

**Lee County Board Of County Commissioners
Agenda Item Summary**

Blue Sheet No. 20060736

1. ACTION REQUESTED/PURPOSE:

Approve the Pine Island Flatwoods Preserve (PIFP) Land Stewardship Plan

2. WHAT ACTION ACCOMPLISHES:

Approving of the PIFP Plan establishes guidelines for restoration activities at the Preserve.

3. MANAGEMENT RECOMMENDATION:

Approve the plan so Land Stewardship staff can begin implementation.

4. Departmental Category: <u> CIA </u>		5. Meeting Date: <u> 6-20-2006 </u>
6. Agenda: <input checked="" type="checkbox"/> Consent <input type="checkbox"/> Administrative <input type="checkbox"/> Appeals <input type="checkbox"/> Public <input type="checkbox"/> Walk-On	7. Requirement/Purpose: (specify)	
	<input type="checkbox"/> Statute	<input type="checkbox"/> Lee Plan
	<input checked="" type="checkbox"/> Ordinance	<input type="checkbox"/> Admin. Code
	<input type="checkbox"/> Other	
		8. Request Initiated: Commissioner _____ Department <u> Parks & Recreation </u> Division _____ By: <u> John Yarbrough, Director </u> <i>John Yarbrough</i>

9. Background:
A Land Stewardship Plan is necessary for appropriate and planned restoration, management and public use facility development of any Conservation 20/20 Preserve. The CLASAC (Conservation Lands Acquisition and Stewardship Advisory Committee) unanimously passed a motion on April 13, 2006 accepting the Pine Island Flatwoods Preserve Land Stewardship Plan.

The plan was available for public review on the internet, as well as at the Pine Island Public Library. A public meeting was held May 15, 2006. Attached are minutes and comments from the meeting.

10. Review for Scheduling:

Department Director	Purchasing or Contracts	Human Resources	Other	County Attorney	Budget Services				County Manager/P.W. Director
					Analyst	Risk	Grants	Mgr.	
<i>[Signature]</i>				<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>

11. Commission Action:

Approved
 Deferred
 Denied
 Other

Rec. by CoAtty
 Date: 6/6/06
 Time: 8:45 AM
 Forwarded To:
11:45 AM
6/6/06

RECEIVED BY
 COUNTY ADMIN: *[Signature]*
 COUNTY ADMIN
 FORWARDED TO: *[Signature]*
6/6/06
3pm

Public Meeting Minutes for Review of the draft Land Stewardship Plan for Pine Island Flatwoods Preserve

Monday May 15, 2006, 6:30 pm Matlacha Community Center

Staff members present: Shelby Evans, Lynne Boyd, Cathy Olson (Conservation 20/20)
15 community members present

Shelby Evans gave presentation on Preserve and what is proposed on the site.

Floor open for questions:

What is the space between the 2 pieces of the Preserve?

It is a palm nursery.

What is behind the nursery (to the west)?

Mostly mangroves, areas to the south are owned by Calusa Land Trust.

Does the northern parcel go all the way to the mangroves?

No, just to the salt flats.

Does the county want more land on Pine Island surrounding this Preserve?

Yes, we are always looking for ways to add conservation lands.

What happened to the croton and shrimp farms that were in the area?

Those farms were on a different property to the north. (Phil B.)

Who has the existing cattle lease? Is he a Pine Island local?

Don't know, but can call staff to get that information.

Wetland area in management unit 9 seems to be heavily infested with melaleuca. Ed Chapin suggests that melaleuca be removed and replaced with cypress.

The plan now is to girdle the melaleuca and leave standing. Typically we do not replant if there is a natural seed source in the area. There are no known cypress on the Preserve currently, so staff would have to look into historic presence before planting.

Ed Chapin also requested that CLT help in the follow up of the exotic removal that occurred along Stringfellow road. There is regeneration of Australian pine and melaleuca that needs to be retreated. He has scheduled a work day for CLT staff and volunteers.

It was noted that County staff must be notified of workdays prior to scheduling them to make sure that efforts are in line with the county plans and any work done/ herbicide used is approved by county staff. County staff is willing to work with CLT and appreciates the effort.

Ed Chapin suggested that work begin at Galt Preserve because portions of the Preserve lie in secondary zones of 2 active bald eagle nests.

Work has begun on the land stewardship plan for Galt Preserve. A draft should be available in September or October of this year and will be available for review. Once the plan is approved by the board of county commissioners and funding is available, work may begin on the Preserve.

Ed Chapin suggested the loop trail be extended to the salt flats with an observation deck.

Staff will explore this idea. Once interior fire breaks are installed, they will also serve as hiking trails. The salt flats are very sensitive and creating an observation deck would also include boardwalks through the mangroves and increased use in these areas. If it is feasible and will not disturb sensitive areas and wildlife, it may be placed in future plans.

Phil Buchanan – Please stress in the plan that the salt flats are sensitive and should not be walked on.

We received your comments earlier and this has been added to the draft plan.

When is it proposed to expand the trail?

We don't have a date.

Phil Buchanan- Thinks plan is very well written. Disagrees that the effluent release is not a legal obligation. Once the county purchased the property, the lease no longer exists. We cannot have a lease with ourselves. Suggest we take it out of this section and meet with Utilities to determine a plan for the area.

Worries that the county will go against the original intent of the land and not keep with the passive recreation plans.

Phil Buchanan- It should be stated that there will be no trash cans or other facilities at the Preserve.

Staff says that we only state what will be placed on the Preserve, it would be a long list and things may get left off if we included all of the things that would be not on the Preserve.

Dogs on leashes should be allowed on the Preserve.

A lengthy discussion followed:

Staff has said that the Preserve has too many sensitive wildlife (especially nesting bald eagles) and dogs should not be allowed on the Preserve. There has not been great pressure from the public and leashed dogs are allowed on CLT properties, so there is a place on the island for them to go.

Request that no dogs allowed, even if leashed dogs are allowed, people don't follow the rules once they get away from the trailhead.

Some visitors are afraid of dogs and would not feel comfortable on the Preserve if dogs were present.

County has a habit of development creeping up on the park lands with increasing facilities and pavement. Please do not let this happen on this Preserve.

This is not the intent of the 2020 program and we will protect the preserve and its resources to the best of our ability.

Matalacha Community Park is an example of the creeping development on county parks. A brief history of the park was presented. Included the Matlacha Beach and Hobby Club as the association that owned the land that is now the park. People who once donated the land now have to pay \$60/hour to use the facility.

Concerns about the new concessions at Bunche Beach were brought up to make sure this did not happen at the Preserve.

When will the plan go to the BoCC?

In the next month. Comments from this meeting will be incorporated into the plan, comments will also be compiled and presented with the plan. Then, the plan will go on the agenda for approval.

Meeting adjourned.



Conservation 20/20 Land Stewardship Plan
Comment Card



P.R. Blalwood

Comments:

Dog on leaser could be permitted.

*Plan should state that bathrooms,
trash cans, will not be provided.*

*Effluent agreement no longer
exists (ceased to
exist when B County
purchased the property).*

Name (optional):

Affiliation (optional):

Phil Buchanan



Conservation 20/20 Land Stewardship Plan
Comment Card



Comments: *The trail could be marked a little more
clearly. A wrong turn takes a hiker
to Spring Fellow Rd. About 1/4 mile south of
the parking lot. The fence is down at
this point.*

Access by canoe would be great!

Name (optional):

Affiliation (optional):

Marty Hastings



Conservation 20/20 Land Stewardship Plan
Comment Card



Comments:

Please more trails
NO DOGS

Name (optional): *D. Hill* Affiliation (optional):



Conservation 20/20 Land Stewardship Plan
Comment Card



Comments:

Great job! A trail
to the salt flats would be
a good addition.

Name (optional): *Ed Elms* Affiliation (optional):



Conservation 20/20 Land Stewardship Plan
Comment Card



Comments:

The plan was very well done and is relatively comprehensive. The western area between the Northern & Southern section should be acquired, at least the wetland portion should be less expensive than the upland and/or developed (Tree Farm) area.

Name (optional):

Affiliation (optional):

Alanna Ward

Pine Island Flatwoods Preserve

Land Stewardship Plan

6351 Stringfellow Road
St. James City, FL 33956

Second DRAFT – May 2006



Prepared by the Land Stewardship Section
Lee County Department of Parks and Recreation

Approved by the Lee County Board of County Commissioners: (date)

Acknowledgements

We would like to thank the following individuals for their assistance in the development of this document: Roger Clark, Cathy Olson, the Lee County Land Stewardship staff and Michael Weston from the Division of Forestry for carefully reviewing the Pine Island Flatwoods Preserve (PIFP) land stewardship plan and providing constructive criticism; members of Management Sub-Committee of the Conservation Lands Acquisition and Stewardship Advisory Committee were also instrumental in providing valuable suggestions regarding land management issues and the formatting of the plan; Dr. George J. Wilder, Botanist, Florida Gulf Coast University, for his time and input to the plant species list; Dean Cerdan, Lee County Parks and Recreation, for providing the plan on the Lee Parks website for public review; Jeff Morgan, Lee County Parks and Recreation, for printing assistance; Lee County Library System for making the plan available for public review and providing a meeting space for public comments; Brenda Anderson for her time in scoping out the best place for the trail and investigating the mangrove tunnels; Becky Sweigert for her time in compiling the history of the bald eagle nests; Howard Wegis, Lee County Utilities.

Lynne Boyd
Shelby Evans

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List of Acronyms

ATV	All Terrain Vehicle
C20/20	Conservation 20/20
CLT	Calusa Land Trust
DHR	Division of Historical Resources
DOF	Florida Division of Forestry
ETAC	Eagle Technical Advisory Committee
FCC	Florida Climate Center
FDACS	Florida Department of Agriculture and Consumer Services
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FLEPPC	Florida Exotic Pest Plant Council
FLUCCS	Florida Land Use, Cover and Forms Classification System
FNAI	Florida Natural Areas Inventory
FWC	Florida Fish and Wildlife Conservation Commission
IRC	Institute for Regional Conservation
LCEC	Lee County Electric Cooperative
LCU	Lee County Utilities
LSOM	Land Stewardship Operations Manual
LWCR	Lower West Coast Region
MU	Management Units
NWI	National Wetlands Inventory
ORV	Off Road Vehicle
PARI	Piper Archaeological Research, Inc.
PIFP	Pine Island Flatwoods Preserve
SFWMD	South Florida Water Management District
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service

Vision Statement

It is the vision of the Lee County Parks and Recreation Department and the Conservation 20/20 Program to conserve, protect and restore Pine Island Flatwoods Preserve to a productive, functional and viable ecosystem. This will include the removal and control of invasive exotic plants, most notably melaleuca in the pine flatwoods. The Preserve includes one of the largest tracts of undeveloped pine flatwoods remaining on the island. It is home to many endangered plant and animal species that rely on these flatwoods. The Preserve also has many acres of undisturbed mangrove and tidal swamps, which provide breeding and foraging grounds for a variety of wading birds. Pine Island has many residents and visitors that enjoy the natural beauty of the island. It is our goal to provide a place for people to enjoy the native ecosystems of the island by participating in hiking and birding at Pine Island Flatwoods Preserve.

I. EXECUTIVE SUMMARY

Pine Island Flatwoods Preserve (PIFP) is located in Lee County, on Pine Island on the west side of Stringellow Road approximately halfway between the Pine Island Center and St. James City. It is 635 acres, made up of five separate acquisitions purchased in 2000, 2001, 2002, 2003 and 2005 through the Conservation 20/20 program for a total of \$5,728,400. The Conservation 20/20 Program was established in 1996 after Lee County voters approved a referendum that increased property taxes by up to .5 mil for the purpose of purchasing and protecting environmentally sensitive lands.

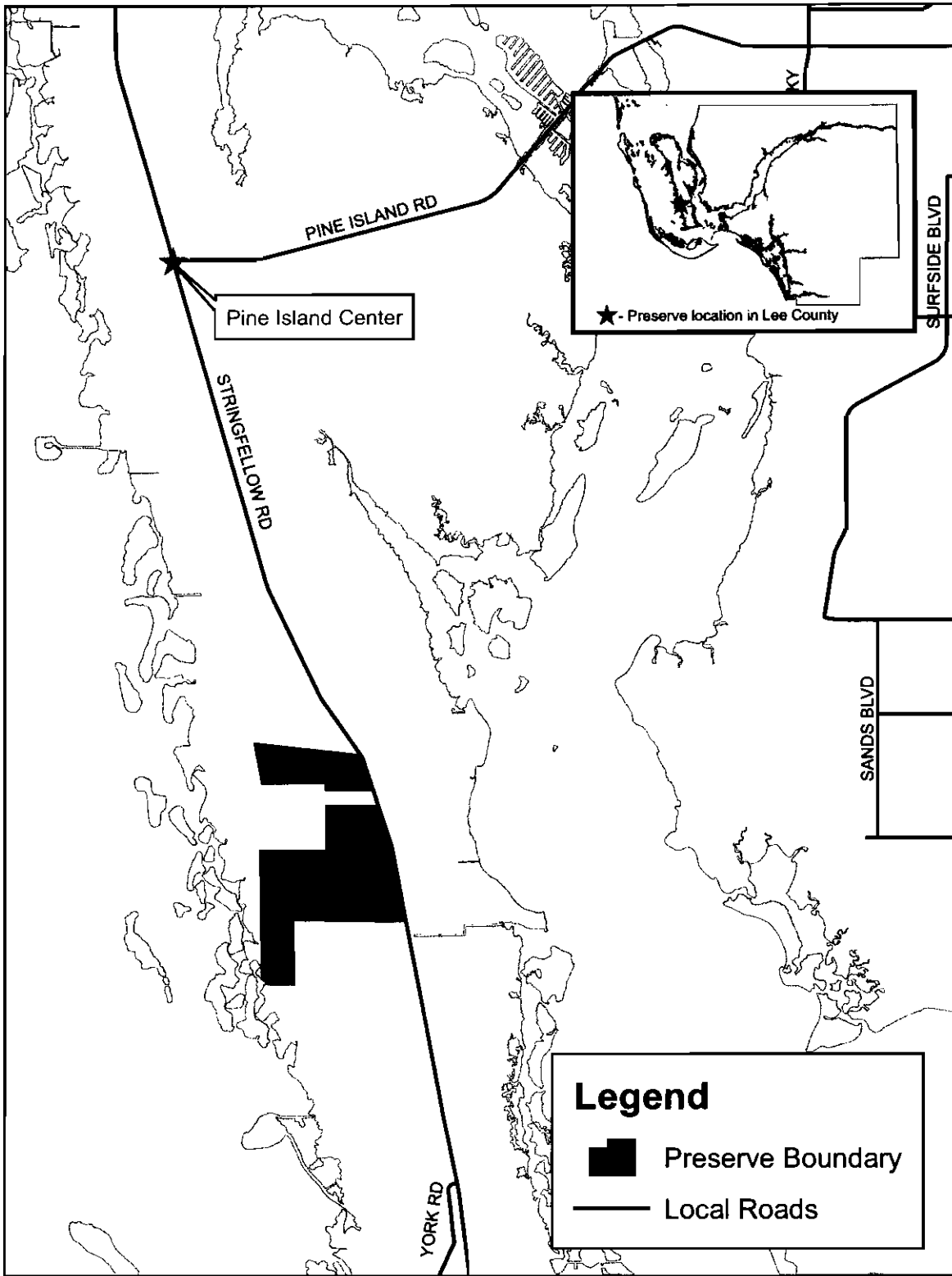
Southwest Florida has a humid, sub-tropical climate due to its maritime influence from the Caribbean Sea and the Gulf of Mexico. Average annual rainfall on Pine Island is 61.6 inches, slightly lower than the average rainfall for the entire county, 64.76 inches. Three tropical systems (Charley, Frances and Jeanne) passed near the Preserve in 2004, bringing hurricane or tropical storm force winds from all three systems. As a result, several slash pines and oaks and/or their limbs fell throughout areas of the Preserve.

Geologically speaking, the northern and eastern portions of the Preserve were created during the Pliocene Epoch between 2 million to 10,000 years ago. This period is also known as the Ice Age, where huge ice sheets formed across Canada and the northern United States. The southwestern portion of the Preserve was created during the Holocene. These areas were formed in the last 10,000 years with the warming of earth and the beginning of man. The natural elevations at PIFP range from 8' on the eastern portion of the Preserve to 2' or less along the eastern boundary and salt flats. There are ten different soil types found at Pine Island Flatwoods Preserve. All of the soil types are nearly level and poorly drained with severe limitations for recreation and local roads. Fifty percent of the soils are characteristic of sloughs and ponds, 24% as south Florida flatwoods, and 10% are salt water marshes. The Preserve lies within the South Pine Island Watershed.


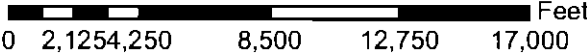
Pine Island Flatwoods Preserve consists of nine plant communities described by the Florida Natural Areas Inventory. The largest plant community is the mesic flatwoods, consisting of 65% of the Preserve. Other plant communities include tidal swamp, hydric hammock, improved pasture, depression marshes and coastal berms. The Preserve is one of the largest areas of undisturbed flatwoods remaining on Pine Island. These flatwoods contain critical habitat for many wildlife species including bald eagles and wood storks, which are listed as threatened or endangered. The salt flats and mangrove fringes also provide feeding and nesting grounds for a variety of wading birds.

Past land uses have resulted in limited disturbances to PIFP. The most notable ones are an approximately 20 acre citrus grove along Stringellow Road, a

Figure 1: Location Map

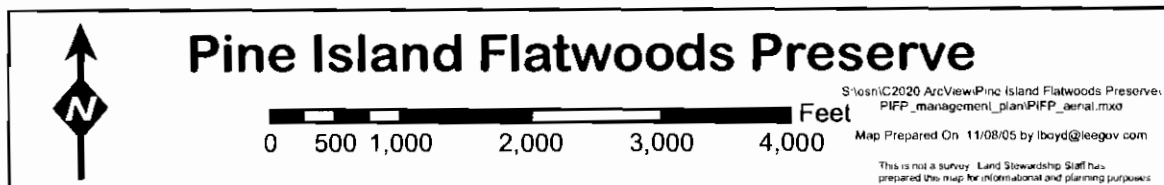
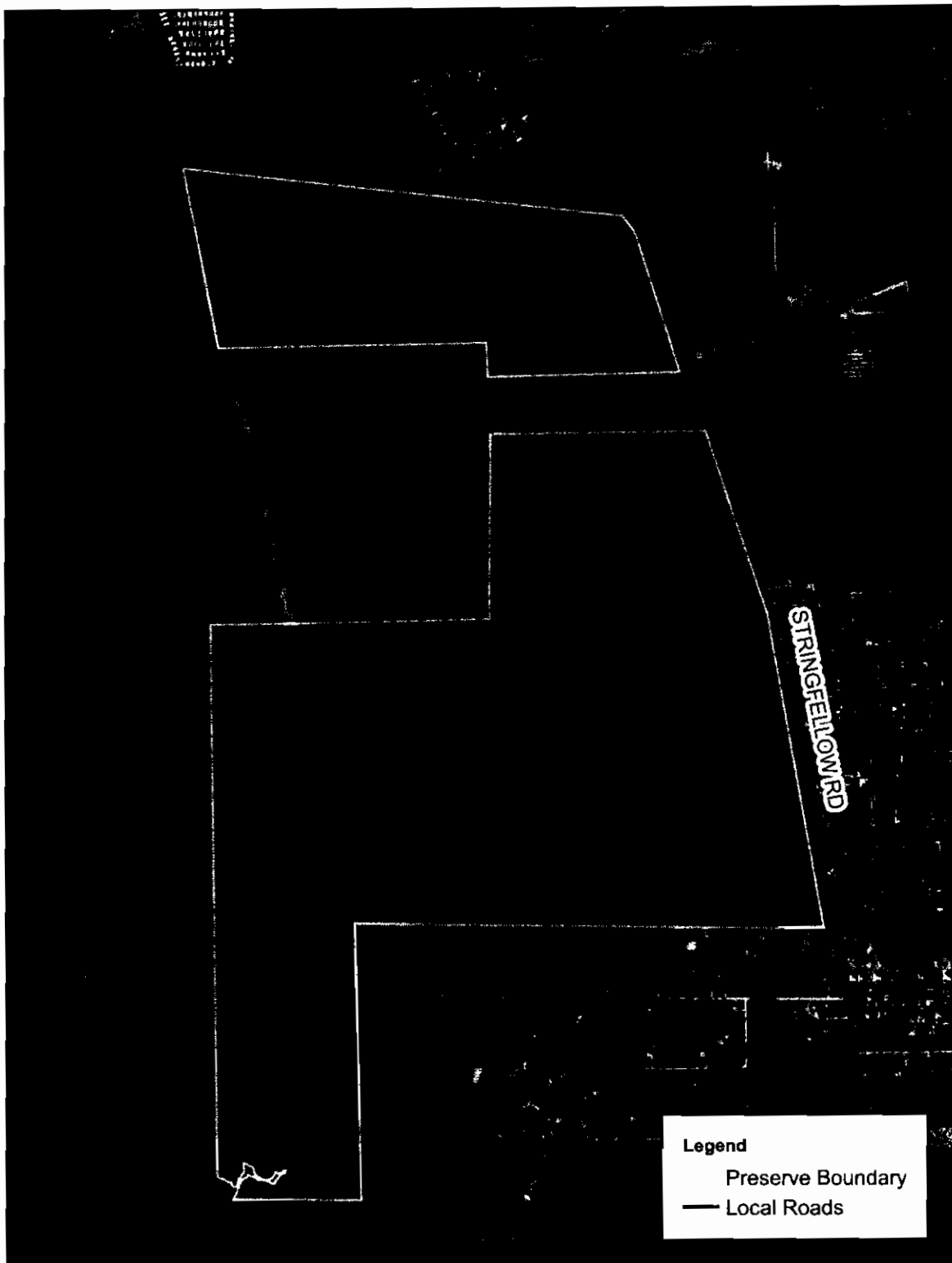


Pine Island Flatwoods Preserve

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 PIFP_management_plan\PIFP_locationmap.mxd
 Map Prepared On: 12/10/05 by sevans@oecgov.com
 This is not a survey. Land Stewardship Staff has prepared this map for informational and planning purposes.

Figure 2: 2005 Aerial Photograph



IV. NATURAL RESOURCES DESCRIPTION

A. Physical Resources

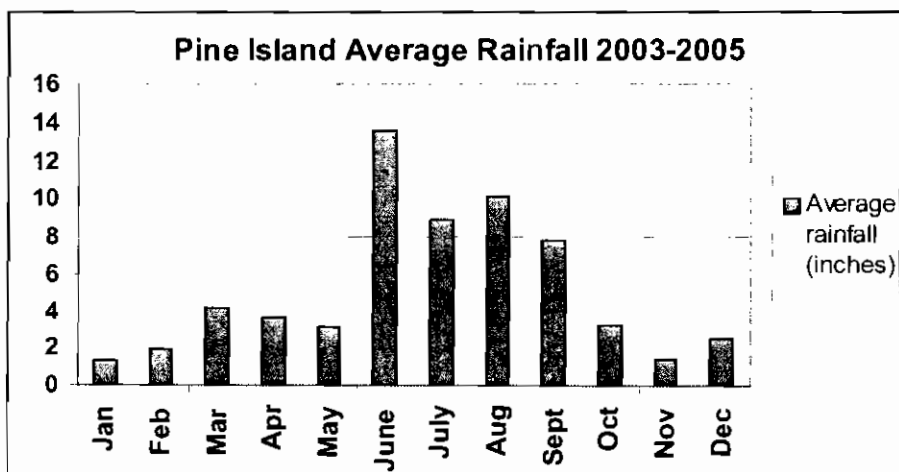
i. Climate

Southwest Florida has a humid, sub-tropical climate due to its maritime influence from the Caribbean Sea and the Gulf of Mexico. The mild temperatures encourage winter residents and tourists to visit the area. Temperate climate influences are exerted as well, with infrequent but significant freezes occurring in December and January (FCC 2005). These freezes prevent some of the more tropical plants from becoming established and occasionally damage the subtropical vegetation. Cold fronts regularly push cool, sometimes moist weather from the southeastern U.S. to southwest Florida during the winter. These cold fronts also encourage migratory birds to utilize the Preserve as either a stop-off point on a longer voyage, or as a winter roosting and feeding area. Table 1 shows the average high and low temperatures for Fort Myers, Florida compiled by the Southeast Regional Climate Center from 1931 to 2004.

Table 1: Average High/Low Temperatures for Ft. Myers, FL (1931-2004)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
High temperature (°F)	74.7	76.1	79.8	84.2	88.7	90.6	91.1	91.4	89.7	85.7	80.2	76.0
Low temperature (°F)	53.5	54.7	58.4	62.4	67.5	72.4	74.1	74.5	73.9	68.3	60.4	55.1

The graph below depicts the rainfall data collected by Greater Pine Island Water Association on a daily basis from their plant located at 9550 Stringfellow Road, Pine Island. This plant is approximately 5 miles north of the Preserve. Average annual rainfall over the three years was 61.6 inches, slightly lower than the average rainfall for the entire county for the last fourteen years (64.76 inches).



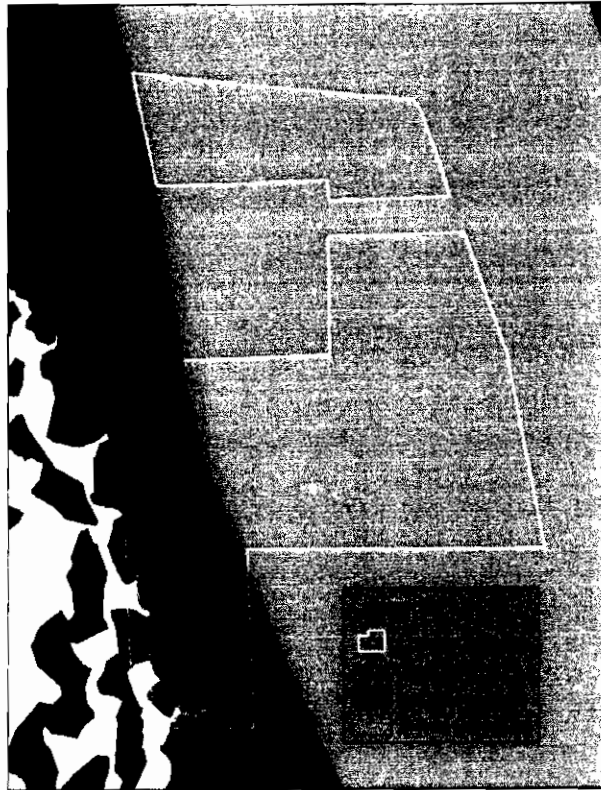
Occasionally, major hurricanes pass through southwest Florida impacting natural ecosystems and man-made infrastructure. Although these effects are believed by many to be short-term, long-term consequences may result in plant canopy restructuring, invasive plant introduction and/or further dispersal, and increased wildfire severity to communities from increased fuel loads (dead vegetation). The effect of hurricanes on natural systems is compounded by the already present anthropogenic impacts. During 2004, three tropical systems (Charley, Frances and Jeanne) passed over Lee County bringing hurricane or tropical storm force winds across the Preserve (Appendix A). As a result, several slash pines and oaks and/or their limbs fell throughout areas of the Preserve. Although the effects were noticeable across Pine Island, the Preserve sustained little damage. During 2005, Hurricane Wilma also passed through Lee County with hurricane force winds. The eye of this storm was far enough to the south that there was little damage on the Preserve.

ii. Geology

For millions of years, the Florida Platform was submerged in the ocean. Sediments accumulated upon it and hardened into sedimentary rock. Thirty-five (35) million years ago, portions of Florida rose above the ocean's surface and for the next 12 million years it alternated between emersion and submergence. From 23 million years ago to the present, at least a small portion of the Florida Platform has always been above the ocean surface.

Ten lithostratigraphic units have been identified in the state of Florida. Lithostratigraphic units are differentiated by the conditions under which they were formed and when in geologic time they were formed. These lithostratigraphic units are further divided by timing of formation into stratigraphic units. Pine Island Flatwoods Preserve lies on the boundary between two stratigraphic units, the Tertiary-Quaternary Sediments and the Holocene Sediments (Figure 3).

Figure 3: Stratigraphic Units

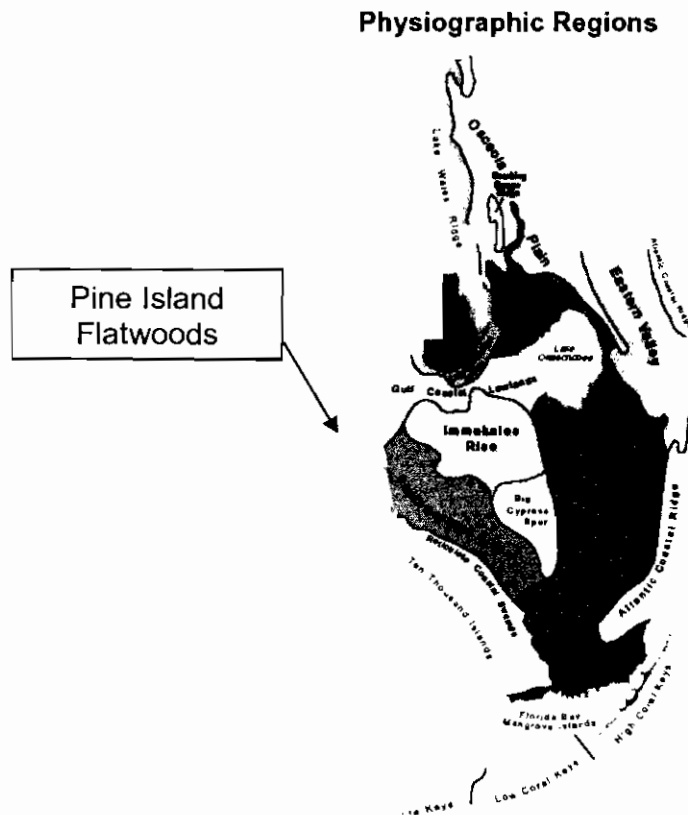


The northern and eastern portions of the Preserve were created during the Pliocene Epoch between 2 million to 10,000 years ago. This period is also known as the Ice Age, where huge ice sheets formed across Canada and the northern United States. When these ice sheets were formed, they consumed large quantities of seawater, dropping the current sea level 300 or more feet, which greatly increased the land area of Florida. As the glaciers shrank, sea levels rose, and the Florida peninsula was again flooded. During the peak warm periods, sea level reached 150 feet above the current sea level. The waves and currents during these high sea level periods reworked the sediments and formed a series of geological units (Caloosahatchee, Ft. Thompson, Anastasia, Miami Limestone and Key Largo Limestone). Each of these geological units is characterized by their unique compositions. However, throughout much of Lee County, including these portions of PIFP, the Caloosahatchee and Fort Thompson units are somewhat indistinct and have been lumped together as undifferentiated Tertiary-Quaternary Sediments. This unit consists of a quartz sand blanket covering limestone and clay. Fossils, including mollusks and corals, are very common and usually in excellent condition (Missimer & Scott 2001).

The southwestern portion of the Preserve is located in the Holocene Sediments. These were formed in the last 10,000 years with the warming of earth and the beginning of man. These sediments occur near the coastlines with elevations generally less than 5 feet. Sediments here include quartz, sands, carbonate sands and muds, and organics (Missimer & Scott 2001).

Southwest Florida can also be divided into ten major physiographic provinces. These are broad-scale subdivisions based on physical geography features such as terrain texture, rock type and geologic structure and history. Figure 3 illustrates where Pine Island Flatwoods Preserve lies within the Gulf Coastal Lowlands (Map source: SFWMDb).

Figure 4: Physiographic Regions of South Florida



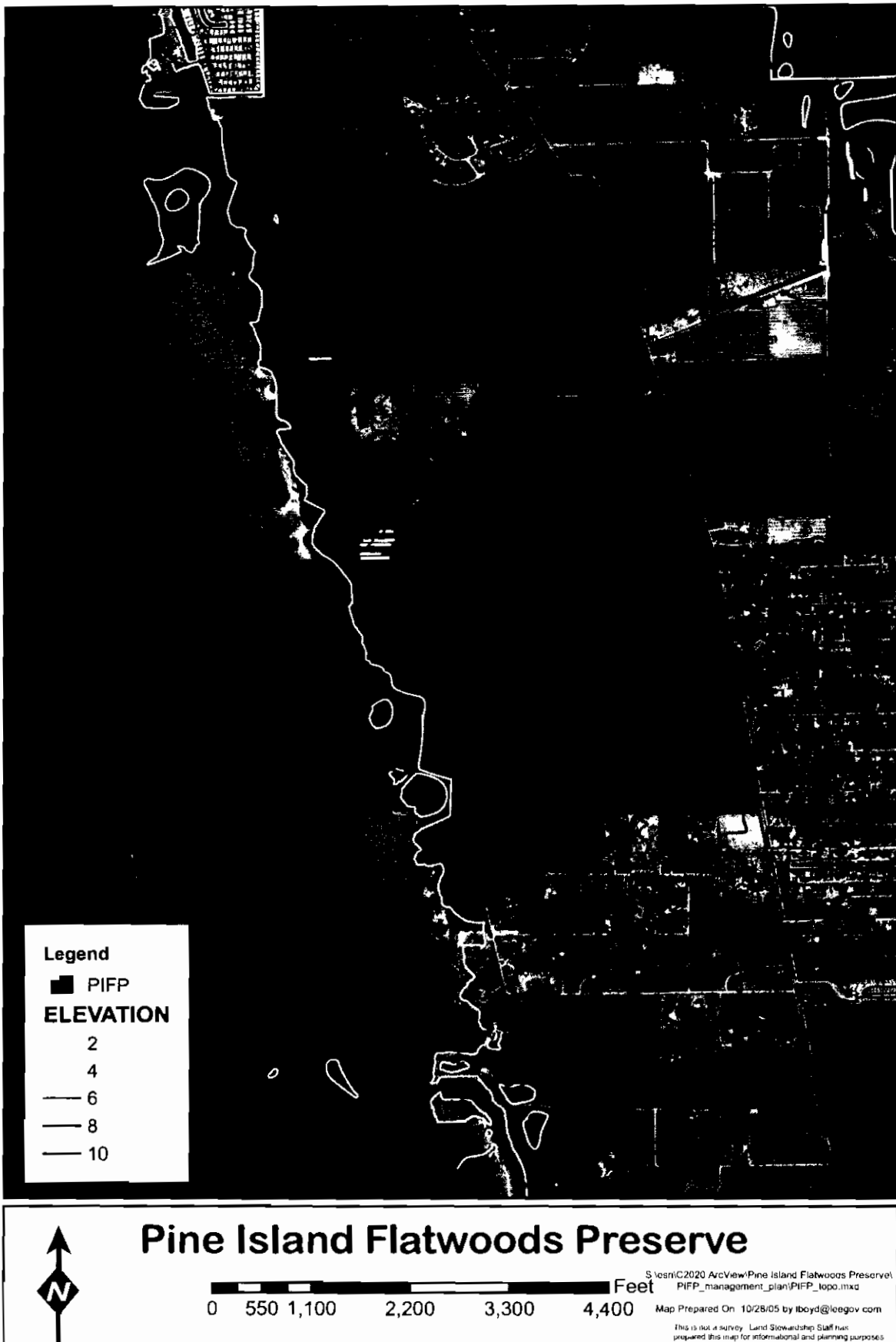
The Gulf Coastal Lowlands are found in northwest Lee County as well as most of Charlotte and Sarasota Counties to the north. This region is characterized as a gently southwestward sloping plain composed of deposited sediments. These sediments are aligned parallel to the coastline, which indicates they were formed by marine forces (Missimer & Scott 2001).

iii. Topography

Lee County is located within the Coastal Lowlands of Florida that extend around the coastal periphery of the state where elevations are generally below 100 feet (Stubbs 1940; Cooke 1945).

The natural elevations at PIFP range from 8' on the eastern portion of the Preserve to 2' or less along the western boundary and salt flats. General sheetflow across this part of the island is from east to west (Figure 5).

Figure 5: Topography Map



iv. Soils

The Soil Survey of Lee County, Florida (Henderson 1984) was designed for a diverse group of clients to be able to comprehend soil behavior, physical and chemical properties, land use limitations, potential impacts, and protection of the environment.

There are ten different soil types found at Pine Island Flatwoods Preserve (Figure 6 and Table 2). A common relationship for all of these soil types is that their slopes range from 0-2%. Slope is “the inclination of the land surface from the horizon.” Essentially, PIFP is fundamentally level. Table 2 and the descriptions below have been organized to quickly provide land stewards with pertinent soils information for understanding restrictions and/or results regarding future restoration and probable recreational plan limitations and expense.

There are eight (8) generalized range site categories in Lee County, four of which are found on PIFP. Man-made areas are not included in range site categories. These categories are not Florida Natural Areas Inventory (FNAI) natural plant community designations, but rather they are used to group soil types and where they might occur. The 4 identified on the Preserve are:

- Saltwater Marshes – Tidal marsh areas along the Gulf of Mexico with the potential to produce significant amounts of cordgrass (*Spartina spp.*), seashore saltgrass (*Distichlis spicata*), and seashore paspalum (*Paspalum vaginatum*).
- South Florida Flatwoods - Nearly level areas with scattered to numerous pine trees (*Pinus spp.*), saw palmetto (*Serenoa repens*), gallberry (*Ilex glabra*), and other woody plants.
- Slough - Open grassland where nearly level areas act as broad natural drainage courses in the flatwoods. The potential plant community is dominated by blue maidencane (*Amphicarpum muhlenbergianum*), chalky bluestem (*Andropogon virginicus* var. *glaucus*), and blue-joint panicum (*Panicum tenerum*).
- Freshwater marshes and ponds - Open grassland marshes or ponds (depressions) with the potential to produce significant amounts of various grasses, sedges, and rushes. Water fluctuates throughout the year.

Wetland classifications are used to identify locations that may retain water for an indeterminate amount of time.

- F-Flooding: Soil flooded by moving water from stream overflow, runoff or high tides.
- S-Slough (sheet flow): A broad nearly level, poorly defined drainage way that is subject to sheet-flow during the rainy season.
- P-Ponding: Standing water on soils in closed depressions. The water can be removed only by percolation or evapotranspiration.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long duration storms. There are two hydrologic soil groups found on the Preserve:

- B - Soils having a moderate infiltration rate (low to moderate runoff potential) when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well-drained soils that have moderately fine texture to moderately coarse texture. Moderate rate of water transmission.
- D - Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist mainly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a clay pan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. Very slow rate of water transmission.

Note that some of the soil types are shown as having dual hydrologic groups, such as B/D. A B/D listing means that under natural conditions the soil belongs to D, but by artificial methods the water table can be lowered sufficiently so that the soil fits in B. The Preserve has been impacted in several ways, including a citrus grove, clearing for pasture, cattle grazing and a power line. Since there are different degrees of drainage or water table control, an onsite evaluation would be needed to determine the exact hydrologic group of the soil at each particular impacted location.

Soil permeability is defined as "the quality of the soil that enables water to move downward through the profile." Permeability is measured as the number of inches per hour that water moves downward through the soil. The water table columns indicate the amount of time water may be present at specified depth ranges. Terms describing permeability are below:

Very slow	< 0.06 inch
Slow	0.06 – 0.2 inch
Moderately slow	0.2 – 0.6 inch
Moderate	0.6 – 2.0 inches
Moderately rapid	2.0 – 6.0 inches
Rapid	6.0 – 20 inches
Very rapid	> 20 inches

Soils affect the type, quality and quantity of food and cover for wildlife. Wildlife diversity and abundance are also influenced by distribution of food, cover, and water. Wildlife habitat may be created or improved by planting appropriate vegetation, maintaining existing plant communities and promoting the natural establishment of desired vegetation. The soils of Lee County occur in 4 different habitat types:

- Openland: Cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. Wildlife attracted includes northern bobwhite quail (*Colinus virginianus*), sandhill cranes (*Grus canadensis*), hawks, various birds, and rabbits.
- Woodland: Deciduous plants, coniferous plants, grasses, legumes, and wild herbaceous plants. Wildlife attracted includes wild turkeys (*Meleagris gallopavo*), thrushes, woodpeckers, squirrels, foxes, raccoons (*Procyon lotor*), white-tailed deer (*Odocoileus virginianus*), snakes, frogs, and bobcats (*Lynx rufus*).
- Wetland: Open, marshy or swampy shallow water areas. Wildlife attracted includes ducks, ibis, egrets, herons, shorebirds, snakes, frogs, alligators (*Alligator mississippiensis*), and otters (*Lutra canadensis*).
- Rangeland: Shrubs and wild herbaceous plants. Wildlife attracted includes white-tailed deer, bobwhite quail, opossums (*Didelphis virginiana*) and various birds.

The potential of the soil for wildlife habitat is rated as:

- Good - Easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected.
- Fair - Established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results.
- Poor - Limitations are severe as habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive.
- Very poor - Restrictions are very severe and unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.
- -- Soil was not rated.

Staff considers soil limitations that affect their suitability for recreational development. Although the Soil Survey of Lee County has other categories under recreation, these are not under consideration for this Preserve. The soils within the Preserve have all been identified as having severe limitations. Severe means "that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures." In particular, paths and trails for "hiking and horseback riding should require little or no cutting and filling" plus "should not be subject to flooding more than once a year during the period of use." All soil types at PIFP are fairly sensitive and restrictive and considerations by the impacts of hiking or management trails are addressed.

Figure 6: Soils Map

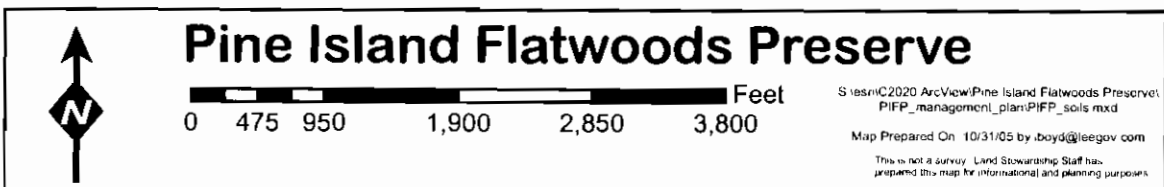


Table 2: Summary of Soil Characteristics

Soil Types	Map Symbol	Total Acres	% of Preserves	Habitats (Range Site)	Wetland Class (1)	Physical Attributes			Biological Attributes			Limitations for Recreational Paths & Trails	
						Hydrologic Group (2)	Surface Permeability	Subsurface Permeability	Water Table within 10' of surface	Water Table below 10-40' of surface	% Organic Matter		Potential as habitat for wildlife in Openland/Wetland/Rangeland
Edisto Muck	18	5.6	0.83	fresh water slough	S	B/D	moderate, mod rapid	mod	10-40'	2-5%	poor	poor	Severe: wetness, excess nutrients
Hilandale Fine Sand	6	4.8	0.87	rough florida flatwoods	S	B/D	moderate, mod rapid	poor	7 months	2-5%	poor	poor	Severe: wetness, too sandy
Hilandale Fine Sand, Slough	75	7.4	1.08	slough	S	B/D	rapid	poor	1-2 months	1-2%	poor	poor	Severe: wetness, too sandy
Immokalee Sand	28	142	20.76	south florida flatwoods	S	B/D	rapid	poor	2-6 months	1-2%	poor	poor	Severe: wetness, too sandy
Myakka Fine Sand	11	331.9	48.59	slough	P	B/D	rapid	poor	2-6 months	<2%	poor	poor	Severe: wetness, too sandy
Myakka Fine Sand, depression	53	4.1	0.60	fresh water marshes and ponds	P	D	moderate, mod rapid	poor	3-6 months	1-2%	very poor	poor	Severe: ponding, too sandy
Pokahontas mucky fine sand	16	106.1	16.38		F	D	moderate, mod rapid	poor	3-6 months	1-2%	very poor	poor	Severe: wetness, too sandy
Savanna Fine Sand	43	16.3	2.68	south florida flatwoods	F	D	moderate, mod rapid	poor	2-6 months	1-5%	poor	poor	Severe: wetness, too sandy
Waldorf Muck	23	67.9	7.86	fresh water marsh	D	D	rapid	poor	10-40'	--	very poor	poor	Severe: wetness, excess nutrients

** Water Table is above the surface of soil

Color Key:
Wet
Wetter
Saturated

* Soils do not support rangeland, vegetation suitable for grazing

(1) F - Flooding. The temporary inundation of an area caused by overflowing streams, runoff from adjacent slopes or tides
S - Slough (sheet flow). A broad, nearly level, poorly defined drainage way that is subject to sheet flow during the rainy season
P - Ponding. Standing water on soils in closed depressions. The water can be removed only by percolation or evapotranspiration

(2) B - Soils having a moderate infiltration rate (low to moderate runoff potential) when thoroughly wet
D - Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet

v. Hydrologic Components and Watershed

For the ease of explanation, this plan will refer to management units (MU) when talking about specific areas of the Preserve (Figure 7). Pine Island Flatwoods Preserve contains six wetland areas ranging in size from less than an acre to 2.6 acres. The largest is located in the northeast corner of MU 9 and contains open marshy areas surrounded by cabbage palms (*Sabal palmetto*) and melaleuca (*Melaleuca quinquenervia*). An eastern indigo snake (*Drymarchon corais couperi*), a listed species, was sighted here in 2004. The other smaller wetlands are seasonally flooded and contain a variety of plant species including pink sundew (*Drosera capillaris*) and Boston fern (*Nephrolepis exaltata*).

There are few hydrological alterations at PIFP. The largest alteration is an area in the northwestern corner of the Preserve in MU 1. Three ponds, their associated ditches and one small canal were created here in the mid 1960's to develop a shrimp farm. It is not known how successful this venture was, but by the mid 1970's the area had been abandoned. The ditches and canals are still present and have been invaded by melaleuca and Brazilian pepper (*Schinus terebinthifolius*). In 1984, a cow well was installed in MU 4. Two other cow wells were installed in MUs 6 and 10 in the early 1990's. The final alteration was an east-west road that runs along the southern boundary of MU 5 from Stringfellow Road to the western boundary. This road may block some sheetflow across the Preserve. Other alterations outside the Preserve include Stringfellow Road and the north/south power line.

Pine Island Flatwoods Preserve is within the northwestern portion of the South Florida Water Management District's (SFWMD) Lower West Coast Region (LWCR). Within a subset of the combined LWCR and Lower East Coast Region, PIFP falls within the 1,400 square-mile Caloosahatchee Basin (SFWMDa 2000). Pine Island is about 16 miles long and 3 miles wide at its widest point. It is divided into two watersheds, North and South, which include Little Pine Island. The dividing line is the east west corridor of Pine Island Road. The Preserve lies within the South Pine Island Watershed, which covers a surface area of approximately 28 square miles. The North Pine Island Watershed is approximately 21 square miles. Figure 8 illustrates the location of the South Pine Island Watershed as well as adjacent watersheds. This watershed drains the southern half of the island from the center of the island (more or less Stringfellow Road) east into Matlacha Pass and west into Pine Island Sound.

In 1974, the United States Fish and Wildlife Service (USFWS) directed its Office of Biological Services to conduct an inventory of the nation's wetlands. This National Wetlands Inventory (NWI) became operational in 1977. Wetlands were identified on the photography by vegetation, visible hydrology, and geography, and subsequently classified in general accordance with the Classification of Wetlands and Deep Water Habitats of the United States (Cowardin et al. 1979).

Figure 9 identifies 151 acres of Estuarine Scrub-Shrub, 15 acres of Estuarine Unconsolidated Bottom and 3 acres of Palustrine Emergent Wetlands. Estuarine systems are defined as deepwater tidal communities and adjacent tidal wetlands that are usually semi-enclosed by land but have open, partly obstructed, or sporadic access to the open ocean and in which ocean water is at least occasionally diluted by freshwater runoff from the land. Scrub-Shrub and Unconsolidated Bottom Estuarine wetlands are intertidal. Unconsolidated bottom wetlands include all wetland and deepwater communities with at least 25% cover of substrate smaller than stones and a vegetative cover less than 30%. Scrub-shrub wetlands are dominated by woody vegetation less than 20 feet tall. Palustrine systems are all non-tidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean derived salts is below 0.5%. Emergent wetlands are characterized by erect rooted, herbaceous hydrophytes, excluding mosses and lichens that are present for most of the growing season.

Figure 7: Management Units

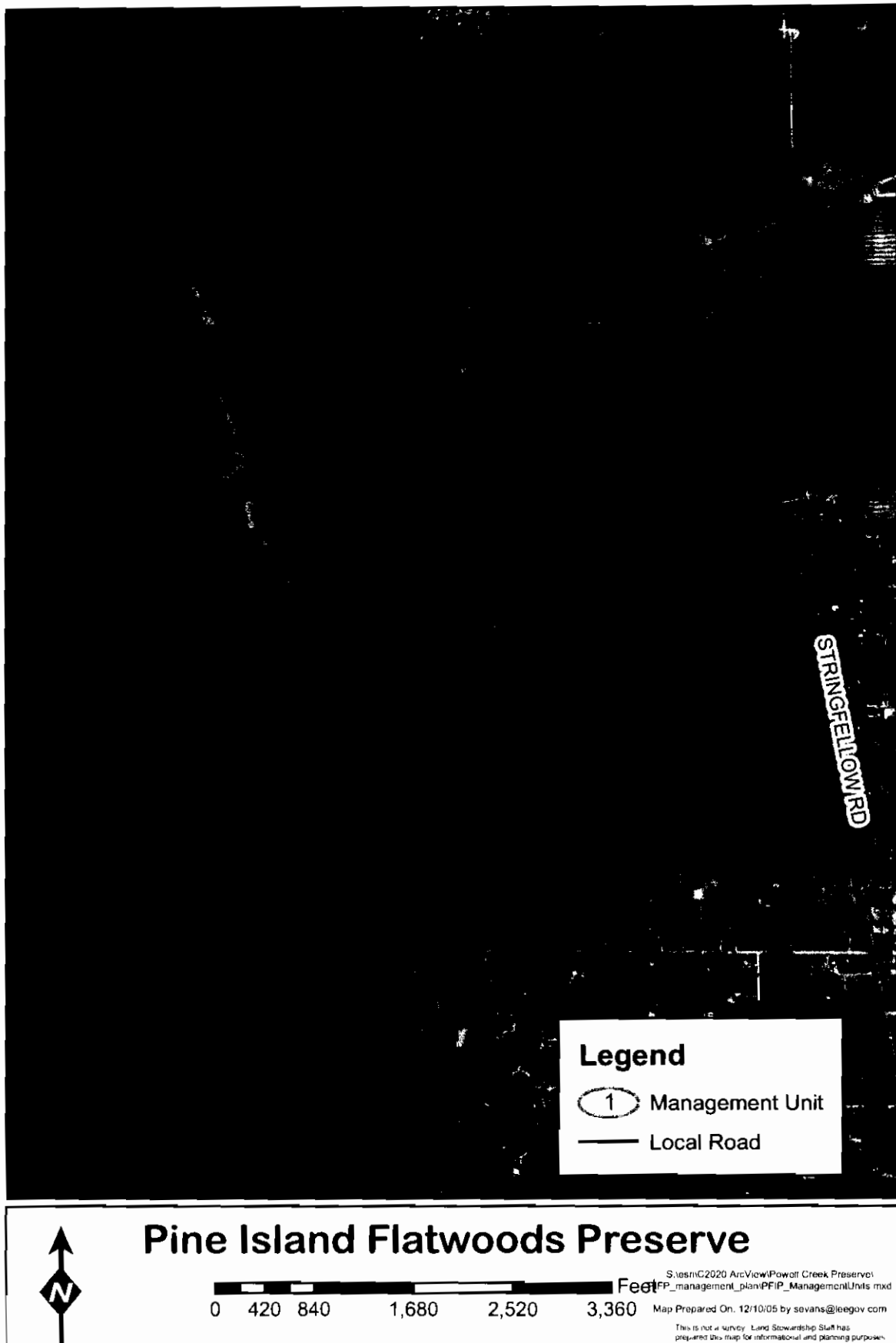
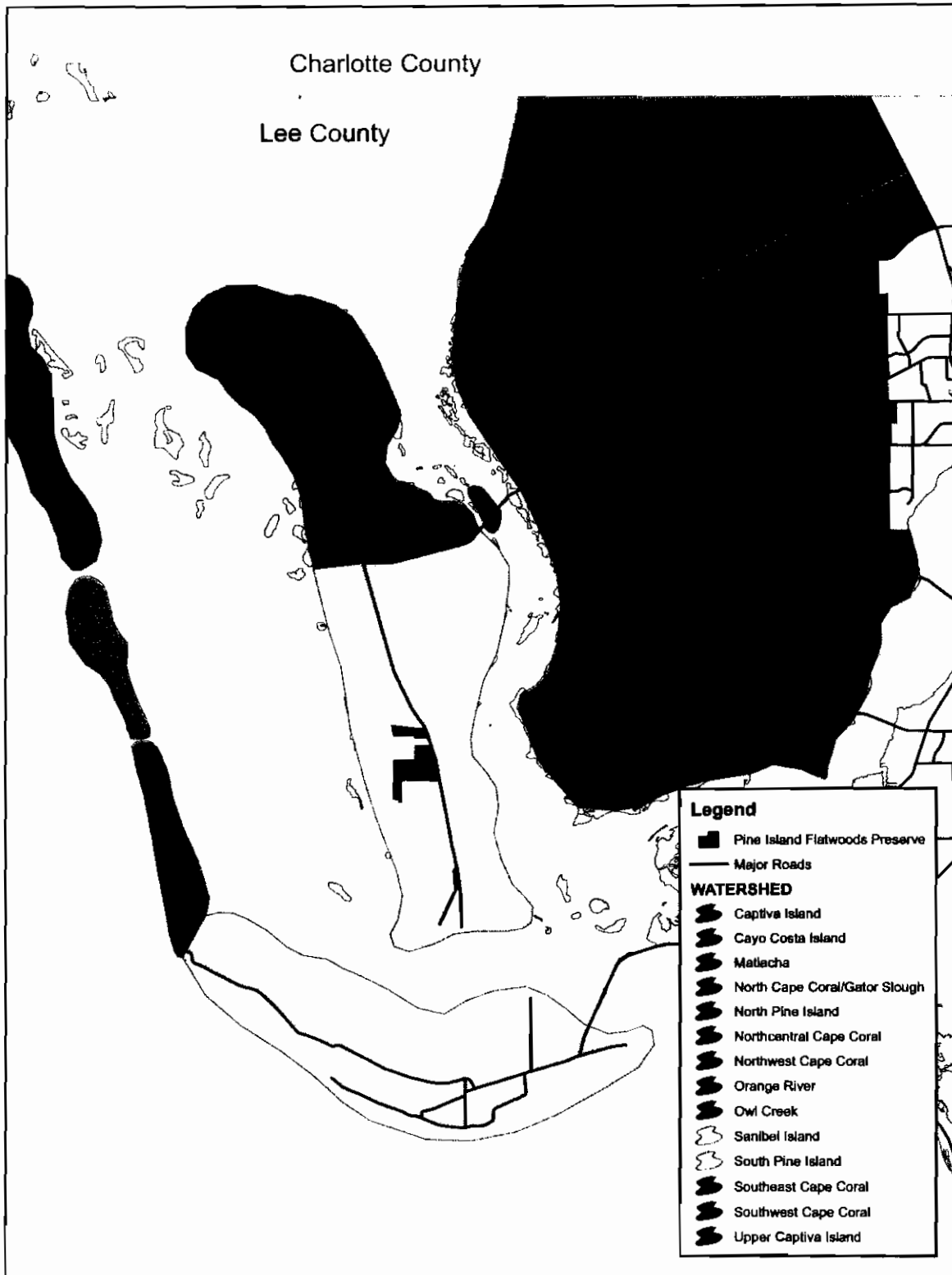

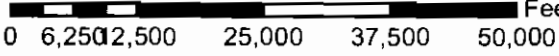


Figure 8: Watershed Map

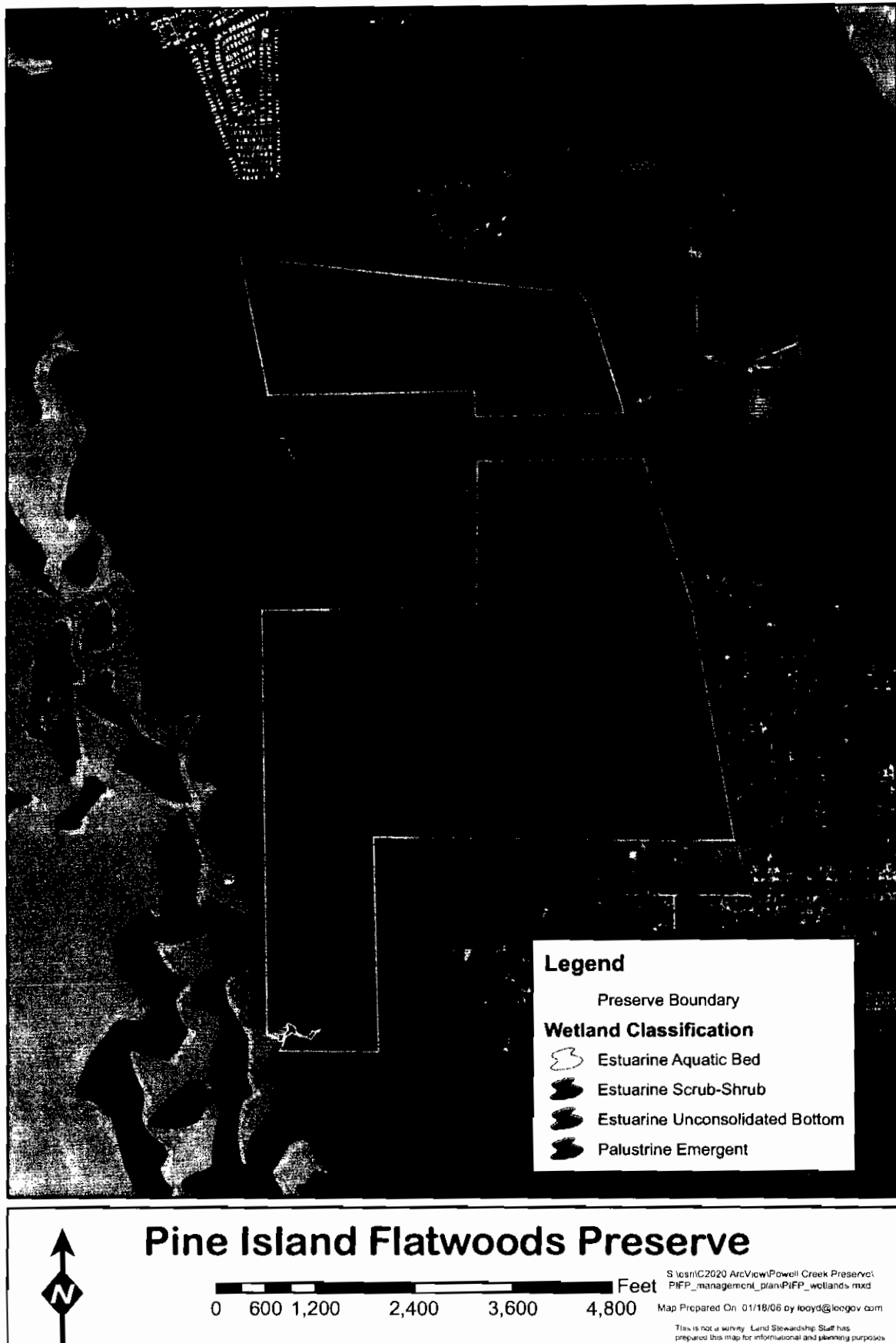


Pine Island Flatwoods Preserve

S:\esri\C2020 ArcView\Pine Island Flatwoods Preserve
 PIFP_management_plan\PIFP_watershed.mxd
 Map Prepared On: 11/01/05 by lboyd@lccgov.com
 This is not a survey. Land Stewardship Staff has prepared this map for informational and planning purposes.

Figure 9: Wetlands Map



B. Biological Resources

i. Ecosystem Function

One hundred years ago, Pine Island uplands (pine flatwoods) covered an estimated 20,000 acres. According to the Calusa Land Trust, 80% of these uplands have been destroyed by either agriculture or development and another 6% has been subdivided and sparsely populated. Only 1,551 acres, or about 8%, has been preserved and another 1,171 acres, or about 6%, remain in good but endangered condition in privately owned parcels of significant size (CLTb 2006).

The pine flatwoods of Pine Island serve as important habitat for wildlife. Birds find shelter in the palmetto understory, nest in the tall pines and forage in the grasses. The oak toad (*Bufo quercicus*) will dig burrows in the sandy soil and hunt for spiders and insects. During a severe flood, the flatwoods serve as a water storage area to help protect adjacent land owners from flooding (Tiner 1998). Fire is a very important ecosystem process for pine flatwoods. Florida has more thunderstorm days per year than anywhere else in the country and in turn one of the highest frequencies of lightning strikes of any region in the United States. Fire has many purposes in the flatwoods: creation of soil conditions suitable for germination of seeds of some species, turnover of litter, humus and nutrients, reduction of competition from hardwoods and increasing the hardiness of some species (Myers and Ewel 1990). Following exotic removal, fire will be a very useful management tool at PIFP.

The wetlands of south Florida are also important to a variety of wildlife. Mangrove swamps, such as those found at PIFP, are significant plant communities because they function as a nursery ground for most of Florida's commercially and recreationally important fish and shellfish. Mangrove swamps also provide breeding grounds for substantial populations of wading birds, shorebirds and other animals (FNAI 1990). Although nesting has not been confirmed, it is possible that mangrove cuckoos (*Coccyzus minor*), black-whiskered vireos (*Vireo altiloquus*) and gray kingbirds (*Tyrannus dominicensis*) utilize the Preserve's vast mangrove swamp for nesting. These three species are dependent on mangroves and their numbers are jeopardized by the fragmentation of mangroves. There are at least two butterfly species, the mangrove skipper (*Phocides pigmalion*) and the black mangrove buckeye (*Junonia evarete*), that depend on mangroves as a larval food source (Postmus, per.comm.). Additionally, mangroves can produce up to 80% of the total organic material available in the aquatic food web through the continuous shedding of their leaves and other plant components (FNAI 1990).

ii. Natural Plant Communities

Pine Island Flatwoods Preserve consists of nine plant communities described by the Florida Natural Areas Inventory. Figure 10 illustrates the location of each community within the Preserve. The natural communities found at PIFP are defined using the Florida Natural Area's Guide to the Natural Communities of Florida (1990) and the Florida Land Use Cover and Forms Classification System (FDOT 1999). Appendix B contains an up-to-date list of plant species identified by George Wilder and Land Stewardship staff on numerous site inspections to PIFP, but not necessarily a comprehensive list for the entire Preserve.

Mesic Flatwoods Community – 442.8 acres, 65% coverage at PIFP

The mesic flatwoods community is the largest community type at the Preserve. Mesic flatwoods occur on relatively flat, moderately to poorly drained soils. Standing water is common for brief periods during the rainy season. Mesic flatwoods are characterized as having an open canopy with widely spaced pine trees and a dense ground cover of herbs and shrubs. Typical plants growing in these communities at PIFP include slash pine (*Pinus elliottii*), longleaf pine (*Pinus palustris*), saw palmetto, staggerbush (*Lyonia fruticosa*) and tar flower (*Befaria racemosa*). The flatwoods found on the Preserve are moderately disturbed with the invasive exotic plant melaleuca.

Wildlife associated with this community that would likely be encountered at the Preserve include black racer (*Coluber constrictor priapus*), pine warbler (*Dendroica pinus*), raccoon and bobcat. There are two active and one abandoned bald eagle (*Haliaeetus leucocephalus*) nests in slash pines in units 2 and 3. A third new nest was spotted in May 2006. The nest was not active during nesting season, but staff will watch for activity during the next nesting season.

Tidal Swamp Community –120.6 acres, 18% coverage of PIFP

Tidal swamps are characterized as dense forests located along the shorelines of southern Florida. The dominant plants in this community are black mangrove (*Avicennia germinans*), red mangrove (*Rhizophora mangle*) and buttonwood (*Conocarpus erectus*). The dominant species of mangrove found in different areas is dependant on abiotic factors such as tidal flushing and salinity. These communities at PIFP are pristine.

A variety of animals utilize this community including osprey (*Pandion haliaetus*), bald eagle, yellow-crowned night heron (*Nyctanassa violacea*), pileated woodpecker (*Dryocopus pileatus*), prairie warbler (*Dendroica discolor*) and mourning dove (*Zenaida macroura*).

Unconsolidated Substrate Community – 48 acres, 7% coverage of PIFP

The most commonly used term for this community is salt flat or tidal flat. This plant community can be characterized as large, relatively open areas of subtidal, intertidal, and supratidal zones without dense populations of vegetation.

Mud flats may support large populations of organisms such as tube worms (*Riftia pachyptila*), sand dollars (*Echinarachnius parma*), mollusks, isopods, amphipods, burrowing shrimp, and a variety of crabs. These organisms are not readily visible in mud flats but their densities can reach the hundreds of thousands per square foot, making this community important feeding grounds for many bottom feeding fish, such as redfish (*Sebastes spp.*), flounder (*Paralichthys spp.*), spot (*Leiostomus xanthurus*) and sheepshead (*Archosargus probatocephalus*) and an extremely important feeding grounds for many shorebirds.

Improved Pasture (FLUCCS 211) – 33.8 acres, 5% coverage at PIFP

Management units 3 and 4 of PIFP consist of this plant community. Typical species found in this area include Bahiagrass (*Paspalum notatum*), Bermudagrass (*Cynodon dactylon*), carpet grass (*Axonopus sp.*), smut grass (*Sporobolus indicus* var. *indicus*), pinebarren goldenrod (*Solidago fistulosa*) and swamp sedge (*Cyperus ligularis*). Scattered pines, palmetto and wax myrtle (*Myrica cerifera*) are still present in these areas. The main exotic plant species present is melaleuca in small sprouts scattered across the pasture with small amounts of Brazilian pepper on the western half of the pasture.

Wildlife that has been seen in the community includes the American kestrel (*Falco sparverius*), bald eagles, and a variety of songbirds and woodpeckers.

Abandoned Groves (FLUCCS 224) – 18.8 acres, 3% coverage of PIFP

This area was used as a citrus grove and abandoned prior to 1944. After the grove was abandoned, it was invaded with Australian pines (*Casuarina equisetifolia*) and melaleuca. In 2003, a mulching machine, Brontosaurus, was used to clear the invasive exotic vegetation. Since the area was cleared, it has reseeded with a variety of native sedges, grasses, and other herbaceous vegetation with an occasional clump of Carolina willow (*Salix caroliniana*).

Hydric Hammock Community – 12.5 acres, <1% coverage of PIFP

Pine Island Flatwoods Preserve has hydric hammock areas on both the central and southern portions. Hydric hammocks are characterized as having a well developed hardwood and cabbage palm canopy with an understory of palmetto and ferns. Typical plant species found on PIFP include live oak (*Quercus*

virginiana), cabbage palm, saw palmetto, myrsine (*Rapanea punctata*), poison ivy (*Toxicodendron radicans*) and swamp fern (*Blechnum serrulatum*). The hydric hammocks found on the Preserve are moderately disturbed with the invasive exotic plant melaleuca.

Wildlife typically associated with this type of plant community includes green anoles (*Anolis carolinensis*), flycatchers (Family *Tyrannidae*), warblers (Family *Parulidae*) and gray squirrels (*Sciurus carolinensis*).

Depression Marsh Community – 4.3 acres, <1% coverage of PIFP

There are five depressional marshes scattered throughout the Preserve. Synonyms for this community include isolated wetland, ephemeral pond and seasonal marsh. At PIFP, this community typically consists of open, treeless areas, with the exception of occasional clumps of Carolina willow. Typical plants include maidencane (*Panicum hemitomon*), wax myrtle, alligator flag (*Thalia geniculata*), pickerelweed (*Pontederia cordata*) and Boston fern. A variety of grasses, sedges and other herbaceous plants occur within this community. The majority of the depressional marshes at the Preserve have some infestation of invasive exotic plants. The most common is melaleuca, which grows on the edges of the majority of these marshes and is sometimes scattered within.

Animals typical of this community include numerous species of fish, freshwater turtles such as the striped mud turtle (*Kinosternon baurii*), American alligator, amphibians such as pig frog (*Rana grylio*), waterbirds such as anhinga (*Anhinga anhinga*), common moorhen (*Gallinula chloropus*), white ibis (*Eudocimus albus*), egrets and herons (Family *Ardeidae*), shorebirds such as yellowlegs (*Tringa spp.*), and songbirds such as red-winged blackbird (*Agelaius phoeniceus*). An indigo snake was spotted during a site inspection near the edge of one of these depression marshes.

Depression marshes are extremely important in providing breeding and foraging habitat for amphibians (FNAI 1990). Because of their temporary nature, few large predatory fish occur in these wetlands, which would feed heavily on the tadpoles. Since this community typically dries down in most years, the aquatic animals become quite concentrated and are an excellent food source for birds and other wildlife.

Coastal Berm Community – 3.6 acres, <1% coverage of PIFP

This plant community is found in a small area on the west boundary of unit 1. Typically, this plant community originates from storm deposited sand, shells and debris although in this case, some of it may be artificial. Historically, there was a shrimp farm in this area and man-made ditches have altered its hydrologic components. This plant community consists of dense thickets of large shrubs and small trees. The three dominant plants in this area are cabbage palm,

melaleuca and Brazilian pepper. This community is associated with, and grades into, tidal swamp at the Preserve.

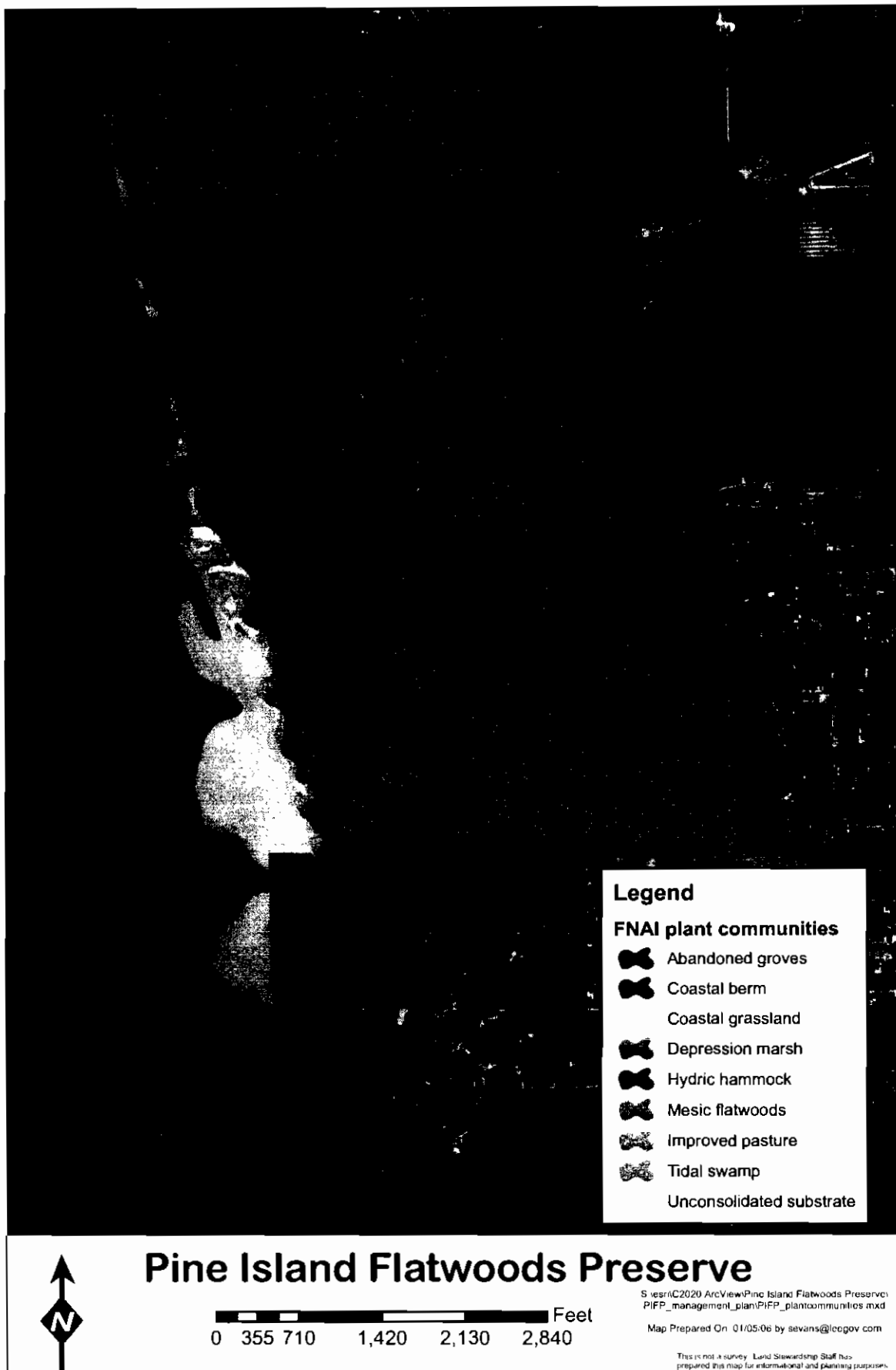
Wildlife expected in this community include red-winged blackbird, American kestrel and raccoon.

Coastal Grassland Community – 1 acre, <1% coverage of PIFP

This community is found in a small area of the western edge of units 1 and 3. Coastal grasslands are treeless flat lands covered by sand or low groundcover that is adapted to the harsh maritime conditions. At PIFP this community is characterized as a predominately treeless flat land with dense ground cover and open sandy areas of varying size. Buttonwood, sea purslane (*Sesuvium portulacastrum*) and glasswort (*Sarcocornia perennis*) represent some of the plant species occupying this community. A variety of grasses, sedges and other herbaceous species also occur within this community. This community does occasionally receive tidal flushing at high tides and during storm events due to the low dune system at the shoreline and tidal creeks that flow throughout the Preserve. The condition of this community is good. Invasive exotic plants, such as Brazilian pepper and melaleuca are very limited in this community at PIFP.

Wildlife expected would include fiddler crab (*Uca sp.*), bobcat and a variety of shorebirds may nest and forage in this community.

Figure 10: PIFP Plant Communities



iii. Fauna

Pine Island Flatwoods Preserve provides a variety of habitats for wildlife. A diversity of mammals, birds, reptiles, amphibians and fish occur in the Preserve, some seasonally, some sporadically and some as permanent residents. See Appendix C for a list of wildlife documented at the Preserve to date. Wildlife species were recorded both during numerous site inspections and by Lee County Bird Patrol volunteers. Future sightings through site inspections, grants and Lee County Bird Patrol volunteers will continue to be recorded.

There are also several exotic wildlife species that have been documented at the Preserve (Table 3). Of primary concern is the feral hog (*Sus scrofa*). Signs of damage from the hogs including soil disturbance and vegetation damage are apparent in the understory of the hydric hammock.

Table 3: Exotic Wildlife at Pine Island Flatwoods Preserve

Scientific Name	Common Name
<i>Eleutherodactylus planirostris planirostris</i>	greenhouse frog
<i>Osteopilus septentrionalis</i>	Cuban treefrog
<i>Anolis sagrei</i>	brown anole
<i>Sus scrofa</i>	feral hog
<i>Dasypus novemcinctus</i>	nine-banded armadillo

Wildlife management at the Preserve will focus on providing optimal habitat for native species. Removal of invasive exotic plants, application of prescribed fire and elimination of off road vehicles (ORV), except when absolutely necessary for stewardship activities, will be critical restoration components. PIFP is part of a countywide quarterly site inspection program for all Conservation 20/20 Preserves. A copy of the site inspection form is available in the Land Stewardship Operations Manual (LSOM). These inspections allow staff to monitor for any impacts and/or changes to each preserve and include lists of all animal sightings and new plant species that are found. If, during these inspections, staff finds FNAI listed species, they will be reported using the appropriate forms.

iv. Designated Species

There are a variety of designated animal and plant species (Table 4) found at Pine Island Flatwoods Preserve. Although all native plant and animal species found at the Preserve have some protection due to the preservation of this property, certain species need additional attention. For stewardship purposes, all plants and animals listed by the U.S. Fish and Wildlife Service (USFWS), Florida Fish and Wildlife Conservation Commission (FWC), Florida Department of

Agriculture and Consumer Services (FDACS), the Institute of Regional Conservation (IRC) and FNAI will be given special consideration.

Typically, designated species will benefit from proper management of the biological communities in which they occur. However, some species may require additional measures to ensure their protection. Management practices likely to benefit wildlife at the Preserve include exotic plant control, hydrological restoration, prescribed burning, trash removal, wildlife monitoring, feral animal control, restricting maintenance and hiking trails in certain areas and enforcement of no littering, no weapons and no motorized vehicles regulations. The public use facilities will include wildlife-proof trashcans and possible wildlife blinds at wetland observation decks that will allow the public to observe wildlife while minimizing any disturbance. Boardwalks will be constructed in wetland areas to protect these sensitive communities.

Table 4: Listed Species Fount at PIFP and Their Designated Status

Scientific Name	Common Name	USFWS	FWC	FNAI	FDA	IRC	Occurrence
REPTILES							
<i>Alligator mississippiensis</i>	American alligator	T S/A	SSC	G5/S4			expected
<i>Crocodylus acutus</i>	American crocodile	E	E	G2/S1			expected
<i>Gopherus polyphemus</i>	gopher tortoise		SSC	G3/S3			confirmed
<i>Drymarchon corais couperi</i>	eastern indigo snake	T	T	G4T3/S3			confirmed
<i>Crotalus adamanteus</i>	eastern diamondback rattlesnake			G4/S3			expected
<i>Malaclemys terrapin</i>	diamondback terrapin			G4/S4			expected
BIRDS							
<i>Pelecanus occidentalis</i>	brown pelican		SSC	G4/S3			expected
<i>Egretta caerulea</i>	little blue heron		SSC	SSC			confirmed
<i>Egretta tricolor</i>	tricolored heron		SSC	G5/S4			confirmed
<i>Egretta thula</i>	snowy egret		SSC	G5/S3			confirmed
<i>Egretta rufescens</i>	reddish egret		SSC	G5/S2			expected
<i>Eudocimus albus</i>	white ibis		SSC	G5/S4			confirmed
<i>Platalea ajaja</i>	roseate spoonbill		SSC	G5/S2			confirmed
<i>Mycteria americana</i>	wood stork	E	E	G4/S2			confirmed
<i>Grus canadensis pratensis</i>	Florida sandhill crane		T	G5T2T3/S2S3			expected
<i>Pandion haliaetus</i>	osprey			G5/S3S4			confirmed
<i>Elanoides forficatus</i>	swallow-tailed kite			G5/S2			expected
<i>Buteo brachyurus</i>	short-tailed hawk			G4G5/S1			expected
<i>Haliaeetus leucocephalus</i>	bald eagle	T	T	G4/S3			confirmed
<i>Falco sparverius paulus</i>	southeastern American kestrel		T	G5T4/S3			expected
<i>Coccyzus minor</i>	mangrove cuckoo			G5/S3			expected
MAMMALS							
<i>Corynorhinus rafinesquii</i>	southeastern big-eared bat			G3G4/S2			expected
<i>Neofiber alleni</i>	round-tailed muskrat			G3/S3			expected
PLANTS							
<i>Acacia farnesiana</i>	sweet acacia					R	confirmed
<i>Acacia pinetorum</i>	pineland acacia					I	confirmed
<i>Acrostichum aureum</i>	golden leather fern				T	R	confirmed
<i>Ammannia latifolia</i>	pink restem					R	confirmed

Table 4: Listed Species Found at PIFP and Their Designated Status (continued)

Scientific Name	Common Name	USFWS	FWC	FNAI	FDA	IRC	Occurrence
<i>Andropogon glomeratus</i> var. <i>glaucopsis</i>	purple bluestem					R	confirmed
<i>Andropogon virginicus</i> var. <i>glaucus</i>	chalky bluestem					R	confirmed
<i>Aristida patula</i>	tall threeawn					R	confirmed
<i>Aristida purpurascens</i>	arrowfeather threeawn					I	confirmed
<i>Aristida spiciformis</i>	bottlebrush threeawn					R	confirmed
<i>Batis maritima</i>	saltwort					R	confirmed
<i>Bejaria racemosa</i>	tarflower					R	confirmed
<i>Burmannia capitata</i>	southern bluethead					R	confirmed
<i>Cardamine pennsylvanica</i>	Pennsylvania bittercress					R	confirmed
<i>Deeringothamnus rugelii</i> var. <i>pulchellus</i>	pretty false pawpaw			E		CI	confirmed
<i>Dicanthelium chamaelonche</i> subsp. <i>Breve</i>						R	confirmed
<i>Dicanthelium ensifolium</i> subsp. <i>Ensifolium</i>						I	confirmed
<i>Distichlis spicata</i>	saltgrass					R	confirmed
<i>Drosera capillaris</i>	pink sundew					R	confirmed
<i>Fuirena pumila</i>	dwarf umbrellasedge					I	confirmed
<i>Gratiola hispida</i>	rough hedgehyssop					R	confirmed
<i>Gratiola ramosa</i>	branched hedgehyssop					R	confirmed
<i>Hydrocotyle umbellata</i>	manyflower marshpennywort					R	confirmed
<i>Hypoxis juncea</i>	fringed yellow stargrass					R	confirmed
<i>Juncus marginatus</i>	grassleaf rush					R	confirmed
<i>Lechea torreyi</i>	piedmont pinweed					R	confirmed
<i>Limonium carolinianum</i>	Carolina sealavendar					R	confirmed
<i>Linaria canadensis</i>	Canada toadflax					R	confirmed
<i>Lobelia feayana</i>	bay lobelia					I	confirmed
<i>Maytenus phyllanthoides</i>	Florida mayten					R	confirmed
<i>Paspalum monostachyum</i>	gulfdune paspalum					R	confirmed
<i>Ptiloblephis rigida</i>	wild pennyroyal					R	confirmed
<i>Pinguicula pumila</i>	small butterwort					R	confirmed
<i>Pinus palustris</i>	longleaf pine					I	confirmed
<i>Polygala nana</i>	candyroot					R	confirmed
<i>Polygala rugelii</i>	yellow milkwort					I	confirmed
<i>Polygala setacea</i>	coastalplain milkwort					I	confirmed
<i>Proserpinaca pectinata</i>	combleaf mermaidweed					R	confirmed

Table 4: Listed Species Found at PIFP and Their Designated Status (continued)

Scientific Name	Common Name	USFWS	FWC	FNAI	FDA	IRC	Occurrence
<i>Quercus minima</i>	dwarf live oak					R	confirmed
<i>Rayjacksonia phyllocephala</i>	camphor daisy					I	confirmed
<i>Rhexia mariana</i>	pale meadowbeauty					R	confirmed
<i>Rhynchospora fascicularis</i>	fasciated beaksedge					R	confirmed
<i>Rhynchospora fernaldii</i>	Fernald's beaksedge					CI	confirmed
<i>Rhynchospora microcarpa sensu lato</i>	southern beaksedge					R	confirmed
<i>Rhynchospora plumosa</i>	plumed beaksedge					R	confirmed
<i>Sabatia brevifolia</i>	shortleaf rosegentian					I	confirmed
<i>Sagittaria latifolia</i>	duck potato					I	confirmed
<i>Scleria georgiana</i>	slenderfruit nutrush					I	confirmed
<i>Scleria reticularis</i>	netted nutrush					R	confirmed
<i>Spiranthes vernalis</i>	spring ladiesstresses					R	confirmed
<i>Syngonanthus flavidulus</i>	yellow hatpins					R	confirmed
<i>Tillandsia balbisiana</i>	northern needleleaf				T		confirmed
<i>Tillandsia fasciculata</i>	cardinal airplant				E		confirmed
<i>Tillandsia utriculata</i>	giant airplant				E		confirmed
<i>Utricularia cornuta</i>	horned bladderwort					R	confirmed
<i>Utricularia purpurea</i>	eastern purple bladderwort					R	confirmed
<i>Utricularia subulata</i>	zigzag bladderwort					R	confirmed
<i>Woodwardia virginica</i>	Virginia chain fern					R	confirmed
<i>Xyris difformis</i>	Florida yelloweyed grass					I	confirmed
<i>Xyris elliotii</i>	elliott's yelloweyed grass					R	confirmed

Key

USFWS - U.S. Fish & Wildlife Service	FNAI - Florida Natural Areas Inventory
FWC - Florida Fish and Wildlife Conservation Commission	G - Global rarity of the species
FDA - Florida Department of Agriculture and Consumer Services	S - State rarity of the species
E - Endangered	T - Subspecies of special population
T - Threatened	1 - Critically imperiled
CE - Commercially Exploited	2 - Imperiled
SSC - Species of Special Concern	3 - Rare, restricted or otherwise vulnerable to extinction
IRC - The Institute for Regional Conservation	4 - Apparently secure
CI - Critically Imperiled	5 - Demonstrably secure
I - Imperiled	
R - Rare	

Wildlife Species

The following is a brief summary of each designated wildlife species explaining why they are in decline. Unless stated otherwise, the reasons for the species decline and the management recommendations were obtained from Hipes et al. (2001).

American Alligator

American alligators have recovered dramatically since the 1960's. There are even some populations large enough to support limited harvests. Human fear and feeding, as well as pollution and destruction of wetlands are currently the main threats to this species. Education, protecting wetlands from ditching, filling and pollution are the management recommendations for this species.

American Crocodile

The American crocodile's (*Crocodylus acutus*) small population size leaves it vulnerable to natural disasters such as disease and hurricanes. Although none has been recorded at PIFP, there is an individual that is frequently seen on the nearby Sanibel Island. The same management recommendations for the American alligator apply to this species.

Gopher Tortoise

Gopher tortoises (*Gopherus polyphemus*) are in decline throughout their range due to loss and degradation of habitat. As a species dependant on dry, upland communities much of their habitat has been lost to urban and residential development, agriculture, citrus groves, mining and pine plantations. Additional threats include a highly contagious respiratory disease and human consumption.

Although no formal census has been conducted at PIFP, they have been confirmed on the Preserve. Exotic plant removal and prescribed burning will benefit this species. Before restoration activities that utilize heavy equipment take place, land stewardship staff will conduct burrow surveys in areas where tortoise burrows could be present. The areas will be flagged off and the equipment operators will be advised to stay outside of those areas.

Eastern Indigo Snake

The eastern indigo snake is a large, iridescent black snake with a red, coral, or white throat (record length, 8.6 feet). This species is found in a large spectrum of habitats throughout Florida and southern Georgia and is often associated with gopher tortoise burrows. The Eastern indigo is threatened throughout its range due to habitat loss, degradation and fragmentation. Although it is now illegal to possess this animal without the proper permits, the pet trade is another cause for

decline of this species. The most common causes of mortality are human caused, either by people afraid of snakes or accidental highway mortality. The indigo snake utilizes a home range of approximately 125-250 acres, and the males are territorial during the breeding season. The indigo snake feeds diurnally on fish, frogs, toads, lizards, snakes, small turtles, birds, and small mammals, often around the edge of wetlands. The eastern indigo snake breeds from November through April, then lays 5-10 eggs in May or June (USFWS 1982).

The eastern indigo snake has been confirmed utilizing PIFP, near the depression marsh in MU 9. Public education about the ecological value of this and other species of snakes will help to protect them from visitors to the Preserve and from adjacent landowners.

Eastern Diamondback Rattlesnake

Although not a listed species, the eastern diamondback rattlesnake (*Crotalus adamanteus*) is commonly thought to be in decline throughout its range. Loss of habitat is a major threat and scientists believe that it requires 10,000 acres or more to sustain long-term viable populations. Additional threats to this species include indiscriminate killing by humans because of fear, as well as for trade and being hit by cars.

Although not confirmed, the eastern diamondback rattlesnake could occur at PIFP. Public education about the ecological value of this and other species of snakes will help to protect them from visitors to the Preserve and from adjacent landowners. Dead trees should be left in place, if damaged for any reason, for winter shelter.

Diamondback Terrapin

The diamondback terrapin (*Malaclemys terrapin*) has been extensively harvested in the past for food. Today it has different threats such as the degradation to its mangrove and salt marsh habitat and also incidental drowning in crab traps. Protecting the mangrove swamps from degradation and pollution are the management recommendations for this species.

Brown Pelican

The brown pelican (*Pelecanus occidentalis*) population was decimated in the 1950's and 60's due to the use of the pesticide DDT (dichlorodiphenyltrichloroethane). Since then populations have risen, but they still face other threats such as increased turbidity from dredging, oil and other chemical spills, freezing weather, human disturbance and entanglement in fishing gear.

Although the brown pelican has not been confirmed at PIFP, the waters to the west of the Preserve would be suitable habitat. Protecting foraging and breeding areas are the management recommendations for this species.

Little Blue Heron, Tricolored Heron, Snowy Egret, Reddish Egret

The little blue heron's (*Egretta caerulea*) and tricolored heron's (*Egretta tricolor*) decline are due to loss of freshwater wetlands and alteration of their natural hydroperiod. There is also some indication that pesticides and heavy metal contamination may affect this heron. Like these herons, the snowy egret (*Egretta thula*) is declining throughout its range, and has been since the 1950's. Scientists believe that the main reason for this decline is the loss and alteration of wetlands where they forage. The reddish egret (*Egretta rufescens*) is the rarest heron due to the plume hunters in the early 1900's.

White Ibis, Roseate Spoonbill

Similar to the herons listed above, the white ibis (*Eudocimus albus*) and roseate spoonbills (*Platalea ajaja*) are declining throughout their range, due to the same reasons as the other wading birds, which includes the reduction and degradation of wetlands and human disturbances to their rookeries.

Wood Stork

Wood storks (*Mycteria americana*) are very sensitive to water levels in freshwater wetlands, as they require high concentrations of fish in fairly shallow water for foraging. Unnaturally high water levels during nesting seasons and extended droughts are both threats that wood storks face.

Florida Sandhill Crane

Florida sandhill cranes (*Grus canadensis pratensis*) and the migratory greater sandhill crane (*Grus canadensis tabida*) are indistinguishable from each other. There have been crane sightings at the Preserve during the summer (April-September) when the migratory greater sandhill cranes are not present. Threats to Florida sandhill cranes include loss and degradation of wetlands, fire suppression, free ranging dogs and cats, and entanglement in fencing (Rodgers et al. 1996). Besides the management recommendations mentioned in Table 5, removal of all interior cattle fencing at the Preserve will greatly reduce the risk of entanglement to the birds.

Osprey

The osprey is found on or near rivers, large lakes and coastal areas where nesting site are suitable. Ospreys have been confirmed, but not nesting at PIFP.

They face many threats, including boat traffic disturbance and limited food availability.

Swallow-tailed Kite

Swallow-tailed kites (*Elanoides forficatus*) migrate to Southwest Florida from South America in late February/early March for their nesting season that lasts through late July/early September. In the early 1900's, swallow-tailed kites were confirmed as nesters in 21 states, today they are only found in seven southeastern states. Habitat loss of nesting sites through development and conversion to agriculture are the major threats to this species.

Short-Tailed Hawk

The short-tailed hawk's (*Buteo brachyurus*) Florida population is very small, with about 400 birds concentrated mainly in the southern part of the state. Although this species is found in other tropical lowlands, Florida's population has probably been isolated for hundreds or even thousands of years. Effects of loss of habitat to urbanization and deforestation are poorly known, but studies suggest that development poses a threat. Florida rehabilitators have treated birds for gunshot wounds and collisions with cars. Nesting habitat has been lost to cypress logging as these birds appear to have high fidelity to their breeding sites.

Bald Eagle

Bald eagle numbers have steadily increased in Florida after a low of 120 active nests in 1973. Still, loss of habitat and human disturbance due to development is a primary concern for this species. Currently, there are two active eagle nests on the Preserve.

Land Stewardship staff will monitor any nesting activities from a distance. Additionally, bird patrol volunteers assigned to the Preserve are always on the look out for nesting activities and report their findings to Land Stewardship staff and Lee County's Eagle Technical Advisory Committee (ETAC).

Southeastern American Kestrel

The southeastern American kestrel (*Falco sparverius paulus*) is found in open pine communities, woodland edges, prairies, and pastures throughout much of Florida. Nest sites are cavities in tall dead trees or utility poles generally with an unobstructed view of the surroundings. The availability of suitable nesting sites is paramount during breeding season. Open patches of grass or bare ground are needed in flatwoods settings, since thick palmettos prevent detection of prey. Natural nesting and foraging habitats have declined, as sandhill and open flatwoods habitats are converted to intensive agricultural lands and residential development. Pastures may be used by the breeding species but often lack

snags used for nesting sites. A key habitat feature necessary for breeding is a suitable cavity tree. Cavity trees are usually excavated in large pines and, less frequently, oaks by various woodpeckers. Additional management activities will permit leaving a reasonable number of tree snags to increase nesting opportunities.

Mangrove Cuckoo

The mangrove cuckoo (*Coccyzus minor*) has not been confirmed at PIFP, but its secretive nature and the dense mangrove forest make it likely to be overlooked. These birds are found in Lee County throughout the year, with their numbers increasing during the summer breeding season. Although little is known about the life history of this species, it is known that large, contiguous mangrove forests are essential for their survival.

Southeastern Big-eared Bat

The southeastern big-eared bat (*Corynorhinus rafinesquii*) is a medium-sized bat with very long ears that extend to the center of the back when laid down. Its long ears distinguish this species from all other Florida bats. It inhabits forested communities, particularly those associated with floodplains, supporting large, hollow trees used for roosting. They also use pine flatwoods and mixed oak-pine forests. This bat is known from less than a dozen locations in Florida, at least four of which are on public or private conservation lands.

Round-Tailed Muskrat

The round-tailed muskrat (*Neofiber alleni*) is nocturnal and constructs dens by weaving grasses and other marsh vegetation into domes of varying size. It lives in shallow marshes of variable size and plant species composition. It is distributed in patches across the state and is threatened by isolation of populations resulting from development and wetland drainage.

Occasional fires are needed to maintain the marsh, but because vegetation needed for food and cover grows back more slowly after winter burns, growing-season burns may be preferred.

Plant Species

Stiff-leaved wild pine

Stiff-leaved wild pine (*Tillandsia fasciculata* var. *densispica*) is an endangered species listed by FDACS and is also known as the cardinal airplant. It is found in hammocks, cypress swamps, and pinelands and has been documented in PIFP.

Threats to this plant include illegal collecting, habitat destruction and the Mexican bromeliad weevil (Save 2003).

Giant airplant

Giant airplant (*Tillandsia utriculata*) is another bromeliad considered to have been quite common in Florida before the arrival of the Mexican bromeliad weevil and is now listed as endangered by FDACS. Another common name for this bromeliad is giant wild-pine. Typical habitats to find this plant include hammocks and pinelands. In addition to the weevil, illegal collecting and habitat destruction threaten this species (Save 2003). Currently, scientists are researching biological control agents for the exotic weevil. Staff will follow the research developments and work with scientists in the future if it is determined that these insects are affecting epiphytes and the United States Department of Agriculture (USDA) is in need of release sites.

The majority of the designated plant species at PIFP have been listed by IRC, which is not a regulatory agency. However, the scientists working for this Institute have conducted a tremendous amount of field work and research documenting plants occurring in conservation areas in the 10 southernmost counties of Florida. This initial floristic inventory allowed the IRC to rank plant species to indicate how rare/common these plants are in protected areas. At PIFP, several rare and imperiled plants occur. Rare plants are defined as being either very rare and local throughout its range in south Florida (21-100 occurrences, or less than 10,000 individuals), or found locally in a restricted range. IRC only ranks those taxa with fewer than 100,000 individuals as rare. Imperiled plants are those that are imperiled in south Florida because of rarity (6-20 occurrences, or less than 3,000 individuals) or because of vulnerability to extinction due to some natural or human factor. IRC only ranks those taxa as imperiled that have fewer than 10,000 individuals.

In their book, Rare Plants of South Florida: Their History, Conservation and Restoration (Gann et al. 2002), the authors provide an entire chapter of recommendations to help restore south Florida's rare plant diversity. Several of these recommendations, particularly those that protect plants on the Preserve and relate to stewardship practices, will be followed. More information on the specifics techniques used will be discussed in the Management Action Plan. The following list highlights those recommendations by IRC that will be incorporated into the management of PIFP:

- Restrict recreational activities such as off-road vehicle use and equestrian use to avoid impacts to rare plant populations.
- Ensure that park improvements and stewardship activities do not needlessly threaten or destroy rare plant populations.
- Prevent illegal poaching of rare plants.
- Prosecute poachers to the fullest extent of the law.
- Implement an ongoing exotic pest plant control program.

- Educate exotic plant control crews about the rare plants to ensure they avoid non-target damage.
- Trap wild hogs, which can completely destroy the above ground vegetation and disturb all the soil in an area where they are feeding.
- Initiate prescribed fire in communities that are fire adapted since fire as a management tool is extremely critical for the protection of many rare plants.
- Rotate prescribed burning so that no more than one-third of the area is burned in one year.

Table 5 outlines some specific management and restoration activities at the Preserve that will be utilized to protect the designated species. If additional listed species are documented on the Preserve they will be added to the lists in Appendices B or C. When any of the designated species' nests or burrows are discovered on the Preserve, their location will be noted to assist staff's planning of restoration activities.

Table 5: Management Recommendations for Designated Wildlife Species

Species		Management Recommendations			
<u>Scientific Name</u>	<u>Common Name</u>	<u>Exotic Control</u>	<u>Prescribed Fire</u>	<u>Mark Nest Location</u>	
<i>Alligator mississippiensis</i>	American alligator	X		X	
<i>Crocodylus acutus</i>	American crocodile	X			
<i>Gopherus polyphemus</i>	gopher tortoise	X	X	X	
<i>Drymarchon corais couperi</i>	eastern indigo snake	X			
<i>Crotalus adamanteus</i>	eastern diamondback rattlesnake	X	X		
<i>Malaclemys terrapin</i>	diamondback terrapin	X			
<i>Pelecanus occidentalis</i>	brown pelican	X			
<i>Egretta caerulea</i>	little blue heron	X			
<i>Egretta tricolor</i>	tricolored heron	X			
<i>Egretta thula</i>	snowy egret	X			
<i>Egretta rufescens</i>	reddish egret	X			
<i>Eudocimus albus</i>	white ibis	X			
<i>Platalea ajaja</i>	roseate spoonbill	X			
<i>Mycteria americana</i>	wood stork	X			
<i>Grus canadensis pratensis</i>	Florida sandhill crane	X			
<i>Pandion haliaetus</i>	osprey	X			
<i>Elanoides forficatus</i>	swallow-tailed kite	X			
<i>Buteo brachyurus</i>	short-tailed hawk	X			
<i>Haliaeetus leucocephalus</i>	bald eagle	X		X	
<i>Falco sparverius paulus</i>	southeastern American kestrel	X			
<i>Coccyzus minor</i>	mangrove cuckoo	X			
<i>Corynorhinus rafinesquii</i>	southeastern big-eared bat	X			
<i>Neofiber alleni</i>	round-tailed muskrat	X			

v. Biological Diversity

Biodiversity at Pine Island Flatwoods Preserve varies within each plant community, but should increase significantly after several stewardship activities have been put into practice (i.e. invasive exotic plant removal/control, hydrological restoration, prescribed fire). The plant communities range from mesic pine flatwoods to tidally influenced mangrove swamps. Protection of the native plants and improvement of hydrologic components across the landscape will enhance the overall biodiversity of the Preserve. As further development continues on the island, the Preserve will become even more important for the protection of these species and their habitat.

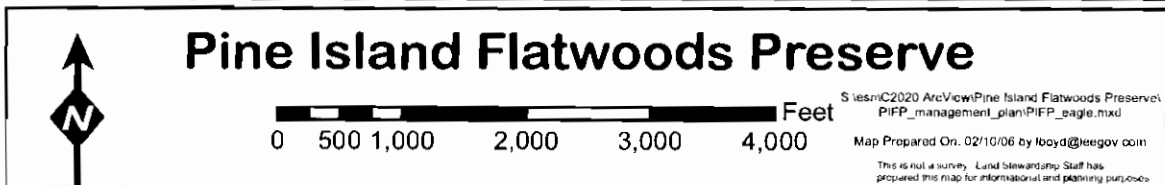
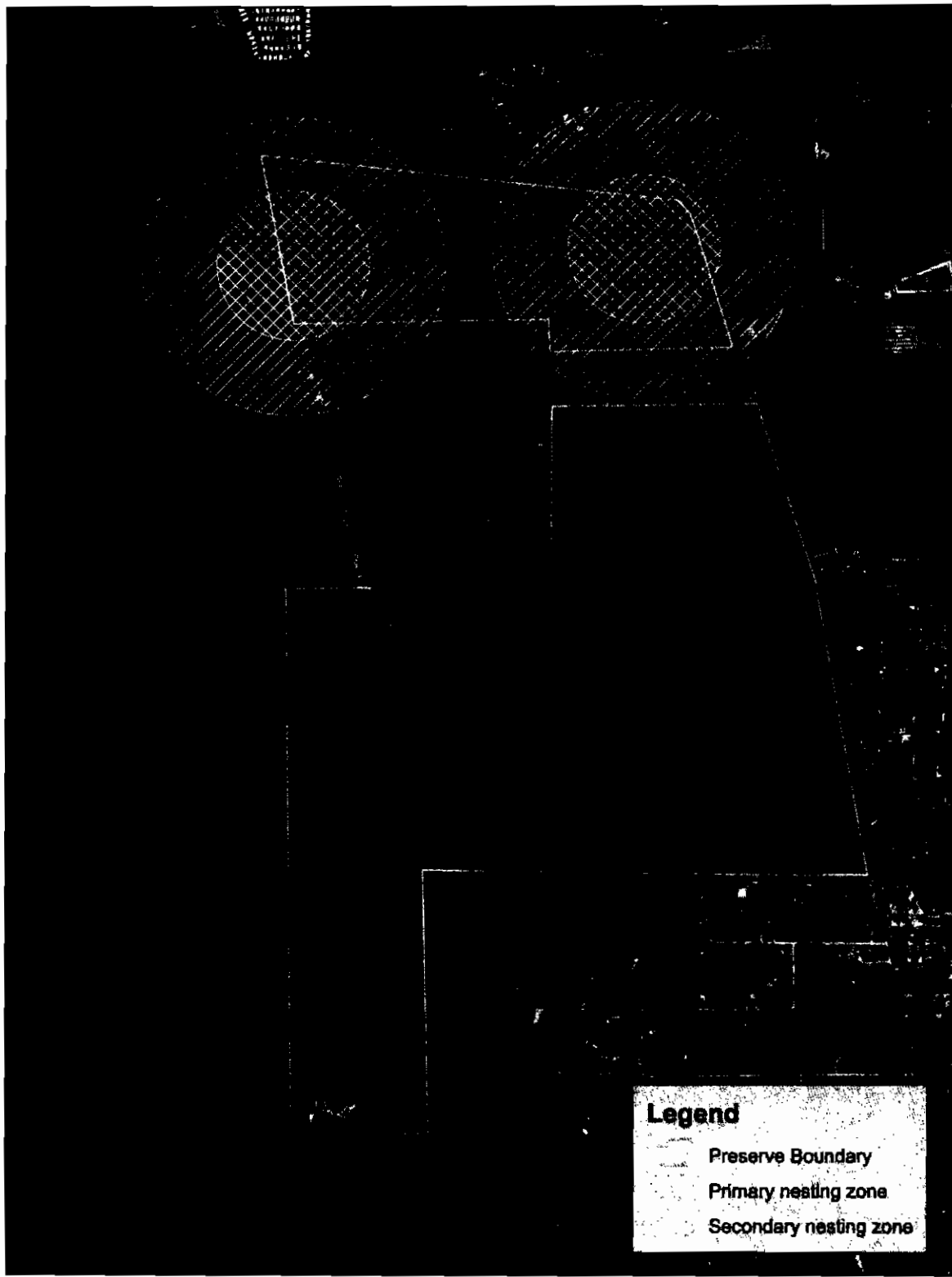
Many wildlife species inhabit PIFP, including bald eagles, gopher tortoises and a variety of wading birds. Currently, 200 plant species (9 exotic) and 67 animal species (5 exotic) have been documented. Invasive exotic plant species are defined by those found on the Florida Exotic Pest Plant Council's 2005 List of Invasive Species (FLEPPC 2005). After invasive plant removal, the number of overall plant species may decrease. However, once restoration and on-going stewardship activities have been integrated, the flora and fauna species numbers will likely expand. Staff will compare the species number and composition in the ten-year revision of this land stewardship plan.

The integrity and diversity of PIFP must be protected when and where possible. Land Stewardship staff will perform the following actions in this regard:

- Control invasive exotic vegetation followed by annual maintenance to provide more suitable habitat for native aquatic and terrestrial species.
- Maintain boundaries with fencing and signs to eliminate illegal access to the Preserve and protect fragile ecosystems.
- Remove any debris and prevent future dumping on site.
- Implement a prescribed fire program to closely mimic the natural fire regimes for the different plant communities to increase plant diversity and insure the canopies remain open.
- Control invasive exotic animal populations to reduce their impacts on the herbaceous plants, native animals and soils.
- Conduct on-going species surveys through volunteers and staff to help catalogue and monitor the diversity that is present.

The restoration and management activities done within the primary eagle nesting zone will be limited to May 15 through October 1, when the eagles are not nesting. Figure 11 shows the eagle nest protection zones, which are discussed further in the Natural Trends and Disturbances section of this plan.

Figure 11: Eagle Nest Protection Zones



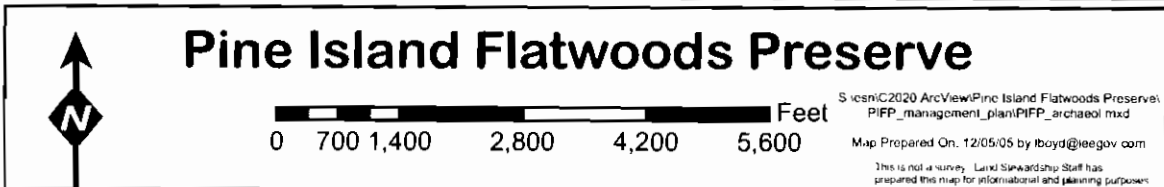
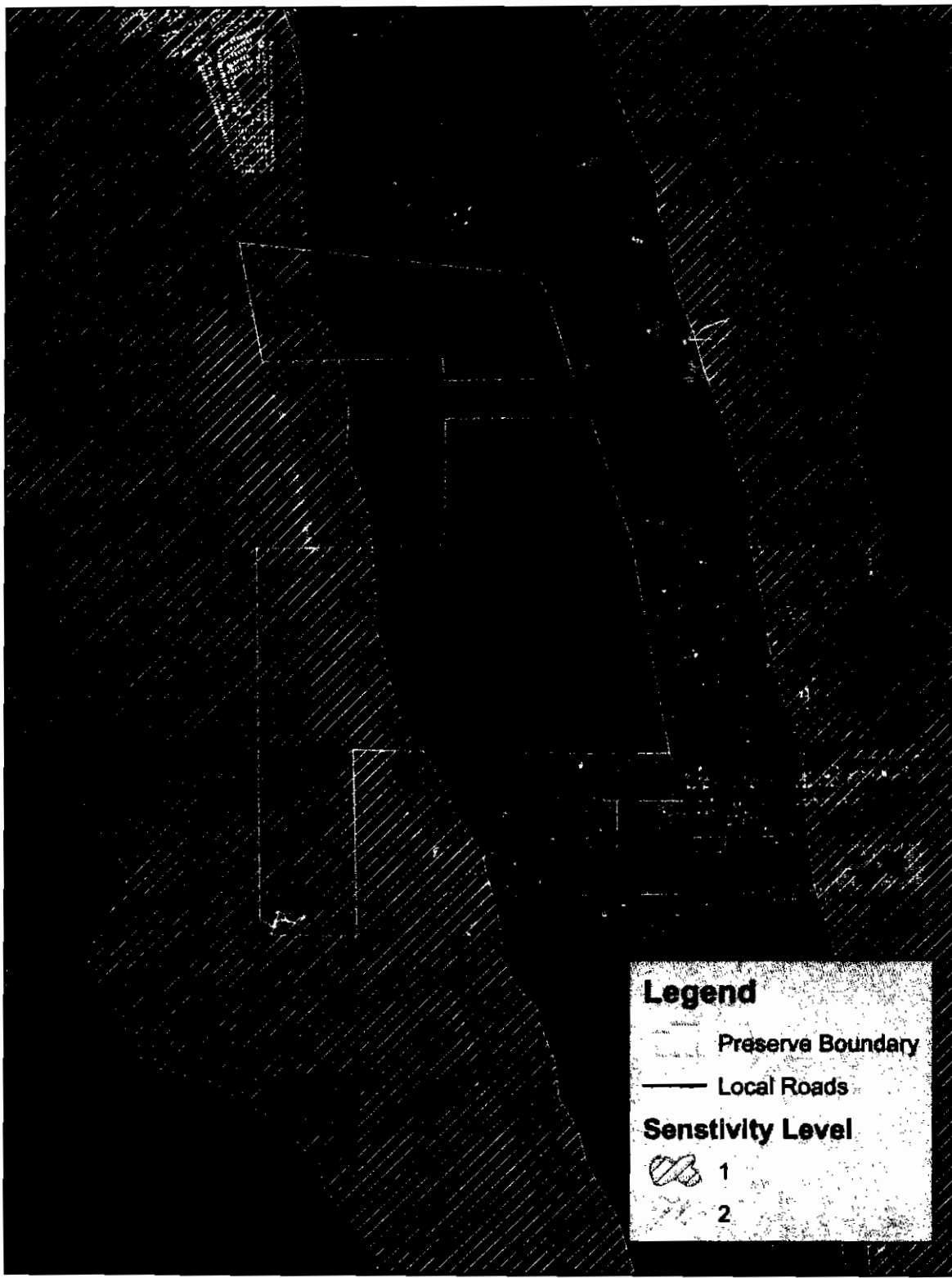
C. Cultural Resources

i. Archaeological Features

In 1987, Piper Archaeological Research, Inc. (PARI) conducted an archaeological site inventory of Lee County. They were able to identify an additional 53 sites increasing the total number of known archaeological sites in Lee County to 204. PARI created a site predictive model and archaeological sensitivity map for the county that highlighted potential areas likely to contain additional archaeological sites. About one third of Pine Island Flatwoods Preserve lies within the study's "Sensitivity Level 2" area (Figure 12). These areas are on the western portion of the Preserve in the areas that are tidally influenced. The study defines this level as "areas that contain known archaeological sites that have not been assessed for significance and/or conform to the site predictive model in such a way that there is a high likelihood that unrecorded sites of potential significance are present. If these areas are to be impacted, then they should be subjected to a cultural resource assessment survey by a qualified professional archaeologist in order to 1) determine the presence of any archaeological sites in the impact area and/or 2) assess the significance of these sites" (Austin 1987).

There has been very little soil disturbance across PIFP. If evidence of shell middens or other artifacts are found in the area, the Division of Historical Resources (DHR) will be immediately contacted and protection procedures will comply with the provision of Chapter 267, Florida Statutes, Sections 267.061 2(a) and (b). Collection of artifacts and/or any disturbance of the archaeological site will be prohibited unless prior authorization has been obtained from the DHR. Any potential site will be managed in coordination with recommendations from the DHR and, if necessary, the site will be kept confidential with periodic monitoring for impacts.

Figure 12: Archaeological Features Map



ii. Land Use History

Pine Island is approximately 17 miles long and 3 miles wide. Though not a barrier island, it is the largest island on the west coast of Florida and lies in the middle of the Charlotte Harbor Estuary. Life on Pine Island most likely started about twelve thousand years ago with the Pre-Calusa Indians. The Calusa Indians were known to inhabit Pine Island up to 6,000 years ago. Remnants of Calusa history still remain on the island in the form of shell middens, mounds, burial grounds and canals. The Randell Research Center at Pineland has preserved some of these well known Calusa sites. The Calusa survived by hunting and fishing and fashioned many tools out of the locally available material to assist in their daily activities. They lived in the same areas that are occupied today; Bokeelia, Pineland and St. James City. They lived on the island until the Spanish arrived in the mid 1500's and either killed or captured and enslaved the Calusa. In 1763, the last two known Calusa were sold into slavery in Cuba and never heard from again (CLTa 1998). The site of Pine Island Flatwoods Preserve is between known village sites and was most likely used by the Calusa for hunting and fishing. There are no known Calusa sites at PIFP.

European life began on Pine Island in the late 1800's. The focus for islanders was fishing. The island was not accessible to the mainland by road until a bridge was built in 1927 and electricity was not brought to the island until 1941. Until recently, fishing remained an important way of life with a more recent shift to ecotourism and tropical nurseries. As the population has grown, the natural areas have been cleared for development and agriculture. From the late nineteenth century until the 1930's, intense logging of longleaf and slash pine virtually eliminated all virgin stands of the southern mixed forest in south Florida. It is not known how much of the Preserve was logged at this time, but some large slash and longleaf pine still remain on site. The last known stand of old growth pines on the island was cut in 1997 (CLTa 1998).

Aerial photographs were used to determine any land use changes on Pine Island Flatwoods Preserve (Figures 13, 14 and 15). There were two major disturbances on the land that is now PIFP. The first is a small square area (19 acres) in MU 6 along Stringfellow Road that was cleared for citrus. Aerial photographs from 1944 show this as a cleared area, so it is not known when the work was done (Figure 13). The second large disturbance at PIFP is in the northwest corner of MU 1. In the mid-1960's, approximately 10 acres were cleared to create a shrimp farm. Three ponds and their associated ditches and canals were dug. It is not known whether the business profited, but it was abandoned by the mid 1970's and is now overgrown with melaleuca and Brazilian pepper.

Other disturbances include cow wells in MUs 4, 6 and 10 that were excavated in the mid 1980's and early 1990's, respectively. In the mid 1990's, the understories of MUs 3 and 4 were cleared for pasture and grazing started and

continues today. Grazing began on portions of MUs 8, 9 and 10 in the mid 1990's and the area was cleared for pasture around 1999.

In 1970 the powerline that is the western boundary of MU 11 was installed. There is also an east/west powerline that runs between MUs 6 and 9 that was installed in late 1980's to provide power to the homes to the west of the Preserve. The final disturbance occurred in the late 1990's when Lee County Utilities signed a contract with the former land owner, Village Links Land Trust, to use the site for treated effluent water release from the Pine Island Wastewater Treatment Facility (Appendix D). The Utilities Department installed a series of sprinklers set up on a grid across the pasture in MUs 3 and 4 for the effluent delivery. Effluent was only released onto the Preserve on 20 days in 2005 and is only used in emergency situations at this time. As growth continues on Pine Island, the need for effluent release at this site may increase. Land Stewardship staff will work with Lee County Utilities staff to ensure the protection of the natural plant communities on site with the possible future increase of effluent released. The current agreement expires in 2009, at this will be discussed.

PIFP is also home to two active bald eagle nests. Both nests have been intermittently active since 1990 and have produced over 15 fledglings in those 15 years. A third new nest was spotted in May 2006. The nest was not active during nesting season, but staff will watch for activity during the next nesting season. See Appendix E for eagle nest histories.

Figure 13: 1944 Historical Aerial Photograph

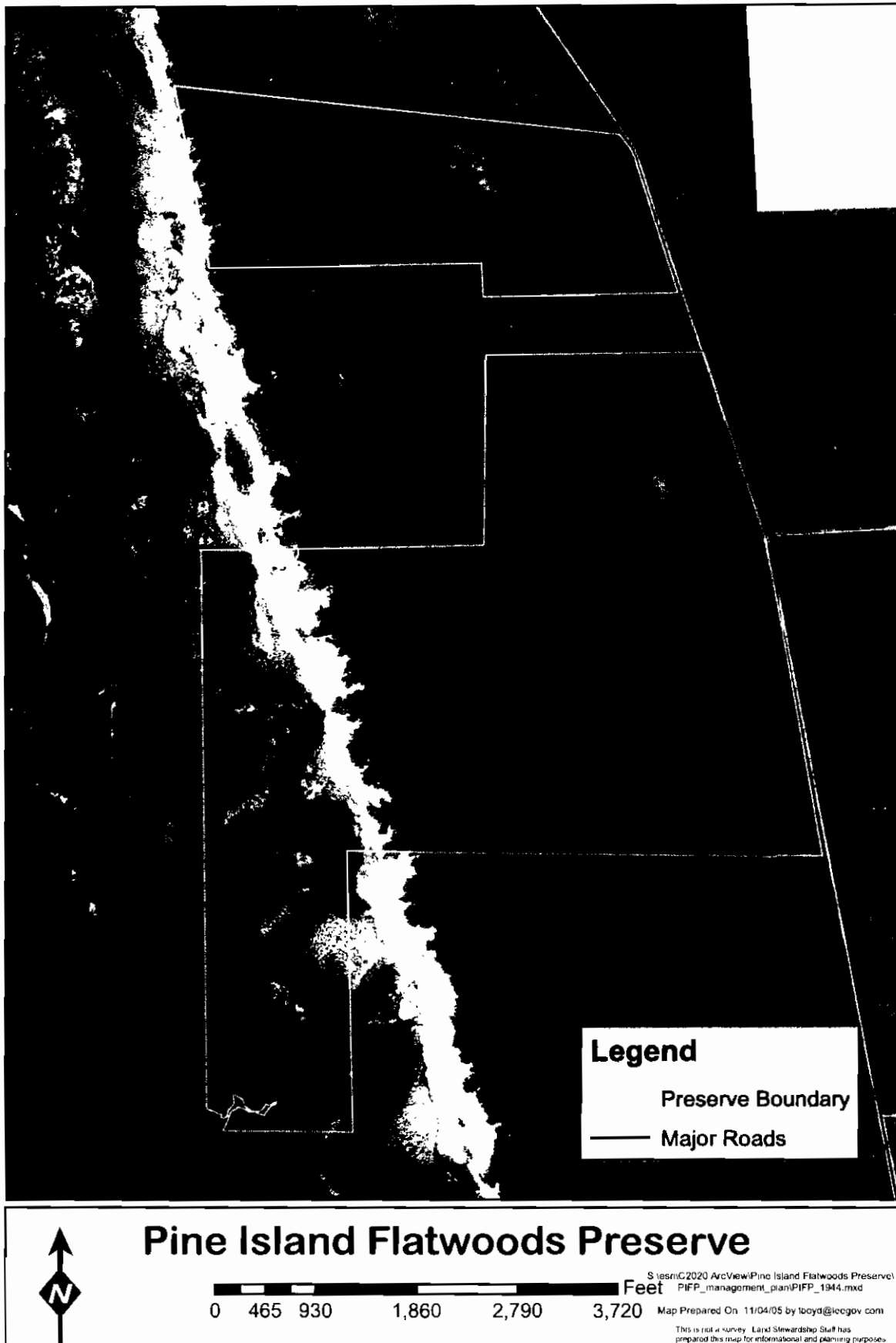


Figure 14: 1953 Historical Aerial Photograph

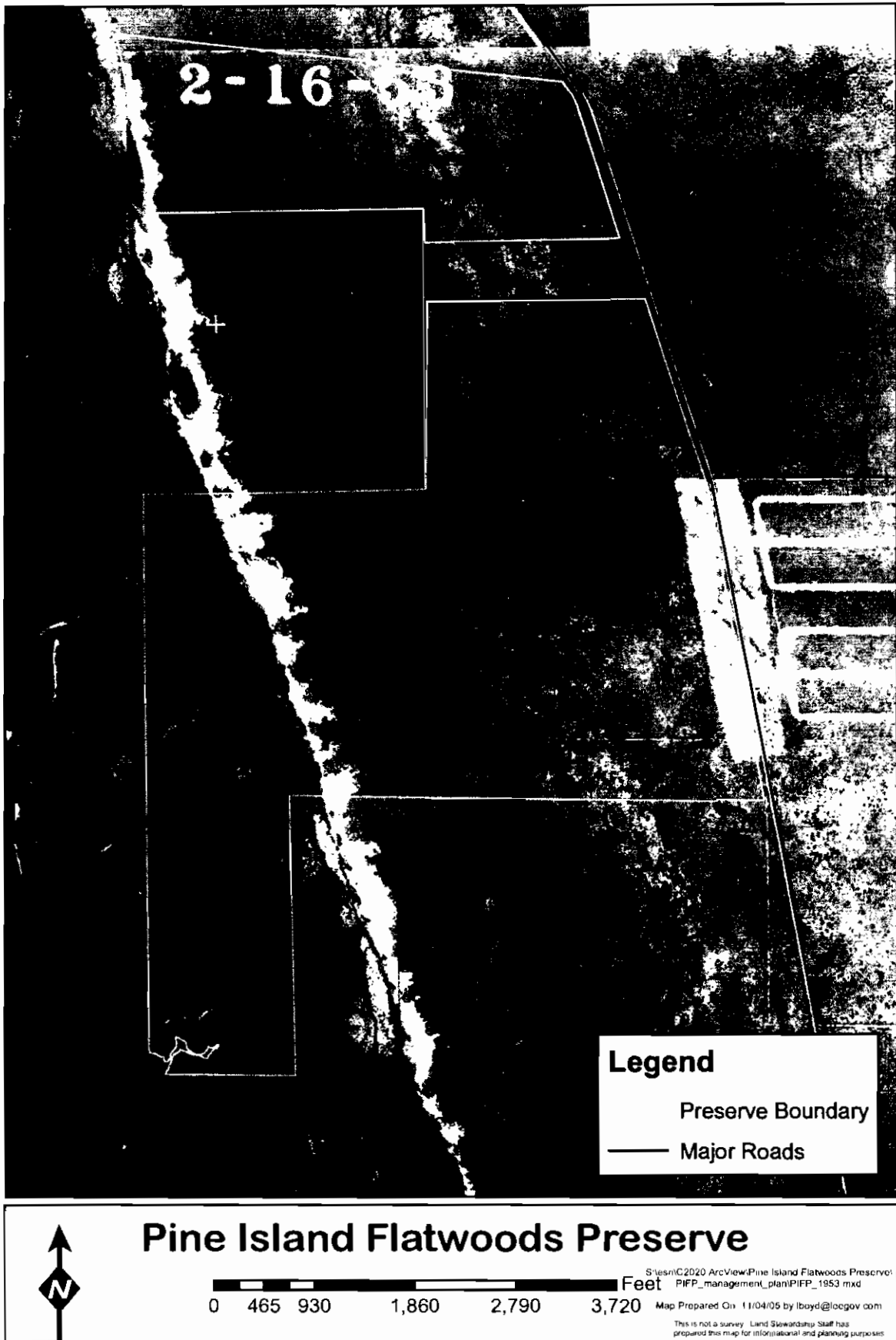
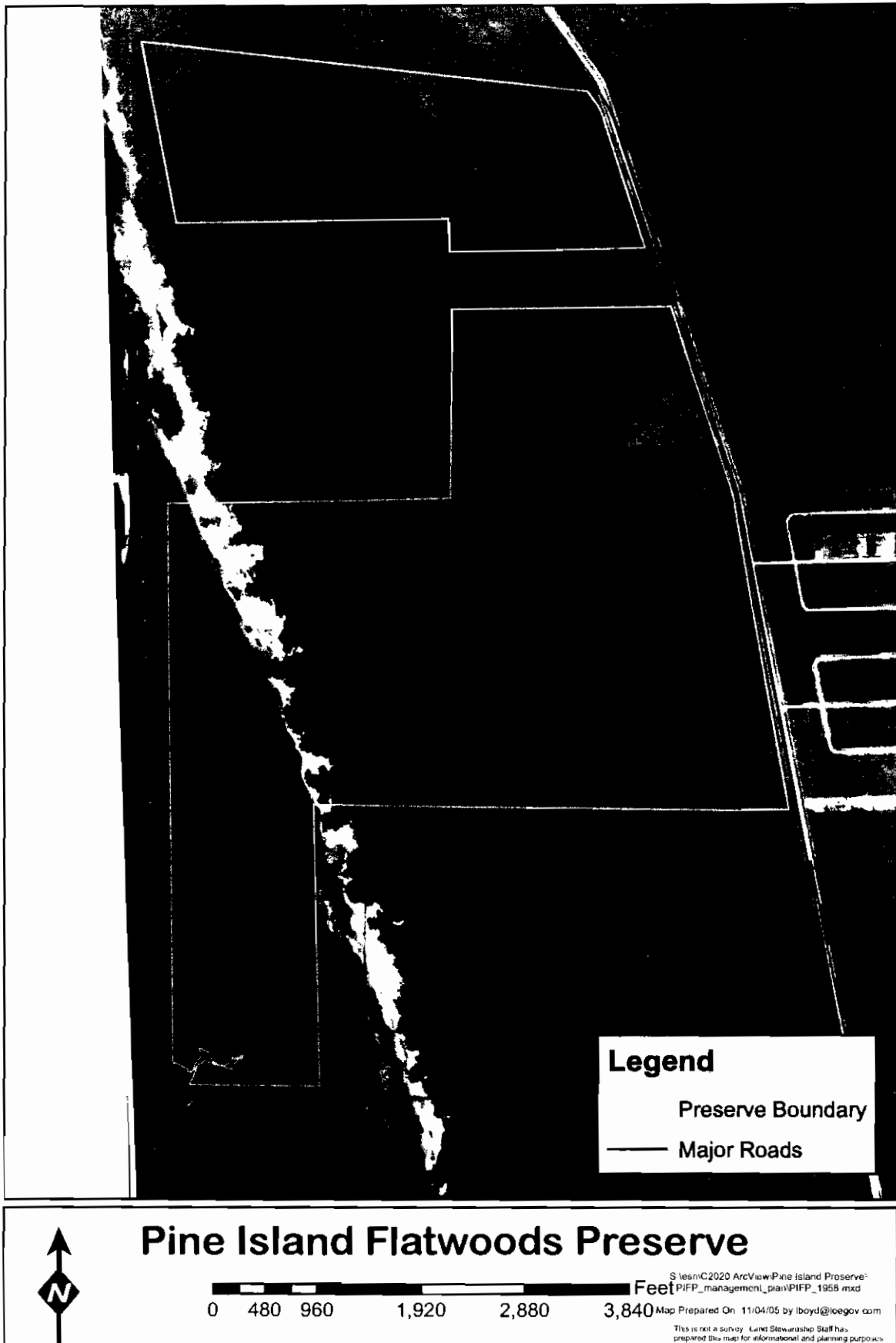


Figure 15: 1958 Historical Aerial Photograph



iii. Public Interest

Pine Island residents are very interested in protecting their natural lands and the island from major development. The Calusa Land Trust and Nature Preserve Association was formed in late 1970's by a small group of motivated people interested in preserving Calusa Island just off the northern point of Pine Island. Then, in 1989 another group of people organized with the interest of protecting and preserving environmentally-sensitive properties on Pine Island. It was decided that they would adopt the existing organization and change the name to Calusa Land Trust and Nature Preserve of Pine Island (CLT). Today, CLT protects over 2,000 acres on Pine Island and has over 800 members. CLT has been an important partner with Lee County Conservation 20/20 through financial assistance in acquiring the parcels that make up Pine Island Flatwoods Preserve and by providing management assistance.

In May 2005, with help from Calusa Land Trust members, a 1-mile hiking loop trail was marked, cleared and opened. The trail winds through pine flatwoods, follows an old cattle trail and runs adjacent to natural wetlands providing visitors a small glimpse of what is on the rest of the Preserve. Since its opening, Land Stewardship staff has seen its use increase and has received positive feedback from trail users.

Pine Island has an active paddling community and the mangrove fringes of MU 12 may be of interest for canoe/kayakers. Staff will continue to explore these areas and determine if a canoe/kayak access point could be created.

V. FACTORS INFLUENCING MANAGEMENT

A. Natural Trends and Disturbances

Natural trends and disturbances influencing native communities and stewardship activities at PIFP include the pattern of wet and dry periods, flooding, occasional freezes, hurricanes and wildfire. Implementation of the Management Action Plan will take into consideration the possibility of these factors and their influence on projects at PIFP. For example, a tropical storm or hurricane could damage large amounts of vegetation. It may be necessary to remove or mulch downed vegetation following a hurricane if it increases the chance of negative impacts to wildlife habitat from a wildfire.

Wildfires caused by lightning strikes are a natural occurrence in Florida. The Florida Division of Forestry (DOF) – Caloosahatchee District - and Lee County Department of Parks and Recreation are developing a wildland firefighting protocol for County preserves. The DOF has been provided a map of the Preserve showing the locations of gates, firebreaks and management units. The

DOF will utilize existing firebreaks to contain wildfires at PIFP whenever possible. No new firebreaks, such as plow lines, will be created unless there is potential for the wildfire to harm property outside the PIFP boundary. This agreement between DOF and the County will protect PIFP from the potential damage associated with emergency firefighting equipment. Land Stewardship staff will lead periodic site visits in order to familiarize DOF staff with PIFP and current management efforts. A comprehensive C20/20 fire plan, to be completed in 2006, will help decrease the impact of catastrophic wildfires on the Preserve and neighboring lands.

Stewardship (exotic plant control, prescribed burning, etc.) of PIFP is influenced by seasonal hydroperiods. The Land Stewardship Operations Manual's (LSOM) exotic plant prescription form will be used to define the conditions for control activities. If heavy equipment is used for exotic plant control, it will be limited to the dry season to minimize soil disturbance. The timing of prescribed burns will also be influenced by seasonal rain, weather and wind patterns.

Currently, there are two bald eagle nests located on the Preserve. A third inactive nest was noticed in May 2006 near the trailhead. Any stewardship activities within the primary buffer zone (750 ft) of an active eagle's nest will be done under the advisement of Lee County's Eagle Technical Advisory Committee (ETAC) and, if necessary, USFWS. See Figure 11 for approximate locations of eagle nest protection zones. All restoration activities will need to be conducted between May 16th and September 30th, outside of nesting season. This includes any work done in MUs 1-4. Future trails established on the Preserve will be located outside of the primary zone and trails located in the secondary zone would be closed during nesting season so that the public does not disturb the nesting area. Signs will be posted during the nesting season advising visitors of the importance of not disturbing the area.

B. Internal Influences

As discussed in the Land Use History section, a variety of human influences have occurred on the site. Many of these activities will influence restoration and other stewardship activities at Pine Island Flatwoods Preserve. Cattle grazing has had the largest impact on the Preserve. In MUs 10 and 11 the land was cleared for grazing and melaleuca invaded and is now mixed with the native plants. The eastern portions of these units have heavier infestations. Future work will include a mulching machine or possibly hand crews cutting and treating melaleuca in these areas. MUs 3 and 4 have also been cleared and invaded by melaleuca. In the past, cattle ranchers have mowed the saplings to control them. In the fall of 2005, Land Stewardship staff had a work day to cut and treat some of the saplings in MU 4. Future work will include controlling the melaleuca in MU 3. Also associated with the cattle grazing are three cow wells. The cow well in MU 4 has melaleuca growing around it, and the ones in MUs 6 and 10 have

earleaf acacia (*Acacia auriculiformis*), melaleuca and Australian pines growing on the spoil piles associated with the pond.

In the summer of 2003, a request was made by the Matlacha Pine Island Fire Control District to remove the Australian pines that were growing along Stringfellow road to lower the blow down potential in a hurricane. This approximately 20 acre area in MU 6 was used as a citrus grove prior to 1944. Once the grove was abandoned, melaleuca and Australian pines invaded. Work was started in August 2003 with a Brontosaurus, mulching machine, to clear about 19 acres of melaleuca and Australian pines in MUs 5, 6 and 9. Following this, in November 2003 the Australian pine stumps were removed with an excavator and piled and burned. Follow-up herbicide treatments occurred on the site in February, April, July and October 2004 and September 2005. Native grasses have started growing in the area, but exotic plant species are still present here and will be treated until controlled.

There are still remnant pieces of fencing from old property boundaries or cattle operations across the preserve. An interior fence runs east to west between management units 1 and 2 and 3 and 4. Currently this fence is used to contain the cattle in the southern portions. If the cattle are removed, the fence will also be removed. There is another fence that runs along the east/west access road in MU 6 that will be removed and another one on the boundary of MUs 6 and 9 that will be removed. The final interior fence runs along the western boundary of MU 8. All portions of these fences will be removed.

There is an active cattle lease on MUs 3 and 4 that will be up for renewal in September 2006. At that time, Land Stewardship staff will evaluate the effect of cattle on the natural vegetation to determine if the lease should be renewed. The contract with the Lee County Utilities for the effluent water release also places constraints on MUs 3 and 4. Work in these areas must be scheduled around water release times. Lee County Utilities has been asked to notify Land Stewardship staff before any water is released on site to coordinate management activities.

The abandoned shrimp farm in the northeast corner of MU 1 alters the natural sheetflow in this area. The ditches created in this area hold water and divert it from reaching the mangrove fringes. Also, many exotic plant species, including Brazilian pepper and melaleuca, are present in this disturbed area. The other alteration that possibly disturbs the natural sheet flow is the road bed on the southern boundary of MU 5. There is also a small ditch that runs under the powerline on the western boundary of MU 11.

C. External Influences

The Pine Island community is made up of mostly coastal suburban neighborhoods, palm and tropical fruit tree nurseries or small commercial

developments and the areas surrounding PIFP are no exception. A future residential development is planned to the north of MUs 1 and 2. In between MUs 4 and 5 is a palm nursery. To the east of the Preserve, across Stringfellow Road are residential communities. The property to the south of the Preserve is a residential development with the potential to add more houses next to the boundary in the future. The main objective for stewardship of these issues will be to maintain fencing and boundary signs to stop possible encroachments or dumping of horticultural waste from the neighboring communities.

D. Legal Obligations and Constraints

i. Permitting

Land stewardship activities at Pine Island Flatwoods Preserve may involve obtaining permits from regulatory agencies. Any proposed hydrologic improvements to the site, including the area where the abandoned shrimp farm occurred, may require permits from the Florida Department of Environmental Protection (FDEP) and SFWMD. Once invasive exotic plants have been removed and controlled in the upland portions of the Preserve and fuel loads have been reduced, prescribed fire may be used as a management tool, requiring burn authorization from the Florida Division of Forestry. Any work done in the mangrove areas, including possible trimming for trails will require a permit from FDEP.

ii. Other Legal Constraints

Currently there is a cattle lease on the northern portion of the Preserve. If the cattle lease proves to be detrimental to the natural communities or restoration work done on site, it will be terminated. See Appendix F for a copy of the cattle lease.

A power line runs north/south on the western border of MU 11. Lee County Electric Cooperative (LCEC) has a 60' wide right of way access easement under the powerline.

iii. Relationship to Other Plans

The Lee Plan, Lee County's comprehensive plan, is designed to depict Lee County as it will appear in the year 2020. Several themes have been identified as having "great importance as Lee County approaches the planning horizon" (Lee County 2004). These themes are:

- The growth patterns of the County will continue to be dictated by the Future Land Use map.
- The continued protection of the County's natural resource base.

- The diversification of the County's traditional economic base.
- The expansion of cultural, educational and recreational opportunities.
- A significant expansion in the County's physical and social infrastructure.

The entire Lee Plan can be found on the Internet at: <http://www.lee-county.com/dcd1/Leeplan/Leeplan.pdf>. The four chapters that affect the management of PIFP are **Chapter II – Future Land Use, Chapter IV – Community Facilities and Services, Chapter V – Parks, Recreation and Open Space and Chapter VII – Conservation and Coastal Management.**

Chapter II, Policy 1.4.6 states that Conservation Lands includes uplands and wetlands that are owned and used for long range conservation purposes. Upland and wetland conservation lands will be shown as separate categories on the FLUM. Upland conservation lands will be subject to the provisions of this policy. Wetland conservation lands will be subject to the provisions of both the Wetlands category described in Objective 1.5 and the Conservation Lands category described in this policy. The most stringent provisions of either category will apply to wetland conservation lands. Conservation lands will include all public lands required to be used for conservation purposes by some type of legal mechanism such as statutory requirements, funding and/or grant conditions, and mitigation preserve areas required for land development approvals. Conservation Lands may include such uses as wildlife preserves; wetland and upland mitigation areas and banks; natural resource based parks; ancillary uses for environmental research and education, historic and cultural preservation, and natural resource based parks (such as signage, parking facilities, caretaker quarters, interpretive kiosks, research centers, and quarters and other associated support services); and water conservation lands such as aquifer recharge areas, flow ways, flood prone areas, and well fields. 2020 lands designated as conservation are also subject to more stringent use provisions of the 2020 Program or the 2020 ordinances. (Added by Ordinance No. 98-09, Amended by Ordinance No. 02-02)

Chapter IV, Policy 59.1.5 provides the county will, through appropriate land use and engineering regulations, continue to control the introduction of obstructions or impediments within floodways. (Amended by Ordinance No. 94-30, 00-22)

Chapter IV, Policy 59.1.6 provides that the county will, through appropriate regulations, continue to provide standards for construction of artificial drainage ways compatible with natural flow ways and otherwise provide for the reduction of the risk of flood damage to new development. (Amended by Ordinance No. 94-30, 00-22)

Chapter IV, Policy 60.1.4 provides that the county will examine steps necessary to restore principal flow-way systems, if feasible, to assure the continued environmental function, value, and use of natural surface water flow-ways and associated wetland systems. (Amended by Ordinance No. 00-22)

Chapter V provides that Land Stewardship staff will ensure that any public use facilities and recreational opportunities will comply with **Goal 85: Park Planning and Design**, which requires that parks and recreation sites are planned, designed, and constructed to comply with the best professional standards of design, landscaping, planning, and environmental concern. Staff will also work to meet **Goal 86: Environmental and Historic Programs, Objective 86.1** to provide information and education programs regarding its cultural history and its environment at appropriate facilities. (Amended by Ordinance No. 94-30, 00- 22)

Chapter VII, Objective 104.1: ENVIRONMENTALLY CRITICAL AREAS provides that within the coastal planning area, the county will manage and regulate, on an ongoing basis, environmentally critical areas to conserve and enhance their natural functions. Environmentally critical areas include wetlands (as defined in Goal 114) and Rare and Unique upland habitats. Rare and Unique upland habitats include, but are not limited to: sand scrub (320); coastal scrub (322); those pine flatwoods (411) which can be categorized as "mature" due to the absence of severe impacts caused by logging, drainage, and exotic infestation; slash pine/midstory oak (412); tropical hardwood (426); live oak hammock (427); and cabbage palm hammock (428). The numbered references are to the Florida Land Use Cover and Forms Classification System (FLUCFCS) Level III (FDOT 1985). (See also Policy 113.1.4.) The digitization of the 1989 baseline coastal vegetation mapping (including wetlands and rare and unique uplands, as defined above) will be completed by 1996. (Amended by Ordinance No. 94-30, 00-22)

Chapter VII, Goal 107: RESOURCE PROTECTION provides to manage the county's wetland and upland ecosystems so as to maintain and enhance native habitats, floral and faunal species diversity, water quality, and natural surface water characteristics. **Objective 107.1: RESOURCE MANAGEMENT PLAN** provides the county will continue to implement a resource management program that ensures the long-term protection and enhancement of the natural upland and wetland habitats through the retention of interconnected, functioning, and maintainable hydroecological systems where the remaining wetlands and uplands function as a productive unit resembling the original landscape. (Amended by Ordinance No. 94-30, 00-22) Under **Policy 107.1.1.4e** the county (or other appropriate agency) will prepare a management plan for each acquired site for the long term maintenance and enhancement of its health and environmental integrity.

Chapter VII, Objective 107.3: WILDLIFE provides the county will maintain and enhance the fish and wildlife diversity and distribution within Lee County for the benefit of a balanced ecological system. (Amended by Ordinance No. 94-30) **Policy 107.3.1:** encourages upland preservation in and around preserved wetlands to provide habitat diversity, enhance edge effect, and promote wildlife conservation. Initiating a prescribed fire regime and removing invasive exotics will follow this policy.

Chapter VII, Objective 107.4: ENDANGERED AND THREATENED SPECIES IN GENERAL provides Lee County will continue to protect habitats of endangered and threatened species and species of special concern in order to maintain or enhance existing population numbers and distributions of listed species. **Policy 107.4.1** states to identify, inventory, and protect flora and fauna indicated as endangered, threatened, or species of special concern in the "Official Lists of Endangered and Potentially Endangered Fauna and Flora of Florida," Florida Fish and Wildlife Conservation Commission (FWC), as periodically updated. Lee County's Protected Species regulations will be enforced to protect habitat of those listed species found in Lee County that are vulnerable to development.

Chapter VII, Objective 107.6: SOUTHERN BALD EAGLES, land stewardship staff will continue to monitor the eagle nest on the Preserve as well as nesting activities on adjacent lands. Staff will report all activities to the Eagle Technical Advisory Committee (ETAC). Additionally, staff will coordinate all restoration work near the nest with ETAC.

Chapter VII, Objective 107.8: GOPHER TORTOISES provides that the county will protect gopher tortoises through the enforcement of the protected species regulations and by operating and maintaining, in coordination with the FWC, the Hickey Creek Mitigation Park. (Amended by Ordinance No. 94-30) **Policy 107.8.1** provides that the county policy is to protect gopher tortoise burrows wherever they are found. However, if unavoidable conflicts make on-site protection infeasible, then off-site relocation may be provided in accordance with FWC requirements. (Amended by Ordinance No. 94-30)

Chapter VII, Goal 113: COASTAL PLANNING AREAS, Objective 113.1: COASTAL PLANNING AREA IN GENERAL provides that Lee County will manage the coastal planning area to provide a balance among conservation of resources, public safety capabilities, and development. (Amended by Ordinance No. 94-30, 00-22) **POLICY 113.1.5** provides that Lee County will protect and conserve the following environmentally sensitive coastal areas: wetlands, estuaries, mangrove stands, undeveloped barrier islands, beach and dune systems, aquatic preserves and wildlife refuges, undeveloped tidal creeks and inlets, critical wildlife habitats, benthic communities, and marine grass beds. (Amended by Ordinance No. 00-22)

Chapter VII, Goal 114: WETLANDS provides that the county maintains and enforces a regulatory program for development in wetlands that is cost-effective, complements federal and state permitting processes, and protects the fragile ecological characteristics of wetland systems. (Amended by Ordinance No. 94-30) **Objective 114.1** provides that the natural functions of wetlands and wetland systems will be protected and conserved through the enforcement of the county's wetland protection regulations and the goals, objectives, and policies in this plan.

"Wetlands" include all of those lands, whether shown on the Future Land Use Map or not, that are identified as wetlands in accordance with F.S. 373.019(17) through the use of the unified state delineation methodology described in FAC Chapter 17-340, as ratified and amended by F.S. 373.4211. (Amended by Ordinance No. 94-30, 00-22)

E. Management Constraints

The principle stewardship constraints for PIFP include limited funding, the brief dry season for stewardship activities and conducting land stewardship activities concurrently with present and future recreational use. Although C20/20 has a management fund, it is inadequate to fulfill the restoration activities for this and other preserves. Efforts to obtain additional funding through grants and/or monies budgeted for mitigation of County infrastructure projects will be pursued. These funds will be used to supplement the operations budget to meet the restoration goals in a timely manner.

Large portions of Pine Island Flatwoods Preserve are wet most of the year. January through April are typically the driest months. Stewardship activities will typically need to be conducted in these months. If access is necessary for management when water levels are high, vehicles such as all terrain vehicles (ATVs) will be used if necessary, otherwise staff will travel on foot.

When potentially dangerous restoration activities are being conducted, such as work utilizing heavy equipment or conducting prescribed burns, signs will be installed at the entrance and on the trail near the management activity to warn the public that the area is temporarily closed. During and after prescribed fires, the entire Preserve will be closed to the public until the site is safe for visitors. The growing development on the island also poses a challenge to prescribed burning. Smoke management will be one of the greatest factors in planning prescribed fires. The power line that runs between MUs 10 and 11 and MUs 6 and 9 will also pose a challenge to prescribed fire and smoke management.

Restoration activities near the bald eagle nests will be restricted to between May 16th and September 30th (outside of nesting season) and mainly during the dry season, which varies from year to year. The cattleman and Lee County Utilities will be notified prior to any restoration activities in MUs 1-4.

Lee County Utilities signed a contract with the former land owner to release effluent water on the site from the Pine Island Wastewater Treatment Facility in 1999 and would be up for renewal in 2009 (Appendix D). Lee County Parks and Recreation staff will meet with Lee County Utilities staff to determine the future plans for effluent release on site. The site is used on a limited and emergency only basis; it was only used for 20 days in 2005. Land Stewardship staff will review the semi-annual monitoring reports to determine the effects of the effluent release on the native plant communities.

F. Public Access and Resource-Based Recreation

Pine Island Flatwoods Preserve has great opportunities for resource-based recreation. Currently, there is a trailhead with educational signage, trail maps and a 1.12 mile trail through the flatwoods (Figure 16). This trail has had a very positive response from the public and is utilized often. The trail was cut with a posi-track machine and will be maintained by mowing at least once a year. The trail was marked using the blaze protocol that is used along the Appalachian Trail. Once installed, fire breaks will make good walking trails, as well. Trails will be contained in the flatwoods areas of the Preserve to protect the delicate nature of the depressional wetlands and tidal flats. In the future if there is a demand, there is a possibility of adding benches and possible boardwalk to an overlook at the salt flats. Staff may look into the possibility of opening up some of the natural fingers through the mangrove swamps on the western edges of the Preserve for a canoeing/kayaking trail. This canoe trail may be a stop along the Great Calusa Blueway paddling trail.

Periodically, small portions of the trail may have standing water throughout the wet season, but the trail may remain open for those visitors willing to hike on flooded trails. The entire Preserve will be closed during certain restoration activities or prescribed fires. There will be signage at the entrance to the Preserve that will alert visitors of any current or upcoming trail closures.

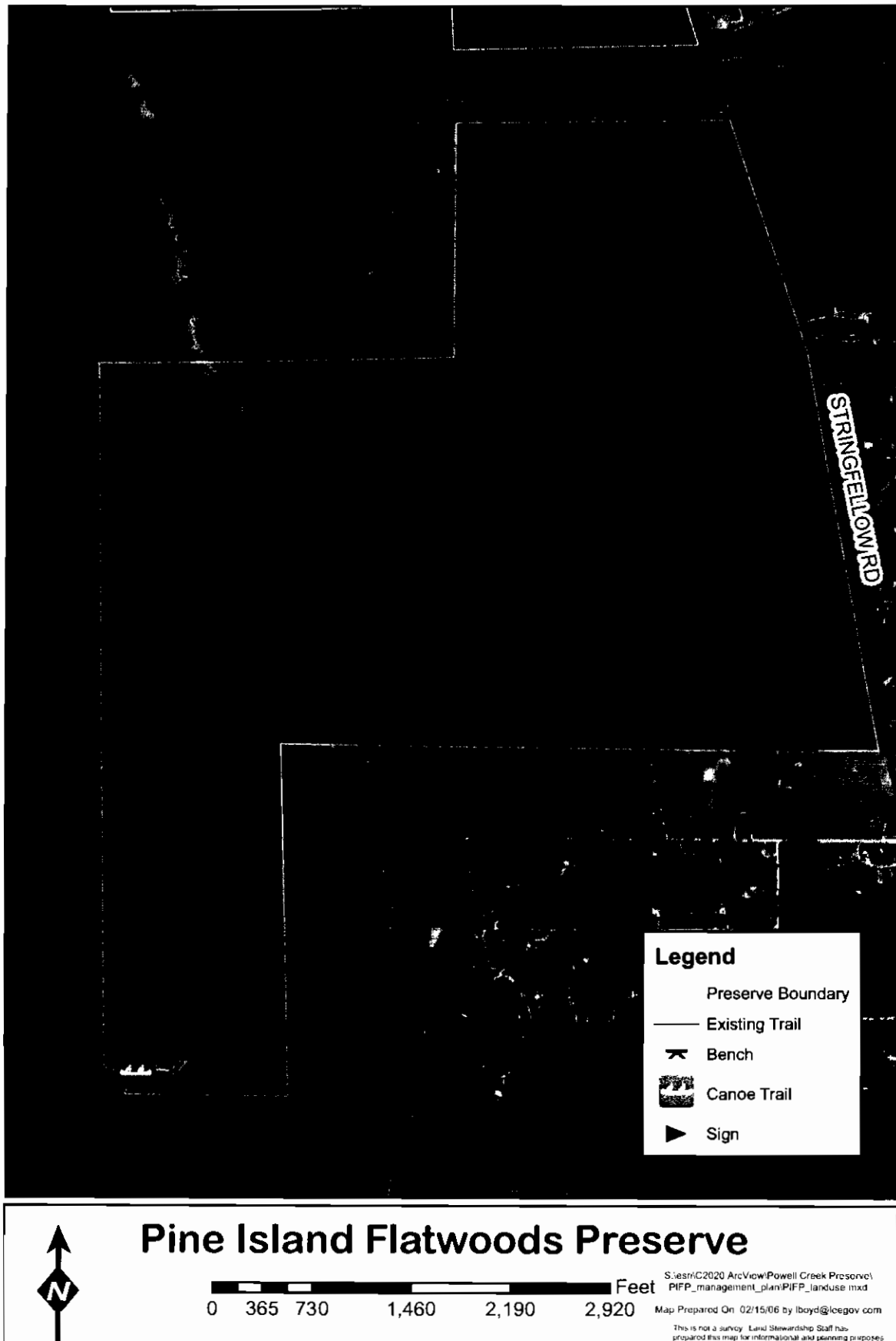
Staff will attempt to provide for the needs of the public, keeping in consideration the lack of daily staff to protect and maintain public use amenities. Formation of a volunteer group will be encouraged to assist staff with trail maintenance, wildlife monitoring and other land stewardship projects. In order to protect the resources on the Preserve, there are currently no dogs allowed on the Preserve. A newly formed eagle's nest was identified near the trail head (although not active in 2006), which is another resource to protect from dogs. On-leash dog walking is allowed at Calusa Land Trust Preserves on the island.

In accordance with the Land Stewardship Operations Manual (LSOM), the southern portion (MU 5-12) of PIFP is currently classified as a Category 3 Limited Use Preserve. Staff does not recommend any additional recreational activities beyond hiking, bird watching, nature photography and nature study that are allowed at all Conservation 20/20 Preserves. As increased facilities are added to the Preserve, including a designated parking area and benches, it may be upgraded to a Category 2 Intermediate Use Preserve. The northern portion (MUs 1-4) of PIFP is classified at a Category 4, which does not provide public access at this time. Staff does not recommend public access to this portion of the Preserve for several reasons:

1. There is an active cattle lease on MUs 3 and 4. Cattle can pose a threat to the public.

2. Lee County Utilities uses MUs 3 and 4 for effluent releases from the Pine Island Wastewater Treatment Plant.
3. There two active bald eagle nests. During nesting season (October 1 through May 15) the public would be restricted to outside of the primary eagle nesting zone, which encompasses most of MU's 1 through 4 (Figure 7).

Figure 16: Conceptual Master Site Plan



G. Acquisition

Pine Island Flatwoods Preserve consists of five parcels purchased from May 2000 and March 2005 (Figure 17). The first parcel acquired, nomination 92, is 80 acres of predominately mangrove forest purchased for \$8,500 on May 11, 2000. This site was important to the C20/20 program because it is adjacent to state owned lands and borders the Pine Island Sound Aquatic Preserve. The second parcel acquired (nomination 147) is 60 acres and was purchased from Richard Thompkins for \$629,500 on March 16, 2001. At the time of purchase, the Calusa Land Trust donated \$10,000 for the management of the Preserve. This money went to the removal of exotic species along Stringfellow Road. The third parcel acquired, nomination 168, is 32.5 acres and was purchased on July 19, 2002 from Robert Miller for \$355,000. Nomination 121, 365 acres, was purchased from Wayne Kelly on April 10, 2003 for \$2,829,000. Nomination 184, 148 acres, was purchased from Thomas Eckerty for \$2,226,400 on March 21, 2005. The Calusa Land Trust contributed \$10,000 to the purchase of this nomination. All of these nominations were important to the program for their large amounts of undisturbed lands and because they were adjacent to existing conservation lands. To date, the total area for PIFP is 685 acres with a purchase price of \$5,728,400.

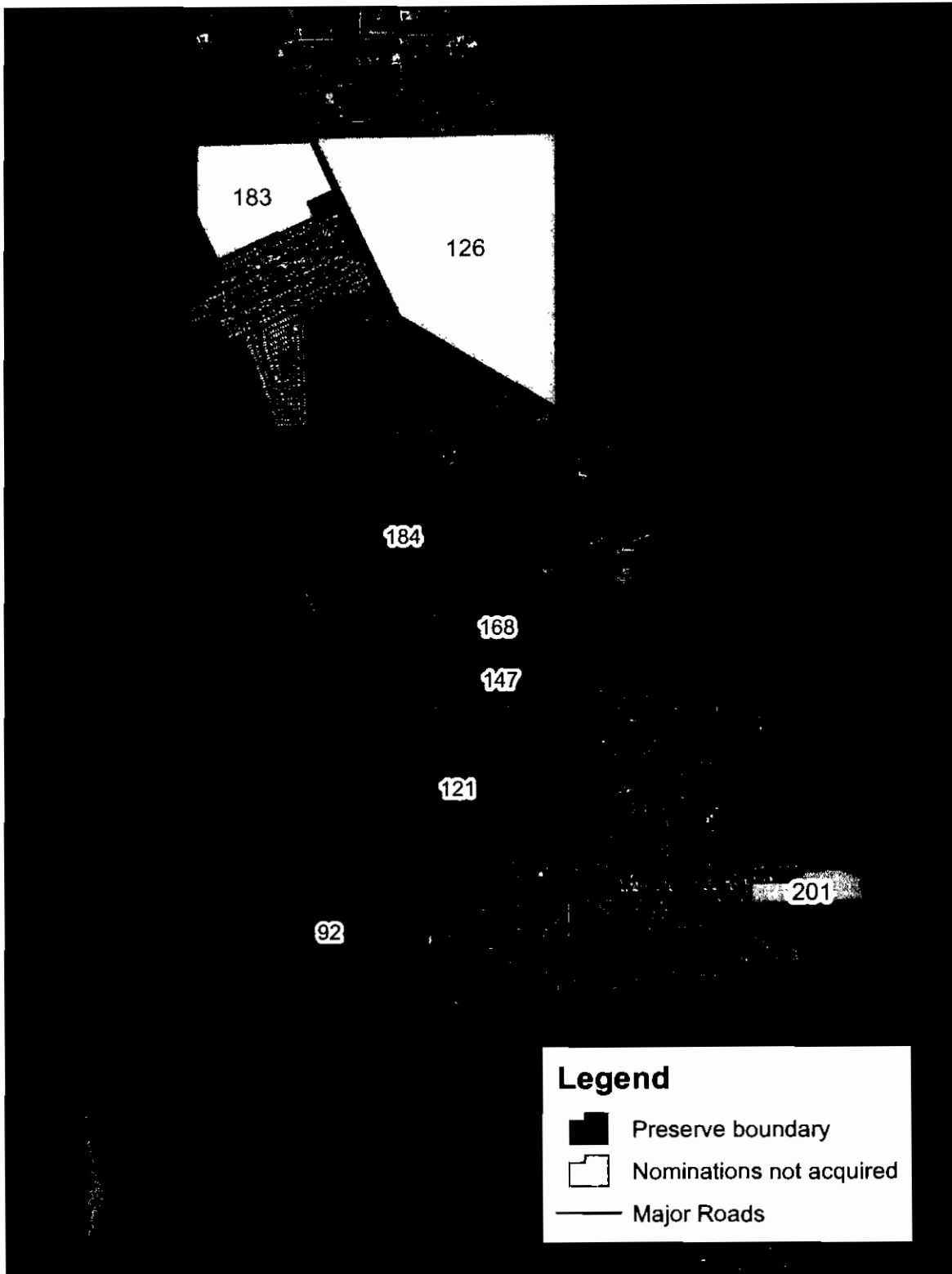
There are three other nominations in close proximity to Pine Island Flatwoods that were not acquired (Figure 17). Nomination 126 was submitted in July 1999 at the same time as and by the same person as nomination 121, which was acquired. This parcel is 381 acres and was submitted with an asking price of \$3,429,000. The parcel was not forwarded for selection at this time because it only met 3 of the 7 evaluation criteria. It was resubmitted in November 2002, and forwarded to the secondary review because it had potential gopher tortoise habitat in the disturbed uplands and was a possible site for Pine Island Waste Water Treatment Plant to create artificial wetlands for disposal of treated wastewater. The site is also continuous with the Pine Island mangrove fringe of which two-thirds are protected. Calusa Land Trust also agreed to contribute \$50,000 to the acquisition and to assist in the management and restoration of the property. Once the site was forwarded to acquisition and a title commitment was made, Lee County Division of County Lands received word that the property was under contract with a third party. The property owner was no longer viewed as a willing seller and the nomination was withdrawn. Subsequently, the parcel was sold to High Point Land Improvement for \$3,900,000.


Nomination 183 is just west of nomination 126 across Stringfellow Road. It is 150 acres, and was nominated in April 2001 with an asking price of \$1,600,000. This site was not forwarded to secondary review due to the degraded condition of the upland habitat, primarily due to exotic plant infestations. The final parcel in the vicinity of PIFP that was nominated to the program is #201. This site is 23 acres to the east of the Preserve that was nominated in July 2001 for and asking

price of \$150,000. The site was not forwarded to secondary review because it only met 3 of the 7 initial evaluation criteria.

Currently, the Future Land Uses for the Preserve are "Conservation Uplands", "Conservation Wetlands" and "Coastal Rural." The southern portions of the Preserve are currently zoned "Agriculture" and the northern parcel, nomination 184 is zoned "Residential Planned Development" (Appendix G). Land Stewardship staff recommends that the Future Land Use be changed to "Conservation Lands" and the zoning category be changed to "Environmentally Critical." The STRAP numbers for the Preserve are: 22-45-22-0000002.0000, 22-45-22-0000001.0000, 23-45-22-001000.0000, 15-45-22-0000001.3020, 15-45-22-0000001.5000, 15-45-22-0000001.3000, and 15-45-22-0000001.3030 (Appendix H).

Figure 17: Acquisition Map



 **Pine Island Flatwoods Preserve**

Miles
0 0.125 0.25 0.5 0.75 1

S:\esm\C2020_ArcView\Pine Island Flatwoods Preserve\PIFP_management_plan\PIFP_acquisition.mxd
Map Prepared On: 02/10/06 by lboyd@leegov.com
This is not a survey. Land Stewardship Staff has prepared this map for informational and planning purposes.

VI. MANAGEMENT ACTION PLAN

A. Management Unit Descriptions

Pine Island Flatwoods Preserve has been divided into 12 management units to better organize and achieve management goals. Figure 7 delineates the management units that were created based on existing trails or plant communities. Some units may be further subdivided to create smaller burn units for prescribed fire.

- Management Unit 1 – 34 acres
Management Unit 1 is in the northwest corner of the Preserve. It consists primarily of pine flatwoods with a small disturbed area in the northwest corner of the unit. It is bordered to the north and west by property boundaries, to the east by MU 2 and to the south by MU 3. Stewardship activities in this unit will focus on exotic plant control in the western disturbed portions and prescribed fire in the eastern portions. There are a few scattered melaleuca in the flatwoods that will be removed prior to burning.
- Management Unit 2 – 28 acres
Management Unit 2 is in the northeast corner of the Preserve. The unit is primarily pine flatwoods with about 2 acres of hydric hammock. There is an active bald eagle nest in this unit. It is bordered by the property boundary to the north and east, MU 1 to the west and MU 4 to the south. Stewardship activities in this unit will focus on exotic plant control and prescribed fire in the eastern portions. There are a few scattered melaleuca in the flatwoods that will be removed prior to burning.
- Management Unit 3 – 51 acres
Management Unit 3 is located directly to the south of MU 1 on the western border of the Preserve. It consists primarily of improved pasture, but also contains a small sliver of coastal grasslands on the western border near the salt flats and a small strip of pine flatwoods on the northern border. This unit has an active cattle lease and some components of the effluent release program. It is bordered to the west and south by the property boundary, to the north by MU 1 and to the east by MU 4. Stewardship activities here will focus on exotic plant control, including melaleuca, Brazilian pepper and downy rose myrtle (*Rhodomyrtus tomentosa*).
- Management Unit 4 – 34 acres
MU 4 is located just to the south of MU 2. It is on the eastern boundary of the northern parcel of PIFP. MU 3 consists of improved pasture and a small strip of pine flatwoods on the northern border. This site contains the majority of the sprinklers for the effluent release from Pine Island Waste Water Treatment Facility. Currently, there is an active cattle lease on this unit. It is

bordered to the east and south by the property boundary, the north by MU 2 and the west by MU 3. Stewardship activities here will focus on exotic plant control, including melaleuca, Brazilian pepper and downy rose myrtle.

- Management Unit 5 – 22 acres
Management Unit 5 is separated from MU 4 by a private palm tree farm. It consists primarily of pine flatwoods. MU 5 is bordered to the north, east and west by the property boundary and to the south by an elevated farm road and MU 6. Stewardship activities in this unit will include maintenance of exotic plant control previously done in a small area on the east side, and prescribed fire in the entire unit. There are scattered melaleuca in the flatwoods that will be removed prior to prescribed burning.
- Management Unit 6 – 71 acres
Management Unit 6 is located directly south of MU 5. It consists primarily of pine flatwoods and approximately 20 acres of disturbed area that was once a citrus grove. It is bordered to the west by the property boundary, to the north by MU 5, to the east by the property boundary and Stringfellow Road, and to the south by MU 9 and a powerline. The trailhead and a 1 mile hiking loop are located in this unit. Stewardship activities in this unit will focus on exotic plant control in the eastern portions that have already been cleared, and prescribed fire in the western portions. There are a few scattered melaleuca in the flatwoods that will be removed prior to prescribed burning.
- Management Unit 7 – 109 acres
Management Unit 7 is located on the western boundary of the Preserve. The western portions of the unit consist of tidal swamps dominated by red mangroves (*Rhizophora mangle*). The middle portion of the unit is an open, tidally influenced area. The eastern portions are pine flatwoods grading into a mangrove fringe. It is bordered to the west and north by the property boundary, to the east by MU 8 and to the south by MU 12. Stewardship activities here are limited due to the open water and mangrove areas. Activities will focus on exotic plant control along the old fence line on the eastern side of the unit.
- Management Unit 8 – 82 acres
Management Unit 8 is located in the center of the preserve and consists of pine flatwoods and approximately 8 acres of hydric hammock. It is bordered to the west by MU 7, the north and south by the property boundaries and to the east by MUs 9 and 10. This unit may be further subdivided to create smaller units for prescribed fire. Stewardship activities here will focus on removal of Brazilian pepper and melaleuca in the hydric hammock area and scattered melaleuca in the pine flatwoods.

- Management Unit 9 – 82 acres
Management Unit 9 is also located in the center of the Preserve. It consists of mainly pine flatwoods with a large depressional marsh. It is bordered to the west by MU 8, to the north by MU 6 and a powerline, to the east by MU 11 and to the south by MU 10. A portion of the hiking trail loops through the northern part of this unit. Stewardship activities here will focus on exotic plant control, mainly melaleuca on the eastern side of the unit and surrounding the large wetland, and prescribed fire. This unit may be further subdivided to create smaller units for prescribed fire.
- Management Unit 10 – 78 acres
Management Unit 10 is located in the southeast corner of the Preserve. This unit consists entirely of pine flatwoods. It is bordered to the west by MU 8, the north by MU 9, the east by MU 11 and the south by the property boundary and residential properties. Stewardship activities here will focus on exotic plant control, mainly of melaleuca in the southern and eastern portions of the unit that were cleared for pasture, and prescribed fire. This unit may be further subdivided to create smaller units for prescribed fire.
- Management Unit 11 – 13 acres
This unit is a small triangle located along Stringfellow Road. The primary plant community here is pine flatwoods. This unit is bordered to the west by a powerline and MUs 9 and 10, the east by Stringfellow Road and the south by the property boundary and commercial properties. Stewardship activities here will focus on exotic plant control, mainly melaleuca, and prescribed fire.
- Management Unit 12 – 80 acres
Management Unit 12 is the southern most portion of PIFP. It consists primarily of tidal swamps dominated by mangroves and approximately 9 acres of open water. This unit is bordered to the north by MU 7 and by the property boundaries to the west, south and east. The areas to the south and west are state owned conservation lands and the Pine Island Sound Aquatic Preserve. Stewardship activities in this unit are very limited due to the nature of mangrove swamps. Staff will explore the option of creating canoe or kayak trails through some of the existing channels in this unit.

B. Goals and Strategies

While the following are the long-term goals for the Preserve, funding is currently not available to conduct all of these activities. Grants and/or monies budgeted for mitigation of any governmental infrastructure projects in Lee County will be used to supplement the operations budget to meet the goals in a timely manner. The main stewardship goal will be to bring the invasive exotic plants to a maintenance level and then manage the ecosystems with fire.

Natural Resource Management

- Exotic Plant Control and Maintenance
- Brush/Fuel Reduction
- Prescribed Fire
- Pasture Restoration
- Monitor and Protect Listed Species
- Exotic Animal Control

Overall Protection

- Install Firebreaks
- Boundaries and Fencing
- Fence/Debris Removal
- Evaluate Cattle Lease
- Evaluate Effluent Release
- Change Land Use/Zoning Categories

Public Use

- Recreation
- Trail Maintenance
- Parking Area Maintenance

Volunteers

- Assist Volunteer Group

The following is a description of how each of these goals will be carried out, the success criteria used to measure accomplishment of each goal and a projected timetable outlining when and in which units each activity will take place follows. Any work done in MUs 1 through 4 will have to be conducted from May 15 through October 1, outside of bald eagle nesting season.

Natural Resource Management

Exotic Plant Control and Maintenance

The most current Florida Exotic Pest Plant Council's List of Invasive Species will be consulted in determining the invasive exotic plants to be controlled in each management unit. The goal is to remove/control these exotic species, followed with semi-annual or as needed treatments of resprouts and new seedlings. This goal will bring the entire Preserve to a maintenance level, defined as less than 5% invasive exotic plant coverage.

Prior to each invasive exotic plant control project at PIFP, a Prescription Form (located in the LSOM) will be filled out by Land Stewardship staff, reviewed by the contractor(s) and filed appropriately. All contractors involved in these projects will be required to fill out the Daily Report Control Form (located in the LSOM) and filed appropriately by staff.

- Flatwoods with light infestations:
The majority of the pine flatwoods at the Preserve have less than 25% exotic plant coverage. There are scattered melaleuca trees, mostly on abandoned cattle trails and old fire plow lines. These trees will be cut close to the ground and the stumps will be treated with the appropriate herbicide. Cut stems will be left in place to biodegrade.
- Flatwoods with moderate infestations:
The areas of MUs 8, 9 and 10 that were once cleared for pasture contain approximately 25-50% cover of melaleuca. Control of exotic species in these areas will utilize a mulching machine that will chip whole trees in place. This machine will be able to minimize the impacts to the soil and native vegetation. Any resprouts will be treated with herbicide.
- Wetlands with heavy infestations:
The depressional marsh in MU 9 is dominated by large melaleuca on the outer ring (greater than 50%). Due to the remoteness and wetness of the area, there is no easy access for heavy equipment to remove the stems to be piled and burned. These trees will be girdled and injected with an appropriate herbicide.

There are also wet areas on the northern boundary of MU 3, on the southern border of MU 4 and another in the northern portion of MU 9 that are dominated by melaleuca trees, with greater than 50% coverage. In these areas, trees will be cut, piled and burned. Stumps will be treated with the appropriate herbicide.

- Pasture with light infestations:
The improved pastures in MUs 3 and 4 have scattered melaleuca seedlings, less than 25% cover. In these areas, hand removal will be utilized for control. The specific methodology will depend on stem size and season, but generally the stem will be cut near the ground and the stump will be sprayed with appropriate herbicide, or a foliar application made to the entire plant (particularly with grasses and broadleaf plants). Hand pulling will be utilized when possible in order to minimize herbicide use.

The area on the western portion of MU 3 also contains sporadic Brazilian peppers in less than 50% of the vegetation cover. Hand removal will be utilized for control in this area. The specific methodology will depend on stem size and season, but generally the stem will be cut near the ground and the stump will be sprayed with appropriate herbicide. Cut stems may be piled to biodegrade or possibly burned outside of eagle nesting season.

- **Pasture with moderate infestations:**
There are areas in the western portions of MU 3 that have 25-50% of the vegetation cover in melaleuca. Heavy equipment and timing will be chosen so that soil disturbance and compaction are minimized. Staff will experiment with the Wet Blade™ system in these areas that have thick melaleuca that is less than 2" in diameter. This system mows the stems while applying the appropriate herbicide. This area may also be treated with a foliar spray of the appropriate herbicide.
- **Cow wells with exotic infestations:**
The cow well in MU 4 is surrounded by melaleuca. Trees in this area will be cut and piled to burn. Stumps will be treated with the appropriate herbicide. The cow wells in MUs 6 and 10 is surrounded by Australian pines, melaleuca and earleaf acacia. Exotic plant control in this area will be done by the mulching machine. Follow-up treatment of these areas will consist of application of an appropriate herbicide mixture to the foliage of any resprouts or seedlings.

Mechanical Brush/Fuel Reduction

In areas where prescribed fire will be used, staff will determine if mechanical treatment is needed to reduce fuel levels prior to burning. Mechanical techniques include roller chopping portions of each burn unit and/or using a Brown Tree Cutter mower to reduce fuels next to the fire breaks.

Prescribed Fire

A prescribed fire program will be implemented to closely mimic the natural fire regimes for the different plant communities to increase plant diversity and ensure the canopies remain open. Fire plays an important role in the pine flatwoods ecosystem in maintaining a healthy stand and promoting regeneration, especially for longleaf pine. Once restoration projects are completed in management units that contain fire dependent communities, a prescribed fire management program will be implemented after the creation of appropriate fire lines/breaks. The timing of prescribed burning will be influenced by seasonal rain and wind patterns. The Conservation 20/20 Burn Team Coordinator is coordinating with the DOF and FWC to develop a C20/20-wide Fire Management Plan that will apply to all Preserves.

Pasture Restoration

At this time there are no plans for restoration of the improved pastures. These areas currently have a cattle lease and the effluent release program on them. If both of these leases terminated, staff will develop plans to help restore these areas back to pine flatwoods.

Hydrologic Improvements

The only hydrologic improvements proposed at this Preserve are in the northwest corner of MU 1 in the abandoned shrimp farm. In this area, exotic plants will be removed with an excavator and piled and burned. Once exotic plants are removed, the area will be regraded to remove the ditches. If necessary, the area will be replanted with native plants, including mangroves. This work will need to be done between May 16 and September 30, outside of eagle nesting season.

Monitor and protect listed species

As discussed in the Designated Species section, there are several listed species that have been documented utilizing the Preserve. For the most part, these species will benefit from restoration activities, such as hydrologic improvements and the removal of invasive exotic plants. During restoration activities, efforts will be made to minimize any negative impact to listed species.

PIFP is part of a countywide quarterly site inspection program conducted for all Conservation 20/20 Preserves. A copy of the site inspection form is available in the Land Stewardship Operations Manual. These inspections allow staff to monitor for any impacts and/or changes to each preserve and includes lists of all animal sightings and new plant species that are found. If, during these inspections or during other field work, staff finds FNAI listed species, they will be reported using the appropriate forms.

Exotic animal control

The primary exotic animal species of concern at SCP is the feral hog. Currently the only acceptable method of hog removal on Conservation 20/20 Preserves is trapping. Staff is researching alternative methods to control feral hog populations on all C20/20 Preserves. Once an acceptable method is determined, an active program will be implemented for the Preserve. Removing all hogs is an unreasonable goal; therefore a removal program will need to be continuous on a long-term basis.

Staff will investigate the feasibility of controlling other exotic species listed in Table 3. If practical, a methodology will be established and implemented.

Overall Protection

Install Fire breaks

Fire breaks will be installed around the perimeter of the Preserve, except MU 12 which is entirely mangroves. A mulching machine will be used to mulch all vegetation in place. Following this machine, a root rake will be used to remove stumps or other vegetation. Fire breaks will be approximately 15 feet wide and

vegetation free and will be disked prior to prescribed fire and/or wildfire season. Using the same techniques, interior fire breaks will be installed in MUs 8, 9 and 10 to reduce the size of the larger unit and create units small enough to burn safely. Staff will create these units based on existing vegetation and burning goals. Fire breaks will be mowed annually and disced in preparation for prescribed fire. These fire breaks will also be incorporated into the trail system at PIFP.

Boundaries and Fencing

All boundaries of the Preserve, except MU 12 have existing fences and the western mangrove fringes. Portions of the fence on the northern boundary of MUs 1 and 2 needs to have the barbed wire restrung.

Boundary signs will be installed to further protect the Preserve. New boundary signs need to be posted on the northern boundary of MUs 1 and 2, and the southern boundary of MUs 7, 8 and 10. Missing or damaged signs will be replaced. C20/20 Rangers will check for boundary signs during the patrols and replace them immediately if possible or report the problem to the C20/20 Supervisor. Boundary signs will be placed every 200-300' along roadsides and problem areas and 500' elsewhere.

Evaluate Cattle Lease

Staff will evaluate the cattle lease yearly to determine if the cattle are having any negative affects on the natural plant communities, soils or water quality. Currently, there is very little disturbance to the natural plant communities on the Preserve. If Land Stewardship staff determines the cattle are negatively impacting the Preserve, staff will meet with the Licensee to determine methods to lessen the impacts of cattle and determine if the lease should be continued or terminated.

Evaluate Effluent Release

Land Stewardship staff will continue to review the semi-annual monitoring reports for the spray fields. If it is determined that the effluent release is having negative impacts to the Preserve, Land Stewardship staff will meet with Utilities staff to alleviate any problems. The agreement with the previous land owner expired in 2009. At this time, Lee County Parks and Recreation staff will meet with Lee County Utilities staff to determine the future plans for effluent release on site.

Fence/Debris Removal

There are several interior fences resulting from the purchase of several different parcels that will be removed. These areas include the northern side of the road in MU 5, the boundary between MUs 6 and 9 and the boundary between MUs 7

and 8. There are also two areas with known debris that will be removed. The first is an old cattle feeder along the road in MU 5 and the second is an area in the northeast corner of MU 9 under the power line, which has scattered rocks and concrete debris.

Land Stewardship staff recognizes that new debris may be dumped in the Preserve periodically and depending on the nature of this debris it will be dealt with accordingly.

Change Land Use/Zoning Categories

Land Stewardship staff will coordinate with Lee County Division of Planning representatives to discuss the change of zoning and Future Land Use designation of PIFP once this stewardship plan is approved. The zoning will be changed from "Agriculture" and "Residential Planned Development" to "Environmentally Critical". The majority of PIFP is already contained in the "Conservation Lands" Future Land Use category. The newest addition to PIFP, including MUs 1 through 4, is still in the Future Land Use category "Coastal Rural". Land Use category for this parcel will be changed to Conservation Lands during a regularly scheduled Comprehensive Plan amendment.

Volunteers

Assist volunteer group

The LSOM identifies the Land Stewardship Volunteer Program's mission statement as:

To aid in the management and preservation of Lee County resource-based public parks and preserves and to provide volunteers with rewarding experiences in nature.

If there is interest from the community to form a volunteer group, staff will work with them to assist with the diverse stewardship activities that will be associated with this Preserve, such as trail maintenance, wildlife monitoring, and other land stewardship projects. There are currently two volunteers in the bird patrol group that visit the Preserve and report their wildlife sightings to Land Stewardship staff. These volunteers also report bald eagle monitoring to ETAC.

The following "Prioritized Projected Timetable for Implementation" is based on obtaining necessary funding for numerous land stewardship projects. Implementation of these goals may be delayed due to changes in staff, extreme weather conditions or a change in priorities on properties managed by Lee County.

VII. PROJECTED TIMETABLE FOR IMPLEMENTATION (JUNE 2006 – MARCH 2011)

Management Activity	Jun-06	Sep-06	Dec-06	Mar-07	Jun-07	Sep-07	Dec-07	Mar-08	Jun-08	Sep-08	Dec-08	Mar-09	Jun-10	Sep-10	Dec-10	Mar-11 or later
Natural Resource Management																
Exotic Plants																
Initial exotic plant control																all
Fire																
Creation of Prescribed Fire Management Plan	X															
Install new fire breaks																all-12
Mechanical brush reduction																6,8,9,10
Implementation of Rx FMP																all-12
Hydrologic Components																
Hydrologic Restoration																1
Pasture Restoration																3,4
Maintenance (On-going/Annual)																
Follow up exotic plant control			3,4				3,4,5				3,4,5				3,4,5	
Exotic animal removal																
Fire break mow/disk			ALL				ALL				ALL				ALL	ALL
Mow trail		6,9				6,9								6,9		
Parking lot maintenance																6
Outside Consultants																
Permitting - mangrove thinning																
Overall Protection																
Large debris removal projects																
Remove internal fencing																
Boundary sign installation					all											
Evaluate cattle lease						3,4										
Evaluate effluent release contract										3,4						
Change Zoning / Land Use categories													3,4			
Public Use																
Create trails - canoe/hiking																
Educational sign installation																
Volunteers																
Form Volunteer Trail Group																
Bird Patrol																

Numbers correspond to Management Units and details on each management activity are found in the Management Action Plan.
 → = project continues

The following Prioritized Projected Timetable for Implementation is based on obtaining necessary funding for numerous land stewardship projects. Implementation of these goals may also be delayed due to changes in staff, extreme weather conditions or a change in priorities on properties managed by Lee County.

VIII. FINANCIAL CONSIDERATIONS

There is a management fund established in perpetuity for all Conservation 20/20 preserves. Monies from this fund primarily serve to meet the operational needs of the Management section of the C20/20 Program, but a certain amount of this fund will be set aside for planned restoration projects. Calusa Land Trust has already contributed money to the acquisition and management of several of the parcels at PFIP. They are also available to help with management activities at the Preserve. There is currently no outside funding available for this preserve. Possible funding for these projects may be requested through grants from agencies such as SFWMD, FDEP and USFWS as well as mitigation opportunities. Projected costs and funding sources are listed in Appendix I.

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X. APPENDICES

Appendix A: 2004 Tropical Systems

Appendix B: Plant List for Pine Island Flatwoods Preserve

Appendix C: Wildlife Sightings at Pine Island Flatwoods Preserve

Appendix D: Lee County Effluent Release Agreement

Appendix E: Bald Eagle Nest History

Appendix F: Cattle Lease

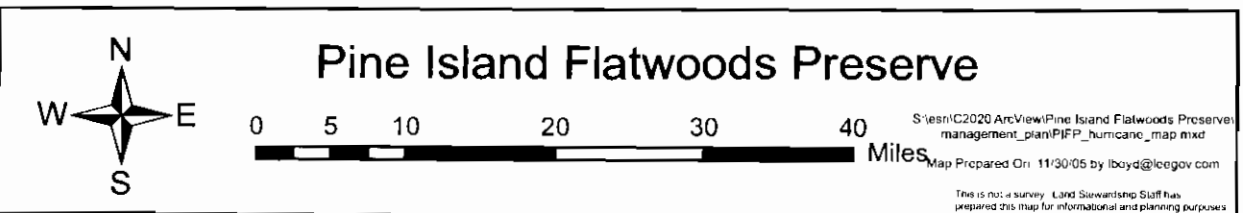
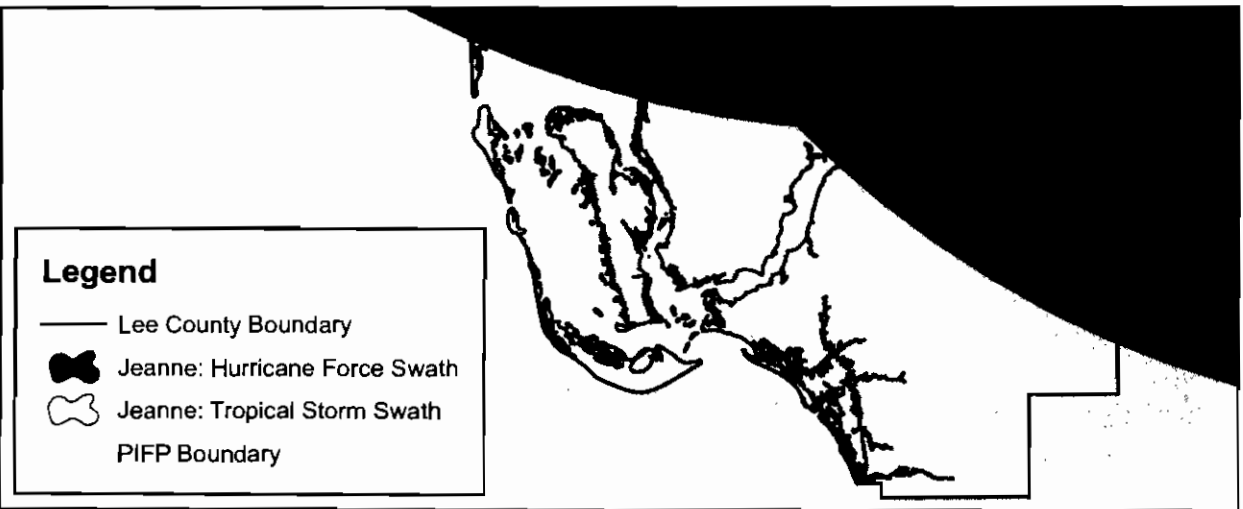
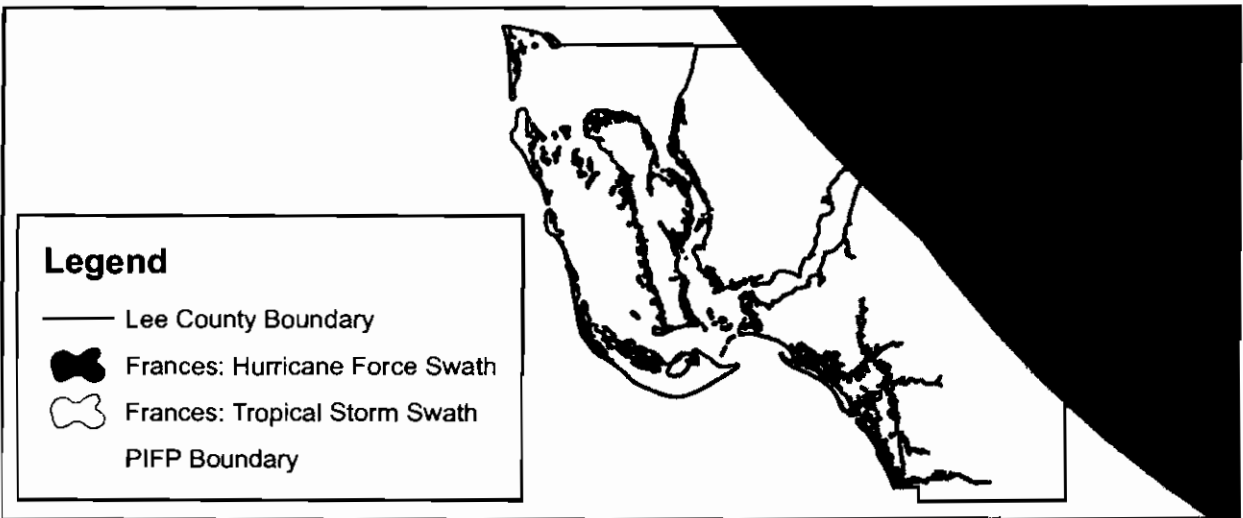
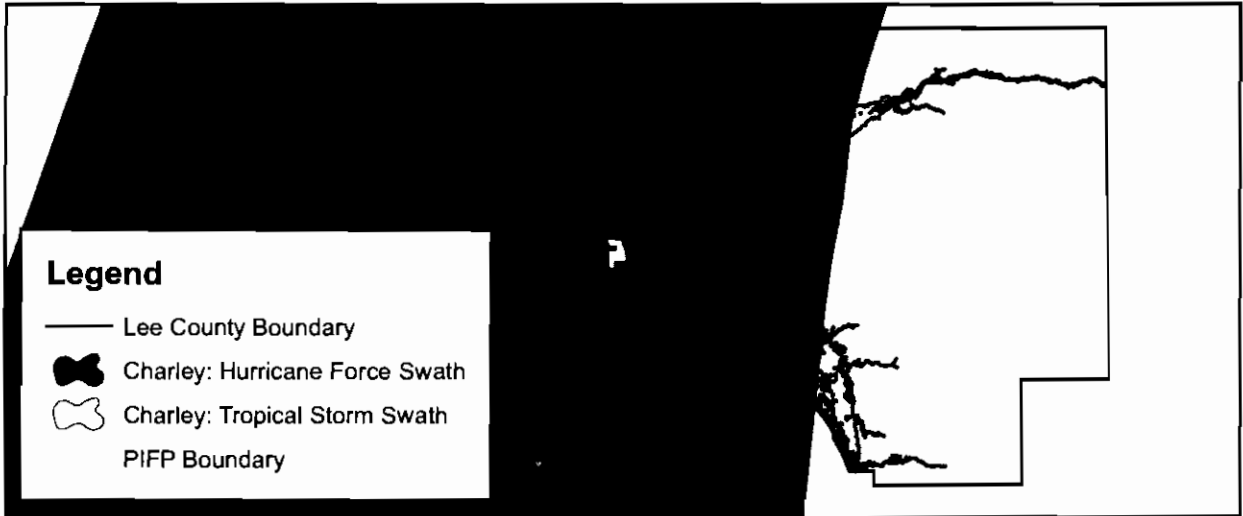
Appendix G: Future Land Use and Zoning Maps

Appendix H: STRAP Number Map

Appendix I: Projected Costs and Funding Sources

Appendix A: 2004 Tropical Systems

Appendix A: 2004 Tropical Systems



Appendix B: Plant List for Pine Island Flatwoods Preserve

Appendix B: Plant Sightings at Pine Island Flatwoods Preserve

Scientific and Common names from this list were obtained from Wunderlin 2003.

Scientific Name	Common Name	Native Status	EPPC	FDA	IRC
Family: Cladoniaceae (lichens)					
<i>Cladonia</i> spp.	reindeer moss	native			
Family: Blechnaceae (mid-sorus fern)					
<i>Blechnum serrulatum</i>	swamp fern	native			
<i>Woodwardia virginica</i>	Virginia chain fern	native			R
Family: Dennstaedtiaceae (cuplet fern)					
<i>Pteridium aquilinum</i> var. <i>caudatum</i>	lacy bracken fern	native			
Family: Nephrolepidaceae (sword fern)					
<i>Nephrolepis exaltata</i>	Boston fern	native			
<i>Nephrolepis multiflora</i>	Asian sword fern	exotic			
Family: Polypodiaceae (polypody)					
<i>Phlebodium aureum</i>	golden polypody	native			
Family: Psilotaceae (whisk-fern)					
<i>Psilotum nudum</i>	wisk-fern	native			
Family: Pteridaceae (brake fern)					
<i>Acrostichum aureum</i>	golden leather fern	native		T	R
<i>Acrostichum danaeifolium</i>	giant leather fern	native			
Family: Pinaceae (pine)					
<i>Pinus elliotii</i>	slash pine	native			
<i>Pinus palustris</i>	longleaf pine	native			I
Family: Thelypteridaceae (marsh fern)					
<i>Thelypteris kunthii</i>	southern shield fern	native			
Family: Alismataceae (water plantain)					
<i>Sagittaria lancifolia</i>	bulltongue arrowhead	native			
<i>Sagittaria latifolia</i>	duck potato	native			I
Family: Arecaceae (palm)					
<i>Sabal palmetto</i>	cabbage palm	native			
<i>Serenoa repens</i>	saw palmetto	native			
Family: Bromeliaceae (pineapple)					
<i>Tillandsia balbisiana</i>	northern needleleaf	native		T	
<i>Tillandsia fasciculata</i>	cardinal airplant	native		E	
<i>Tillandsia paucifolia</i>	potbelly airplant	native			
<i>Tillandsia recurvata</i>	ballmoss	native			
<i>Tillandsia setacea</i>	southern needleleaf	native			
<i>Tillandsia usneoides</i>	spanish moss	native			
<i>Tillandsia utriculata</i>	giant airplant	native		E	
Family: Burmanniaceae (burmannia)					
<i>Burmannia capitata</i>	southern bluethread	native			R
Family: Cyperaceae (sedge)					
<i>Carex tribuloides</i>	blunt broom sedge	native			
<i>Cyperus ligularis</i>	swamp flatsedge	exotic			
<i>Cyperus surinamensis</i>	tropical flatsedge	native			
<i>Eleocharis geniculata</i>	Canada spikerush	native			
<i>Fimbristylis schoenoides</i>	ditch fimbry	exotic			
<i>Fuirena pumila</i>	dwarf umbrellasedge	native			I
<i>Kyllinga brevifolia</i>	shortleaf spikesedge	exotic			
<i>Rhynchospora colorata</i>	starrush whitetop	native			
<i>Rhynchospora divergens</i>	spreaking beaksedge	native			

Appendix B: Plant Sightings at Pine Island Flatwoods Preserve (continued)

Scientific Name	Common Name	Native Status	EPPC	FDA	IRC
Family: Cyperaceae (sedge) continued					
<i>Rhynchospora fernaldii</i>	Fernald's beaksedge	native			CI
<i>Rhynchospora microcarpa sensu lato</i>	southern beaksedge	native			R
<i>Rhynchospora plumosa</i>	plumed beaksedge	native			R
<i>Scleria georgiana</i>	slenderfruit nutrush	native			I
<i>Scleria reticularis</i>	netted nutrush				R
Family: Eriocaulaceae (pipewort)					
<i>Syngonanthus flavidulus</i>	yellow hatpins	native			R
Family: Juncaceae (rush)					
<i>Juncus marginatus</i>	grassleaf rush	native			R
<i>Juncus scirpoides</i> ?	needlepod rush	native			
Family: Haemodoraceae (bloodwort)					
<i>Lachnanthes carolina</i>	Carolina redroot	native			
Family: Hypoxidaceae (yellow stargrass)					
<i>Hypoxis juncea</i>	fringed yellow stargrass	native			R
Family: Marantaceae (arrowroot)					
<i>Thalia geniculata</i>	alligator flag	native			
Family: Orchidaceae (orchid)					
<i>Habenaria floribunda</i>	toothpetal false reinorchid	native			
<i>Spiranthes vernalis</i>	spring ladiestresses	native			R
Family: Poaceae (grass)					
<i>Andropogon glomeratus</i> var. <i>glaucoptis</i>	purple bluestem	native			R
<i>Andropogon glomeratus</i> var. <i>pumilus</i>		native			
<i>Andropogon virginicus</i> var. <i>glaucus</i>	chalky bluestem	native			R
<i>Aristida patula</i>	tall threeawn	native			R
<i>Aristida purpurascens</i>	arrowfeather threeawn	native			I
<i>Aristida spiciformis</i>	bottlebrush threeawn	native			R
<i>Aristida stricta</i>	wiregrass	native			
<i>Cynodon dactylon</i>	Bermudagrass	native			
<i>Dicanthelium aciculare</i> subsp. <i>Neuranthum</i>	needleleaf witchgrass	native			
<i>Dicanthelium chamaelonche</i> subsp. <i>Breve</i>					R
<i>Dicanthelium ensifolium</i> subsp. <i>Ensifolium</i>		native			I
<i>Dichanthelium portoricense</i> ?	hemlock witchgrass	native			
<i>Dichanthelium</i> spp.					
<i>Dichanthelium strigosum</i> var. <i>glabrescens</i>		native			
<i>Digitaria bicornis</i>	Asia crabgrass	exotic			
<i>Digitaria longiflora</i>	Indian crabgrass	exotic			
<i>Distichlis spicata</i>	saltgrass	native			R
<i>Eragrostis atrovirens</i>	feather lovegrass	exotic			
<i>Eustachys petraea</i>	pinewoods fingergrass	native			
<i>Muhlenbergia capillaris</i>	hairawn muhly grass	native			
<i>Panicum hemitomon</i>	maidencane	native			
<i>Panicum maximum</i>	Guineagrass	exotic	II		
<i>Paspalum monostachyum</i>	gulfdune paspalum	native			R
<i>Paspalum setaceum</i> var. <i>stramineum</i>	thin paspalum	native			
<i>Sacciolepis indica</i>	Indian cupscale	exotic			
<i>Setaria parviflora</i>	knotroot foxtail	native			
<i>Spartina bakeri</i>	Sand cordgrass	native			

Appendix B: Plant Sightings at Pine Island Flatwoods Preserve (continued)

Scientific Name	Common Name	Native Status	EPPC	FDA	IRC
Family: Pontederiaceae (pickerelweed)					
<i>Pontederia cordata</i>	pickerelweed	native			
Family: Smilacaceae (smilax)					
<i>Smilax auriculata</i>	earleaf greenbrier	native			
Family: Typhaceae (cattail)					
<i>Typha domingensis</i>	southern cattail	native			
Family: Xyridaceae (yelloweyed grass)					
<i>Xyris difformis</i>	Florida yelloweyed grass	native			I
<i>Xyris elliotii</i>	elliott's yelloweyed grass	native			R
<i>Xyris jupicai</i>	Richard's yelloweyed grass	exotic			
Family: Aizoaceae (mesembryanthemum)					
<i>Sesuvium ssp.</i>	seapurslane	native			
Family: Amaranthaceae (amaranth)					
<i>Blutaparion vermiculare</i>	silverhead	native			
<i>Sarcocornia perennis (Salicornia)</i>	perennial glasswort	native			
<i>Suaeda linearis</i>	sea linearis	native			
Family: Anacardiaceae (cashew)					
<i>Schinus terebinthifolius</i>	Brazilian pepper	exotic	I		
<i>Toxicodendron radicans</i>	eastern poison ivy	native			
Family: Annonaceae (custard-apple)					
<i>Asimina reticulata</i>	netted pawpaw	native			
<i>Deeringothamnus rugelii var. pulchellus</i>	pretty false pawpaw	native		E	CI
Family: Apocynaceae (dogbane)					
<i>Sarcostemma clausum</i>	white twinevine	native			
Family: Araliaceae (ginseng)					
<i>Centella asiatica</i>	spadeleaf	native			
<i>Hydrocotyle umbellata</i>	manyflower marshpennywort	native			R
<i>Schefflera actinophylla</i>	Australian umbrella tree	exotic	I		
Family: Asteraceae (aster)					
<i>Ambrosia artemisiifolia</i>	common ragweed	native			
<i>Baccharis angustifolia</i>	saltwater falswillow	native			
<i>Baccharis halimifolia</i>	groundsel tree	native			
<i>Bidens alba</i>	beggerticks	native			
<i>Coreopsis leavenworthii</i>	Leavenworth's tickseed	native			
<i>Eclipta prostrata</i>	false daisy	native			
<i>Emilia fosbergii</i>	Florida tassleflower	exotic			
<i>Emilia sonchifolia</i>	lilac tassleflower	exotic			
<i>Erechtites hieraciifolius</i>	fireweed	native			
<i>Erigeron quercifolius</i>	oakleaf fleabane	native			
<i>Eupatorium capillifolium</i>	dog fennel	native			
<i>Euthamia minor</i>	goldenrod	native			
<i>Flaveria linearis</i>	narrowleaf yellowtops	native			
<i>Gamochaeta pensylvanicum</i>	Pennsylvania everlasting	native			
<i>Mikania scandens</i>	climbing hempvine	native			
<i>Pluchea carolinensis</i>	cure-for-all	native			
<i>Pluchea odorata</i>	sweetscent	native			
<i>Pluchea rosea</i>	rosy camphorweed	native			

Appendix B: Plant Sightings at Pine Island Flatwoods Preserve (continued)

Scientific Name	Common Name	Native Status	EPPC	FDA	IRC
Family: Asteraceae (aster) continued					
<i>Pterocaulon pycnostachyum</i>	blackroot	native			
<i>Rayjacksonia phyllocephala</i>	camphor daisy	native			I
<i>Solidago</i> ssp.	goldenrod	native			
Family: Avicenniaceae (black mangrove)					
<i>Avicennia germinans</i>	black mangrove	native			
Family: Bataceae (saltwort)					
<i>Batis maritima</i>	saltwort	native			R
Family: Boraginaceae (borage)					
<i>Heliotropium polyphyllum</i>	pineland heliotrope	native			
Family: Brassicaceae (mustard)					
<i>Cardamine pensylvanica</i>	Pennsylvania bittercess	native			R
Family: Cactaceae (cactus)					
<i>Opuntia</i> spp.	prickly-pear	native			
Family: Campanulaceae (bellflower)					
<i>Lobelia feayana</i>	bay lobelia	native			I
Family: Caryophyllaceae (pink)					
<i>Drymaria cordata</i>	West Indian chickweed	native			
Family: Casuarinaceae (sheoak)					
<i>Casuarina equisetifolia</i>	Australian pine	exotic	I		
Family: Celastraceae (stafftree)					
<i>Maytenus phyllanthoides</i>	Florida mayten	native			R
Family: Chrysobalanceae (coco plum)					
<i>Licania michauxii</i>	gopher apple	native			
Family: Cistaceae (rockrose)					
<i>Lechea torreyi</i>	pedmont pinweed	native			R
Family: Clusiaceae (mangosteen)					
<i>Hypericum cistifolium</i>	roundpod St. John's-wort	native			
<i>Hypericum tetrapetalum</i>	fourpetal St. John's-wort	native			
Family: Combretaceae (combretum)					
<i>Conocarpus erectus</i>	buttonwood	native			
<i>Laguncularia racemosa</i>	white mangrove	native			
Family: Convolvulaceae (morning glory)					
<i>Ipomoea sagittata</i>	saltmarsh morning-glory	native			
Family: Cucurbitaceae (gourd)					
<i>Momordica charantia</i>	balsampear	exotic			
Family: Droseraceae (sundew)					
<i>Drosera capillaris</i>	pink sundew	native			R
<i>Drosera brevifolia</i>	dwarf sundew	native			
Family: Ericaceae (heath)					
<i>Bejaria racemosa</i>	tarflower	native			R
<i>Lyonia fruticosa</i>	coastalplain staggerbush	native			
<i>Lyonia lucida</i>	fetterbush	native			
<i>Vaccinium myrsinites</i>	shiny blueberry	native			
Family: Euphorbiaceae (spurge)					
<i>Chamaesyce hypericifolia</i>	graceful sandmat	native			
<i>Cnidioscolus stimulosus</i>	tread softly	native			

Appendix B: Plant Sightings at Pine Island Flatwoods Preserve (continued)

Scientific Name	Common Name	Native Status	EPPC	FDA	IRC
Family: Fabaceae (pea)					
<i>Acacia auriculiformis</i>	earleaf acacia	exotic	I		
<i>Acacia farnesiana</i>	sweet acacia	native			R
<i>Acacia pinetorum</i>	pineland acacia	native			I
<i>Albizia julibrissin</i>	mimosa	exotic	I		
<i>Chamaecrista fasciculata</i>	partridge pea	native			
<i>Crotalaria rotundifolia</i>	rabbitbells	native			
<i>Dalbergia ecastaphyllum</i>	coinvine	native			
<i>Desmodium triflorum</i>	threeflower ticktrefoil	exotic			
<i>Mimosa quadrivalvis</i>	sensitive brier	native			
<i>Vigna luteola</i>	hairypod cowpea	native			
Family: Fagaceae (beech)					
<i>Quercus geminata</i>	sand live oak	native			
<i>Quercus laurifolia</i>	laurel oak	native			
<i>Quercus minima</i>	dwarf live oak	native			R
<i>Quercus virginiana</i>	live oak	native			
Family: Gentianaceae (gentian)					
<i>Sabatia brevifolia</i>	shortleaf rosegentian	native			I
<i>Sabatia stellaris</i>	Rose-of-Plymouth	native			
Family: Haloragaceae (watermilfoil)					
<i>Proserpinaca pectinata</i>	combleaf mermaidweed	native			R
Family: Lamiaceae (mint)					
<i>Hyptis alata</i>	musky mint	native			
<i>Piloblephis rigida</i>	wild pennyroyal	native			R
Family: Lentibulariaceae (bladderwort)					
<i>Pinguicula pumila</i>	small butterwort	native			R
<i>Utricularia purpurea</i>	eastern purple bladderwort	native			R
<i>Utricularia cornuta</i>	horned bladderwort	native			R
<i>Utricularia foliosa</i>	leafy bladderwort	native			
<i>Utricularia subulata</i>	zigzag bladderwort	native			R
Family: Lauraceae (laurel)					
<i>Cassytha filiformis</i>	love vine	native			
Family: Lythraceae (loosestrife)					
<i>Ammannia latifolia</i>	pink restem	native			R
Family: Malvaceae (mallow)					
<i>Urena lobata</i>	caesarweed	exotic	II		
Family: Melastomataceae (melastome)					
<i>Rhexia mariana</i>	pale meadowbeauty	native			R
Family: Myricaceae (bayberry)					
<i>Myrica cerifera</i>	wax myrtle	native			
Family: Myrsinaceae (myrsine)					
<i>Rapanea punctata</i>	myrsine	native			
Family: Myrtaceae (myrtle)					
<i>Melaleuca quinquenervia</i>	punktree	exotic	I		
<i>Rhodomyrtus tomentosa</i>	downy rose myrtle	exotic	I		
<i>Syzygium cumini</i>	java plum	exotic	I		

Appendix B: Plant Sightings at Pine Island Flatwoods Preserve (continued)

Scientific Name	Common Name	Native Status	EPPC	FDA	IRC
Family: Onagraceae (eveningprimrose)					
<i>Ludwigia microcarpa</i>	smallfruit primrosewillow	native			
<i>Ludwigia peruviana</i>	Peruvian primrosewillow	exotic			
<i>Ludwigia octovalvis</i>	Mexican primrosewillow	native			
<i>Ludwigia repens</i>	creeping primrosewillow	native			
Family: Orobanchaceae (broomrape)					
<i>Buchnera americana</i>	american bluehearts	native			
Family: Oxalidaceae (woodsorrel)					
<i>Oxalis corniculata sensu lato</i>	common yellow woodsorrel	native			
Family: Passifloraceae (passionflower)					
<i>Passiflora</i> spp.		native			
Family: Phytolaccaceae (pokeweed)					
<i>Phytolacca americana</i>	American pokeweed	native			
Family: Plumbaginaceae (leadwort)					
<i>Limonium carolinianum</i>	Carolina sealavendar	native			R
Family: Polygalaceae (milkwort)					
<i>Polygala grandiflora</i>	showy milkwort	native			
<i>Polygala nana</i>	candyroot	native			R
<i>Polygala rugelii</i>	yellow milkwort	native			I
<i>Polygala setacea</i>	coastalplain milkwort	native			I
Family: Rhizophoraceae (mangrove)					
<i>Rhizophora mangle</i>	red mangrove	native			
Family: Rubiaceae (madder)					
<i>Galium hispidulum</i>	coastal bedstraw	native			
<i>Houstonia procumbens</i>	roundleaf bluet	native			
<i>Oldenlandia uniflora</i>	clustered mille grains	native			
<i>Randia aculeata</i>	white indigoberry	native			
<i>Spermacoce assurgens</i>	woodland false buttonweed	native			
<i>Spermacoce verticillata</i>	shrubby false buttonweed	native			
Family: Salicaceae (willow)					
<i>Salix caroliniana</i>	Carolina willow	native			
Family: Sapotaceae (sapodilla)					
<i>Sideroxylon reclinatorum</i>	Florida bully	native			
Family: Solanaceae (nightshade)					
<i>Lycium carolinianum</i>	christmasberry	native			
Family: Tetrachondraceae (tetrachondra)					
<i>Polypremum procumbens</i>	rustweed	native			
Family: Verbenaceae (vervain)					
<i>Callicarpa americana</i>	American beautyberry	native			
<i>Phyla nodiflora</i>	turkey tangle fogfruit	native			
Family: Veronicaceae (speedwell)					
<i>Bacopa monnieri</i>	herb-of-grace	native			
<i>Gratiola hispida</i>	rough hedgehyssop	native			R
<i>Gratiola ramosa</i>	branched hedgehyssop	native			R
<i>Linaria canadensis</i>	Canada toadflax	native			R
<i>Lindernia crustacea</i>	Malaysian false pimpernel	exotic			
<i>Lindernia grandiflora</i>	Savannah false pimpernel	native			
<i>Scoparia dulcis</i>	licoriceweed	native			

Appendix B: Plant Sightings at Pine Island Flatwoods Preserve (continued)

Scientific Name	Common Name	Native Status	EPPC	FDA	IRC
Family: Vitaceae (grape)					
<i>Parthenocissus quinquefolia</i>	Virginia creeper	native			
<i>Vitis rotundifolia</i>	muscadine	native			

Key

Florida EPPC Status

I = species that are invading and disrupting native plant communities

II = species that have shown a potential to disrupt native plant communities

FDA (Florida Department of Agriculture and Consumer Services)

E = Endangered

CE = Commercially Exploited

IRC (Institute for Regional Conservation)

CI = Critically Imperiled

I = Imperiled

R = Rare

Appendix C: Wildlife Sightings at Pine Island Flatwoods Preserve

Appendix C: Wildlife Sightings at Pine Island Flatwoods Preserve

Scientific Name	Common Name	Designated Status	
		FWS	FWC
Birds			
Family: Alcedinidae (kingfishers)			
<i>Ceryle alcyon</i>	belted kingfisher		
Family: Anhingidae (anhingas or darters)			
<i>Anhinga anhinga</i>	anhinga		
Family: Ardeidae (herons, egrets, bitterns)			
<i>Ardea herodias</i>	great blue heron		
<i>Egretta caerulea</i>	little blue heron		SSC
<i>Egretta tricolor</i>	tricolored heron		SSC
<i>Egretta thula</i>	snowy egret		SSC
Family: Threskiornithidae (ibises and spoonbills)			
<i>Eudocimus albus</i>	white ibis		SSC
<i>Ajaia ajaja</i>	roseate spoonbill		SSC
Family: Ciconiidae (storks)			
<i>Mycteria americana</i>	wood stork	E	E
Family: Cathartidae (new world vultures)			
<i>Cathartes aura</i>	turkey vulture		
<i>Coragyps atratus</i>	black vulture		
Family: Pandionidae (ospreys)			
<i>Pandion haliaetus</i>	osprey		
Subfamily: Circinae (harriers)			
<i>Circus cyaneus</i>	northern harrier		
Family: Accipitridae (hawks, kites, accipiters, harriers and eagles)			
Subfamily: Buteoninae (buzzard hawks)			
<i>Buteo lineatus</i>	red-shouldered hawk		
<i>Buteo jamaicensis</i>	red-tailed hawk		
<i>Haliaeetus leucocephalus</i>	bald eagle	T	T
Family: Falconidae (true falcons)			
<i>Falco sparverius</i>	American kestrel		
Family: Charadriidae (plovers)			
<i>Charadrius vociferus</i>	killdeer		
Family: Scolopacidae (sandpipers)			
<i>Tringa flavipes</i>	lesser yellowlegs		
<i>Actitis macularia</i>	spotted sandpiper		
<i>Calidris alpina</i>	dunlin		
Family: Columbidae (pigeons and doves)			
<i>Zenaidura macroura</i>	mourning dove		
<i>Columbina passerina</i>	common ground-dove		
Family: Mimidae (mockingbirds and thrashers)			
<i>Dumetella carolinensis</i>	gray catbird		
Family: Strigidae (true owls)			
<i>Bubo virginianus</i>	great horned owl		
Family: Caprimulgidae (nighthawks)			
<i>Chordeiles minor</i>	common nighthawk		
Family: Picidae (woodpeckers)			
<i>Melanerpes carolinus</i>	red-bellied woodpecker		
<i>Picoides pubescens</i>	downy woodpecker		
<i>Picoides villosus</i>	hairy woodpecker		

Appendix C: Wildlife Sightings at Pine Island Flatwoods Preserve (continued)

Scientific Name	Common Name	Designated Status	
		FWS	FWC
Family: Tyrannidae (tyrant flycatcher)			
<i>Myiarchus crinitus</i>	great crested flycatcher		
Family: Troglodytidae (wrens)			
<i>Thryothorus ludovicianus</i>	Carolina wren		
Family: Corvidae (crows, jays, etc.)			
<i>Corvus brachyrhynchos</i>	American crow		
<i>Cyanocitta cristata</i>	blue jay		
Family: Vireonidae (vireos)			
<i>Vireo griseus</i>	white-eyed vireo		
Family: Parulidae (wood-warblers)			
<i>Dendroica coronata</i>	yellow-rumped warbler		
<i>Dendroica discolor</i>	prairie warbler		
<i>Dendroica palmarum</i>	palm warbler		
<i>Dendroica pinus</i>	pine warbler		
<i>Setophaga ruticilla</i>	American redstart		
Families: Fringillidae, Emberizidae, Cardinalidae			
(grosbeaks, finches, sparrows, buntings)			
<i>Cardinalis cardinalis</i>	northern cardinal		
<i>Pipilo erythrophthalmus</i>	eastern towhee		
Family: Icteridae (blackbirds, orioles, etc.)			
<i>Sturnella magna</i>	eastern meadowlark		
Amphibians			
Family: Bufonidae (toads)			
<i>Bufo quercicus</i>	oak toad		
Family: Hylidae (treefrogs and their allies)			
<i>Hyla cinerea</i>	green treefrog		
<i>Hyla femoralis</i>	pine woods treefrog		
<i>Osteopilus septentrionalis</i>	cuban treefrog*		
Family: Leptodactylidae			
<i>Eleutherodactylus planirostris</i>	greenhouse frog*		
Genus: Pseudacris (chorus frogs)			
<i>Pseudacris nigrita verrucosa</i>	Florida chorus frog		
Family: Microhylidae (narrowmouth toads)			
<i>Gastrophryne carolinensis</i>	eastern narrowmouth toad		
Family: Ranidae (true frogs)			
<i>Rana utricularia</i>	southern leopard frog		
Reptiles			
Family: Colubridae			
<i>Drymarchon corais couperi</i>	eastern indigo snake	T	T
<i>Thamnophis sirtalis</i>	eastern garter snake		
Family: Polychrotidae (anoles)			
<i>Anolis sagrei</i>	brown anole *		
Family: Teiidae (whiptails)			
<i>Cnemidophorus sexlineatus</i>	six-lined racerunner		
Family: Testudinidae (gopher tortoises)			
<i>Gopherus polyphemus</i>	gopher tortoise		SSC

Appendix C: Wildlife Sightings at Pine Island Flatwoods Preserve (continued)

Scientific Name	Common Name	Designated Status	
		FWS	FWC
Family: Scincidae (skinks)			
<i>Eumeces fasciatus</i>	five-lined skink		
Mammals			
Family: Dasypodidae			
Subfamily: Dasypodinae			
<i>Dasypus novemcinctus</i>	nine-banded armadillo		
Family: Felidae (cats)			
<i>Lynx rufus</i>	bobcat		
Family: Leporidae (rabbits and hares)			
<i>Sylvilagus floridanus</i>	eastern cottontail		
Family: Muridae (rats and mice)			
Subfamily: Sigmodontinae (new world rats and mice)			
<i>Sigmodon hispidus</i>	hispid cotton rat		
Family: Procyonidae (raccoons)			
<i>Procyon lotor</i>	northern raccoon		
Family: Suidae (pigs and worthogs)			
<i>Sus scrofa</i>	feral hog *		
Family: Talpidae (moles)			
<i>Scalopus aquaticus</i>	eastern mole		
Butterflies			
Family: Nymphalidae (brushfoots)			
<i>Agraulis vanillae</i>	gulf fritillary		
Family: Papilionidae (swallowtails)			
<i>Eurytides marcellus</i>	zebra swallowtail		
Spiders			
Family: Tetragnathidae			
<i>Nephila clavipes</i>	golden-silk spider		
Horseshoe Crabs			
Family: Limulidae (horseshoe crabs)			
<i>Limulus polyphemus</i>	horseshoe crab		
Crabs			
Family: Ocypodidae			
Subfamily: Ocypodinae			
<i>Uca stylifera</i>	fiddler crab		

KEY:

FWC= Florida Fish & Wildlife Conservation Commission

FWS= U.S. Fish & Wildlife Service

E= Endangered

T= Threatened

SSC= Species of Special Concern

* = Non-native

Appendix D: Lee County Effluent Release Agreement

FINAL AGREEMENT

 **LEE COUNTY**
SOUTHWEST FLORIDA

BOARD OF COUNTY COMMISSIONERS

Writer's Direct Dial Number: (941) 335-2236

John E. Manning
District One

September 15, 1999

Douglas R. St. Cerny
District Two

Ray Judah
District Three

Andrew W. Coy
District Four

John E. Albion
District Five

Donald D. Stilwell
County Manager

James G. Yaeger
County Attorney

Diana M. Parker
County Hearing
Examiner

Thomas G. Eckerty, Esq.
Attorney at Law
12734 Kenwood Lane, Suite 89
Fort Myers, Florida 33907-5638

**RE: VILLAGE LINKS GOLF COURSE / LEE COUNTY UTILITIES /
PINE ISLAND RECLAIMED WATER**

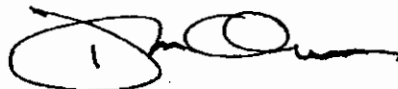
Dear Tom:

I am providing you with an original, recorded Agreement between the County and the Village Links Land Trust in the above matter for your client's file.

Thank you and your client for your cooperation and patience in this matter.

Please advise if I can ever be of any service.

Cordially,



David M. Owen
Assistant County Attorney

DMO:dm
Enclosure

- xc: James G. Yaeger, County Attorney (w/o enclosure)
- Robert W. Gray, Deputy County Attorney (w/o enclosure)
- J.W. French, P.E., Director, Public Works Administration (w/o enclosure)
- Larry Johnson, P.E., Director, Environmental Services (w/enclosure)
- Glenn Greer, P.E., Director, Lee County Utilities (w/enclosure)
- Ivan Velez, P.E., Lee County Utilities (w/enclosure)

RECEIVED

SEP 16 1999

ENVIRONMENTAL SERVICES
THIRD FLOOR

INSTR # 4706842
OR BK 03162 PG 2595

**AGREEMENT FOR THE DELIVERY
OF RECLAIMED EFFLUENT WATER**

RECORDED 08/31/99 12:50 PM
CHARLIE GREEN CLERK OF COURT
LEE COUNTY
RECORDING FEE 96.00
DEPUTY CLERK B Cruz

(UNIMPROVED PROPERTY)

THIS AGREEMENT is made and entered into on this 3rd day of August, 1999, by and between VILLAGE LINKS LAND TRUST, its assigns and/or successors in interest, hereinafter referred to as "TRUST", and LEE COUNTY, a political subdivision of the State of Florida, hereinafter referred to as "COUNTY"; collectively, "the Parties" hereto.

WITNESSETH:

WHEREAS, the COUNTY is in the process of permitting for the construction and operation of certain wastewater treatment facilities in Lee County on Pine Island, which will produce treated effluent water of a quality sufficient for the irrigation of grasses, woodlands, and certain crops; and

WHEREAS, as a condition of the permitting process for the COUNTY'S Pine Island Wastewater Treatment System and treated effluent water distribution ("System"), the Florida Department of Environmental Protection ("FDEP") has required that the COUNTY secure additional lands for treated effluent water disposal; and,

WHEREAS, the COUNTY desires to deliver treated effluent water for certain irrigation uses by others, as a means of treated effluent water disposal; and

WHEREAS, the COUNTY as part of the construction and operation of the System, will construct and utilize a reclaimed effluent water distribution system in order

VILLAGE.

that delivery of treated effluent water can be made to the TRUST property; and

WHEREAS, the COUNTY finds that it serves a public purpose to enter into this Agreement with the TRUST in order to further dispose of effluent water from its wastewater treatment facilities on Pine Island.

NOW, THEREFORE, IN CONSIDERATION OF THE FOREGOING AND THE MUTUAL COVENANTS CONTAINED HEREIN, THE TRUST AND THE COUNTY DO HEREBY AGREE AS FOLLOWS:

1. **LICENSE**

(a) The TRUST will grant to the COUNTY, a license for the construction, operation and maintenance of the delivery system for the placement of the reclaimed effluent water on the TRUST property. The License Agreement, and the legal description of the property subject to the License are incorporated herein and attached hereto as Exhibit A to this Agreement.

(b) Upon execution by both Parties to this Agreement, the entire Agreement, to include Exhibit A, shall be recorded in the appropriate record book in the Official Records of Lee County, Florida.

2. **TERM OF THE AGREEMENT**

The COUNTY shall deliver, and the TRUST shall accept, reclaimed effluent water produced by the COUNTY from its Pine Island Wastewater Treatment Facilities, once operational, for the term of this Agreement. This Agreement shall be effective for an initial term of ten (10) years from the date of this Agreement, or until such time as it is replaced by the "Subsequent Agreement" as contemplated at paragraph 16.; herein,

and may be extended beyond the initial term upon written amendment executed by both Parties hereto. This Agreement may be terminated for good cause shown by the TRUST or the COUNTY during the initial term, or during any subsequent term, upon written notice by the terminating party to the non-terminating party not less than one hundred eighty (180) days prior to any such termination. If the noticed, non-terminating party fails to cure or correct the matters in dispute during the one hundred eighty (180)-day notice period, this Agreement will be then terminated by the terminating party. This Agreement shall become effective as of the operational date for the Pine Island Wastewater Treatment Facilities.

3. AUTHORIZATION FOR DELIVERY OF RECLAIMED WATER

(a) The TRUST shall allow the COUNTY'S reclaimed effluent water to be delivered by the COUNTY to the TRUST property as designated herein. The COUNTY represents to the TRUST that said reclaimed effluent water shall be used by the COUNTY only for lawful purposes and that said use shall be at all times and in all manners, consistent with the provisions of this Agreement. COUNTY further represents to the TRUST that use of the reclaimed effluent water shall be consistent with all local, state and federal regulations, and shall be in such a manner so as not to require a federal wastewater discharge permit.

(b) The TRUST agrees to receive reclaimed effluent water within ten (10) days of receipt of written notice from the COUNTY that deliveries will commence from the Pine Island Wastewater Treatment Facilities.

*do they
still do
this?*

VILLAGE

4. **WATER QUALITY**

Reclaimed effluent water delivered under this Agreement shall be treated by the COUNTY to levels which meet all federal and state requirements for irrigation on lands with public access. Reclaimed effluent water shall be quality tested by the COUNTY at its source (the Pine Island Wastewater Treatment Plant) every month, and the results made available to the TRUST. In the event such testing reveals that the effluent water does not meet minimum local, state, or federal regulations, then the delivery of such effluent water will cease until such standards are met and certified to the TRUST.

5. **VOLUME OF WATER: DELIVERY SCHEDULE**

The COUNTY will deliver reclaimed effluent water, and the TRUST shall accept a volume of gallons of reclaimed water per day, not to exceed an application rate of 1.5 inches per week, and in any event, not to exceed 350,000 gallons per day, as requested and notified by the COUNTY. The COUNTY will install appropriate meters at the Point(s) of Delivery so that the volume of reclaimed effluent water delivered will be monitored. The COUNTY shall maintain the reclaimed effluent water distribution system on the TRUST property to include, but not be limited to: monitoring of flows and percolation rates so as to avoid ponding or odor on the TRUST property.

6. **POINT(S) OF DELIVERY**

The Point(s) of Delivery on the TRUST property shall be placed as authorized and designated by the TRUST. The COUNTY shall own and operate the reclaimed effluent water distribution system placed by the COUNTY on the TRUST property.

The COUNTY shall provide, in a manner approved by the appropriate regulatory

agencies, a positive check-valve between the reclaimed effluent water irrigation system and any other TRUST irrigation water source(s). The TRUST agrees to identify for the COUNTY, any well(s) that may be connected to the TRUST'S irrigation system when constructed. The TRUST may use any existing well(s) and/or lake or pond water source(s) for its future irrigation system, when appropriate permits are obtained and facilities constructed, provided that the two are not interconnected or operated simultaneously with the COUNTY'S reclaimed effluent irrigation system.

The COUNTY will construct, at its expense, all lines, meters, valves and other appurtenances necessary to extend the COUNTY'S reclaimed effluent water distribution system from existing COUNTY facilities to the TRUST property, and if requested by the TRUST, will promptly remove same from the TRUST property at COUNTY'S expense upon termination of this Agreement or as may be required for construction of the planned golf course development.

A breach of any of the terms or conditions of this paragraph 6., or paragraphs 4. or 5. above, shall constitute sufficient grounds for the termination of this Agreement by the TRUST upon one hundred eighty (180) days written notification of such termination provided to the COUNTY.

7. EXCUSE FROM PERFORMANCE BY GOVERNMENTAL ACTS

If for any reason during the term of this Agreement, Local, State or Federal governments or agencies shall fail to issue necessary permits, grant necessary approvals, or shall require any change in the operation of the treatment, transmission and distribution systems or the application and use of reclaimed effluent water, then to the extent that such requirements shall affect the ability of any Party to perform any of

the terms of this Agreement, the affected Party shall be excused from the performance thereof and a new Agreement may be negotiated by the Parties hereto in conformity with such permits, approvals, or requirements.

8. **INDEMNIFICATION**

(a) To the extent as provided for by law, in particular the terms and limitations as set out at Section 768.28, Florida Statutes, the COUNTY shall indemnify and hold harmless the TRUST, including its officers, directors, members, employees and agents, and any successors in interest or assigns, against any and all claims, actions, suits, proceedings, costs, expenses, including attorney's fees, damages or liabilities arising out of any injury, illness, or disease to persons or property alleged to have been caused directly or indirectly, in whole or in part, by the reclaimed effluent water as furnished by the COUNTY to the TRUST.

(b) The obligation of the COUNTY to indemnify the TRUST shall be conditioned upon the compliance of the TRUST with all regulatory agency requirements and regulations for the use of the reclaimed effluent water from any point(s) within the TRUST'S control, provided that such noncompliance with the said regulations by the TRUST, is the proximate cause of the alleged injury, illness or disease to any persons or to property.

(c) The TRUST shall save and hold harmless and indemnify the COUNTY, its agents, representatives, servants and employees, from any and all claims, costs, penalties, suits at law or in equity or administrative actions, damages and expenses (including attorney's fees) arising out of the following:

1. claims related to any of the TRUST'S construction, erection,

- location, operation, maintenance, repair, installation, replacement or removal of any part of the reclaimed effluent water distribution system controlled by the TRUST; and,
2. claims arising out of the TRUST'S negligence or omissions with respect any to reclaimed effluent water distribution upon any areas owned, controlled, operated, or maintained by the TRUST, other than the area that is the subject of this Agreement as designated in Exhibit A, hereto.

9. **CHARGES AND RELATED CONSIDERATIONS**

As consideration for the TRUST allowing reclaimed effluent water from the COUNTY to be placed on the TRUST property as further described herein, and specifically for the term of this Agreement, the TRUST will not be charged by the COUNTY for any reclaimed water delivered to the TRUST undeveloped property. As further consideration, the COUNTY will reserve the first 350,000 gallons per day of reclaimed effluent water from the COUNTY Pine island Wastewater Treatment System for irrigation use at the proposed golf course development on the TRUST property.

10. **ACCESS**

The COUNTY shall have the right at any reasonable time and upon reasonable notice to the TRUST in advance, to enter upon the TRUST property to review, inspect, maintain and operate the COUNTY'S effluent distribution equipment on the TRUST property.

Such entry shall normally be for the purpose of review of the operation of the

reclaimed effluent water irrigation system, for inspection of COUNTY-owned mains and appurtenances, regular maintenance, and for sampling of any monitoring wells located on the TRUST property. The TRUST has the option of having a TRUST representative accompany the COUNTY'S personnel when on the TRUST property. All such on-site monitoring in any manner will be at COUNTY'S expense.

11. **DISCLAIMER OF THIRD PARTY BENEFICIARIES**

This Agreement is solely for the benefit of, and is binding upon the Parties hereto, their heirs, successors in interest or assigns, and no right or cause of action shall accrue upon or by reason hereof, to or for the benefit of any third party not a party hereto.

12. **SEVERABILITY**

If any part of this Agreement is found invalid or unenforceable by any court of competent jurisdiction, such invalidity or unenforceability shall not affect the other parts of this Agreement if the rights and obligations of the Parties contained therein are not materially prejudiced and if the intentions of the Parties can continue to be effected. To that end, this Agreement is declared to be severable.

13. **LAND USE APPROVALS**

This Agreement shall not be construed as any basis for (1) granting or assuring or indicating, or (2) denying, refusing to grant, or preventing, any future grant of land use or zoning approvals, permissions, variances, special exceptions, or rights with respect to the real property in the irrigated area.

14. **APPLICABLE LAW**

This Agreement and the provisions contained herein shall be construed, controlled, and interpreted according to the laws of the State of Florida.

15. **NOTICES**

All notices required or authorized under this Agreement shall be given in writing and shall be served by mail on the Parties at the addresses below:

FOR THE COUNTY: A. GLENN GREER, P.E., DIRECTOR
LEE COUNTY UTILITIES DEPARTMENT
Post Office Box 398
Fort Myers, FL 33902-0398

FOR THE TRUST: JAMES R. HIIRONEN
4099 Tamiami Trail, North, Suite 305
Naples, Florida 33940

16. **SUBSEQUENT AGREEMENTS**

The Parties recognize that this Agreement is for the delivery of reclaimed effluent water to the TRUST'S unimproved lands at this time, and that it is the expressed intent and agreement of the Parties that a Subsequent Agreement will be negotiated and entered into by the Parties for the delivery of COUNTY reclaimed effluent water to the TRUST'S improved property, at the time of development. In furtherance of that purpose, the Parties specifically agree to meet, negotiate and enter into a Subsequent Agreement for the delivery of reclaimed water to the TRUST'S improved property, one hundred eighty (180) days prior to the commencement of construction for the initial phase(s) of the "Village Links" golf course and residential community (or any successor community), on Pine Island. The Parties further agree that this provision constitutes a binding obligation for the COUNTY to deliver, and the TRUST to accept, reclaimed effluent water for its golf course facilities at "Village Links" from the COUNTY'S Pine Island Wastewater Treatment Facilities pursuant to the terms and conditions of a Subsequent Agreement.

The Parties further agree that certain terms and conditions exist between the

Parties for the subsequent Agreement to be finalized when the TRUST commences construction of the "Village Links" Golf Course and Community (or successor Development). Such agreed to terms and conditions are as follows:

1. Lee County, at its sole cost and expense, will construct, own and maintain all treated wastewater effluent lines up to the "Point of Delivery" on the TRUST'S property for the delivery of treated effluent from the COUNTY'S System to the TRUST'S residential and golf course community for the TRUST'S irrigation purposes.
2. The TRUST shall bear no cost or expense for the construction or maintenance of the COUNTY'S treated wastewater effluent lines up to the "Point of Delivery" on the TRUST'S property, nor shall the TRUST be liable for any COUNTY special assessments or other financing mechanisms for the COUNTY'S construction or operation of the System's treated effluent lines. However, this provision specifically does not apply to the COUNTY'S levy of any special assessments or other financing mechanisms for any System wastewater force mains, collection lines or gravity collection systems which may be developed by the County for the connection of the TRUST property development to the COUNTY'S System for wastewater treatment and disposal.

3. At the time of the development of the TRUST property, the TRUST shall, at its sole cost and expense, construct on its property, an isolated holding pond, pump station(s) and all necessary lines and related apparatus for the TRUST'S internal distribution of the treated wastewater effluent within the TRUST property for its use for irrigation purposes of its property.
4. Upon the connection of the TRUST'S "Village Links" Golf Course and Residential Development (or its successor Development) to the COUNTY'S effluent re-use lines at the Point of Delivery, the TRUST shall then be charged by Lee County for its use of the System treated effluent for irrigation, consistent with the then-existing rates for such effluent use pursuant to COUNTY Resolution.

17. **EXHIBITS**

This Agreement incorporates the following exhibit which is specifically made a part of this Agreement:

Exhibit A: DELIVERY OF RECLAIMED EFFLUENT WATER LICENSE

IN WITNESS WHEREOF, this Agreement with its attached Exhibit A, constitutes the entire Agreement between the Parties for this particular effluent disposal arrangement and has been entered into voluntarily and with the independent advice of legal counsel, and has been executed by the authorized representative of each Party on the date first written above. Any modifications to or waivers of the provisions herein shall only be made in writing, by the Parties hereto.

SIGNED, SEALED AND DELIVERED IN THE PRESENCE OF:

WITNESS:

VILLAGE LINKS LAND TRUST

Deborah K. Lewis
1st Witness
Brenda Lawmaster
2nd Witness

By: Thomas G. Eckerty
Trustee
Title

STATE OF FLORIDA
COUNTY OF LEE) SS:

The foregoing instrument was signed and acknowledged before me this 20th day of Dec., 1999 by THOMAS G. ECKERTY
(Print or Type Name)
who has produced PERSONALLY KNOWN
(Type Of Identification and Number)
as identification, and who (did), (did not) take an oath.

Deborah K. Lewis
Notary Public Signature
DEBORAH K. LEWIS
Printed Name of Notary Public
CC517207
Notary Commission Number



ATTEST: CHARLIE GREEN
CLERK OF THE COURTS

LEE COUNTY, BY AND THROUGH ITS
BOARD OF COUNTY COMMISSIONERS

By: *Aria J. Preece*
Deputy Clerk

By: *Ray Judas*
Chairman or Vice Chairman



APPROVED AS TO FORM:

By: *[Signature]*
Office of County Attorney

EXHIBIT A
GRANT OF LICENSE FOR DELIVERY OF RECLAIMED EFFLUENT WATER

VILLAGE LINKS LAND TRUST, whose mailing address is 4099 Tamiami Trail, North, Suite 305, Naples, Florida 33940, hereinafter referred to as "GRANTOR," in consideration of the mutual benefits to be derived, hereby grants and sets over to the COUNTY OF LEE, a political subdivision of the State of Florida, with its mailing address being Post Office Box 398, Fort Myers, Florida 33902-0398, hereinafter referred to as "GRANTEE," a license for the use and benefit of the Lee County Utilities Division for the delivery and distribution of reclaimed effluent water by spray irrigation, and the use of public utility facilities and equipment in connection with the delivery and distribution of said reclaimed effluent water, through and across certain real property located in Lee County, Florida, being more particularly described in Figures A-1 and A-2, attached hereto and made a part hereof.

This is a non-exclusive License Agreement with the GRANTOR reserving unto itself, and its successors or assigns, the right to the continued free use, access and enjoyment of the property herein described, for any purposes which are not inconsistent or restrictive of the rights and uses granted herein unto the GRANTEE.

At such time as the facilities of GRANTEE are removed or abandoned, this license shall be extinguished and all rights granted herein shall revert to the GRANTOR, its heirs, successors, or assigns.

IN WITNESS WHEREOF, the GRANTOR, has caused these presents to be duly executed this 29th day of Jun, 1999

WITNESS:

VILLAGE LINKS LAND TRUST

Deborah K. Lewis
1st Witness

By: Thomas Eckert

Brenda Furmasta
2nd Witness

Trustee
Title

STATE OF FLORIDA
COUNTY OF LEE) SS:

The foregoing instrument was signed and acknowledged before me this 29th day of Jun, 1999 by THOMAS G. ECKERTY
(Print or Type Name)
who has produced PERSONALLY KNOWN
(Type Of Identification and Number)
as identification, and who (did) (did not) take an oath.

Deborah K. Lewis
Notary Public Signature
DEBORAH K. LEWIS
Printed Name of Notary Public
CC517207
Notary Commission Number



EXHIBIT A
FIGURE A-1

DESCRIPTION

VILLAGE LINKS LAND TRUST

A-3

COMPOSITE

EXHIBIT "A"

Description of a Parcel of Land
Lying in
Section 15, T-45-S, R-22-E
Pine Island, Lee County, Florida
(Michael Parcel)
(North Remainder Parcel)

A parcel of land situated in the State of Florida, County of Lee, lying in Section 15, Township 45 South, Range 22 East, and further bounded and described as follows:

Starting at the northwest corner of said Section 15; thence $S12^{\circ}40'58"E$ for 1241.75 feet; thence $S9^{\circ}57'43"E$ for 510.28 feet to the northwest corner of a parcel recorded in Official Records Book 1288 at Page 2322 and the Point of Beginning; thence $S80^{\circ}16'46"E$ along the north line of said parcel for 4418.79 feet to the southwesterly right-of-way line of Pine Island Boulevard (S. R. 767 - 100 feet wide); thence $S17^{\circ}24'17"E$ along said right-of-way line for 467.48 feet; thence $S89^{\circ}26'26"W$ for 1829.86 feet to a concrete post marking the east line of the southwest one quarter (SW 1/4) of said Section 15; thence $N00^{\circ}28'31"E$ along said east line for 329.59 feet to a concrete post marking the northeast corner of said fraction; thence $S89^{\circ}23'55"W$ along the south line of the northwest one quarter (NW 1/4) of said section for 2509.02 feet to a concrete monument marking the southwest corner of said parcel recorded in Official Records Book 1288 at Page 2322; thence $N09^{\circ}57'43"W$ along the westerly line of said parcel for 920.67 feet to the Point of Beginning.

Beatings are based on the east line of the southwest one quarter (SW 1/4) of said Section 15 as bearing $N00^{\circ}28'31"E$.

A parcel of land in Section 35, Township 45 South, Range 22 East, further described as follows: Begin at a concrete monument at the Northwestern corner of St. Jude Harbors, a subdivision recorded in Plat Book 16, page 141, Lee County, Florida, thence North 11 degrees 43'15" West 335.08 feet along the easterly right of way line of Pine Island Boulevard (50 feet from centerline), thence North 89 degrees 07' East 397 feet, more or less to the waters of a tidal canal, thence southeasterly along the waters of said canal a distance of 335.08 feet, more or less, to a point North 89 degrees 07' East of the Point of Beginning. Thence South 89 degrees 07' West 397 feet, more or less to the Point of Beginning.

LOTS 5, 6 AND 7, AND TRACT A, BLOCK 2, UNIT 1, ST. JUDE
HARBORS SUBDIVISION, AS RECORDED IN PLAT BOOK 16, PAGE 141,
PUBLIC RECORDS OF LEE COUNTY, FLORIDA.

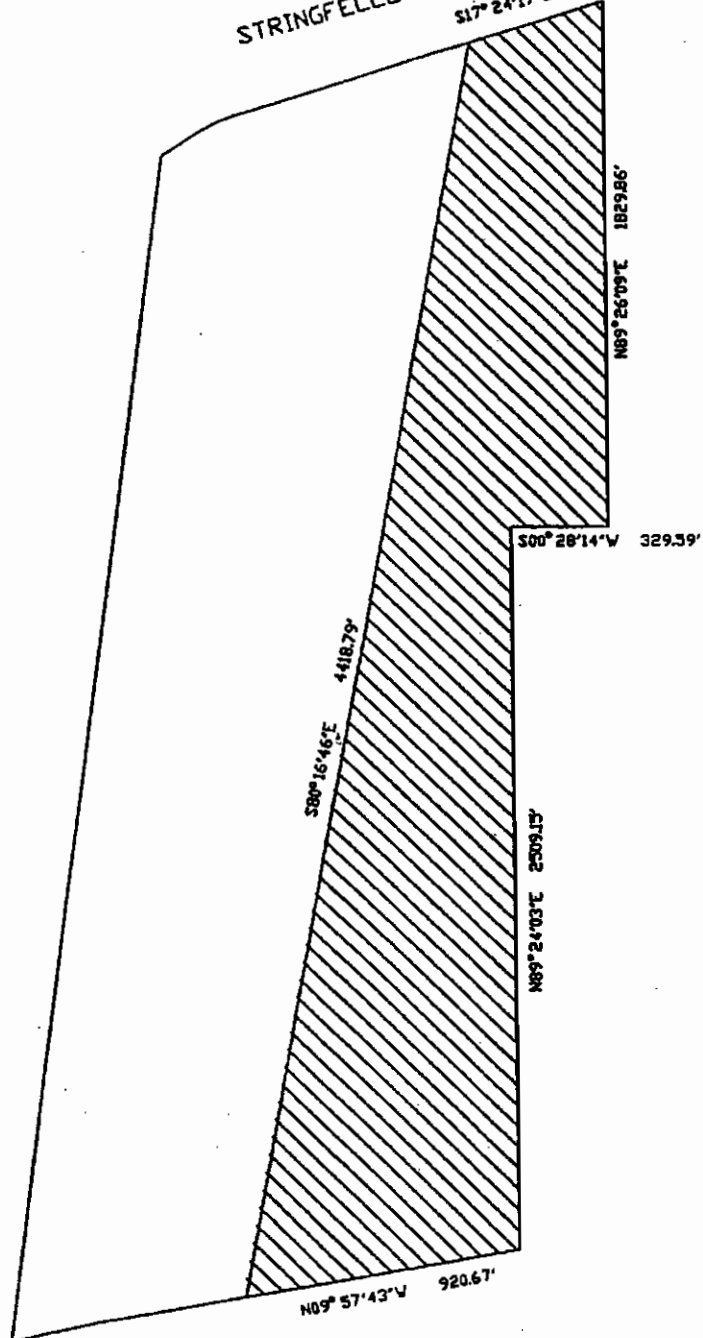
EXHIBIT A
FIGURE A-2

Description of license area to Lee County for Operation and Maintenance of a Treated Effluent Water Spray Irrigation System:

A-4



STRINGFELLOW ROAD
 S17°24'17"E 467.48'



ENVIRONMENTAL SERVICES
 DIVISION: UTILITIES
 1400 Avenue B, Fort Worth, Texas 76102
 Tel: (817) 491-1111 Fax: (817) 491-1112

EXHIBIT "A"
 FIGURE A-2
 SECTION-15, TOWNSHIP-45, RANGE-22

SCALE: 1" = 100'	DATE: _____
BY: _____	REVISION: _____
CHECKED: _____	DATE: _____
APPROVED: _____	DATE: _____

Appendix E: Bald Eagle Nest History

**MEMORANDUM
FROM
DEPARTMENT OF COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL SCIENCES**

Date: February 22, 2006

To: Lynne Boyd, Lee County Parks and Recreation

From: Becky Sweigert, Senior Environmental Planner

Re: LE-24B Nesting History

Year	History
90-91	Active, 2 Fledglings confirmed
91-92	Nest in poor condition
92-93	Active, 1 Fledgling confirmed
93-94	Active, 1 Fledgling confirmed
94-95	Active, Fledglings not confirmed
95-96	Active, 1 Fledgling confirmed
96-97	Active, 1 Fledgling confirmed
97-98	Active, 1 Fledgling confirmed
98-99	Nest failed
99-00	Nest in poor condition
00-01	Nest in poor condition
01-02*	Active, LE-24C - *New nest location observed approx 1200' west of previous nest, adults observed but chicks not confirmed. LE-24B nest in poor condition
02-03	Active, LE-24C Observed two chicks during Jan 31, 2003 flyover. Presumed fledged.
03-04	Active, one adult incubating during FWC flyover Feb 6, 2004 flyover
04-05	Inactive per FWC information. No data available

**MEMORANDUM
FROM
DEPARTMENT OF COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL SCIENCES**

Date: February 22, 2006

To: Lynne Boyd, Lee County Parks and Recreation

From: Becky Sweigert, Senior Environmental Planner

Re: LE-16C Nesting History

Year	History
90-91	Active, 1 chick confirmed
91-92	Owls in nest
92-93	Owls in nest
93-94	Inactive
94-95	Inactive
95-96	Active, 2 chicks confirmed
96-97	Active, 2 chicks confirmed
97-98	Active, 2 chicks confirmed
98-99	Active, 1 chick confirmed
99-00	Active, adults present in area
00-01	Active, One chick found under nest. Diagnosed by CROW with Avian Pox and went Maitland, FL
01-02	Active, One adult noted on nest on 3-12-02 flyover
02-03	Active, Two chicks observed on Jan 31, 2003 on flyover. Presumed fledged.
03-04	Active, Nest failed per FWC information
04-05	Active, per FWC information

Appendix F: Cattle Lease

Scot Anderson

**LICENSE FOR USE OF SITE AT
6557 AND 6641 STRINGFELLOW ROAD
BY JAMES NEWLAND FOR CATTLE GRAZING**

THIS AGREEMENT made this 25 day of March, 2005, by and between LEE COUNTY, a political subdivision of the State of Florida, by and through John Yarbrough, Director of Parks and Recreation, 3410 Palm Beach Boulevard, Fort Myers, Florida 33916, Telephone 239-461-7400, hereinafter called the Licensor, and James Newland, an individual, whose address is 4444 Berkshire Road, St. James City, Florida 33956, Telephone 239-462-1687, hereinafter called the Licensee.

WITNESSETH:

Licensor, in consideration of the fees paid, the covenants and agreements herein to be kept and performed by the Licensee, does hereby grant to the Licensee the right, privilege and permission to graze cattle on Licensor's lands as described as follows, to wit:

SEE EXHIBIT "A" ATTACHED HERETO AND MADE A PART HEREOF:

Otherwise commonly known as 6557 and 6641 Stringfellow Road,
St. James City, Florida 33956

In further consideration of this Agreement, the parties agree as follows:

1. Licensee agrees to pay Licensor the total sum of Eighty Three Dollars (\$83.00) per year for the term of this license to use the described property solely for cattle grazing.
2. This License is not assignable to any other party.
3. This License shall extend for an initial term of one (1) year, which at the expiration of such term may be renewable upon the written consent of both parties, and/or may be revocable by the Licensor by giving the Licensee thirty (30) days written notice to remove the cattle from the premises.
4. Licensee will not use the described lands for any other purpose other than cattle grazing.
5. Licensee acknowledges the legal title of Licensor to the above-described property and agrees never to deny such title or to claim title in Licensee's name.
6. Licensee will maintain the existing four (4)-strand barbed wire fence around the perimeter of the property with the exception of the road frontage. Road frontage fencing will be maintained

Site # 184

with five (5)-strand barbed wire during the term of this license. The fence shall remain the property of the Licensor.

7. Licensee will keep the fence in an excellent state of repair at all times during the term of this Agreement.
8. It is mutually agreed that this Agreement may be canceled upon forty-eight (48) hours written notice to the Licensee if any of the cattle are not kept within the confines of the property described in Exhibit "A".
9. Licensee will file an annual personal property tax return with the County of Lee, State of Florida, as required by law.
10. All section corners, quarter corners, and other survey monuments lying in the premises will be properly flagged by the Licensor. Licensee agrees to bear any survey costs for the resetting of these monuments in the event they are disturbed by the Licensee in any way.
11. Licensee will exercise the privilege granted herein at Licensee's own risk and agrees that Licensee will never claim any damages against Lessor for any injuries or damages suffered on account of the exercise of such privilege. Licensee hereby indemnifies and releases the Licensor from any and all claims for damages to both persons and property as the result of the cattle grazing, and will hold Licensor harmless from all such damages during the term of this Agreement to include all reasonable fees, costs and expenses from any resulting litigation in any forum as the result of such damages as claimed or brought by third parties.
12. Licensee must obtain written approval from the Director of Lee County Parks and Recreation, prior to performing any land clearing, controlled burns, fertilizing, exotic removal, chopping, chemical spraying, or other land management activities.
13. Licensee will not have more than twenty-seven (27) cattle on the property at any given time.
14. Licensee agrees not to erect or to cause or permit to be erected on the above described property any buildings or structures, whether permanent or temporary, including, but not limited to, stadiums, shelters, sheds, or other things attached to or placed on the property without the express written approval of the Director of Parks and Recreation.

Signed and sealed the date above written.

ATTEST:
CHARLIE GREEN, CLERK OF COURTS

By: *Anna L. Rennie*
Deputy Clerk

LICENSOR:
LEE COUNTY BOARD OF
COUNTY COMMISSIONERS

By: *John Yarbrough* 4-11-05
John Yarbrough, Director
Parks and Recreation

APPROVED AS TO FORM BY:

[Signature]
Office of the County Attorney

LICENSEE:

James Newland
James Newland



Barbara Clavo
Witness

Barbara Clavo
Printed Name

Patricia Parlon
Witness

Patricia Parlon
Printed Name

STATE OF FLORIDA) ss:
COUNTY OF LEE)

The foregoing instrument was acknowledged before me this 25 day of March, 2005, by James Newland, an individual, who is personally known to me or has produced _____ as identification and did (did not) take an oath.

Barbara Clavo
Notary Public

Barbara Clavo
(Print Name)

My Commission Expires: Jan. 27, 2006

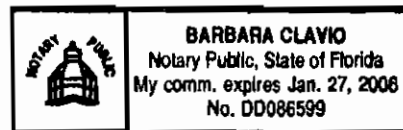


EXHIBIT A

BOUNDARY AND LOCATION SURVEY OF THE FOLLOWI

DESCRIPTION OF TRACT 'A'

A TRACT OR PARCEL OF LAND LYING IN THE NORTH 1/2 OF SECTION 15 TOWNSHIP 45 SOUTH, RANGE 22 EAST, PINE ISLAND, LEE COUNTY, FLORIDA WHICH TRACT OR PARCEL IS DESCRIBED AS FOLLOWS:

FROM THE INTERSECTION OF THE NORTH LINE OF SAID SECTION WITH THE SOUTHWESTERLY LINE 50' FROM THE CENTERLINE OF PINE ISLAND ROAD STATE ROAD S-767 RUN S 33°44'00" E ALONG SAID SOUTHWESTERLY LINE FOR 1773.35' TO A CONCRETE POST AND THE POINT OF BEGINNING OF THE HEREIN DESCRIBED PARCEL. FROM SAID POINT OF BEGINNING, RUN N 83°04'36" W FOR 4153.04' TO A CONCRETE POST; THENCE RUN S 12°40'58" E FOR 287.98' TO A POINT; THENCE RUN S 09°57'43" E FOR 510.37' TO A POINT; THENCE RUN S 80°16'46" E FOR 4418.35' TO AN INTERSECTION WITH SAID SOUTHWESTERLY LINE OF PINE ISLAND ROAD; THENCE RUN N 17°23'51" W ALONG SAID SOUTHWESTERLY LINE FOR 822.23' TO A POINT OF CURVATURE; THENCE RUN NORTHWESTERLY ALONG SAID SOUTHWESTERLY LINE AND ALONG THE ARC OF A CURVE TO THE LEFT OF RADIUS 522.52' FOR 148.98' TO A POINT OF TANGENCY; THENCE RUN N 33°44'00" W ALONG SAID SOUTHWESTERLY LINE FOR 132.82' TO THE POINT OF BEGINNING; CONTAINING 84.88' ACRES, MORE OR LESS.

ABOVE MENTIONED BEARINGS ARE FROM ASSUMING THE SOUTHWESTERLY LINE OF SAID STATE ROAD 2-767 TO BEAR N 33°44'00" W, AS RECORDED IN D.R. BOOK 1286, PAGE 2322.

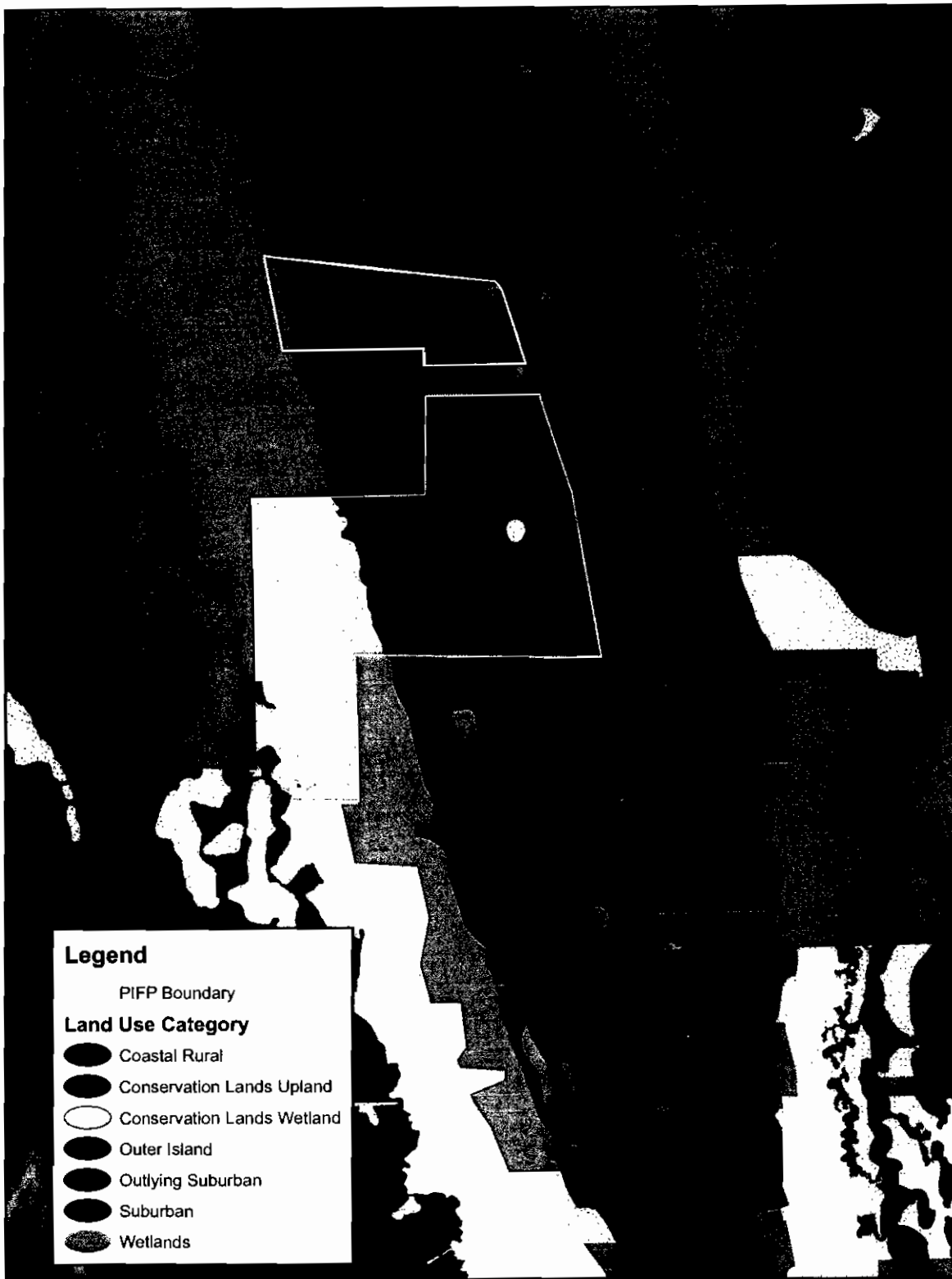
DESCRIPTION OF TRACT 'B'

A TRACT OR PARCEL OF LAND LYING IN SECTION 15, TOWNSHIP 45 SOUTH, RANGE 22, EAST, PINE ISLAND, LEE COUNTY, FLORIDA WHICH TRACT OR PARCEL IS DESCRIBED AS FOLLOWS:

FROM THE CONCRETE POST MARKING THE NORTHWEST CORNER OF SAID SECTION 15, RUN S 12°40'58" E ALONG THE EASTERLY EDGE OF THE WETLANDS ADJACENT TO PINE ISLAND SOUND FOR 1241.75' TO A STEEL PIPE; THENCE RUN S 09°57'43" E ALONG SAID EASTERLY LINE FOR 510.37' TO THE POINT OF BEGINNING OF THE HEREIN DESCRIBED PARCEL FROM SAID POINT OF BEGINNING, RUN S 80°16'46" E FOR 4418.35' TO AN INTERSECTION WITH THE SOUTHWESTERLY LINE (50' FROM THE CENTERLINE) OF PINE ISLAND BOULEVARD; THENCE RUN S 17°23'51" E ALONG SAID SOUTHWESTERLY LINE FOR 467.48' TO A POINT ON THE SOUTHERLY LINE OF THE NORTH 1/8 OF THE SOUTHEAST 1/4 OF SAID SECTION 15; THENCE S 89°26'09" W ALONG THE SAID SOUTH LINE NORTH 1/8 A DISTANCE OF 1829.86' TO A POINT ON THE WEST LINE SAID SOUTHEAST QUARTER; THENCE N 00°28'14" E ALONG SAID WEST LINE A DISTANCE OF 329.59' TO A CONCRETE MONUMENT MARKING THE CENTER OF SAID SECTION 15; THENCE RUN S 89°24'03" W ALONG THE SOUTHERLY LINE OF THE NORTHWEST QUARTER OF SAID SECTION FOR 2508.94' TO A CONCRETE POST MARKING THE INTERSECTION WITH THE EASTERLY LINE OF SAID WETLANDS; THENCE RUN N 09°57'43" W ALONG SAID EASTERLY LINE FOR 920.67' TO THE POINT OF BEGINNING.

Appendix G: Future Land Use and Zoning Maps

Appendix G: Land Use Map

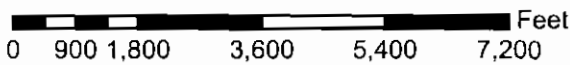


Legend

- PIFP Boundary
- Land Use Category**
- Coastal Rural
- Conservation Lands Upland
- Conservation Lands Wetland
- Outer Island
- Outlying Suburban
- Suburban
- Wetlands

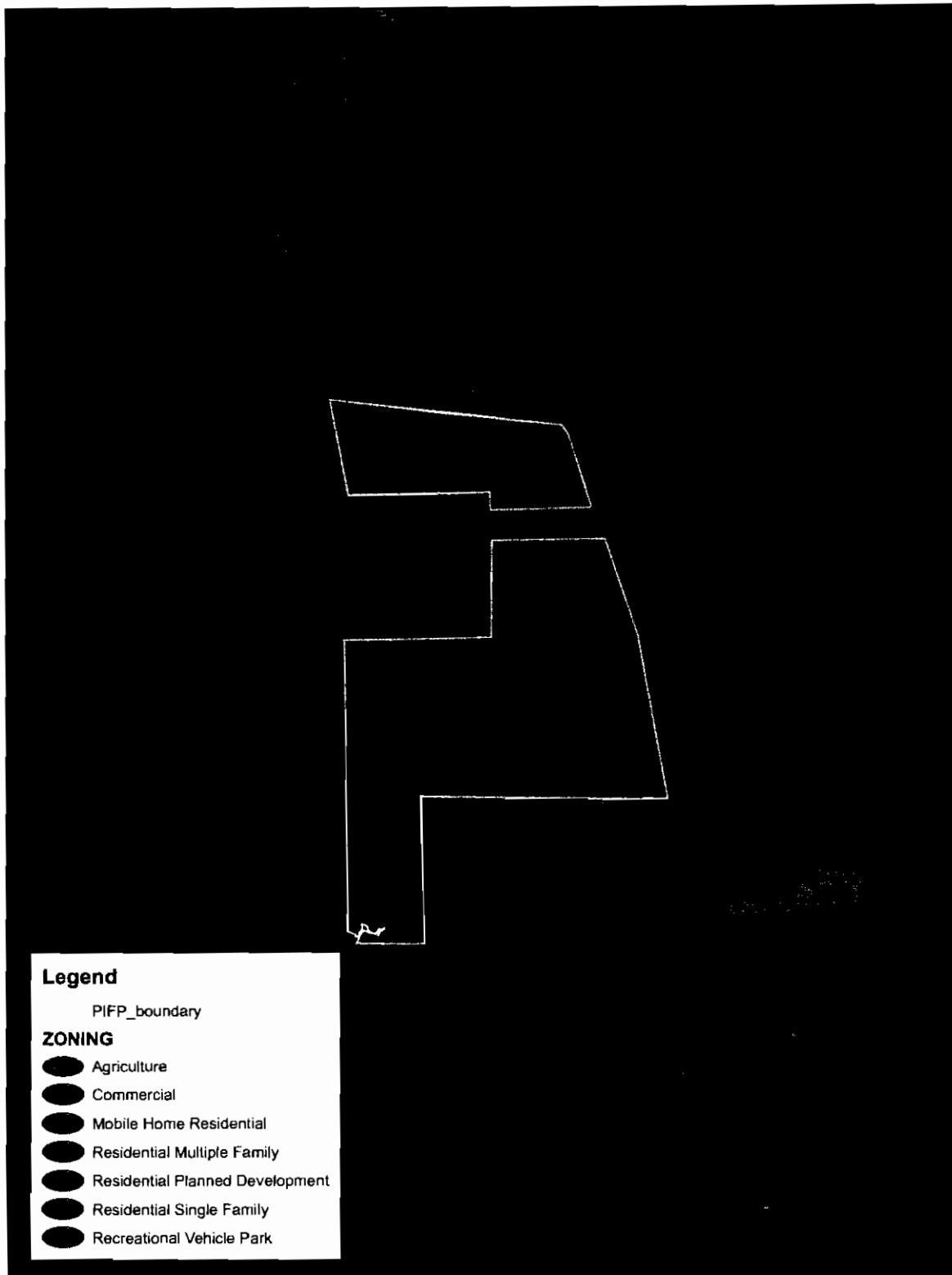


Pine Island Flatwoods Preserve



S:\osm\C2020 ArcView\Powell Creek Preserve\
PIFP_management_plan\PIFP_landuse.mxd
Map Prepared On: 02/15/06 by lboyd@leegov.com
This is not a survey. Land Stewardship Staff has
prepared this map for informational and planning purposes.

Appendix G: Zoning Map




Legend

PIFP_boundary

ZONING

- Agriculture
- Commercial
- Mobile Home Residential
- Residential Multiple Family
- Residential Planned Development
- Residential Single Family
- Recreational Vehicle Park

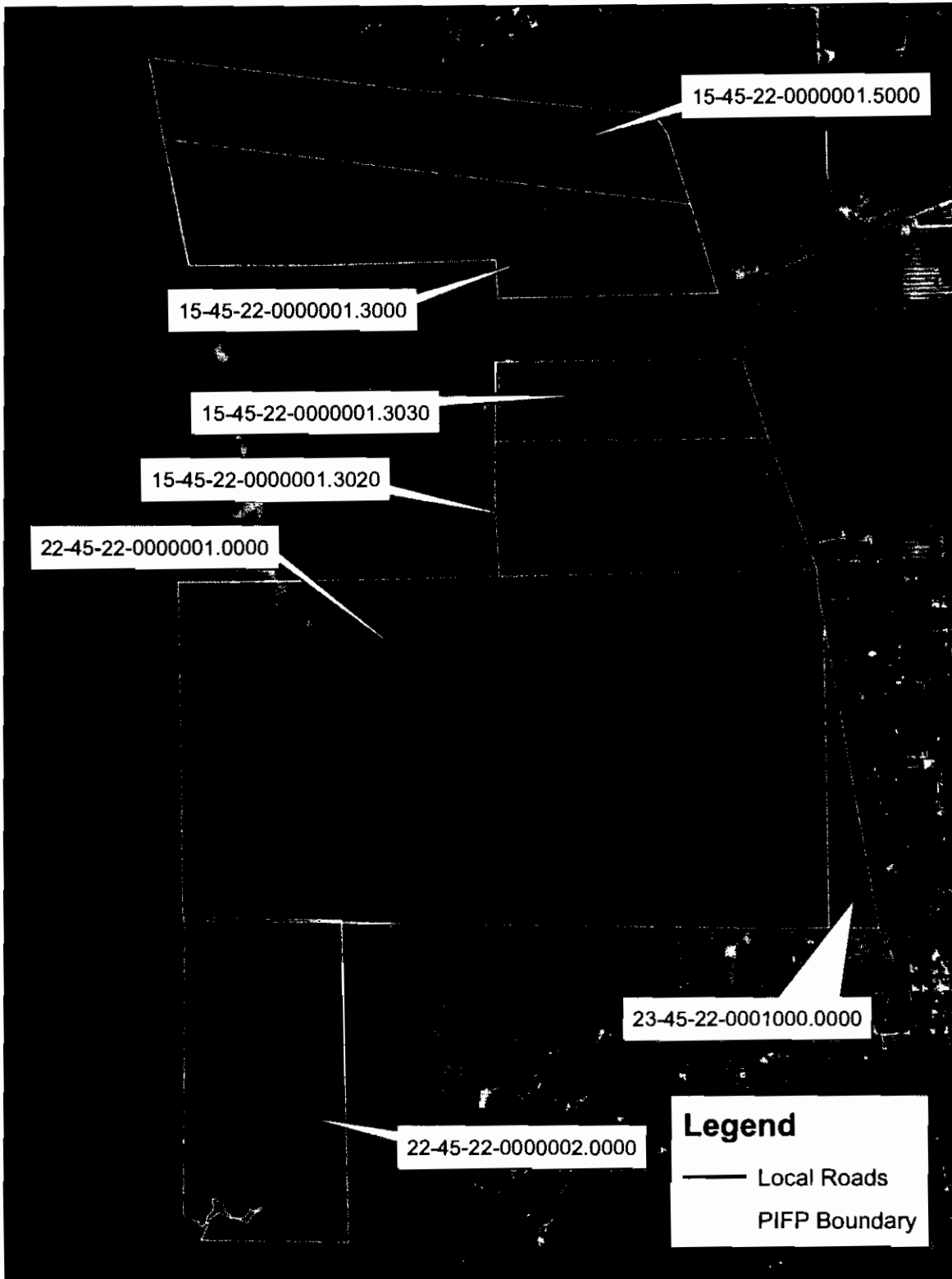
 **Pine Island Flatwoods Preserve**

0 900 1,800 3,600 5,400 7,200 Feet

S:\lean\C2020 ArcView\Powell Creek Preserve\PIFP_management_plan\PIFP_zoning.mxd
Map Prepared On: 02/15/06 by lboyd@leogov.com
This is not a survey. Land Stewardship Staff has prepared this map for informational and planning purposes.

Appendix H: STRAP Number Maps

Appendix H: STRAP Numbers



Pine Island Flatwoods Preserve

0 487.5 975 1,950 2,925 3,900 Feet

Map Prepared On: 03/28/06 by lboyd@leegov.com

This is not a survey. Land Stewardship Staff has prepared this map for informational and planning purposes.

Appendix I: Projected Costs and Funding Sources

Appendix I: Projected Costs and Funding Sources Table

Resource Enhancement and Protection

Item	Possible Funding Source	Estimated Costs
Initial exotic plant control	C20/20, CLT, other grants	\$331,000
Install fire breaks	C20/20, DOF	\$20,000
Mechanical brush reduction		\$325,000
Debris removal	C20/20	in-house
Exotic animal removal	C20/20	researching

Signage

Item	Possible Funding Source	Estimated Costs
Educational Signs	C20/20	\$510
Boundary Signs	C20/20	\$400

TOTAL COST ESTIMATE

\$676,910

Site Management and Maintenance

Item	Possible Funding Source	Estimated Costs
Exotic Plant Control	C20/20	\$15,000
Prescribed Fire Regime	LC P&R, C20/20	In-house
Mow trails	C20/20	In-house
Fence Repairs	C20/20	\$500
Parking lot maintenance	C20/20	1,000

Yearly Maintenance Estimate

\$16,500

*All costs are rough estimates based on information currently available.
Every effort will be made to not exceed this budget by more than 10%.*

