	Lee County Board Of County Commissioners Agenda Item Summary	Blue Sheet No. 20070802

1. ACTION REQUESTED/PURPOSE: Approve the Imperial River Preserve (IRP) Land Stewardship Plan.

2. FUNDING SOURCE: N/A

3. WHAT ACTION ACCOMPLISHES: Approving of the IRP Plan establishes guidelines for restoration activities at IRP.

4. MANAGEMENT RECOMMENDATION: Approve

5. Departmental Category: CIIB					**6. Meeting Date:** 6/5/2007	
7. Agenda:		**8. Requirement/Purpose:** *(specify)*			**9. Request Initiated:**	
☒	**Consent**	☐	**Statute**		**Commissioner**	
☐	**Administrative**	☐	**Ordinance**		**Department:**	**Parks & Recreation**
☐	**Appeals**	☐	**Admin. Code**		**Division**	
☐	**Public**	☒	**Other**		**By: John Yarbrough, Director of Parks and Recreation**	
☐	**Walk-On**				John Yarbrough	

10. 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 Acquistion and Stewardship Advisory Committee) unanimously passed a motion on April 12, 2007, accepting the Imperial River Preserve Land Stewardship Plan.

The plan was available for public review on the internet, as well as at the East County Regional Library. A public meeting was held May 17, 2007.

11. Review for Scheduling:

COMM

Department Director	Purchasing or Contracts	Human Resources	Other	County Attorney	Budget Services				County Manager/ P.W. Director
					Analyst	Risk	Grants	Mgr.	
5-23-07				Mataya Basen	DEH 5/23/07	MK 5/23/07	5/24/07	5/24	

12. Commission Action:

_____Approved
_____Deferred
_____Denied
_____Other

RECEIVED BY COUNTY ADMIN: 5/23 3:35 PM.
COUNTY ADMIN FORWARDED TO: P/C 5/24 11:40

Rec. by CoAtty Date: 5/23/07 Time: 1:10 pm Forwarded To: CAD 2:56pm

Summary of Public Comments Received on the Imperial River Preserve Land Stewardship Plan

The second draft of the **Imperial River Preserve (IRP) Land Stewardship Plan** was available for public comment from May 1 – May 17, 2006. The plan was made available to the public through the Parks and Recreation website and at the Bonita Springs Public Library. Citizens were informed of the plan through a combination of public service announcements, a legal advertisement in the News Press, and a mailing sent to adjacent property owners.

A public meeting was held on May 17 2007, at 5:00 P.M. at Lee County Parks and Recreation Support Services Facility. A brief presentation was provided and included background on the Preserve and current management activities. Lee County Parks and Recreation staff received verbal comments during the meeting. In the following, issues raised during the public comment period are summarized.

Any questions on this summary should be directed to:

Cathy Olson
Land Stewardship Supervisor
Conservation 20/20
Lee County Parks & Recreation
3410 Palm Beach Boulevard
Ft. Myers, FL 33916
colson@leegov.com

Public Meeting Minutes for Review of the draft Land Stewardship Plan for Imperial River Preserve

Thursday, May 17 2007, 5:00 pm, Lee County Parks and Recreation Support Services Facility
Staff members present: Peter DeWitt and Laura Wewerka (Conservation 20/20)

Peter DeWitt gave a presentation on the Preserve and what is proposed for the site.

Floor open for questions:

There was a question about the different boundary of the preserve used during the power point program as compared to the printed display map.

Peter DeWitt explained the history of the site, before being acquired by Lee County. The site was platted for development and included roads and canals. The "technical" boundary as used by the Lee County Property Appraiser reflects those canals (which are actually mangrove swamp and not open water). Conservation 20/20 will conduct management activities (exotic plant removal, wildlife monitoring, trash removal, etc) in the areas that are considered open water.

Questions were raised about the mangrove swamps surrounding the Preserve and what the possibility would be of any development.

Peter showed the areas that are part of a conservation easement for a large housing development as well as those areas that are currently in private ownership. He explained the difficulty in obtaining permitting to develop these areas, but also admitted that development was possible, but highly unlikely.

Someone requested a further explanation on Peter's use of the term "healthy" when describing the Preserve.

Peter explained that the low percentage of exotics, high diversity of wildlife and presence of several listed species were all indicators of a healthy ecosystem.

A discussion of volunteer opportunities and occasional problems (particularly dumping) was sparked from the previous question.

Peter encouraged the attendees to become active with Lee County Bird Patrol, which monitors many Lee County preserves. He also passed out business cards and requested that if they saw someone illegally dumping to not approach the people, but to try and get a license plate number or company name and report it to Conservation 20/20 and/or the Lee County Sheriff.

The final discussion centered on the change from the first edition of the stewardship plan which called for a boardwalk and kayak launch to the current plan which eliminated these possibilities.

Peter explained staff's decision was primarily due to the small size of the preserve and the 2 facilities nearby with established parking, kayak launches, restrooms, etc. The attendees were extremely supportive of this decision and stated that this was the feeling with all the neighbors living along Esplanade Street. They felt that disturbing "pristine" preserve with facilities and parking was not appropriate for Conservation 20/20 preserves, particularly when there were other launch sites just a short paddle down and up river.

Imperial River Preserve

CONSERVATION 20/20 LAND PROGRAM

Land Stewardship Plan 2007

Discover LEE COUNTY Parks & Recreation

Imperial River Preserve

Land Stewardship Plan

Second Edition

5120 Esplanade Street
Bonita Springs, FL 34134

2st DRAFT - April 2007

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 for carefully reviewing the Imperial River Preserve (IRP) Land Stewardship Plan and providing constructive criticism; members of Management Sub-Committee of the Conservation Lands Acquisition and Stewardship Advisory Committee, who were also instrumental in providing valuable suggestions regarding land management issues and the formatting of the plan; Robert Clemens, Lynda Riley, Renee Armstrong for clarification on several sections; Lee County Parks and Recreation and Lee County Library System for making the plan available for public review.

Peter De Witt
Laura Wewerka

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List of Acronyms

BoCC	Board of County Commissioners
C20/20	Conservation 20/20
CLASAC	Conservation Land Acquisition Selection Advisory Committee
Corps	United States Army Corps of Engineers
DHR	Division of Historical Resources
FDA	Florida Department of Agriculture and Consumer Services
FDEP	Florida Department of Environmental Protection
FDNR	Florida Department of Natural Resouces
FLEPPC	Florida Exotic Pest Plant Council
FLUM	Future Land Use Map
FNAI	Florida Natural Areas Inventory
FWC	Florida Fish and Wildlife Conservation Commission
IRC	Institute for Regional Conservation
IRP	Imperial River Preserve
LCDCL	Lee County Division of County Lands
LCDP	Lee County Division of Planning
LCTDC	Lee County Tourist Development Council
LSOM	Land Stewardship Operations Manual
LWCR	Lower West Coast Region
NMFS	National Marine Fisheries Service
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
PARI	Piper Archaeological Research, Inc.
ROW	Right of Way
RPA	Resource Protection Area
SFWMD	South Florida Water Management District
STRAP	Section, Township, Range, Area, Parcel (Block Lot)
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
WCIND	West Coast Inland Navigation District

VISION STATEMENT

It is the vision of the Lee County Department of Parks and Recreation to conserve, protect and restore the natural resources at Imperial River Preserve to a productive, functional and viable ecosystem. The Preserve, acting as the boundary between the urban area of Bonita Springs and a much larger network of mangrove forest is essential to buffering the effects of climate on the local community and provides vital habitat for wildlife. The stewardship of Imperial River Preserve will ensure its health and continue to allow plenty of opportunity for passing paddlers and boaters to enjoy the scenic beauty of the area and the natural plant and wildlife supported within the mangrove community.

I. EXECUTIVE SUMMARY

Imperial River Preserve (IRP) is part of an extensive mangrove swamp system located at the mouth of the Imperial River in Bonita Springs, Florida, within Sections 31 and 32, Township 47 South, Range 25 East. The 39 acre Preserve was acquired in 1998 by Lee County as part of a court agreement. The previous owners, the Reahard Family, had plans to develop the site as part of the Imperial Shores subdivision. In 1984, Lee County's Comprehensive Plan designated the property as a Resource Protection Area which nullified the planned subdivision. In 1997, the Circuit Court of Lee County ruled that the Reahards were entitled to reimbursement of the value of the land, plus interest since 1984. In 1998 the Lee County Board of Commissioners requested that the property be considered for purchase under the Conservation 20/20 Program (C20/20). The C20/20 program was established in 1996 after Lee County voters approved a referendum that increased taxes by up to 0.5 mils for the purpose of purchasing and protecting environmentally sensitive lands. The Preserve price was reimbursed to Lee County's general fund by the C20/20 fund.

The Gulf of Mexico and Caribbean Sea influence the climate of IRP creating humid, sub-tropical conditions. Average annual rainfall within the vicinity is about 60 inches, lower than the County's average (66 inches). The majority of the rain falls between June and September. Natural trends and disturbances influencing native communities and stewardship at IRP include hurricanes, occasional freezes and the cycling of wet and dry seasons. The Preserve has received hurricane and tropical storm force winds from tropical systems since it was purchased through the C20/20 with minor damage.

The land where IRP is located today was created during the Pliocene Epoch between 2 million and 10 thousand years ago. It was developed by a buildup of sediments corresponding with the rise and fall of sea levels. Typically, land in these areas consists of a quartz sand blanket covering limestone and clay.

The Preserve falls within the Southwestern Slope physiographic region. This region probably originated as a marine terrace during higher sea levels. Elevations at IRP range from 4 feet in the north portion of the Preserve, adjacent to the roads and gradually slope to sea level.

There are two soil types found at IRP. Wulfert Muck, associated with the majority of the Preserve in the tidal swamps and St. Augustine in the disturbed fringe adjacent to the road.

The Preserve is located in the Imperial River Watershed and South Florida Water Management District's Estero River Basin. IRP is tidally influenced by the Fish Trap Bay estuarine system which is within Estero Bay Aquatic Preserve.

The Preserve has one plant community, tidal swamp. This community is of critical importance to both wildlife and humans in the area. Tidal swamps serve

The Preserve has one plant community, tidal swamp. This community is of critical importance to both wildlife and humans in the area. Tidal swamps serve as a nursery ground for commercial and recreational fish and shellfish. They also provide feeding and nesting sites for numerous wildlife species, some of which are found in no other areas. Tidal swamps also protect the coastline from erosion and help to buffer inland areas from tropical systems.

The goal of the first revision of this land stewardship plan is to identify Preserve resources, develop strategies to protect those resources, record stewardship activities that have taken place since the first edition was written and continue with activities to ensure IRP is maintained as a productive, functional and viable ecosystem while ensuring that the Preserve will be managed in accordance with Lee County Parks and Recreation's Land Stewardship Operations Manual. Maintenance activities at IRP will focus on periodic invasive exotic plant treatment, removing debris and monitoring possible shoreline erosion, mangrove die-off and boat traffic concerns. A Management Action Plan that outlines stewardship goals is part of this plan. This land stewardship plan will be revised in ten years (2017).

II. INTRODUCTION

Imperial River Preserve (IRP) was acquired through Lee County's Environmentally Sensitive Lands Acquisition Program, Conservation 20/20 (C20/20). The purchase and perpetual preservation of this site will provide protection to the Imperial River/Fish Trap Bay estuary, which is within the Estero Bay Aquatic Preserve, the states 1st aquatic preserve designated in 1966 by the Florida Department of Environmental Protection as an "Outstanding Florida Water". IRP's natural state will continue to contribute to the ecosystem functions and help maintain its integrity.

Initially, the property was purchased by the Reahard Family in 1944 and a sub-division sales plat for the Imperial Shores residential development was prepared and recorded in 1961 showing 126 parcels on the site. On December 21, 1984 Lee County Board of County Commissioners (BoCC) adopted the Comprehensive Land Use Plan classifying the 40-acre parcel as a resource protection area prohibiting all development of the parcel except for a single residence or use for open space recreation or conservation. After an extensive legal battle, Lee County purchased the property from the Reahards where it later became a C20/20 preserve.

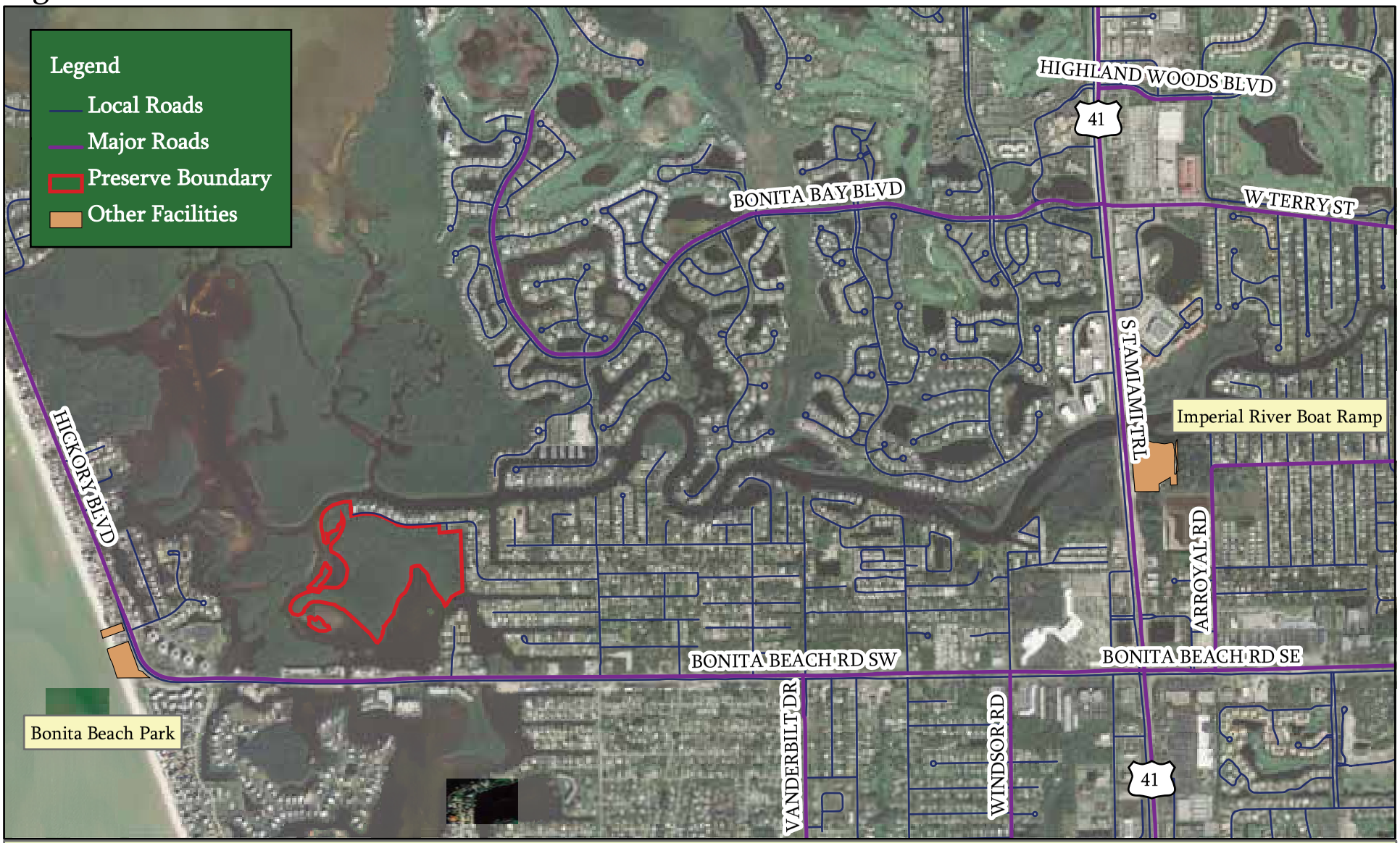
Since acquiring the site Land Stewardship staff has brought the Preserve to a maintenance level for invasive exotics though the projects set out in the first management plan, completed in 2000.

III. LOCATION AND SITE DESCRIPTION

IRP is located in southwestern Lee County, in Sections 31 and 32, Township 47 south and Range 25 east, less than a tenth of a mile north of Bonita Beach Road, approximately two miles west of US Highway 41 and a half mile east of the Gulf of Mexico. Bordering the site to the north is Esplanade Street and the Imperial River, Little Hickory Bay boarders the Preserve to the south and west (Figure 1).

The Preserve is a 39-acre tidal swamp, also known as a mangrove swamp or mangrove forest. Dominant plant species of tidal swamps are red mangrove (*Rhizophora mangle)*, black mangrove (*Avicennia germinans)*, white mangrove (*Laguncularia racemosa*) and buttonwood (*Conocarpus erectus)*. The site is in near pristine condition with the exception of fewer than 5 acres impacted by exotics present on natural and man-made berms sporadically located along the edges of the property. The site's proximity to a residential community has made it vulnerable to dumping, especially of horticultural debris and construction materials, within a two-acre area of the property.

Figure 1. Location



IV. NATURAL RESOURCES DESCRIPTION

A. Physical Resources

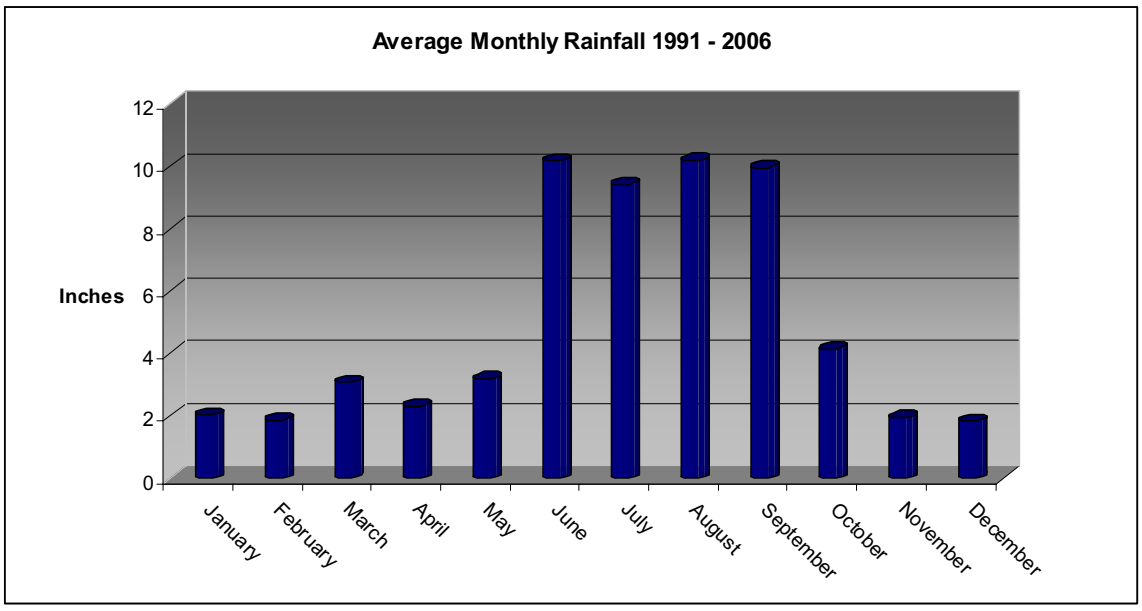
i. Climate

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 through February. 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 United States to Southwest Florida during the winter. Table 1 shows the average high and low temperatures for Fort Myers, Florida, compiled by the Southeast Regional Climate Center from 1931 to 2005.

Table 1: Average High and Low Temperatures for Fort Myers, 1931 - 2005

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
High temperature (°F)	74.7	76.1	79.8	84.2	88.6	90.5	91.2	91.4	89.7	85.7	80.2	75.9
Low temperature (°F)	53.5	54.7	58.4	62.4	67.5	72.4	74.2	74.5	73.9	68.3	60.5	55.1

The following graph depicts the rainfall data collected by Lee County Division of Natural Resources on a daily basis from the Bonita Springs Utility facility. The gauge is located at 11860 East Terry Street in Bonita Springs, approximately 5 miles east of the Preserve. Average annual rainfall from 1991-2006 was 60.07 inches, lower than the average rainfall for the entire county (63.46 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 (fallen and dead vegetation).

ii. Geology

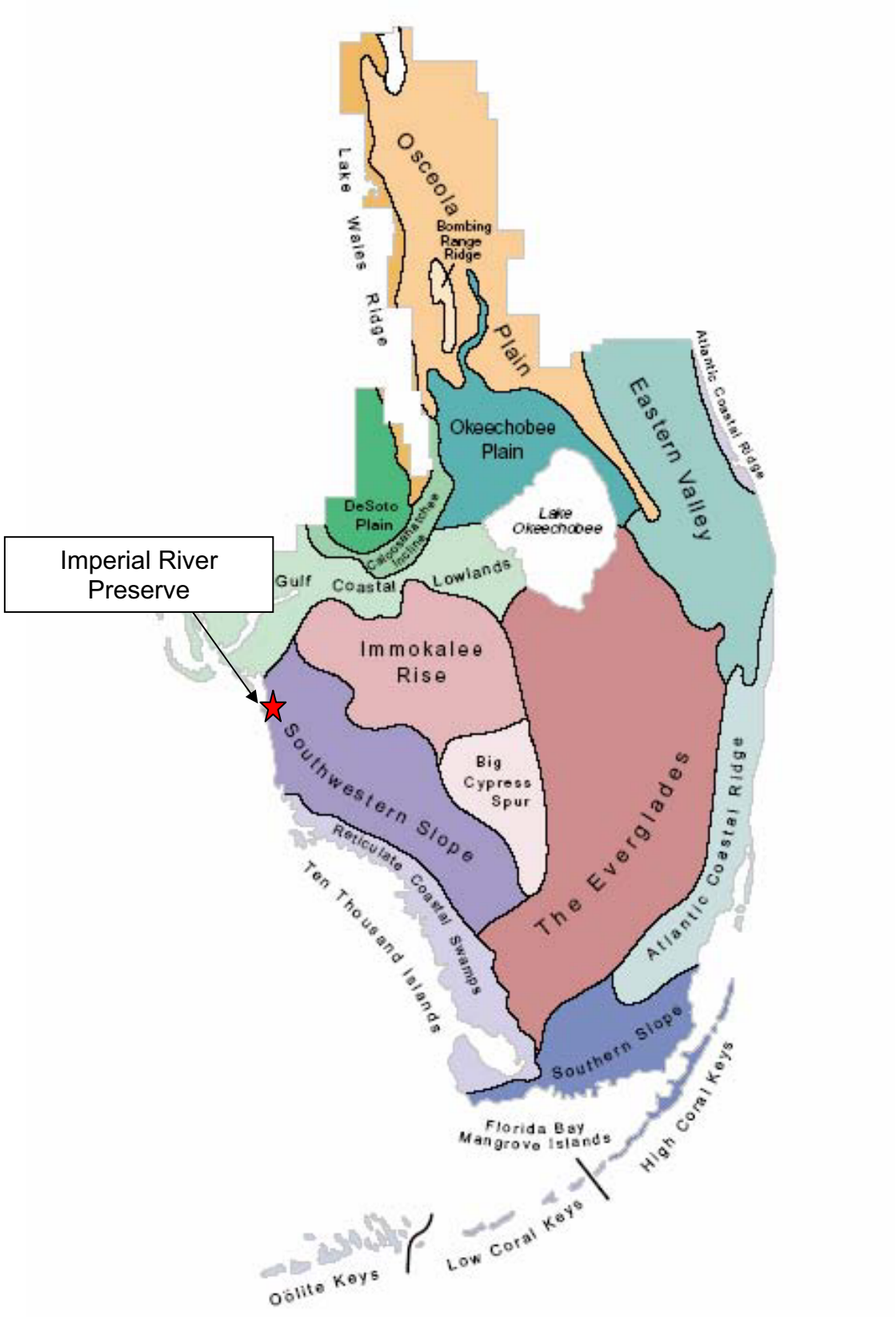
For millions of years, the Florida Platform was submerged in the ocean. The Florida Platform lies on the south-central part of the North American Plate, extending to the southeast from the North American continent to separate the Gulf of Mexico from the Atlantic Ocean (Missimer & Scott 2001). Sediments accumulated upon it and hardened into sedimentary rock. Thirty-five (35) million years ago, portions of Florida rose above the surface and for the next twelve (12) million years it alternated between emersion and submergence. From twenty-three (23) million years ago to the present, at least a small portion of the Florida Platform was always above the ocean surface.

Imperial River Preserve was created during the Pliocene Epoch between two 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 IRP, 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). During the lower sea levels, Florida's land mass was twice as large as it is today and Florida's current west coastline connected to the Caribbean Sea, Mexico and the Yucatan Peninsula (Renz 1999).

Southwest Florida can be divided into ten major physiographic provinces (Figure 2, Map from: SFWMD 2000). These are broad-scale subdivisions based on physical geography features such as terrain texture, rock type and geologic structure and history. IRP lies within the Southwestern Slope. The Southwestern Slope borders the Immokalee Rise on the southwest and slopes gently from a high elevation near 25 feet at its eastern edge to sea level at the

Gulf Coast. This region probably originated as a marine terrace during higher sea level periods. Near surface sediments of the Southwestern Slope are predominantly shell, marl, organic material and limestone (Janicki et al. 1999).

Figure 2: Physiographic Regions

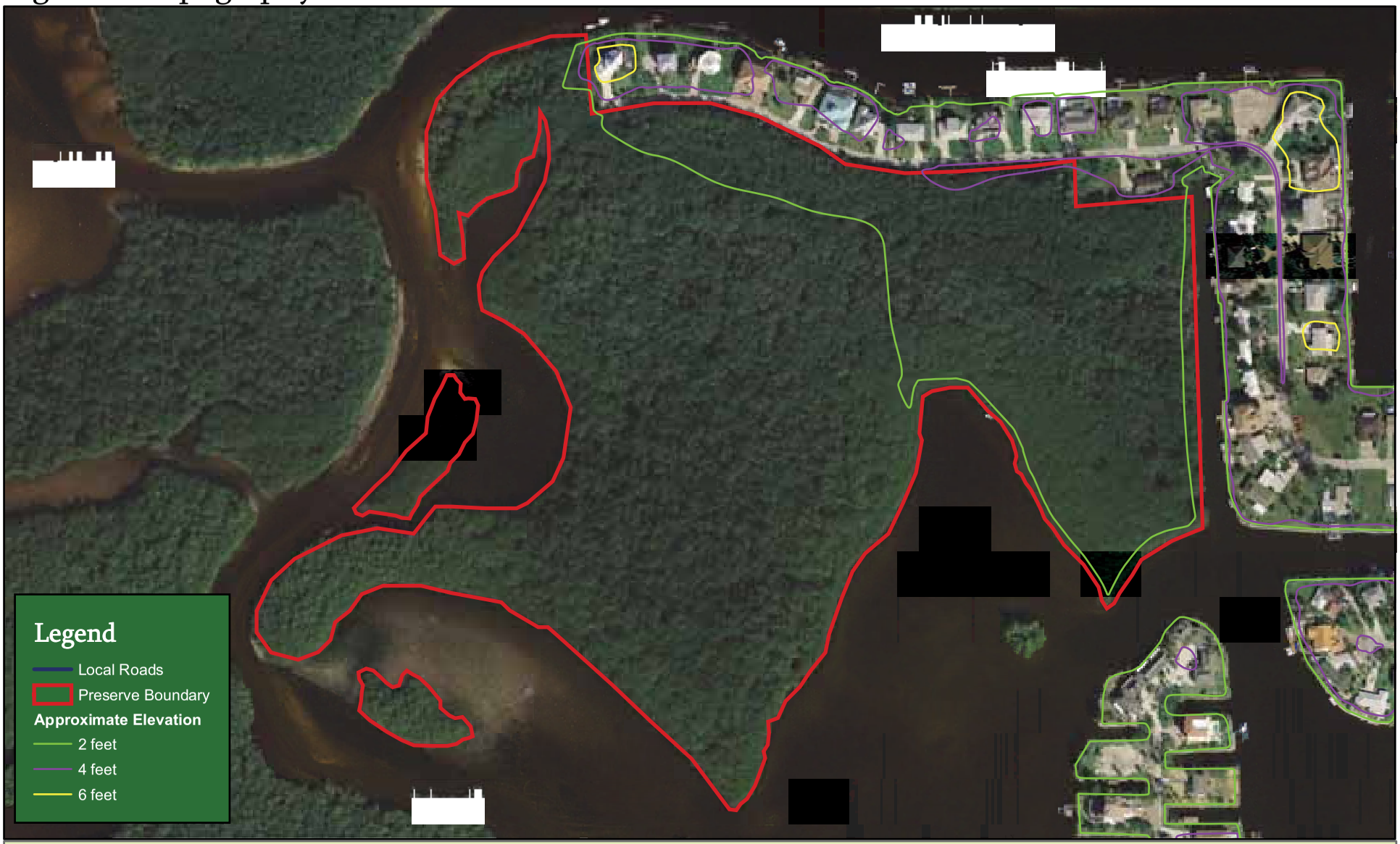


iii. Topography

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 elevations at IRP range from over 4’ on northern portions of the Preserve adjacent to Esplanade Street and gradually slope to sea level (Figure 3).

Figure 3. Topography



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 two soil types found at Imperial River Preserve; Wulfert Muck and St. Augustine (Figure 4 and Table 2). These soil types are associated with salt marsh and mangrove communities. The difference is that St. Augustine soils have been disturbed during urban development. Table 2 and the descriptions below have been organized to quickly provide conservation managers with pertinent soils information for understanding restrictions and/or results regarding future land restoration and probable recreational plan limitations and expenses.

There are eight generalized range site categories in Lee County, one of which is found on IRP. Man-made areas are not included in range site categories. Note that 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 one identified on the Preserve is:

- 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*).

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.

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-well 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.

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 four different habitat types:

- Openland: Cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. Wildlife attracted includes: northern bobwhite (*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, American alligators (*Alligator mississippiensis*), and river otters (*Lutra canadensis*).
- Rangeland: Shrubs and wild herbaceous plants. Wildlife attracted includes: white-tailed deer, northern bobwhite, Virginia opossum (*Didelphis virginiana*) and various bird species.

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. The soils within the Preserve have all been identified as having severe limitations for this purpose. For recreation “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.”

Figure 4. Soils

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

Map Prepared On: 01/30/07

By: lwewerka@leegov.com

Imperial River Preserve

0 237.5 475 950 1,425 1,900 Feet

N

S:\esri\C2020 ArcView\Imperial River Preserve\Management Plan\IRP_soils.mxd

Table 2: Summary of Soil Characteristics

				Physical Attributes							*Biological Attributes*					
Soil Types	**Map Symbol**	**Total Acres**	**% of Preserve**	**Habitats (Range Site)**	**Wetland Class (1)**	**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--**				**Limitations for Recreational Paths & Trails**
												Openland	**Woodland**	**Wetland**	**Rangeland**	
St. Augustine sand, organic substratum - Urban land complex	25	0.3	<.01	none	--	B	rapid	rapid	--	2-4 months	1-3%	very poor	very poor	poor	--	Severe: too sandy
Wulfert Muck	23	38.7	99.9	salt water marsh	F	D	rapid	--	tidal	--	--	very poor	very poor	fair	--	Severe: wetness, excess humus

Color Key:
Dry
Saturated

(1) F - Flooding: The temporary inundation of an area caused by overflowing streams, runoff from adjacent slopes or tides.

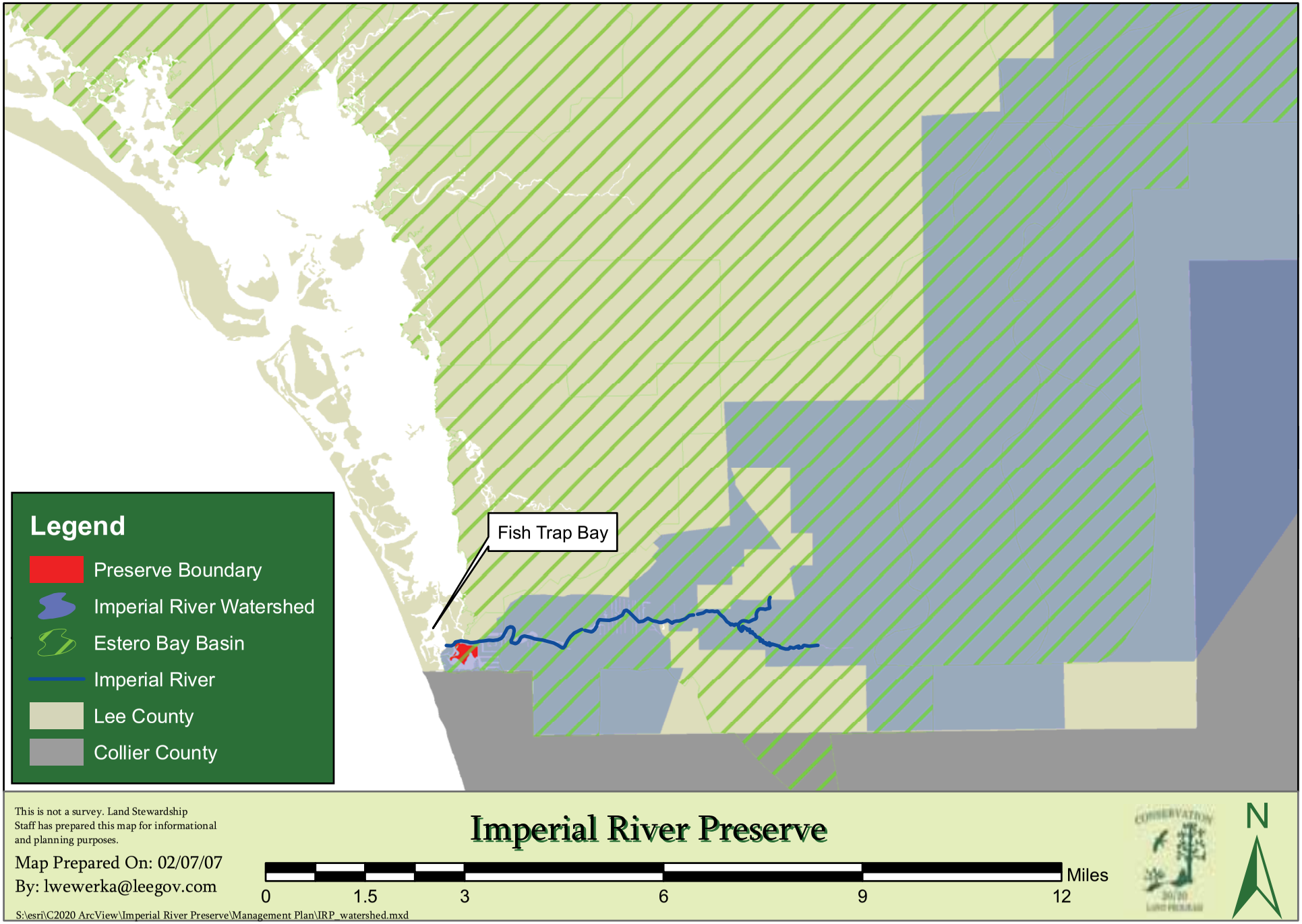
(2) * Water table is above the surface of soil
B - Soils having a moderate infiltration rate (low to moderate runoff potential) when thoroughly wet.
D - Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet.

v. *Hydrologic Components and Watershed*

IRP is part of the 86 square mile Imperial River Watershed, the largest in Lee County within South Florida Water Management District's (SFWMD) Estero Bay Basin. The Preserve is positioned at the mouth of the Imperial River (Figure 5). Due to its location, IRP is subject to tidal influence from the Fish Trap Bay estuarine system. The Preserve's natural hydroperiod, such as tidal flushing from the north, has most likely been altered by the surrounding Imperial Shores subdivision and canal bordering the eastern boundary. It is difficult to ascertain the hydrological impact to the IRP resulting from early historical landscape alterations.

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 hydrologic features, 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). IRP was classified as Estuarine Scrub-Shrub. 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 wetlands are intertidal and are dominated by woody vegetation less than 20 feet tall. Based on the federal NWI evaluation, all of IRP is classified as wetlands.

Figure 5. Watershed



B. Biological Resources

i. Ecosystem Function

A tidal swamp, such as that found at IRP, is a significant plant community because it functions as a nursery ground for most of Florida's commercially and recreationally important fish and shellfish. Occurring in flat coastal areas the soils are generally saturated with brackish water at all times, and at high tides these same soils are usually inundated with standing water. In older areas, the sands and muds are usually covered by a layer of peat which has built up from detritus (decaying plant material). Temperature, salinity, tidal fluctuation, substrate and wave energy are five physical factors influencing the size and extent of these communities. Requiring an annual average water temperature above 19°C (66°F) they do not tolerate temperatures below freezing or temperatures which fluctuate widely over the course of a year (FNAI & FDNR 1990).

The prop roots of red mangroves, the extensive pneumatophores (aerial roots) of black mangroves and the dense root mats of the white mangrove serve to entrap sediments and recycle nutrients from upland areas and from tidal import. This process serves in island stabilization and is an important part of preserving the coastline of south Florida. These root structures also provide substrate for the attachment of and shelter for numerous marine and estuarine organisms (FNAI & FDNR 1990). In addition to island formation, tidal swamps are also important in protecting the coastline from erosion. The roots of the mangroves act to disperse wave energy and stabilize the shoreline. Additionally, tidal swamps help protect other inland communities by absorbing the brunt of tropical storms and hurricanes.

Tidal swamps provide breeding grounds for substantial populations of wading birds, shorebirds and other animals (FNAI & FDNR 1990). Several bird species including; mangrove cuckoos (*Coccyzus minor*), black-whiskered vireos (*Vireo altiloquus*) and gray kingbirds (*Tyrannus dominicensis*) are dependent on mangroves for nesting. These species numbers are jeopardized by the fragmentation of thier habitat. The tidal swamp is also important habitat for wading birds such as wood storks (*Mycteria americana*), white ibis (*Eudocimus albus*), and roseate spoonbills (*Platalea ajaja*) all of which are known to use the larger mangroves as nesting areas. Although not all have been documented at the Preserve, there are several wildlife species that are found exclusively in tidal swamps including mangrove salt marsh snakes (*Nerodia clarkii compressicauda*) and 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 its leaves and other plant components (FNAI & FDNR 1990).

ii. Natural Plant Communities

IRP is a homogenous mix of red, white and black mangroves. The Florida Natural Areas Inventory (FNAI) identifies and describes only one plant community at the Preserve; Tidal Swamp. The natural community is tainted by the presence of Brazilian Pepper (*Schinus terebinthifolius)* and other exotics around the perimeter of the Preserve and on higher elevations within the Preserve itself. Appendix A contains a list of plant species identified on numerous site inspections to IRP, but not necessarily a comprehensive list for the entire Preserve.

In "Guide to the Natural Communities of Florida" the Florida Natural Areas Inventory and Department of Natural Resources (1990) define the plant community found at Imperial River Preserve as;

Tidal Swamps - (*synonyms: mangrove forest, mangrove swamp, mangrove islands*). 39 acres, 100% coverage of Imperial River Preserve

Marine and estuarine tidal swamps are "Floral Based Natural Communities" characterized as dense, low forests occurring along relatively flat, intertidal and supratidal shorelines of low wave energy along southern Florida. The dominant plants of tidal swamp communities inculde red mangrove, black mangrove, white mangrove and buttonwood. These four species occasionally occur in zones which are defined by varying water levels, with red mangrove occupying the lowest zone, black mangrove the intermediate zone, and white mangrove and buttonwood the highest zone.

Salt water is a key element in reducing competition from other plants and allowing mangroves to flourish. In addition, mangroves have adapted to the salt water environment by either excluding or excreting salt from plant tissues. Mangroves can survive in fresh water but are not usually found in large stands under such conditions in nature because they succumb to competition (FNAI & FDNR 1990).

iii. Fauna

Typical animals of the Tidal Swamp include mangrove salt marsh snake, raccoon (*Procyon lotor)*, brown pelican (*Pelecanus occidentalis)*, white ibis, osprey (*Pandion haliaetus)*, bald eagle (*Haliaeetus leucocephalus*), and a variety of shorebirds, herons and egrets (FNAI & DNR 1990). Fishes are likewise diverse in this community including; sharks, rays, tarpon (*Megalops atlanticus)*, ladyfish (*Elops saurus*), sardines, snapper, sheepshead (*Archosargus probatocephalus)*,

and mullet (*Mugil cephalus)*. Several of these species take advantage of the protection that the mangroves provide for their nurseries.

The intertidal zone shows the most diversity in fauna found on the Preserve, where species found is determined by the amount of time spent submerged on a particular point on the mangrove's prop root. The roots themselves support populations of crabs including the mangrove tree crab (*Aratus pisonii)* and fiddler crab (*Uca spp*.) as well as a variety of snails found along the roots and in the mud beneath. Star barnacles (*Chthamalidae spp*.) occupy the uppermost regions of the prop roots, while larger barnacles are found farther down, leading eventually to the oysters in the midtidal zone. Mussels populate the mid and lower intertidal zones. The subtidal zone is home to tunicates, sponges, fanworms, and numerous other invertebrates.

Additional faunal communities are supported in other areas of the Preserve including a variety of insects such as the mosquito and arachnids like the spinyback orb weaver (*Gasteracantha cancriformis)*.

Species occurring at the Preserve are recorded during quarterly site inspections by staff and by Lee County Bird Patrol volunteers. Future sightings will continue to be recorded. See Appendix B for a complete list of wildlife documented at the Preserve.

Several exotic wildlife species have been documented at the Preserve (Table 3).

Table 3: Exotic Wildlife at Imperial River Preserve

Scientific Name	**Common Name**
Osteopilus septentrionalis	Cuban treefrog
Anolis sagrei	brown anole
Eleutherodactylus planirostris planirostis	greenhouse frog

iv. Designated Species

There are a variety of listed animal and plant species found at IRP (Table 3). 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 (FDA), Florida Natural Areas Inventory (FNAI) and/or the National Marine Fisheries Service (NMFS) 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. Staff is currently evaluating monitoring methods to determine if management techniques on all C20/20 preserves are effective. Stewardship practices at the Preserve including exotic plant control, trash removal and enforcement of no littering, no weapons and no motorized vehicles regulations will all help with the protection of listed species.

Table 4 documents listed species both observed and expected to be found at Imperial River Preserve, followed by a brief summary of each species explaining why they are in decline. If more listed species are documented on the Preserve they will be added to this list.

Table 4: Observed and Expected Species and their Listed Status

Scientific Name	Common Name	FDA	FNAI	FWC	USFWS	IRC	Occurrence
REPTILES							
Alligator mississippiensis	American alligator		G5/S4	SSC	T (S/A)		expected
BIRDS							
Coccyzus minor	mangrove cuckoo		G5/S3				expected
Egretta caerulea	little blue heron		G5/S4	SSC			confirmed
Egretta thula	snowy egret		G5/S3	SSC			confirmed
Egretta tricolor	tricolored heron		G5/S4	SSC			confirmed
Egretta rufescens	reddish egret		G5/S4	SSC			
Eudocimus albus	white ibis		G5/S4	SSC			confirmed
Haliaeetus leucocephalus	bald eagle		G4/S3	T	T		confirmed
PLANTS							
Acrostichum aureum	golden leather fern	T				R	confirmed
Baccharis angustifolia	Saltwater falsewillow					R	confirmed
Batis maritima	saltwort					R	confirmed
Encyclia tampensis	Florida butterfly orchid	CE					confirmed
Gossypium hirsutum	wild cotton	E				R	confirmed
Rhabdadenia biflora	rubbervine, mangrovevine					R	confirmed
Spermacoce prostrata	prostrate false buttonweed					R	confirmed
Tillandsia fasciculata	cardinal airplant	E					confirmed
Tillandsia utriculata	giant airplant	E					confirmed

Key

E = Endangered
T / T (S/A) = Threatened / Threatened due to Similarity of Appearance
R = Rare
SSC = Species of Special Concern
CE = Commercially Exploited
G5 = Globally Secure
G4 = Globally Apparently Secure
S4 = Florida Apparently Secure
S3 = Florida Rare

American Alligator

American alligators (*Alligator mississippiensis*) have recovered dramatically since the 1960's. There are even some populations large enough to support limited harvests. Pollution and destruction of wetlands are currently the main threat to this species. Protecting wetlands from ditching, filling and pollution are the management recommendations for this species (Hipes et al. 2000).

Mangrove Cuckoo

The mangrove cuckoo has not been documented at IRP, but its secretive nature makes 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 unfragmented mangrove forest is essential for their survival (Hipes et al 2000).

Little Blue Heron, Snowy Egret, Tricolored Heron, White Ibis

The little blue heron's (*Egretta caerulea*) and the tricolored heron's (*E. tricolor*), white ibis and snowy egret's (*E. thula*) decline are due to loss of essential habitat. There is also some indication that pesticides and heavy metal contamination may affect little blue herons and human disturbance to rookeries may be an increased factor for the white ibis (Hipes et al. 2000).

Bald Eagle

Bald eagle numbers have steadily increased in Florida after a low of 120 active nests in 1973 (Hipes et al. 2000). Still, loss of habitat and human disturbance due to development is a primary concern for this species.

Golden Leather Fern

Golden leather fern is found in mangrove swamps, saltwater and brackish marshes and coastal hammocks. Its range is restricted to the southern coastal regions of Florida. It has been documented in several portions of IRP.

Florida Butterfly Orchid

Although locally abundant (Brown 2002), the Florida butterfly orchid (*Encyclia tampensis*) is designated as Commercially Exploited by the FDA. A plant that is designated as "Commercially Exploited" is considered to be threatened by commercial exploitation. Butterfly orchids are not allowed to be collected, injured or destroyed on public lands and strict limits for collection are permitted on private lands (with permission from the land owner).

Tillandsia Species

The cardinal airplant (*Tillandsia fasciculata var. densispica*) and giant airplant (*Tillandsia utriculata*) are all found in scattered populations throughout the Preserve. Threats to this species include illegal collecting, the exotic Mexican bromeliad weevil (*Metamasius callizana*) and habitat destruction. Both species were considered to be fairly common before the introduction of the weevil (Save 2004).

Wild Cotton

Wild cotton (*Gossypium hirsutum*) has been introduced (planted) in the Preserve. Threats to this species include illegal collecting, various pests and diseases and habitat destruction. Wild cotton is cultivated commercially and although listed in Florida, it is common in other areas and considered invasive in some states.

A number of the designated plant species (Table 4) were provided by IRC, which is not a regulatory agency. IRC's designation was either obtained from their book (Gann 2002) or Internet website (http://www.regionalconservation.org/ircs/database/search/QuickSearch.asp). 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 IRP, a number of Rare, Imperiled and Critically 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 as rare with fewer than 100,000 individuals. 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. Critically Imperiled plants are defined as being either extreme rarity (5 or fewer occurrences, or fewer than 1,000 individuals), or because of extreme vulnerability to extinction due to some natural or human factor. IRC only ranks those taxa as critically imperiled with 10,000 or fewer individuals.

In their book, Rare Plants of South Florida: Their History, Conservation and Restoration (Gann 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 IRP:

- Ensure that park improvements and management 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.

If additional listed species are documented on the Preserve they will be added to the lists in Appendices A or B. When any of the designated species' nests are discovered on the Preserve, a map will be created, for staff use only, to assist with planning for restoration activities.

v. Biological Diversity

Representing one of the most biodiverse coastal communities, tidal swamps play an important part in the health of both inland systems and the marine environment. Site inspections and field work have identified over 65 plant species (approximately 1/3 of which are exotic species) and numerous wildlife sightings at IRP. Still a large number of species within the intertidal zone go unidentified due to the difficulty in accessing these areas. Through continued field work and recurring site inspections both plant and animal species will continue to be identified and added, of which existing known naturally occurring populations will be monitored ensuring their persistence within the community.

The removal of invasive exotic species will potentially lower the Alpha Diversity (species richness) of the Preserve; however the resulting community will be healthier and overtime could increase in overall species richness through the recruitment of species pushed out by the exotics.

C. Cultural Resources

i. Archaeological Features

In 1977, an archeological investigation was performed on the Preserve by the Southwest Florida Archeological Society. The site was called the Wild Lime Site. The Preserve's archeological significance consists of shell middens where investigators found sand tempered plain ceramics from the Glades Period. A more thorough survey could be conducted in the future with the collaboration of Florida Department of Environmental Protection (FDEP) Estero Bay Preserve State Park staff, since IRP is included within their aquatic preserve. The

preservation of the archaeological site will consist of passive management by keeping the site location confidential and periodic monitoring for impacts.

If evidence of additional shell middens or other artifacts are found in the Preserve, 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.

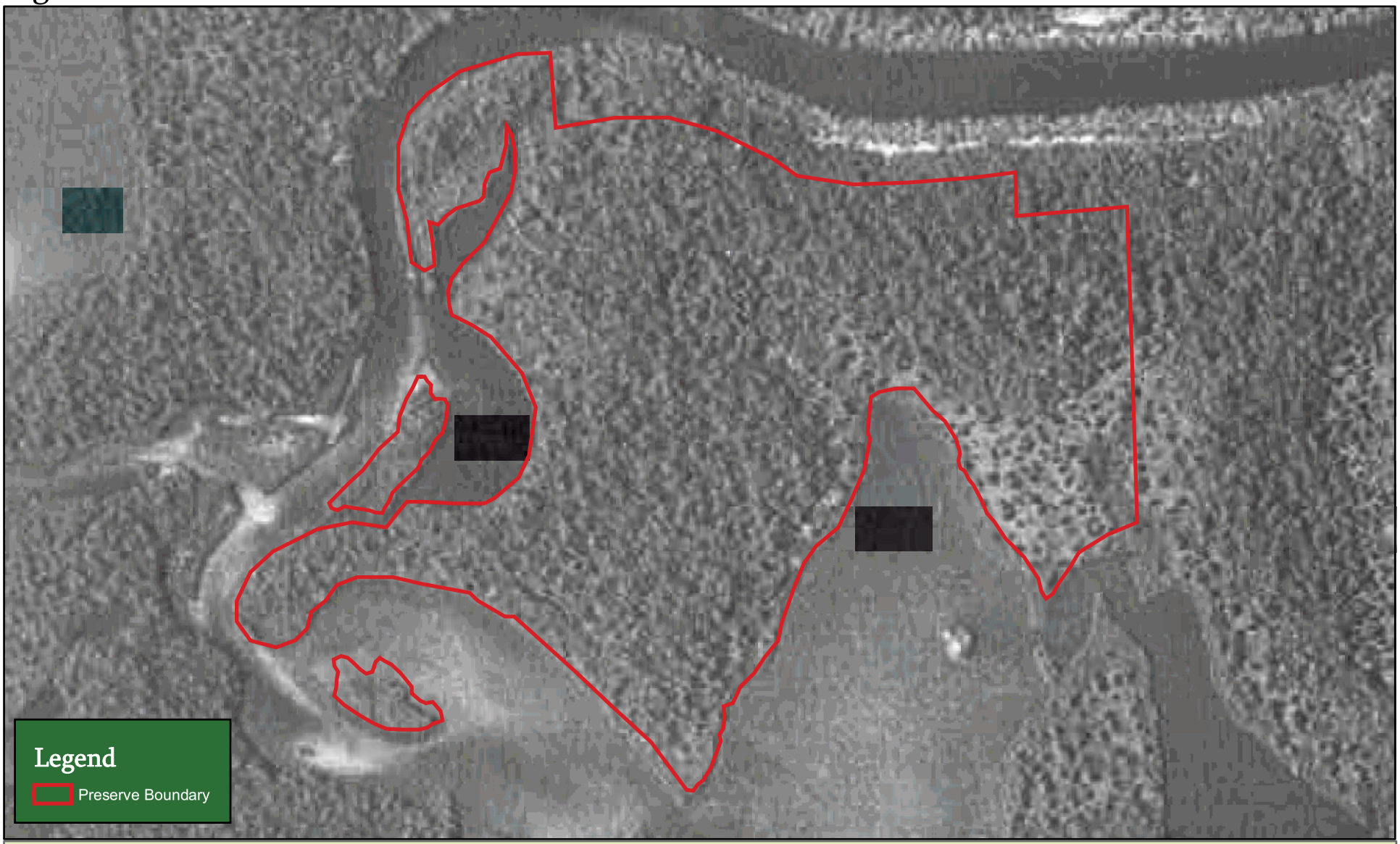
ii. Land Use History

IRP has remained relatively unchanged since aerial photography was first used in Lee County in 1944. According to aerials provided by the USDA Natural Resources Conservation Service, the Preserve was part of a much larger coastal mangrove community through 1953 (Figures 6 & 7). By 1958 (Figure 8) numerous roads had been constructed throughout the area including a road which connected the present day Imperial Shores Boulevard, through the northeast corner of the Preserve, terminating at the Imperial River.

According to later aerial photographs, development of the surrounding neighborhood continued to impact the Preserve. By 1968, the road visible in the 1958 aerial had vanished and the north-south canal, along the eastern boundary of the IRP, had been dredged. In 1974 and 1975 the mangroves were cleared along the future Esplanade Street, adjacent to the north boundary of IRP. This clearing included an encroachment into the Preserve by an extension of Esplanade Street further west than its current location. By 1977, the road encroachment was widened into a cul-de-sac and the lots adjacent to the northeastern boundary were cleared approximately 50 feet into IRP. By 1981, the Esplanade Street encroachment had filled in with mangroves. It took another 12 years for the northeast boundary encroachment to fill in, unfortunately, instead of filling in with native mangroves; the disturbed area vegetation was primarily Brazilian pepper.

After acquiring the Preserve in 1998, Lee County Parks & Recreation (LCPR) staff wrote the first edition of the Land Stewardship Plan for the Preserve and commenced restoration activities. Invasive exotic plants were removed in 2000, followed by native plantings in the road right-of-way (ROW) and in the northeast corner of the Preserve. Unfortunately, the plantings were not as successful as planned and Land Stewardship staff decided that the best way to maintain the ROW was to mow as needed.

Figure 6. 1944 Aerial



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

Map Prepared On: 02/20/07

By: pdewitt@leegov.com

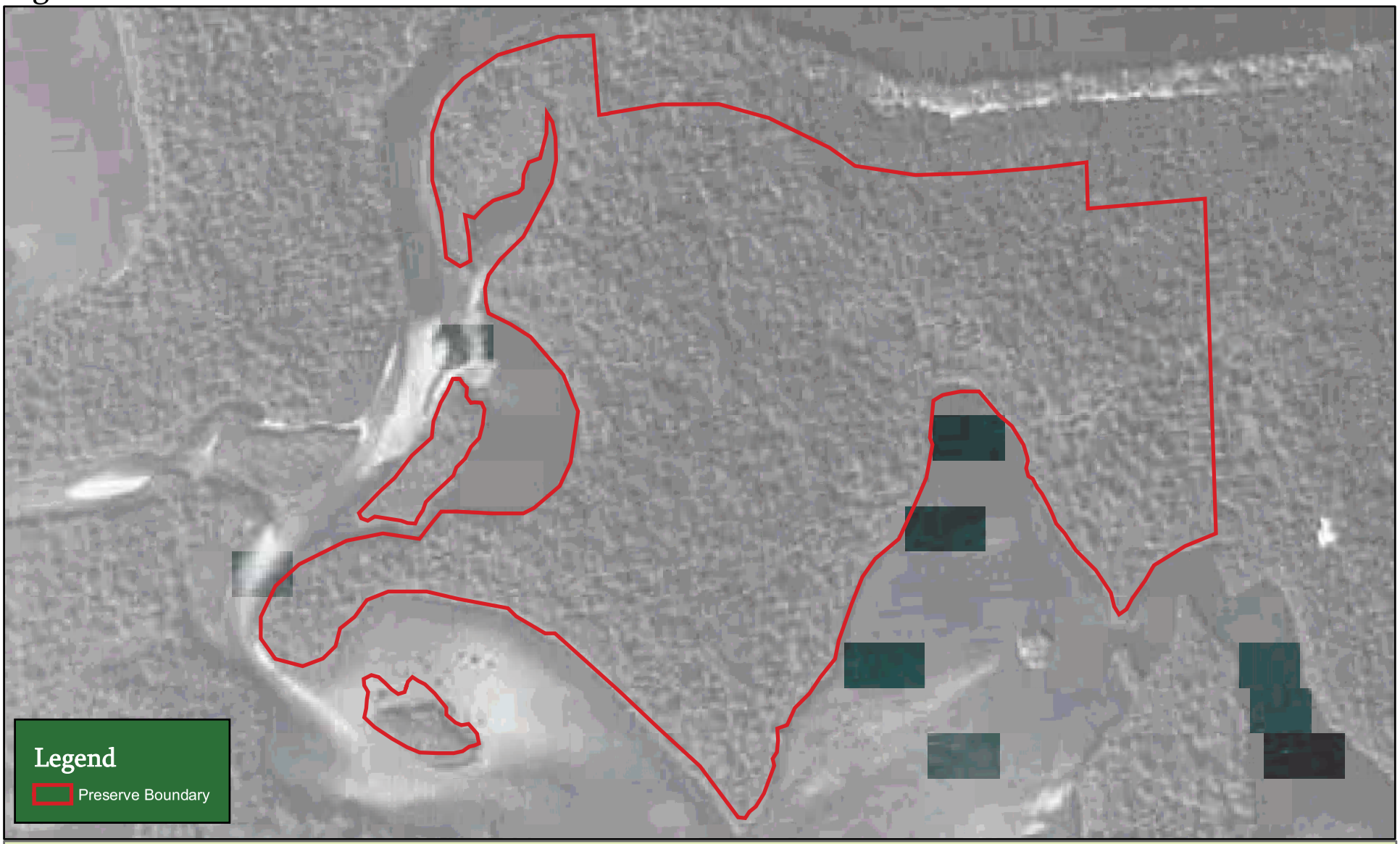
Imperial River Preserve

0 230 460 920 1,380 1,840 Feet

N

S:\esri\C2020 ArcView\Imperial River Preserve\Management Plan\IRP_1944 Aerial.mxd

Figure 7. 1953 Aerial



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

Map Prepared On: 02/20/07
By: pdewitt@leegov.com

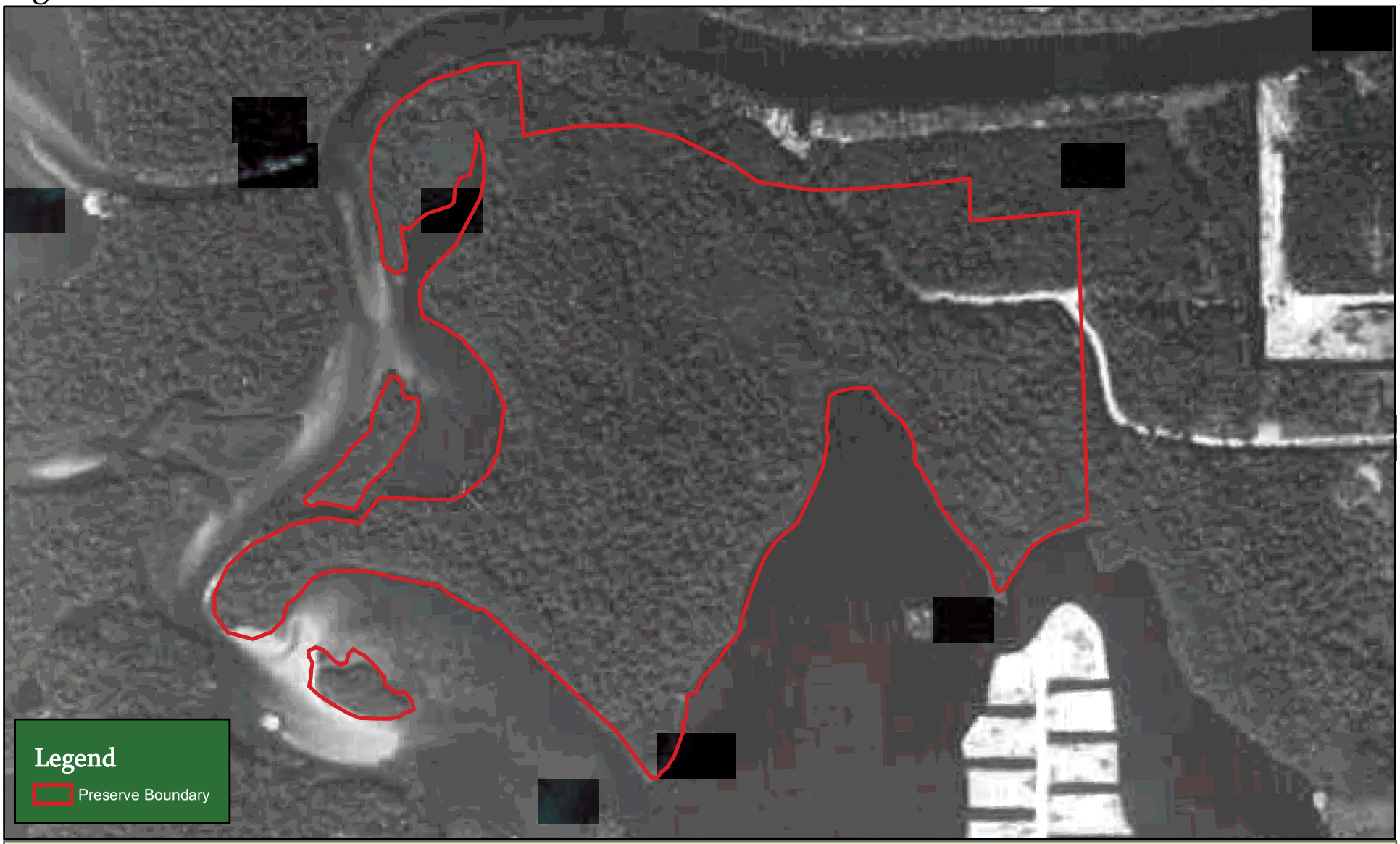
Imperial River Preserve

0 220 440 880 1,320 1,760 Feet

N

S:\esri\C2020 ArcView\Imperial River Preserve\Management Plan\IRP_1953 Aerial.mxd

Figure 8. 1958 Aerial



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

Map Prepared On: 02/20/07
By: pdewitt@leegov.com

Imperial River Preserve

0 240 480 960 1,440 1,920 Feet

S:\esri\C2020 ArcView\Imperial River Preserve\Management Plan\IRP_1958 Aerial.mxd

N

iii. Public Interest

Acquisition of Imperial River Preserve is important for the preservation of environmentally sensitive lands, potential to provide water quality enhancements, storage of floodwaters and flood protection. The entire Preserve lies within the Tropical Storm Surge zone and the Coastal High Hazard area. The tidal swamp provides protection from flooding during extreme weather events for the interior areas.

V. FACTORS INFLUENCING MANAGEMENT

A. Natural Trends and Disturbances

Natural trends and disturbances influencing native communities and stewardship at IRP include hurricanes, tides and the cycling wet and dry seasons. Implementation of the Management Action Plan will take all of these factors and their influence on projects at IRP into consideration. For example, a tropical storm or hurricane could damage large amounts of vegetation. In the event that the IRP is impacted by a hurricane, the site will be left to recover on its own. Land Stewardship staff will remove only those trees hindering traffic on Esplanade Street and those posing a threat to neighbors.

Invasive exotic plant control is influenced by seasonal hydroperiods and tides. The Land Stewardship Operations Manual's (LSOM's) exotic plant prescription form will be used to define the conditions for control activities. Care shall be taken to prevent herbicide from running off during a typical summer thunderstorm so as not to affect non-target plants. Only herbicides approved for aquatic application will be used for treatment of vegetation in standing water or where flooding may occur.

B. Internal Influences

There are few signs of human influences at IRP. Dredged channels and berms created for the surrounding development have altered the natural landscape and provide habitat for invasive exotic vegetation.

A study of historic aerial photographs shows that there has been minimal human disturbance on the site with the exception of a primitive road constructed between 1953 and 1958 (Figure 8), a cul-de-sac in the NW portion of the preserve and a ditch through the preserve. By 1981 the cul-de-sac had become overgrown and no evidence of the road remained on the Preserve; the ditch still exists in parts and has become overgrown with mangroves.

An additional internal influence is trash that has accumulated on the Preserve, most of it has probably washed up during storms and tidal events. Among this

waste is the wreckage of a small boat in the tidal zone that has become a substantial oyster colony and provides habitat for several species of juvenile fish.

C. External Influences

Like many natural areas surrounded by urban development, one of the primary external influences at IRP is dumping of horticultural and other debris on the north boundary, as well as assorted trash (monofilament and other fishing gear, small appliances, boats, etc.) along the shoreline. During quarterly site inspections, Land Stewardship staff will pick up smaller debris, and coordinate larger clean up efforts when necessary. Abandoned boats will be reported to Lee County's Division of Natural Resources.

A second influence to IRP is mangrove die-off. Land Stewardship staff has noticed that along the western boundary of the Preserve, the red mangroves growing on the fringe have died back to approximately 15 feet into the Preserve. There is also a small (less than 1 acre) patch of dead black mangroves in the southeastern corner. In the case of the extensive fringe die-back, numerous propagules are growing up among the root system of the dead adult trees. Initially, staff speculated that this die off was caused by boat wakes, as most of the die back is adjacent to the boat channel connecting Estero, Fish Trap and Little Hickory Bays. Further research indicates that there are numerous reasons that mangroves die back, some human caused and some natural. The extensive list includes pesticides, pollution, increased salinity (both natural and by water management), nutrient deficiency, pests, in-washing of sandy deposits from storm surges, freezes, hurricane damage, erosion and rising sea levels due to climate change. What is known is that die offs are often part of the natural cycles of mangrove forests. In this instance, many of the causes listed above are reasonable explanations, including storm surge from Hurricane Wilma, the center of which passed within 30 miles of the Preserve in 2005. Staff will continue to monitor the mangroves while conducting site inspections.

Boat usage on the Imperial River can also influence the overall health of the Preserve; these impacts include: pollution from engines/exhausts, trash dropped out of passing boats and noise pollution which scares off wildlife.

A final possible concern is erosion along the shoreline adjacent to the mouth of the Imperial River. In 2004, a neighbor of the Preserve reported erosion problems on the north boundary that they believed was caused by boat wakes. Land Stewardship staff placed a photo point on the north boundary near some mangroves that had fallen into the water. The neighbor graciously granted permission to use their dock to take pictures of the point, and a protocol was established to take pictures at each quarterly site inspection at low tide for nearby Little Hickory Island, according to www.saltwatertides.com. At the time of the revision of this stewardship plan (2 years), no additional trees have dropped

into the water. Staff will continue to utilize this photo point for monitoring of possible erosion concerns.

D. Legal Obligations and Constraints

i. Permitting

At this time land stewardship activities at IRP are not expected to involve obtaining permits from regulatory agencies except for where work may harm mangrove species; before any such work is undertaken (i.e. removal of Australian Pines) application shall be made for a mangrove deminimus permit.

ii. Other Legal Constraints

Beyond the 1996 Mangrove Trimming and Preservation Act (Sections 403.9321 - 403.9333) no other legal constraints have been identified that would influence the management and land stewardship activities on Imperial River Preserve at this time.

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 2006). 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 Imperial River Preserve 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)

Ordinance No. 98-09, Amended by Ordinance No. 02-02, has recently been repealed and replaced by Ordinance No. 06-26.

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 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, OBJECTIVE 105.1: DEVELOPMENT IN COASTAL HIGH HAZARD AREAS includes **POLICY 105.1.4:** Through the Lee Plan amendment process, land use designations of undeveloped areas within coastal high hazard areas will be considered for reduced density categories (or assignment of minimum allowable densities where density ranges are permitted) in order to limit the future population exposed to coastal flooding. (Amended by Ordinance No. 92-35, 94-30, 00-22). In accordance to this policy, Land Stewardship staff will direct the Community Development Department to change the zoning of CGMP to Environmentally Critical.

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.

Same chapter, **Objective 77.6: 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 107.4: 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, 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 IRP include limited funding and limited vehicular access. Although C20/20 has a management fund, it is inadequate to fulfill the restoration activities for this and the other preserves. Fortunately, initial exotic plant removal was conducted at IRP in 2000, and except for some large

Australian pines on the east boundary, the Preserve can be considered at a maintenance level for invasive exotic plants.

Access to the majority of the Preserve is limited to boats or on foot through thick mangroves with a substrate of muck that is often inundated by the tides. The nearest public boat ramp access is 2.5 miles upstream at the Imperial River boat ramp. Staff has also obtained permission to launch a canoe from an adjacent neighbor (see Acquisition section) for the purposes of site inspections and land stewardship activities.

F. Public Access and Resource-Based Recreation

In accordance with the LSOM, IRP is classified as a Category 3 Limited Use Preserve. Due to its small size, sensitive wetlands and thick vegetation staff does not propose additional recreational activities beyond the usual hiking, bird watching, nature photography and study that are allowed on all C20/20 preserves.

The Preserve borders a section of The Great Calusa Blueway, Lee County's paddling trail that provides an ecological tour of the bays, rivers, backwaters and shorelines of southwest Florida. Information on Phases I and II can be found at www.thegreatcalusablueway.com. Although the Preserve provides no suitable landing spot for boaters, efforts will be made to identify the Preserve on Blueway maps as a point of interest.

No additional amenities are proposed at this time as the Preserve is located between two other Lee County Parks & Recreation parks, Imperial River Boat Ramp and Bonita Beach (Figure 1). Both of these parks offer more advanced facilities including a boat ramp, restrooms and boardwalks.

G. Acquisition

The 1984 Lee County Comprehensive Plan recognized the environmentally sensitive nature of the 39-acre mangrove tract, owned by Richard and Ann Reahard, and placed it in the "Resource Protection Area" designation (RPA) of the Comprehensive Plan. This land use designation restricted density to a maximum of one dwelling unit per 40 acres or uses of a recreation open space or conservation nature. The Reahards maintained that due to the county imposition of the RPA classification they were unable to carry out the planned 41 to 126 residential unit development on the subject parcel, which had been platted to be included in the Imperial Shores residential development. Even though they acknowledged the validity of the Comprehensive Plan designation the Reahards felt that they should be compensated for their inability to develop the subject parcel. Lee County's position was that under the Laws of Florida filling in wetlands and developing a 126 lot subdivision was not a property right Reahard possessed.

The Circuit Court of Lee County ruled, on March 4th, 1997, that the defendant, Lee County, pay to the plaintiffs, Richard and Ann Reahard, the sum of $600,000.00, the value of the property as a 126 unit subdivision in 1984, plus interest from December 21st, 1984, in the amount of $839,506.84, for a total sum of $1,439,506.84. The Reahards then had 30 days to turn the title of the property over to Lee County.

Lee County purchased the property in 1998 from the Reahard family. Figure 9 shows the "actual" boundary of the site, reflecting the proposed development, including several proposed canals.

On February 24th 1998 a walk on item was introduced at the BOCC meeting (Blue Sheet #980164) to approve payment of final judgment of the land cost and interest from the C20/20 fund. Commissioners had different suggestions on which fund would be appropriate for the interest. The final motion that was approved 4-1 was to have the land costs and the interest be "termed as a loan" until the Conservation Land Acquisition Selection Advisory Committee (CLASAC) and BOCC could determine if it was an appropriate use of C20/20 funds. This motion resulted in public outcry by numerous citizens and environmental groups. The primary concerns were that since the subject came up as a walk on item, citizens were not present or prepared to speak about the issue and that the advisory group was not consulted ahead of time. It was later explained that the "walk on" was necessary because the interest fee was increasing almost $400 per day and BOCC would not be meeting again until March 17th (Schwartz 1998).

The Lee County BOCC asked CLASAC to review the subject property using the established criteria and make a recommendation to BOCC as to whether or not the property should be purchased through the C20/20 program. CLASAC reviewed the property and felt that it had met the criteria and agreed to use C20/20 funds for the land cost but the interest payment was an inappropriate use.

At the time of acquisition, there was an existing encroachment of rip rap and sod, (Figure10). To avoid future liability, reduce maintenance, time and money, minimize management time and expense of fencing for a highly disturbed area, Land Stewardship and County Lands staff jointly recommended that the BOCC surplus of the 1937 square feet and sale to the adjacent land owner who acquired the property in 2000. This motion was approved June 13, 2006 and $3,500 was reimbursed to the C20/20 fund.

IRP's Future Land Use is "Conservation Lands Wetland" and has a mix of zoning (Agriculture, Light Industrial, Residential Multiple Family and Two Family Conservation) designations (Appendix C). Land Stewardship Staff will work with Lee County's Planning Division to change the zoning to "Environmentally Critical".

Figure 9. Technical Preserve Boundary & STRAP Numbers

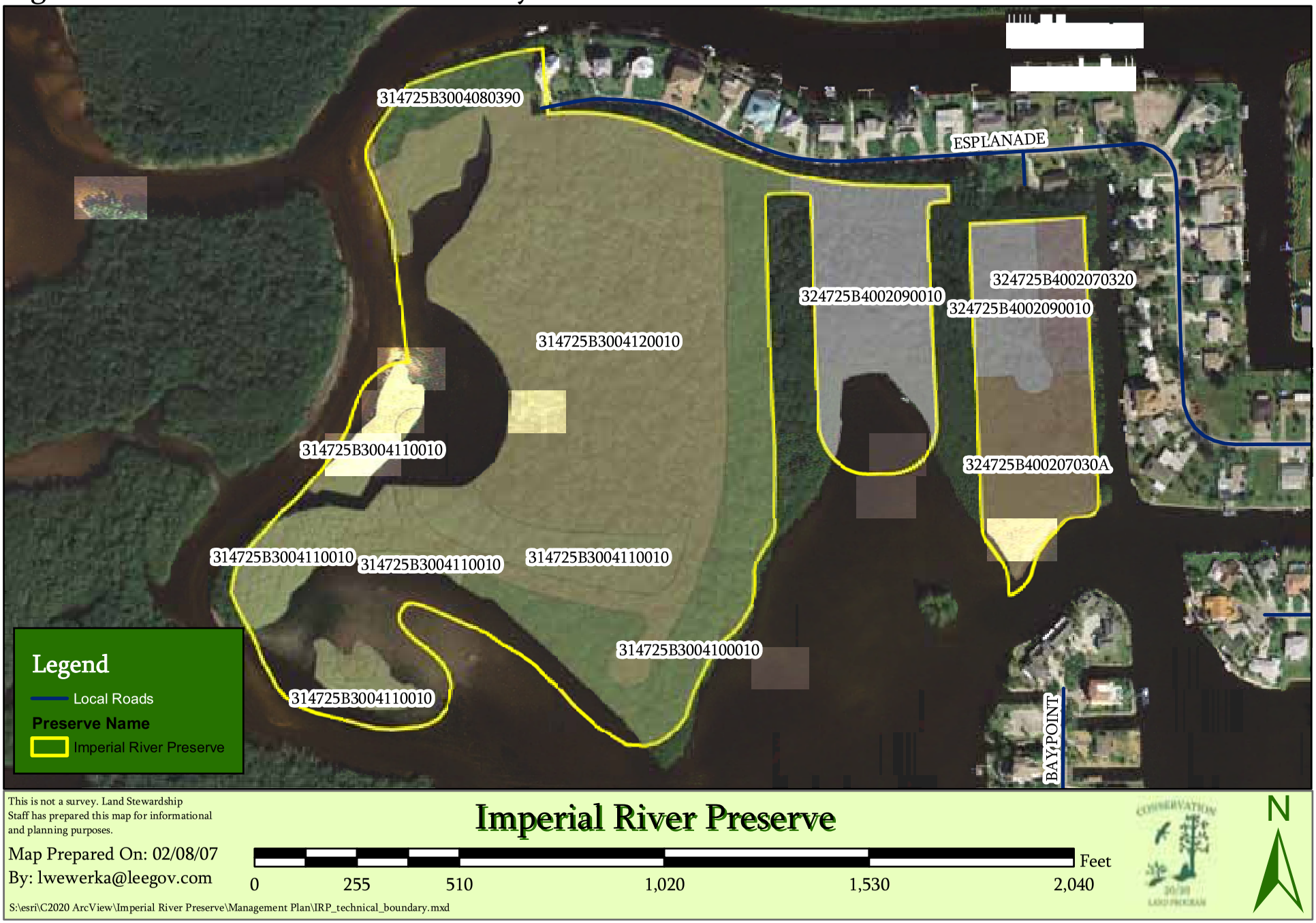


Figure 10. Previous Encroachment Location

VI. MANAGEMENT ACTION PLAN

A. Management Unit Descriptions

Due to its small size and consistency in ecological community (tidal swamp) Imperial River Preserve will not be divided into separate Management Units.

B. Goals and Strategies

While the following are our 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 governmental infrastructure projects will be used to supplement our operations budget to meet our goals in a timely manner.

Natural Resource Management

- ✓ Exotic plant control and maintenance
- ✓ Monitor and protect listed species
- ✓ Exotic and feral animal removal

Overall Protection

- ✓ Shoreline erosion control
- ✓ Debris removal and prevention of dumping
- ✓ Boundary and Preserve sign installation
- ✓ Change zoning categories

Public Use

- ✓ Public Information
- ✓ Conservation 20/20 Outreach Program

Volunteers

- ✓ Assist volunteer groups

The following is a description of how each of these goals will be carried out, the success criteria used to measure each goal and a projected timetable outlining when and where each activity will take place.

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 on the Preserve. The goal is to remove/control these exotic species, followed with treatments of resprouts and new seedlings as needed. This goal will continue to

maintain the entire Preserve at its maintenance level, defined as less than 5 percent invasive exotic plant coverage. Land Stewardship staff will designate one of the quarterly site inspections each year to the control of identified invasive exotic species. This site inspection/exotic control will occur during the driest part of the year between February and April.

Prior to each invasive exotic plant control project at IRP, a Prescription Form (located in the LSOM) will be filled out by Land Stewardship staff. If future work involves hiring a contractor, the prescription will be reviewed by the contractor(s) and filed appropriately. Contractors involved in these projects will be required to fill out the Daily Report Control Form (located in the LSOM), which will be filed appropriately by staff.

- Wetlands with light to moderate exotic species infestations:

  Staff will hand pull, basal bark, girdle, foliar, or cut-stump treat the exotics with the appropriate herbicide during periods of extreme low tide. Follow-up treatments will be conducted on an as needed basis as discovered in the quarterly site inspections. No replanting will be needed due to significant presence of native vegetation and native seed bank.

Monitor and protect listed species

As discussed in the Designated Species section, there are several listed species that have been documented on the Preserve including golden leather fern, giant & cardinal airplants, tricolored & little blue herons and the snowy egret. These species will benefit from exotic plant control activities. During stewardship activities, efforts will be made to minimize any negative impact to listed species.

IRP is part of a countywide quarterly site inspection program conducted for all C20/20 preserves. A copy of the site inspection form is available in the LSOM. 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, staff finds FNAI listed species, they will be reported using the appropriate forms.

Exotic and feral animal removal

Although not noted at IRP, this Preserve, like other C20/20 preserves, does not contain nor will it support feral cat colonies. FWC's Feral and Free Ranging Cats policy is *"To protect native wildlife from predation, disease, and other impacts presented by feral and free-ranging cats"* (FWC 2003). Any feral cats will be trapped and taken to Lee County Animal Services.

Overall Protection

Shoreline erosion control

Currently there is no plan to control the natural erosion that maybe taking place within the Preserve. However, staff will continue to monitor the shoreline and associated vegetation for signs of increased degradation. If deemed necessary Land Stewardship staff will endeavor to work with other agencies to mitigate erosion issues, ideally extending the boaters “no wake” out past the Preserve.

The main objective of this effort would be to prevent or reduce vegetation and soils from falling into the estuary. This will reduce turbidity, reduce the receding shoreline, save native plants and increase foraging opportunities for wading birds while also providing more suitable habitat for other wildlife.

Debris removal and prevent dumping

IRP has a small amount of debris on interior portions and shoreline. The debris readily accumulates as it washes in during tides or waves generated by boats. Debris removal will be an ongoing effort at IRP. During quarterly site inspections, small objects that are encountered will be removed. C20/20 Rangers will also assist with removing small items when they are on patrol at the Preserve.

Land Stewardship staff will also work with other agencies in the removal of derelict boats from the shoreline of the Preserve.

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

Boundary and Preserve sign installation

Boundary signs have been installed to further protect and delineate the Preserve. Missing or damaged signs will be replaced. C20/20 Rangers or staff 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 300 feet along Esplanade Street and 500 feet along the shoreline and where deemed necessary.

Change zoning categories

Staff will coordinate with Lee County Division of Planning staff to update the zoning designation of IRP. The zoning categories will be changed to “Environmentally Critical” from “Light Industrial,” “Residential Multiple Family,” “Two Family Conservation,” and “Agriculture.”

Public Use

Public Information

Information regarding IRP and the C20/20 program will be made available through the C20/20 website (www.leeparks.org/2020) and other published media.

Conservation 20/20 Outreach Program

The C20/20 Outreach Program seeks to inform and educate the public about C20/20 and the importance of the preserves though presentations and activities available to the public and at special request.

IRP provides a unique portrait of the tidal swamp community and its inclusion in the Outreach Program will allow for guided kayak tours, nature walks and presentations concerning the Preserve.

Volunteers

Assist volunteer groups

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, wildlife monitoring, debris removal, exotic plant removal and other land stewardship projects.

VII. FINANCIAL CONSIDERATIONS

There is a perpetual management fund established for all C20/20 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. There is currently no outside funding available for this preserve. If additional funding becomes necessary monies will be supplemented through grants from various agencies as they become available.

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IX. APPENDICES

Appendix A: Plant Species List
Appendix B: Wildlife Species List
Appendix C: Zoning and Future Land Use Maps

Appendix A: Plant Species List at Imperial River Preserve

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

Scientific Name	Common Name	Native Status	EPPC	FDA	IRC
Family: Blechnaceae (mid-sorus fern)					
Blechnum serrulatum	swamp fern	native			
Family: Nephrolepidaceae (sword fern)					
Nephrolepis exaltata	wild Boston fern	native			
Family: Polypodiaceae (polypody)					
Phlebodium aureum	golden polypody	native			
Family: Pteridaceae (brake fern)					
Acrostichum aureum	golden leather fern	native		T	R
Acrostichum danaeifolium	giant leather fern	native			
Family: Zamiaceae (Zamia)					
Cycas revoluta	sago palm	exotic			
Family: Apocynaceae (dogbane)					
Rhabdadenia biflora	rubbervine, mangrovevine	native			R
Family: Arecaceae (palm)					
Phoenix reclinata	Senegal date palm	exotic	II		
Sabal palmetto	cabbage palm	native			
Family: Bromeliaceae (pineapple)					
Tillandsia fasciculata var. densispica	cardinal airplant	native		E	
Tillandsia recurvata	ballmoss	native			
Tillandsia setacea	southern needleleaf	native			
Tillandsia usneoides	Spanish moss	native			
Tillandsia utriculata	giant airplant	native		E	
Family: Commelinaceae (spiderwort)					
Commelina diffusa var. diffusa	common dayflower	exotic			
Family: Cyperaceae (sedge)					
Fimbristylis cymosa	hurricanegrass	native			
Family: Orchidaceae (orchid)					
Encyclia tampensis	Florida butterfly orchid	native		CE	
Family: Poaceae (grass)					
Cenchrus spinifex	coastal sandbur	native			
Dactyloctenium aegyptium	durban crowfootgrass	exotic			
Eleusine indica	Indian goosegrass	exotic			
Eustachys petraea	pinewoods fingergrass	native			
Paspalum notatum	bahiagrass	exotic			
Setaria parviflora	knotroot foxtail	native			
Family: Ruscaceae (butcher's broom)					
Sansevieria hyacinthoides	bowstring hemp	exotic	II		
Family: Acanthaceae (acanthus)					
Ruellia tweediana	mexican bluebell	exotic	I		
Famiy: Aizoaceae (mesembryanthemum)					
Sesuvium portulacastrum	shoreline seapurslane	native			
Family: Amaranthaceae (amaranth)					
Iresine diffusa	Juba's bush	native			
Family: Anacardiaceae (cashew)					
Schinus terebinthifolius	Brazilian pepper	exotic	I		
Family: Annonaceae (custard-apple)					
Annona glabra	pond apple	native			

Appendix A: Plant Species List at Imperial River Preserve (continued)

Scientific Name	Common Name	Native Status	EPPC	FDA	IRC
Family: Apocynaceae (dogbane)					
Asclepias curassavica	scarlet milkweed	exotic			
Cryptostegia madagascariensis	madagascar rubbervine	exotic	II		
Family: Asteraceae (aster)					
Ambrosia artemisiifolia	common ragweed	native			
Baccharis angustifolia	saltwater false willow	native			R
Baccharis halimifolia	groundsel tree	native			
Bidens alba	beggerticks	native			
Borrichia frutescens	bushy seaside oxeye	native			
Eupatorium capillifolium	dogfennel	native			
Sphagneticola trilobata	creeping oxeye	exotic	II		
Family: Avicenniaceae (black mangrove)					
Avicennia germinans	black mangrove	native			
Family: Bataceae (saltwort)					
Batis maritima	saltwort	native			R
Family: Burseraceae (gumbo-limbo)					
Bursera simaruba	gumbo-limbo	native			
Family: Casuarinaceae (sheoak)					
Casuarina equisetifolia	Australian-pine	exotic	I		
Family: Combretaceae (combretum)					
Conocarpus erectus	buttonwood	native			
Laguncularia racemosa	white mangrove	native			
Family: Convolvulaceae (morning-glory)					
Ipomoea alba	moonflowers	native			
Ipomoea hederacea	ivyleaf morning-glory	exotic			
Family: Crassulaceae (orpine)					
Kalanchoe delaagoensis	chandelier plant	exotic			
Kalanchoe pinnata	life plant	exotic	II		
Family: Cucurbitaceae (gourd)					
Momordica charantia	balsampear	exotic			
Family: Euphorbiaceae (spurge)					
Poinsettia cyathophora	paintedleaf	native			
Family: Fabaceae (pea)					
Acacia auriculiformis	earleaf acacia	exotic	I		
Albizia lebbeck	woman's tongue	exotic	I		
Dalbergia ecastaphyllum	coinvine	native			
Dalbergia sissoo	Indian rosewood	exotic	II		
Vigna luteola	hairypod cowpea	native			
Family: Malvaceae (mallow)					
Gossypium hirsutum	wild cotton	native		E	R
Thespesia populnea	portia tree	exotic	I		
Family: Myricaceae (bayberry)					
Myrica cerifera	wax myrtle	native			
Family: Myrtaceae (myrtle)					
Melaleuca quinquenervia	punktree	exotic	I		
Psidium cattleianum	strawberry guava	exotic	I		
Syzygium cumini	Java plum	exotic	I		
Family: Onagraceae (eveningprimrose)					
Gaura angustifolia	southern beeblossom	native			

Appendix A: Plant Species List at Imperial River Preserve (continued)

Scientific Name	Common Name	Native Status	EPPC	FDA	IRC
Family: Passifloraceae (passionflower)					
Passiflora suberosa	corkystem passionflower	native			
Family: Polygonaceae (buckwheat)					
Coccoloba uvifera	seagrape	native			
Family: Rhizophoraceae (mangrove)					
Rhizophora mangle	red mangrove	native			
Family: Rubiaceae (madder)					
Spermacoce prostrata	prostrate false buttonweed	native			R
Family: Sapotaceae (sapodilla)					
Sideroxylon celastrinum	saffron plum	native			
Family: Solanaceae (nightshade)					
Lycium carolinianum	Christmasberry	native			
Solanum americanum	American black nightshade	native			
Family: Urticaceae (nettle)					
Boehmeria cylindrica	false nettle	native			
Family: Vitaceae (grape)					
Vitis rotundifolia	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

T = Threatened

CE = Commercially Exploited

IRC (Institute for Regional Conservation)

R = Rare

Appendix B: Wildlife Species List at Imperial River Preserve

		Designated Status		
Scientific Name	**Common Name**	**FWC**	**FWS**	**FNAI**
MAMMALS				
Family: Delphinidae (dolphins)				
Tursiops truncatus	bottlenose dolphin			
Family: Sciuridae (squirrels)				
Sciurus carolinensis	eastern gray squirrel			
BIRDS				
Family: Pelecanidae (pelicans)				
Pelecanus occidentalis	brown pelican			
Family: Phalacrocoracidae (cormorants)				
Phalacrocorax auritus	double-crested cormorant			
Family: Ardeidae (herons, egrets, bitterns)				
Ardea herodius	great blue heron			
Egretta caerulea	little blue heron	SSC		G5/S4
Egretta tricolor	tricolored heron	SSC		G5/S4
Ardea alba	great egret			
Egretta thula	snowy egret	SSC		G5/S3
Butorides virescens	green heron			
Nyctanassa violacea	yellow-crowned night heron			
Family: Threskiornithidae (ibises and spoonbills)				
Eudocimus albus	white ibis	SSC		G5/S4
Family: Cathartidae (new world vultures)				
Cathartes aura	turkey vulture			
Coragyps atratus	black vulture			
Family: Accipitridae (hawks, kites, accipiters, harriers, eagles) ***Subfamily: Buteoninae (buzzard hawks)***				
Haliaeetus leucocephalus	bald eagle	T		G4/S3
Family: Pandionidae (ospreys)				
Pandion haliaetus	osprey			
Family: Falconidae (falcons)				
Falco spaverius	American kestrel			
Family: Scolopacidae (sandpipers, phalaropes)				
Arenaria interpres	ruddy turnstone			
Actitis macularia	spotted sandpiper			
Family: Laridae (gulls)				
Larus atricilla	laughing gull			
Family: Columbidae (pigeons and doves)				
Zenaida macroura	mourning dove			
Family: Alcedinidae (kingfishers)				
Ceryle alcyon	belted kingfisher			
Family: Picidae (woodpeckers)				
Droyocopus pileatus	pileated woodpecker			
Melanerpes carolinus	red-bellied woodpecker			
Picoides pubescens	downy woodpecker			
Family: Sylviidae ***Subfamily: Polioptilinae (gnatcatchers)***				
Polioptila caerulea	blue-gray gnatcatcher			

Appendix B: Wildlife Species List at Imperial River Preserve (continued)

		Designated Status		
Scientific Name	**Common Name**	**FWC**	**FWS**	**FNAI**
BIRDS (continued)				
Family: Mimidae (mockingbirds and thrashers)				
Dumetella carolinensis	gray catbird			
Family: Corvidae (crows, jays, etc.)				
Corvus brachyrhyncos	American crow			
Cyanocitta cristata	blue jay			
Family: Vireonidae (vireos)				
Vireo solitarius	blue-headed vireo			
Family: Parulidae (wood-warblers)				
Mniotilta varia	black-and-white warbler			
Dendroica coronata	yellow-rumped warbler			
Families: Fringillidae, Emberizidae, Cardinalidae (grosbeaks, finches, sparrows, buntings)				
Cardinalis cardinalis	northern cardinal			
Family: Icteridae (blackbirds, orioles, etc.)				
Quiscalus major	boat-tailed grackle			
REPTILES				
Family: Emydidae (box and water turtles)				
Terrapene carolina bauri	Florida box turtle			
Family: Polychridae (anoles)				
Anolis sagrei	brown anole *			
Family: Colubridae (snakes)				
Nerodia clarkii compressicauda	mangrove salt marsh snake			
Coluber constrictor constrictor priapus	southern black racer			
AMPHIBIANS				
Family: Leptodactylidae (tropical frogs)				
Eleutherodactylus planirostris planirostis	greenhouse frog *			
Family: Hylidae (treefrogs)				
Osteopilus septentrionalis	Cuban treefrog *			
FISH				
Family: Belonidae (needlefish)				
Strongylura notata	redfin needlefish			
Family: Centropomidae (snooks)				
Centropomus undecimalis	common snook			
Family: Dasyatidae (rays)				
Dasyatis spp.	stingray			
Family: Sparidae (porgies)				
Archosargus probatocephalus	sheepshead			
CRUSTACEANS				
Family: Grapsidae (grapsids & shore crabs)				
Aratus pisoni	mangrove tree crab			
Family: Ocypodidae (fiddler crabs)				
Uca spp.	fiddler crab			

Appendix B: Wildlife Species List at Imperial River Preserve (continued)

		Designated Status		
Scientific Name	**Common Name**	**FWC**	**FWS**	**FNAI**
INSECTS				
Family: Nymphalidae (brush-footed butterflies)				
Subfamily: Heliconiinae (longwings)				
Heliconius charitonius	zebra longwing			
SPIDERS				
Family: Araneidae (orbweavers)				
Gasteracantha cancriformis	spinybacked orbweaver			
amily: Tetragnathidae (long-jawed orb weavers)				
Leucauge venusta	orchard spider			

KEY:

FWC = Florida Fish & Wildlife Conservation Commission
FWS = U.S. Fish & Wildlife Service
E - Endangered
T - Threatened
SSC - Species of Special Concern

FNAI = Florida Natural Areas Inventory
G - Global rarity of the species
S - State rarity of the species
T - Subspecies of special population
1 - Critically imperiled
2 - Imperiled
3 - Rare, restricted or otherwise vulnerable to extinction
4 - Apparently secure
5 - Demonstratebly secure

Appendix C: Zoning Map