, AGAVE, GRAY NICKER, LANTANA SP., SOPHORA TOM
GOPHPOLY*501	Gopherus polyphemus	Gopher Tortoise	G3	S3	N	LS	1986-03-29	"SCRUBBY".	No EO data given
GOPHPOLY*503	Gopherus polyphemus	Gopher Tortoise	G3	S3	N	LS	1986-03-28	ROSEMARY SCRUB.	No EO data given
STYLABDI*15	Stylisma abdita	Scrub Stylisma	G3	S3	N	LE	1990-09-29	No general description given	BURCH (NO #) COLLECTED SPECIMEN.
DRYMCOUP*122	Drymarchon couperi	Eastern Indigo Snake	G3	S3	LT	LT	1970->	No general description given	T. CRUTCHFIELD OBSERVED INDIGO SNAKE, POST-1970 (P. MOLER INTERVIEW OF 3 NOV 1981).
STYLABDI*11	Stylisma abdita	Scrub Stylisma	G3	S3	N	LE	1990-11-10	No general description given	BURCH (NO #) COLLECTED SPECIMEN.

1018 Thomasville Road
Suite 200-C
Tallahassee, FL 32303
(850) 224-8207
(850) 681-9364 Fax
www.fnai.org
FLORIDA Natural Areas INVENTORY

Florida Natural Areas Inventory

ELEMENT OCCURRENCES DOCUMENTED ON OR NEAR *PROJECT SITE*

Map Label	Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listing	Observation Date	Description	EO Comments
ANDRARCT*47	Andropogon arctatus	Pine-woods Bluestem	G3	S3	N	LT	1967-10-21	1967-10-21: Pine flatwoods; in seabreezes among Carphephorus, Liatris and Balduina (S67LAKSFFLUS).	1967-10-21: Abundant and showy in seabreezes; specimen taken [fr.] (S67LAKSFFLUS).
SCELWOOD*242	Sceloporus woodi	Florida Scrub Lizard	G3	S3	N	N	1986-02-20	Scrub	1986-02-20: S.P. Christman, MNH observation.
LECHCERN*89	Lechea cernua	Nodding Pinweed	G3	S3	N	LT	1986-03-29	1986-03-29: LOW OPEN SCRUB WITH MINIMAL GROUND COVER(U88CHR01FLUS).	No EO data given
CHAMCUMU*10	Chamaesyce cumulicola	Sand-dune Spurge	G2	S2	N	LE	1967-07-29	PINUS CLAUSA - CERATIOLA ASSOCIATION	(FL & FR)
MARIHAMM*33	Maritime hammock		G3	S2	N	N	1999	BEHIND COASTAL STRAND.	1999: Update to last obs date was based on interpretation of aerial photography (previous value was 1983) (U05FNA02FLUS). CABBAGE PALM MYRSINE, STRANGLER FIG, WHITE STOPPER, SEVEN-YEAR APPLE, RANDIA, GUMBO LIMBO (REMNANT ON DELNOR-WIGGINS PASS) (U82DRP02
LECHCERN*91	Lechea cernua	Nodding Pinweed	G3	S3	N	LT	1986-03-29	1986-03-29: ROSEMARY SCRUB AND SAND PINE SCRUB(U88CHR01FLUS).	No EO data given
BEACDUNE*17	Beach dune		G3	S2	N	N	1999	LOW DUNES CLOSEST TO SHORE.	1999: Update to last obs date was based on interpretation of aerial photography (previous value was 1983) (U05FNA02FLUS). DOMINATED BY SEA OATS & RAILROAD VINE (U82DRP02).
ESTUSWAM*12	Estuarine tidal swamp		G5	S4	N	N	1999	MANGROVE SWAMP EXTENDING FULL LENGTH OF BOTH PROPERTIES ON BAY SIDE.	1999: Update to last obs date was based on interpretation of aerial photography (previous value was 1983) (U05FNA02FLUS). DOMINATED BY RED & BLACK MANGROVES, WITH SOME WHITE MANGROVE. BUTTONWOOD COMMON ABOVE HIGH TIDE LINE.
ACROAURE*30	Acrostichum aureum	Golden Leather Fern	G5	S3	N	LT	1964-12-04	1964-12-04: Mangrove shores, bayhead, pineland and glade, Ceratiola-Quercus shrub; mangrove margin (S64LAKSFFLUS).	1964-12-04: Specimen collected [spores] (S64LAKSFFLUS).
STYLABDI*19	Stylisma abdita	Scrub Stylisma	G3	S3	N	LE	1990-08-27	No general description given	No EO data given

1018 Thomasville Road
Suite 200-C
Tallahassee, FL 32303
(850) 224-8207
(850) 681-9364 Fax
www.fnai.org

FLORIDA Natural Areas INVENTORY

Florida Natural Areas Inventory

ELEMENT OCCURRENCES DOCUMENTED ON OR NEAR *PROJECT SITE*

Map Label	Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listing	Observation Date	Description	EO Comments
RIVUMARM*5	Rivulus marmoratus	Mangrove Rivulus	G3	S3	C	LS	1967-08-21	No general description given	Two specimens in Florida Museum of Natural History (UF-065971).
GOPHPOLY*499	Gopherus polyphemus	Gopher Tortoise	G3	S3	N	LS	1986-03-29	ROSEMARY SCRUB AND SAND PINE SCRUB.	No EO data given
GOPHPOLY*1058	Gopherus polyphemus	Gopher Tortoise	G3	S3	N	LS	1986-03-29	Scrub	1986-03-29: R.B. Huck, DEP, observation.
GOPHPOLY*500	Gopherus polyphemus	Gopher Tortoise	G3	S3	N	LS	1986-04-04	OAK SCRUB	No EO data given
CARECARE*36	Caretta caretta	Loggerhead	G3	S3	LT	LT	1980	13.4 KM. STRETCH OF GULF COASTAL BEACH.	NESTING BEACH. DATA PRESENTED AS YEAR: # NESTS OBSERVED (#/KM). BONITA BEACH (9.7 KM) MONITORED 1975-79: 1975: 40 (4.1), 1976: 44 (4.5), 1977: 32 (3.3), 1978: 40 (4.1), 1979: 52 (5.4). WIGGINS PASS (3.7 KM) ADDED IN 1980 TO TOTAL AREA MONITORED: 1980: 22
HYDRHAMM*4	Hydric hammock		G4	S4	N	N	1999	PALM HAMMOCK ON BORDER OF MANGROVE SWAMP -- LITTLERELIEF.	1999: Update to last obs date was based on interpretation of aerial photography (previous value was 1971-) (U05FNA02FLUS). SABAL PALMETTO AND MAGNOLIA VIRGINIANA CONSPICUOUS EMERGENTS, SECOND STRATUM DOMINATED BY PERSEA PALUS- TRIS WITH ACER RUBRUM AND B
SCRUB****264	Scrub		G2	S2	N	N	1999	No general description given	1999: Update to last obs date was based on interpretation of aerial photography (previous value was 1986-04-04) (U05FNA02FLUS). "OAKS", HOGPLUM, "LUPINE"
RANACAPI*45	Rana capito	Gopher Frog	G3	S3	N	LS	ZZ	No general description given	SPEC. (LA-60564), COLLECTOR N/A, DATE N/A.
GOPHPOLY*502	Gopherus polyphemus	Gopher Tortoise	G3	S3	N	LS	1986-03-29	REMNANT BEACH DUNE OF EXCESSIVELY DRAINED WHITE SAND.	No EO data given
STERMAXI*44	Sterna maxima	Royal Tern	G5	S3	N	N	1991-06-13	Unconsolidated substrate	1991-06-13: M.S. Robson, GFC - 250 loafing.
URSUFLOR*20	Ursus americanus floridanus	Florida Black Bear	G5T2	S2	N	LT*	1984-	*[EORANKCOMM]: POP. DATA, BASED ON PNDBRA02.	COMMON REPORTS CA. 1984.

1018 Thomasville Road
Suite 200-C
Tallahassee, FL 32303
(850) 224-8207
(850) 681-9364 Fax
www.fnai.org

FLORIDA Natural Areas INVENTORY

Florida Natural Areas Inventory

ELEMENT OCCURRENCES DOCUMENTED ON OR NEAR *PROJECT SITE*

Map Label	Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listing	Observation Date	Description	EO Comments
LECHCERN*93	Lechea cernua	Nodding Pinweed	G3	S3	N	LT	1986-03-29	1986-03-29: REMNANT BEACH DUNE OF EXCESSIVELY DRAINED WHITE SAND(U88CHR01FLUS).	No EO data given
DENDPALU*10	Dendroica discolor paludicola	Florida Prairie Warbler	G5T3	S3	N	N	1983	IN MANGROVES OF BOTH AREAS.	NUMEROUS NESTS IN 1983 (P84ALV01).
CHAMCUMU*5	Chamaesyce cumulicola	Sand-dune Spurge	G2	S2	N	LE	1979-07-28	DRY, SANDY FILL NEAR INLET-[ROAD THROUGH MANGROVES].	FLOWERING ON 28 JULY 1979.
STYLABDI*17	Stylisma abdita	Scrub Stylisma	G3	S3	N	LE	1990-09-23	No general description given	BURCH (NO #) COLLECTED SPECIMEN.
VIREALTI*17	Vireo altiloquus	Black-whiskered Vireo	G5	S3	N	N	1983	IN MANGROVES (& HAMMOCK?) OF BOTH AREAS.	NUMEROUS NESTS IN 1983 (P84ALV01).
CROTADAM*30	Crotalus adamanteus	Eastern Diamondback Rattlesnake	G4	S3	N	N	1992-08-30	Dunes.	2 snakes observed: Aug. 30, 1992, Clausen observed 3 1/2 ft. individual in bird nesting area; June 14, 1979, Sam Ferguson observed snake in parking area (moved to safe location).
STERANTI*124	Sterna antillarum	Least Tern	G4	S3	N	LT	1988	No general description given	1988: Nesting began on 15 April and ended on 15 June; 15 nests counted (U97GFC02FLUS).
STERSAND*22	Sterna sandvicensis	Sandwich Tern	G5	S2	N	N	1991-06-13	Consolidated substrate	1991-06-13: M.S. Robson, GFC observed 30 terns. 1989-01-13: M.S. Robson observed 5 adults feeding.
RYNCNIGE*48	Rynchops niger	Black Skimmer	G5	S3	N	LS	1989-01-13	Consolidated substrate	1989/01/13: M.S. Robson, GFC, observed 5 adults. mixed flock.
GOPHPOLY*92	Gopherus polyphemus	Gopher Tortoise	G3	S3	N	LS	1998-04	SANDY UPLAND STRIP CA. 1 MI. LONG AND 500' WIDE FRONTING MANGROVE-FILLED BAY 1998-04:1991-02-23: AREA CA. 1/2 MILE WIDE. HABITAT FOR GOPHERS CONSISTS OF CLUMPS OF SHRUBS AND PALMS WITH OPEN AREAS BETWEEN. SUBSTRATE OF SAND WITH MUCH SHELL FRAGMENTS ADMIX	1998-04: estimated 150-180 active tortoises in the Preserve in approximately 31.5 acres of habitat; approximately 13.6 active burrows/acre. The size of burrows (inactive and active) measured 2 cm to 55 cm internal diameter, the majority in the 25 cm ran
SCRUB****259	Scrub		G2	S2	N	N	1999	ROSEMARY SCRUB AND SAND PINE SCRUB.	1999: Update to last obs date was based on interpretation of aerial photography (previous value was 1986-03-29) (U05FNA02FLUS).

1018 Thomasville Road
Suite 200-C
Tallahassee, FL 32303
(850) 224-8207
(850) 681-9364 Fax
www.fnai.org

FLORIDA Natural Areas INVENTORY

Florida Natural Areas Inventory

ELEMENT OCCURRENCES DOCUMENTED ON OR NEAR *PROJECT SITE*

Map Label	Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listing	Observation Date	Description	EO Comments
BEACDUNE*18	Beach dune		G3	S2	N	N	1999	LOW DUNES CLOSEST TO SHORE. SANDY STRIP CA. 1 MI. LONG AND 500' WIDE FRONTING MANGROVE-FILLED BAY AREA CA. 1/2 MILE WIDE. (F91JOH25FL)	1999: Update to last obs date was based on interpretation of aerial photography (previous value was 1991-02-23) (U05FNA02FLUS). DOMINATED BY SEA OATS & RAILROAD VINE (U82DRP02). 1991-02-23: NARROW (20') LEDGE DOMINATED BY SEA OATS ABOVE SHELLY BEACH. SCA
SCRUB****260	Scrub		G2	S2	N	N	2005-SPR	ROSEMARY SCRUB.	2005-SPR: OBSERVED IN PASSING ON SECTION LINE TRAIL THAT SCRUB WAS BEING AFFECTED BY ORV TRAILS AND THERE WAS EVIDENCE OF RECENT LOGGING (PNDHOF0)
SCRUB****266	Scrub		G2	S2	N	N	1999	"SCRUBBY"	1999: Update to last obs date was based on interpretation of aerial photography (previous value was empty) (U05FNA02FLUS).
MARIHAMM*34	Maritime hammock		G3	S2	N	N	1999	BEHIND COASTAL STRAND. SANDY UPLAND STRIP CA. 1 MI. LONG AND 500' WIDE FRONTING MANGROVE-FILLED BAY AREA CA. 1/2 MILE WIDE. (F91JOH25FL)	1999: Update to last obs date was based on interpretation of aerial photography (previous value was 1991-02-23) (U05FNA02FLUS). CABBAGE PALM, MYRSINE, STRANGLER FIG, WHITE STOPPER, SEVEN-YEAR APPLE, RANDIA, GUMBO LIMBO (U82DRP02). 1991-02-23: LOW (25') C
SCRUB****267	Scrub		G2	S2	N	N	1999	No general description given	1999: Update to last obs date was based on interpretation of aerial photography (previous value was empty) (U05FNA02FLUS).
SCRUB****261	Scrub		G2	S2	N	N	1999	LOW, OPEN SCRUB W/ MINIMAL GROUNDCOVER.	1999: Update to last obs date was based on interpretation of aerial photography (previous value was 1986) (U05FNA02FLUS). 3' ROSEMARY & OAKS. UNUSUAL ASCLEPIAS.
HALILEUC*649	Haliaeetus leucocephalus	Bald Eagle	G5	S3	N	LT	2003	No general description given	Nest status 1999-2003: Active - 2003, 2002, 2000, 1999; Unknown/not assessed - 2001;Status 1995-98: Continuously active. (U03FWC01FLUS). Previous data (note different format) NEST; 1991: PRODUCED 1 YOUNG.

1018 Thomasville Road
Suite 200-C
Tallahassee, FL 32303
(850) 224-8207
(850) 681-9364 Fax
www.fnai.org

FLORIDA Natural Areas INVENTORY

Florida Natural Areas Inventory

ELEMENT OCCURRENCES DOCUMENTED ON OR NEAR *PROJECT SITE*

Map Label	Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listing	Observation Date	Description	EO Comments
HALILEUC*741	Haliaeetus leucocephalus	Bald Eagle	G5	S3	N	LT	2003	No general description given	Nest status 1995-2003: Continuously active. (U03FWC01FLUS). Previous data (note different format) NEST; 1991: ACTIVE BUT PRODUCED 0 YOUNG.
HALILEUC*247	Haliaeetus leucocephalus	Bald Eagle	G5	S3	N	LT	2003	No general description given	Nest status 1995-2003: Continuously active. (U03FWC01FLUS). Previous data (note different format) NEST: 1978-1988 ACTIVE. FLEDGED YOUNG 1978-1983, 1987-1988, UNKNOWN 1986.
ACROAURE*39	Acrostichum aureum	Golden Leather Fern	G5	S3	N	LT	2006-01-10	2006-01-10: This natural area is a fragment of flatwoods and tidal marsh that is part of the Estero Bay-Cape Romano Coastal Strip, a poorly-drained low flatwoods plain, with some paleo-dunes, and alot of mangrove swamp (G81BRO02FLUS) (PNDJEN04FLUS).	2006-01-10: Plants in good numbers (30-40) along edge of salt marsh and uplands. Plants look healthy for the most part, some with discoloration in leaves. Area is ecotone of Tidal Marsh and Mesic Flatwoods. Invasive species such as Brazilian Pepper (<
GOPHPOLY*1181	Gopherus polyphemus	Gopher Tortoise	G3	S3	N	LS	ZZ	2006-01-10: This natural area is a fragment of flatwoods and tidal marsh that is part of the Estero Bay-Cape Romano Coastal Strip, a poorly-drained low flatwoods plain, with some paleo-dunes, and alot of mangrove swamp (G81BRO02FLUS) (PNDJEN04FLUS).	2006-01-10: One gopher tortoise encountered near active burrow. Tortoise looked healthy and was medium sized. Upland mesic habitats are extremely infested with a diversity of exotic species and the area is in need of habitat restoration because of its fi

1018 Thomasville Road
Suite 200-C
Tallahassee, FL 32303
(850) 224-8207
(850) 681-9364 Fax
www.fnai.org

FLORIDA Natural Areas INVENTORY

Florida Natural Areas Inventory

Biodiversity Matrix Report

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listin
Matrix Unit ID: 38350					
Documented					
Acrostichum aureum	Golden Leather Fern	G5	S3	N	LT
Haliaeetus leucocephalus	Bald Eagle	G5	S3	LT,PDL	LT
Scrub		G2	S2	N	N
Likely					
Chamaesyce cumulicola	Sand-dune Spurge	G2	S2	N	LE
Dendroica discolor paludicola	Florida Prairie Warbler	G5T3	S3	N	N
Estuarine tidal swamp		G5	S4	N	N
Gopherus polyphemus	Gopher Tortoise	G3	S3	N	LS
Maritime hammock		G3	S2	N	N
Mycteria americana	Wood Stork	G4	S2	LE	LE
Rynchops niger	Black Skimmer	G5	S3	N	LS
Sciurus niger avicennia	Mangrove Fox Squirrel	G5T2	S2	N	LT
Sterna antillarum	Least Tern	G4	S3	N	LT
Sterna sandvicensis	Sandwich Tern	G5	S2	N	N
Stylisma abdita	Scrub Stylisma	G3	S3	N	LE
Stylisma abdita	Scrub Stylisma	G3	S3	N	LE
Vireo altiloquus	Black-whiskered Vireo	G5	S3	N	N
Matrix Unit ID: 38351					
Documented					
Haliaeetus leucocephalus	Bald Eagle	G5	S3	LT,PDL	LT
Documented-Historic					
Gopherus polyphemus	Gopher Tortoise	G3	S3	N	LS
Likely					
Andropogon arctatus	Pine-woods Bluestem	G3	S3	N	LT
Aphelocoma coerulescens	Florida Scrub-jay	G2	S2	LT	LT
Chamaesyce cumulicola	Sand-dune Spurge	G2	S2	N	LE
Dendroica discolor paludicola	Florida Prairie Warbler	G5T3	S3	N	N
Estuarine tidal swamp		G5	S4	N	N
Gopherus polyphemus	Gopher Tortoise	G3	S3	N	LS
Gopherus polyphemus	Gopher Tortoise	G3	S3	N	LS
Gopherus polyphemus	Gopher Tortoise	G3	S3	N	LS
Gopherus polyphemus	Gopher Tortoise	G3	S3	N	LS
Gopherus polyphemus	Gopher Tortoise	G3	S3	N	LS
Lechea cernua	Nodding Pinweed	G3	S3	N	LT
Lechea cernua	Nodding Pinweed	G3	S3	N	LT
Mycteria americana	Wood Stork	G4	S2	LE	LE
Rynchops niger	Black Skimmer	G5	S3	N	LS
Sciurus niger avicennia	Mangrove Fox Squirrel	G5T2	S2	N	LT
Scrub		G2	S2	N	N
Scrub		G2	S2	N	N
Sterna antillarum	Least Tern	G4	S3	N	LT
Sterna sandvicensis	Sandwich Tern	G5	S2	N	N

Definitions: *Documented - Rare species and natural communities documented on or near this site.*
Documented-Historic - Rare species and natural communities documented, but not observed/reported within the last twenty years.
Likely - Rare species and natural communities likely to occur based on suitable habitat and/or known occurrences in the vicinity.

10 29 2007 Page 1 of 2

/ /

1018 Thomasville Road
Suite 200-C
Tallahassee, FL 32303
(850) 224-8207
(850) 681-9364 Fax
www.fnai.org

FLORIDA Natural Areas INVENTORY

Florida Natural Areas Inventory

Biodiversity Matrix Report

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Listin
Stylisma abdita	Scrub Stylisma	G3	S3	N	LE
Stylisma abdita	Scrub Stylisma	G3	S3	N	LE
Stylisma abdita	Scrub Stylisma	G3	S3	N	LE
Vireo altiloquus	Black-whiskered Vireo	G5	S3	N	N
Potential from any/all selected units					
Andropogon arctatus	Pine-woods Bluestem	G3	S3	N	LT
Aphelocoma coerulescens	Florida Scrub-jay	G2	S2	LT	LT
Ardea herodias occidentalis	Great White Heron	G5T2	S2	N	N
Athene cunicularia floridana	Florida Burrowing Owl	G4T3	S3	N	LS
Calopogon multiflorus	Many-flowered Grass-pink	G2G3	S2S3	N	LE
Crocodylus acutus	American Crocodile	G2	S2	LT	LE
Drymarchon couperi	Eastern Indigo Snake	G3	S3	LT	LT
Elytraria caroliniensis var. angustifolia	Narrow-leaved Carolina Scalystem	G4T2	S2	N	N
Eragrostis pectinacea var. tracyi	Sanibel Lovegrass	G5T1	S1	N	LE
Eretmochelys imbricata	Hawksbill	G3	S1	LE	LE
Eumops floridanus	Florida bonneted bat	G1	S1	N	LE
Forestiera segregata var. pinetorum	Florida Pinewood Privet	G4T2	S2	N	N
Gymnopogon chapmanianus	Chapman's Skeletongrass	G3	S3	N	N
Heterodon simus	Southern Hognose Snake	G2	S2	N	N
Lechea cernua	Nodding Pinweed	G3	S3	N	LT
Lechea divaricata	Pine Pinweed	G2	S2	N	LE
Linum carteri var. smallii	Carter's Large-flowered Flax	G2T2	S2	N	LE
Matelea floridana	Florida Spiny-pod	G2	S2	N	LE
Mesic flatwoods		G4	S4	N	N
Mustela frenata peninsulae	Florida Long-tailed Weasel	G5T3	S3	N	N
Nemastylis floridana	Celestial Lily	G2	S2	N	LE
Picoides borealis	Red-cockaded Woodpecker	G3	S2	LE	LS
Pteroglossaspis ecristata	Giant Orchid	G2G3	S2	N	LT
Puma concolor coryi	Florida Panther	G5T1	S1	LE	LE
Rallus longirostris scottii	Florida Clapper Rail	G5T3?	S3?	N	N
Rana capito	Gopher Frog	G3	S3	N	LS
Rivulus marmoratus	Mangrove Rivulus	G3	S3	C	LS
Rostrhamus sociabilis plumbeus	Snail Kite	34G5T3C	S2	LE	LE
Sceloporus woodi	Florida Scrub Lizard	G3	S3	N	N
Trichechus manatus	Manatee	G2	S2	LE	LE
Ursus americanus floridanus	Florida Black Bear	G5T2	S2	N	LT*

Definitions: *Documented - Rare species and natural communities documented on or near this site.*
Documented-Historic - Rare species and natural communities documented, but not observed/reported within the last twenty years.
Potential - Rare species and natural communities likely to occur based on suitable habitat and/or known occurrences in the vicinity.

Florida Natural Areas Inventory Rank Explanations ***February, 2007***

GLOBAL AND STATE RANKS

Florida Natural Areas Inventory (FNAI) defines an **element** as any rare or exemplary component of the natural environment, such as a species, natural community, bird rookery, spring, sinkhole, cave, or other ecological feature. FNAI assigns two ranks to each element found in Florida: the **global rank**, which is based on an element's worldwide status, and the **state rank**, which is based on the status of the element within Florida. Element ranks are based on many factors, including estimated number of occurrences, estimated abundance (for species and populations) or area (for natural communities), estimated number of adequately protected occurrences, range, threats, and ecological fragility.

GLOBAL RANK DEFINITIONS

G1	Critically imperiled globally because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor.
G2	Imperiled globally because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.
G3	Either very rare and local throughout its range (21-100 occurrences or less than 10,0000 individuals) or found locally in a restricted range or vulnerable to extinction from other factors.
G4	Apparently secure globally (may be rare in parts of range).
G5	Demonstrably secure globally.
G#?	Tentative rank (e.g., G2?)
G#G#	Range of rank; insufficient data to assign specific global rank (e.g., G2G3)
G#T#	Rank of a taxonomic subgroup such as a subspecies or variety; the G portion of the rank refers to the entire species and the T portion refers to the specific subgroup; numbers have same definition as above (e.g., G3T1)
G#Q	Rank of questionable species - ranked as species but questionable whether it is species or subspecies; numbers have same definition as above (e.g., G2Q)
G#T#Q	Same as above, but validity as subspecies or variety is questioned.
GH	Of historical occurrence throughout its range, may be rediscovered (e.g., ivory-billed woodpecker)
GNA	Ranking is not applicable because element is not a suitable target for conservation (e.g. as for hybrid species)
GNR	Not yet ranked (temporary)
GNRTNR	Neither the full species nor the taxonomic subgroup has yet been ranked (temporary)
GX	Believed to be extinct throughout range
GXC	Extirpated from the wild but still known from captivity/cultivation
GU	Unrankable. Due to lack of information, no rank or range can be assigned (e.g., GUT2).

STATE RANK DEFINITIONS

Definition parallels global element rank: substitute "S" for "G" in above global ranks, and "in Florida" for "globally" in above global rank definitions.

Tracking Florida's Biodiversity

Florida Natural Areas Inventory Rank Explanations **February, 2007**

FEDERAL AND STATE LEGAL STATUSES (U.S. Fish and Wildlife Service – USFWS) PROVIDED BY FNAI FOR INFORMATION ONLY.

For official definitions and lists of protected species, consult the relevant state or federal agency.

FEDERAL LEGAL STATUS

Definitions derived from U.S. Endangered Species Act of 1973, Sec. 3. Note that the federal status given by FNAI refers only to Florida populations and that federal status may differ elsewhere.

LE	Listed as Endangered Species in the List of Endangered and Threatened Wildlife and Plants under the provisions of the Endangered Species Act. Defined as any species which is in danger of extinction throughout all or a significant portion of its range.
LE,XN	A non essential experimental population of a species otherwise Listed as an Endangered Species in the List of Endangered and Threatened Wildlife and Plants. LE,XN for Grus americana (Whooping crane), Federally listed as XN (Non essential experimental population) refers to the Florida experimental population only. Federal listing elsewhere for Grus americana is LE.
PE	Proposed for addition to the List of Endangered and Threatened Wildlife and Plants as Endangered Species.
LT	Listed as Threatened Species, defined as any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.
LT,PDL	Species currently listed Threatened but has been proposed for delisting.
PT	Proposed for listing as Threatened Species.
C	Candidate Species for addition to the list of Endangered and Threatened Wildlife and Plants, Category 1. Federal listing agencies have sufficient information on biological vulnerability and threats to support proposing to list the species as Endangered or Threatened.
SAT	Threatened due to similarity of appearance to a threatened species.
SC	Species of Concern, species is not currently listed but is of management concern to USFWS.
N	Not currently listed, nor currently being considered for addition to the List of Endangered and Threatened Wildlife and Plants.

FLORIDA LEGAL STATUSES (Florida Fish and Wildlife Conservation Commission – FFWCC/ Florida Department of Agriculture and Consumer Services – FDACS)

Animals: Definitions derived from "Florida's Endangered Species and Species of Special Concern, Official Lists" published by Florida Fish and Wildlife Conservation Commission - FFWCC, 1 August 1997, and subsequent updates.

LE	Listed as Endangered Species by the FFWCC. Defined as a species, subspecies, or isolated population which is so rare or depleted in number or so restricted in range of habitat due to any man-made or natural factors that it is in immediate danger of extinction or extirpation from the state, or which may attain such a status within the immediate future.
LT	Listed as Threatened Species by the FFWCC. Defined as a species, subspecies, or isolated population which is acutely vulnerable to environmental alteration, declining in number at a rapid rate, or whose range or habitat is decreasing in area at a rapid rate and as a consequence is destined or very likely to become an endangered species within the foreseeable future.
LT*	Indicates that a species has LT status only in selected portions of its range in Florida. LT* for Ursus americanus floridanus (Florida black bear) indicates that LT status does not apply in Baker and Columbia counties and in the Apalachicola National Forest. LT* for Neovison vison pop. 1 (Southern mink, South Florida population) state listed as Threatened refers to the Everglades population only (Note: species formerly listed as Mustela vison mink pop. 1. Also, priorly listed as Mustela evergladensis).
LS	Listed as Species of Special Concern by the FFWCC, defined as a population which warrants special protection, recognition, or consideration because it has an inherent significant vulnerability to habitat modification,

Tracking Florida's Biodiversity

Florida Natural Areas Inventory Rank Explanations **February, 2007**

environmental alteration, human disturbance, or substantial human exploitation which, in the foreseeable future, may result in its becoming a threatened species.

LS* Indicates that a species has LS status only in selected portions of its range in Florida. LS* for Pandion haliaetus (Osprey) state listed as LS (Species of Special Concern) in Monroe County only.

PE Proposed for listing as Endangered.

PT Proposed for listing as Threatened.

PS Proposed for listing as a Species of Special Concern.

N Not currently listed, nor currently being considered for listing.

Plants: Definitions derived from Sections 581.011 and 581.185(2), Florida Statutes, and the Preservation of Native Flora of Florida Act, 5B-40.001. FNAI does not track all state-regulated plant species; for a complete list of state-regulated plant species, call Florida Division of Plant Industry, 352-372-3505 or please visit: http://DOACS.State.FL.US/PI/Images/Rule05b.pdf

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

PE Proposed by the FDACS for listing as Endangered Plants.

LT Listed as Threatened Plants in the Preservation of Native Flora of Florida Act. Defined as species native to the state that are in rapid decline in the number of plants within the state, but which have not so decreased in such number as to cause them to be endangered. LT* indicates that a species has LT status only in selected portions of its range in Florida.

PT Proposed by the FDACS for listing as Threatened Plants.

N Not currently listed, nor currently being considered for listing.

1018 Thomasville Road
Suite 200-C
Tallahassee, FL 32303
(850) 224-8207
(850) 681-9364 Fax
www.fnai.org

FLORIDA
Natural Areas
INVENTORY

Tracking Florida's Biodiversity

Appendix 4. Division of Migratory Bird Management Fact Sheet on Laws Protecting the Bald Eagle

The Bald Eagle: Other Protection following Delisting under the Endangered Species Act of 1973

November 5, 2004 draft (revised January 4, 2007)

The Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act will continue to protect the bald eagle following delisting under the Endangered Species Act. Originally passed in 1940 to protect bald eagles, the Eagle Act was amended in 1962 to protect golden eagles as well, by prohibiting the take, possession, sale, purchase, barter, offer to sell, purchase or barter, transport, export or import, of any bald or golden eagle, alive or dead, including any part, nest, or egg, unless allowed by permit (16 U.S.C 668(a); 50 CFR 22). "Take" includes pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb (16 U.S.C. 668c; 50 CFR 22.3).

A violation of the Eagle Act can result in a fine of $100,000 or imprisonment for one year, or both, for a first offense. An organization may be fined $200,000. Penalties increase for additional offenses. A second violation is a felony and can result in two years' imprisonment and a fine of up to $250,000 for an individual— or $500,000 for an organization. People who provide information leading to an arrest and conviction are eligible for a reward of up to half of the fine.

The Lacey Act

Congress originally passed the Lacey Act in 1900 to help States protect resident species by making it a Federal violation to transport illegally taken wildlife across State lines. Later amending the law, Congress extended its prohibitions to importing, exporting, selling, acquiring, or purchasing fish, wildlife, or plants taken, possessed, transported or sold in violation of U.S. or Indian law or State or foreign law. Prohibitions of the Lacey Act (16 U.S.C. 3371-78) will continue to apply to the bald eagle including its feathers, parts, nests, and eggs—as well as its products—following delisting under the Endangered Species Act. The Lacey Act also prohibits making false records, labels, or identification of shipped wildlife; importing injurious species; and shipping fish or wildlife in an inhumane manner. Penalties include a maximum of five years in prison and a $250,000 fine for felony convictions, a maximum $10,000

fine for civil violations, and a $250 fine for marking violations. The maximum criminal fine for an organization is $500,000. People who provide information leading to an arrest, criminal conviction, civil penalty, or forfeiture of property are eligible for a reward. Fish, wildlife, and plants involved in violations are subject to forfeiture. Vessels, vehicles, aircraft, and other equipment used to aid in importing, exporting, transporting, selling, receiving, acquiring, or purchasing fish or wildlife or plants in a criminal violation are subject to forfeiture upon a felony conviction involving commercialization.

The Migratory Bird Treaty Act

The Migratory Bird Treaty Act is a Federal law that carries out the United States' commitment to four international conventions— with Canada, Mexico, Japan, and Russia. The conventions protect migratory birds as an international resource. The Migratory Bird Treaty Act (16 U.S. C 703-712) and its implementing regulations (50 CFR 21) provide authority to conserve bird species such as the bald eagle, even if Endangered Species Act protections are removed. Except as allowed by permit (50 CFR 21.11), the Migratory Bird Treaty Act makes it unlawful to pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry or cause to be carried, receive for shipment, or export any migratory bird—including eggs, parts, and nests. In addition, the Act authorizes and directs the Secretary of the Interior to determine if, and by what means, the take of migratory birds should be allowed and to adopt regulations permitting and governing take—for example, hunting seasons for ducks and geese.

Penalties include a maximum of two years' imprisonment and a $250,000 fine for a felony conviction and six months' imprisonment and $15,000 fine for a misdemeanor conviction. A commercial activity is a felony, just as is take with intent to sell. Maximum fines are doubled for any organization convicted of a felony violation.