

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

Blue Sheet No. 20061497

1. ACTION REQUESTED/PURPOSE:

Approve the Orange River Preserve (ORP) Land Stewardship Plan.

2. WHAT ACTION ACCOMPLISHES:

Approving of the ORP Plan establishes guidelines for restoration and public use facilities at ORP.

3. MANAGEMENT RECOMMENDATION: Approve the plan so Land Stewardship staff can begin implementation.

4. Departmental Category: #

CIIB

5. Meeting Date: 11/21/06

6. Agenda:

- Consent
- Administrative
- Appeals
- Public
- Walk-On

7. Requirement/Purpose: (specify)

- Statute
- Ordinance Lee Plan
- Admin. Code
- Other

8. Request Initiated:

Commissioner _____
 Department Parks & Recreation
 Division _____
 By: John Yarbrough, Director

9. Background:

A Land Stewardship Plan is necessary for appropriate and planned restoration, management and public use facility development of any Conservation 20/20 Preserve. The CLASAC (Conservation Lands Acquisition and Stewardship Advisory Committee) unanimously passed a motion, accepting the Orange River Preserve Land Stewardship Plan.

The plan was available for public review on the internet, as well as at the Fort Myers – Lee County Public Library. A public meeting was held October 23, 2006 with seven neighbors and other interested parties attending. Attached is a summary of all verbal comments received with responses by staff, written comments and a copy of the sign in sheet.

10. Review for Scheduling:

Department Director	Purchasing or Contracts	Human Resources	Other	County Attorney	Budget Services				County Manager/P.W. Director
					Analyst	Risk	Grants	Mgr.	
<u>11-6-06</u>				<u>11/8/06</u>	<u>11/8/06</u>	<u>11/8/06</u>	<u>11/8/06</u>	<u>11-8-06</u>	

11. Commission Action:

- Approved
- Deferred
- Denied
- Other

Rec. by CoAtty
Date <u>11/8/06</u>
Time: <u>8:30 AM</u>
Forwarded To: <u>CAD 9:50 AM</u>

RECEIVED BY COUNTY ADMIN. <u>[Signature]</u>
<u>11/8/06</u>
<u>11:00 AM</u>
COUNTY ADMIN FORWARDED TO: <u>[Signature]</u>
<u>11-8-06</u>
<u>11:30 AM</u>

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

The second draft of the **Orange River Preserve (ORP) Land Stewardship Plan** was available for public comment from October 5 – October 23, 2006. The plan was made available to the public through the Parks and Recreation website and at the Fort Myers – Lee County 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 October 23, 2006, at 6:00 P.M. at Manatee Park. A brief presentation was provided and included background on the Preserve, proposed management activities and a timeline to complete these activities. Lee County Parks and Recreation staff received a few written responses during the public comment period in addition to verbal comments during the meeting. In the following, the issues raised during the public comment period are summarized. Copies of all original comments are included with this document.

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 Orange River Preserve

Monday, October 23, 2006, 6:00 pm, Manatee Park

Staff members present: Laura Wewerka and Cathy Olson (Conservation 20/20)

7 community members present

Laura Wewerka gave a presentation on the Preserve and what is proposed for the site.

Floor open for questions:

Several people pointed out different parcels and asked if Conservation 20/20 could purchase them.

Laura Wewerka explained the process of nominating property to the program and encouraged those attending to contact the landowners.

All but one citizen voiced their concern for the elevated noise from the modifications to the FPL power plant. They felt that removing vegetation from the Preserve would increase the problem. They wanted to know when the trees would be removed and if there would be replantings.

Laura Wewerka explained that they would be removing the exotic trees, tentatively scheduled for 2011. She also pointed out that the plan does call for planting of natives if natural recruitment does not occur.

The citizens were still very concerned about the additional noise that would result from the tree removal reducing their quality of life.

Will you open the preserve to primitive camping?

It would be unlikely, but I cannot promise what could happen during the 10-year revision.

Is it possible that a substation for FPL or other structure could be built on the Preserve?

We have already changed the Future Land Use to Conservation Lands and plan on changing the Zoning to Environmentally Critical. These changes would help to protect the parcel as a nature preserve.

Will you be removing the vines from the mangroves on the river?

No, they are native vines.

Will you give notice when you burn?

Yes, we are hoping to partner with EOC to call neighbors. If this does not work, we will mail out a general notice that we are hoping to burn in a specified time period.



Conservation 20/20 Land Stewardship Plan
Comment Card



Comments:

Noise from power plant very loud on east side of Orange River (in Orange River Hills Subdivision). Perhaps from loss of trees in preserve area.

Name (optional):

Carol J. Wilson

Affiliation (optional):



Conservation 20/20 Land Stewardship Plan
Comment Card



Comments:

Please be everywhere to protect from the noise

NO ATV

Protect Boat Trails

Name (optional):

Affiliation (optional):



Conservation 20/20 Land Stewardship Plan
Comment Card



Comments:

Do not "ATV's" allowed.
Boats needed to patrol orange river - to many speeding through Manatee zone + no wake zones.

FPL should be required to place noise buffers!! I live on the orange river - my home is worth 830,000.00 and I cannot use my back porch! Sleeping with my windows open is impossible! Why is FPL allowed to get away with this. They need to be responsible + respectful

Name (optional): Control the noise! Affiliation (optional): Buffer on Rt. 80 would help!
4636 Little River lane, Ft. Myers Fl 229105



Conservation 20/20 Land Stewardship Plan
Comment Card



Comments:

1. Keep Small Island a mangrove Sanctuary
2. Take out pepper & paper trees - Replace w/ Oak trees
We need a Buffer for the Noise on Rt. 80
3. No Boardwalk 500ft from Rt 80 - will Destroy wild life
4. Buy property for 50/50 1-2 plots for Orange River Preserve

(PS) Keep us updated on your progress. Good Meeting!!
Good job!

Name (optional): Joan Burton

Affiliation (optional):



Conservation 20/20 Land Stewardship Plan
Comment Card



Comments:	
BUFFER	
NOISE FROM AIR	
NO ATV	
PATROL BOAT TEAM	
DENNIS THOMPSON	
Name (optional):	Affiliation (optional):

Orange River Preserve

Land Stewardship Plan

10651 Palm Beach Boulevard
Fort Myers, FL 33905

DRAFT – October 2006

CONSERVATION



20/20

LAND PROGRAM



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, Nancy MacPhee, Nancy Kilmartin and Michael Weston from the Division of Forestry for carefully reviewing the Orange River Preserve land stewardship plan and providing constructive criticism; members of Management Sub-Committee of the Conservation Lands Acquisition and Stewardship Advisory Committee were also instrumental in providing valuable suggestions regarding land management issues and the formatting of the plan; Lee County Library System for making the plan available for public review.

Lynne Boyd
Laura Wewerka

Table of Contents

Vision Statement.....	1
I. Executive Summary.....	2
II. Introduction.....	4
III. Location and Site Description.....	4
IV. Natural Resources Description.....	7
A. Physical Resources.....	7
i. Climate.....	7
ii. Geology.....	9
iii. Topography.....	11
iv. Soils.....	14
v. Hydrologic Components and Watershed.....	19
B. Biological Resources.....	22
i. Ecosystem Function.....	22
ii. Natural Plant Communities.....	22
iii. Fauna.....	26
iv. Designated Species.....	26
v. Biological Diversity.....	32
C. Cultural Resources.....	33
i. Archaeological Features.....	33
ii. Land Use History.....	36
iii. Public Interest.....	40
V. Factors Influencing Management.....	40
A. Natural Trends and Disturbances.....	40
B. Internal Influences.....	41
C. External Influences.....	41
D. Legal Obligations and Constraints.....	42
i. Permitting.....	42
ii. Relationship to Other Plans.....	42

E. Management Constraints	45
F. Public Access and Resource-Based Recreation	45
VI. Management Action Plan	48
A. Management Unit Descriptions	48
Figure 15: Management Unit MapB. Goals and Strategies	49
B. Goals and Strategies	50
VII. Projected Timetable for Implementation	54
III. Financial Considerations	55
IX. Literature Cited	56
X. Appendices	58

List of Figures

Figure 1: Location Map	5
Figure 2: 2005 Aerial Photograph	6
Figure 3: Physiographic Regions	10
Figure 4: Topography Map.....	12
Figure 5: Tropical Storm Surge Area	13
Figure 6: Soils Map	17
Figure 7: Watershed Map	20
Figure 8: Wetlands Map.....	21
Figure 9: Natural Plant Communities	25
Figure 10: Archaeological Features	35
Figure 11: 1944 Historical Aerial Photograph	37
Figure 12: 1953 Historical Aerial Photograph	38
Figure 13: 1958 Historical Aerial Photograph	39
Figure 14: Acquisition Map	47
Figure 15: Management Unit Map.....	49

List of Tables

Table 1: Average High and Low Temperatures for Fort Myers, 1931 - 2004	7
Table 2: Soil Types	18
Table 3: Exotic Wildlife at Orange River Preserve	26
Table 4: Listed Species Found at ORP and Their Designated Status.....	28
Table 5: Management Recommendations for Designated Wildlife Species.....	32

List of Acronyms

C20/20	Conservation 20/20
CCP	Caloosahatchee Creeks Preserve
DHR	Division of Historical Resources
FDACS	Florida Department of Agriculture and Consumer Services
FDEP	Florida Department of Environmental Protection
FDNR	Florida Department of Natural Resources
FDOF	Florida Division of Forestry
FDOT	Florida Department of Transportation
FLEPPC	Florida Exotic Pest Plant Council
FNAI	Florida Natural Areas Inventory
FLUM	Future Land Use Map
FPL	Florida Power and Light
FWC	Florida Fish and Wildlife Conservation Commission
IRC	Institute for Regional Conservation
LCNR	Lee County Natural Resources
LSOM	Land Stewardship Operations Manual
MU	management units
NWI	National Wetlands Inventory
ORP	Orange River Preserve
PARI	Piper Archaeological Research, Inc.
RPD	Residential Planned Development
SFWMD	South Florida Water Management District
USACOE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service

VISION STATEMENT

It is the vision of Lee County Parks and Recreation and the Conservation 20/20 Program to conserve, protect and restore Orange River Preserve to a productive, functional and viable ecosystem. The pine flatwoods will become more open, natural and diverse. The mangrove fringe on the shoreline of the Orange River will be maintained as a natural area, providing habitat for wildlife as well as a scenic backdrop for residents and visitors to southwest Florida who recreate on the river.

I. EXECUTIVE SUMMARY

Orange River Preserve (ORP) is located in northeastern Lee County on the south side of Palm Beach Boulevard, 1 mile east of I-75. The approximately 58 acre Preserve was acquired in 2002 through the Conservation 20/20 (C20/20) Program for \$1,750,000. The Conservation 20/20 Program was established in 1996 after Lee County voters approved a referendum that increased property taxes by up to .5 mil for the purpose of purchasing and protecting environmentally sensitive lands. This Preserve was purchased primarily to provide a buffer for the Orange River. Although it was purchased as one nomination, there is a privately owned outparcel that divides the Preserve on the west side.

The Gulf of Mexico and Caribbean Sea influence the climate of ORP creating mild, sub-tropical conditions. Florida Power and Light Company's Fort Myers Plant (Orange River Substation) also influences the climate of the Preserve by using water from the Caloosahatchee River to make electricity. The water is heated which creates steam which spins the turbines. Once that steam condenses, it is released as warm water into a canal which flows under Palm Beach Boulevard and into the Orange River. This in turn attracts West Indian manatees that congregate near the banks of the Preserve in the winter. Average annual rainfall is more than 66"; slightly higher than the County's average (65"). Most of the rain falls between June and September.

Geologically, the Preserve contains Tamiami Formation sediments created during the Pliocene Epoch between 5.3 million and 1.8 million years ago. Natural elevations at ORP range from 7 feet at the northeast corner and slope in a general southwesterly direction to the Orange River (elevation a little more than one foot). Due to the low elevations and proximity to water, the entire Preserve lies within the Coastal High Hazard area and portions of the preserve are likely to be inundated during tropical storms or category 1 hurricanes. The entire Preserve would likely be submerged during stronger storms especially with storm surge. Two soil types are found at the Preserve, Immokalee sand and Wulfert muck. Both are nearly level and poorly drained with severe limitations for recreation. The Preserve lies within the Orange River Watershed. More than half of ORP has been categorized by the National Wetlands Inventory (Cowardin 1979) as an estuarine scrub-shrub, a deepwater tidal community dominated by woody vegetation.

Orange River Preserve consists of three plant communities. It is split almost equally between upland (scrubby flatwoods and mesic hammock) and wetland (tidal swamp) plant communities that border the Orange River. Tidal swamps are particularly important as nursery grounds for fish and shellfish, as well as providing breeding habitat for wading birds. Additionally, leaf shedding from the mangroves provides the majority of the organic material for the aquatic food web.

Numerous plant and animal species have been documented at ORP, including listed species and species not native to Florida. Listed wildlife documented at the Preserve includes West Indian manatees, bald eagles and American alligators.

The entire Preserve, and all the land along the banks of the Orange River, lies within the archaeological "Sensitivity Level 2" zone. For ORP, this indicates that it lies in an area with a high likelihood that unrecorded sites of potential significance are present.

There has been minimal recent historical use of the Preserve. Aerial photographs show jeep trails appearing in the 1970s and cleared lines for possible subdividing or development in the 1980s. Those lines are still evident as melaleuca monocultures covering 11.5% of the Preserve. Lack of fire has resulted in the scrubby flatwoods that consist primarily of dense, tall saw palmetto with low plant diversity. This heavy fuel load creates a danger for a catastrophic wildfire. If prescribed burning is used as a management tool, careful planning will be necessary due to the numerous smoke sensitive areas that surround the Preserve. Other disturbances to the Preserve are minimal, but include occasional homeless camps and palmetto berry pickers in the summer.

Although there are no specific plans for recreational amenities at the Preserve, Lee County Department of Parks and Recreation is considering creating a boardwalk system over the FPL canal that could connect to ORP. A short trail system, could be added to the uplands portion of the Preserve if a connection is made. The sensitive soils, low elevation, and likelihood of flooding make additional amenities impractical. It is hoped that the existing educational programs at Lee County's Manatee Park will be able to incorporate the Preserve in their programming.

Currently, the Future Land Use for the Preserve is "Suburban" and "Wetlands" and the zoning is "Agriculture" and "Commercial." Staff will work with the Division of Planning to change the land use to "Conservation Lands" and the zoning to "Environmentally Critical."

The goal of this land stewardship plan is to identify Preserve resources, develop strategies to protect these resources and implement restoration activities to return ORP to a productive, functional and viable ecosystem while ensuring the Preserve will be managed in accordance with Lee County Parks and Recreation's Land Stewardship Operations Manual. Restoration and management activities at ORP will focus on control of invasive exotic plant and animal species, maintaining upland ecosystems with prescribed fire and brush reduction and enhancing wildlife habitat. A Management Action Plan that outlines restoration and stewardship goals has been developed. This plan outlines these goals and strategies, explains how to accomplish these goals, and

provides a timetable for completion. This land stewardship plan will be revised in ten years.

II. INTRODUCTION

Orange River Preserve (ORP) was acquired as a single disjunct parcel in March 2002 through Lee County's Conservation 20/20 (C20/20) program for 1.75 million dollars. The Preserve totals over 58 acres and is located on the south side of Palm Beach Boulevard, east of Interstate 75. The Preserve is split almost equally between upland (flatwoods and hammock) and wetland (mangrove swamp) plant communities that border the Orange River. These communities are relatively undisturbed with the exception of invasive exotic plants.

Land stewardship challenges for the site include invasive exotic plant control, mechanical reduction of dense shrubs and reintroduction of fire. At this time, there are no immediate public recreation amenities however there may be a future trail established in the flatwoods community if the Lee County Department of Parks and Recreation is successful in creating a boardwalk connection to Manatee Park, located less than one mile to the east.

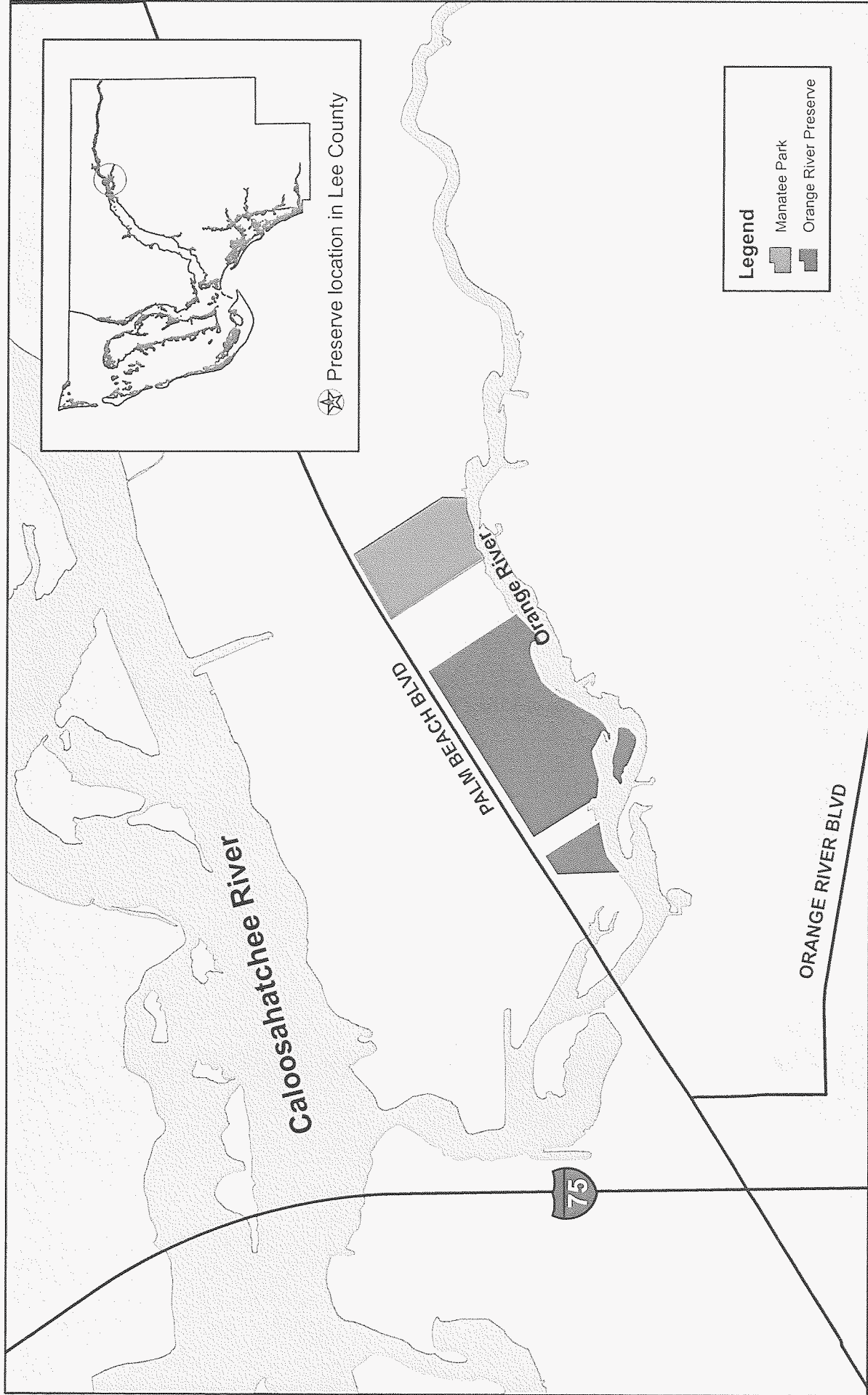
The purpose of this stewardship plan is to define conservation goals for ORP that will address the above concerns. It will serve as a guide for the Lee County Department of Parks and Recreation to use best management practices to ensure proper stewardship and protection of the Preserve. A significant number of field surveys were conducted along with a review of scientific literature and historical records to understand how the Preserve functions in the ecosystem, which wildlife and plants are found within its boundaries and how it has been impacted by people. This allows the plan to serve the purpose as a reference guide for those interested in learning more about the Preserve and some of the land stewardship efforts in Lee County.

III. LOCATION AND SITE DESCRIPTION

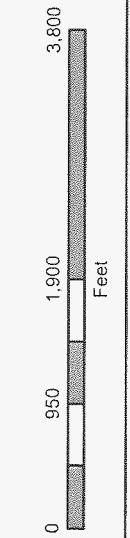
Orange River Preserve is located at 10651 Palm Beach Blvd., within Section 35, Township 43 South, Range 25 East (Figure 1). The Preserve is located approximately one mile east of Interstate 75 just after crossing the Orange River. State Road 80 (Palm Beach Boulevard) is the northern border and the Orange River is the southern border; it is bordered by private property to the east and west. The Preserve is divided into two parcels by a privately owned outparcel.

The Preserve consists of three plant communities: scrubby flatwoods, mesic hammock and tidal swamp. These community designations are based on the Guide to the Natural Communities of Florida (1990) prepared by the Florida Natural Areas Inventory (FNAI) and Florida Department of Natural Resources (FDNR). Figure 2 identifies the boundaries of ORP in a 2005 aerial photograph.

Figure 1: Location Map

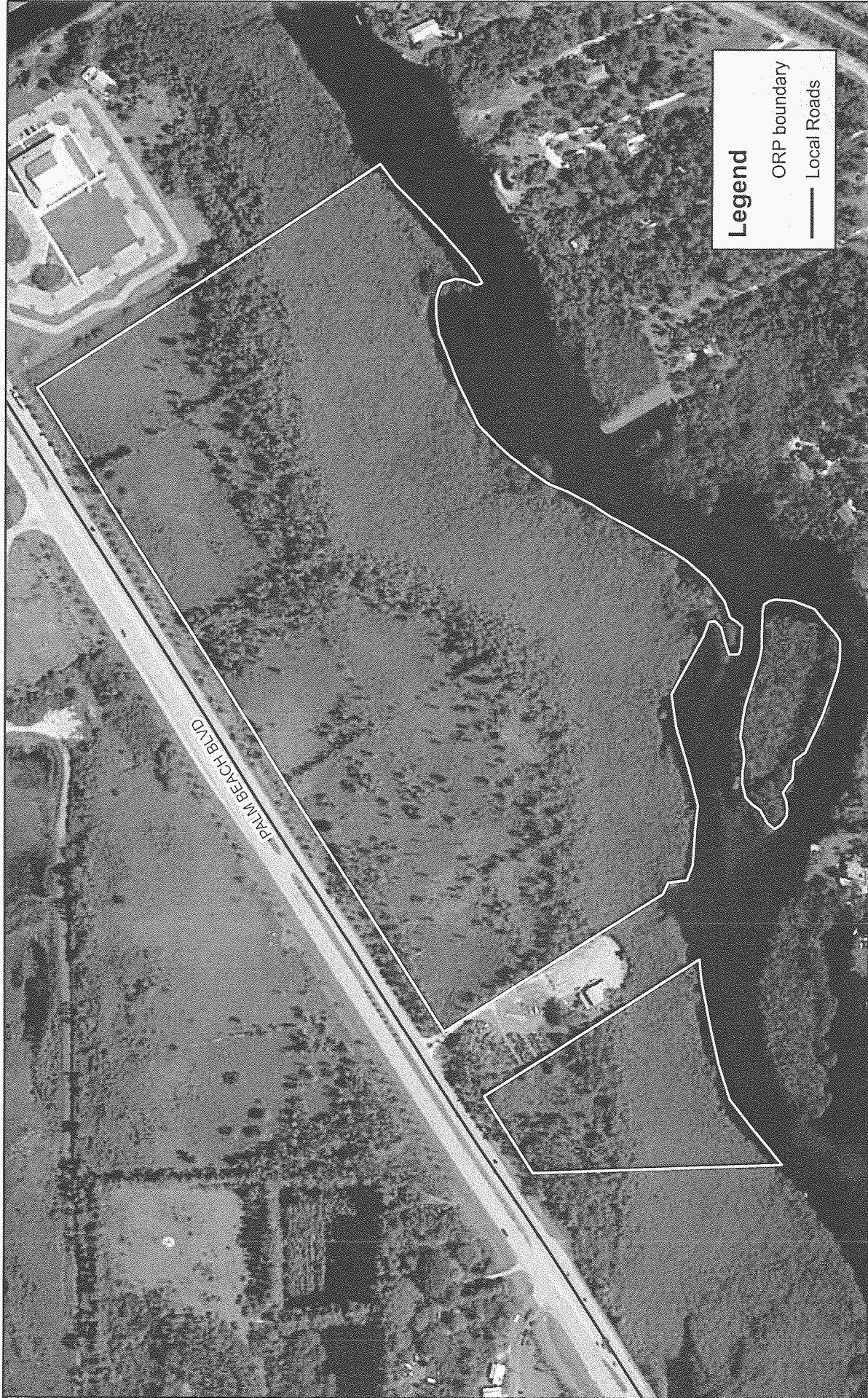


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Map Prepared On: 06/20/06 by lboyle@lecgov.com
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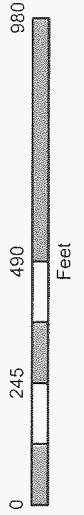


Orange River Preserve

Figure 2: 2005 Aerial Photograph



Orange River Preserve



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prepared this map for informational and planning purposes.

IV. NATURAL RESOURCES DESCRIPTION

A. Physical Resources

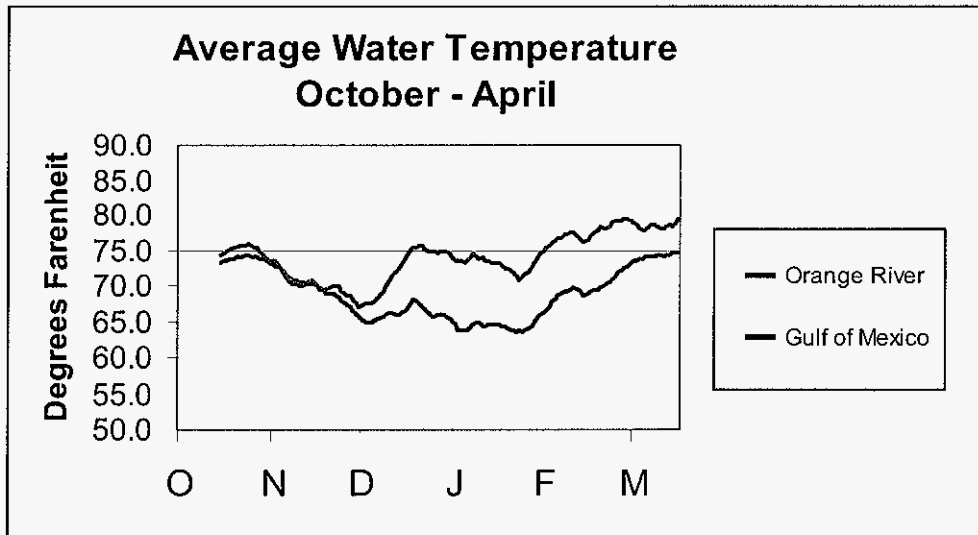
i. Climate

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

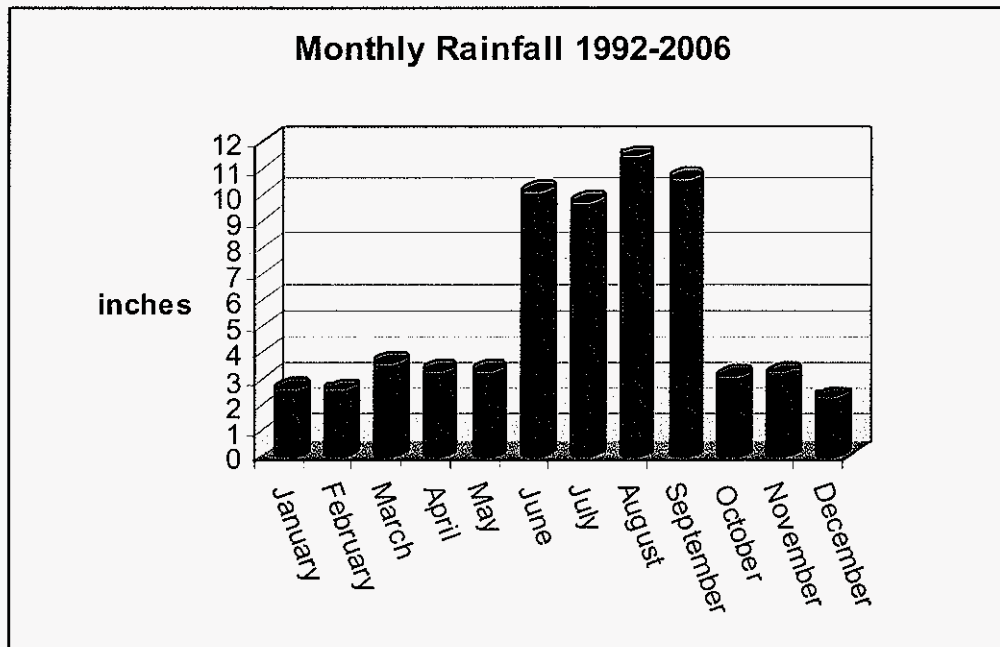
Table 1: Average High and Low Temperatures for Fort Myers, 1931 - 2004

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

At ORP, there is another climatic variation to consider because of its location on the Orange River. Florida Power and Light's (FPL) Orange River Substation releases warm water into the Orange River. The heated water is a byproduct of generating electricity. West Indian manatees (*Trichechus manatus*) live in waters with an ambient temperature over 68° Fahrenheit. In the winter (typically December through March), they seek out the natural warm springs of Florida's coastal rivers or human influenced areas such as the outflows of power plants. The graph below compares the average water temperatures taken in the Orange River at the fishing pier at Manatee Park and the average Gulf temperature taken at the National Ocean Service's water level station (8725520) located in at the City of Fort Myers Yacht Basin for the 2004/2005 and 2005/2006 winters.



The following graph depicts the rainfall data collected by Lee County Division of Natural Resources on a daily basis from the North Reservoir rain gauge. The gauge is located near the corner of Samville Road and Bayshore Road, approximately 3.4 miles northwest of the Preserve. Average annual rainfall from 1992-2006 was 66.35 inches, slightly higher than the average rainfall for the entire county (64.12 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). The effect of hurricanes on natural systems is compounded by the already present human impacts. During the 2004 and 2005 hurricane seasons four tropical systems (Charley, Frances, Jeanne and Wilma) passed over Orange River Preserve with minimal damage beyond a few downed melaleuca (*Melaleuca quinquenervia*) trees.

ii. Geology

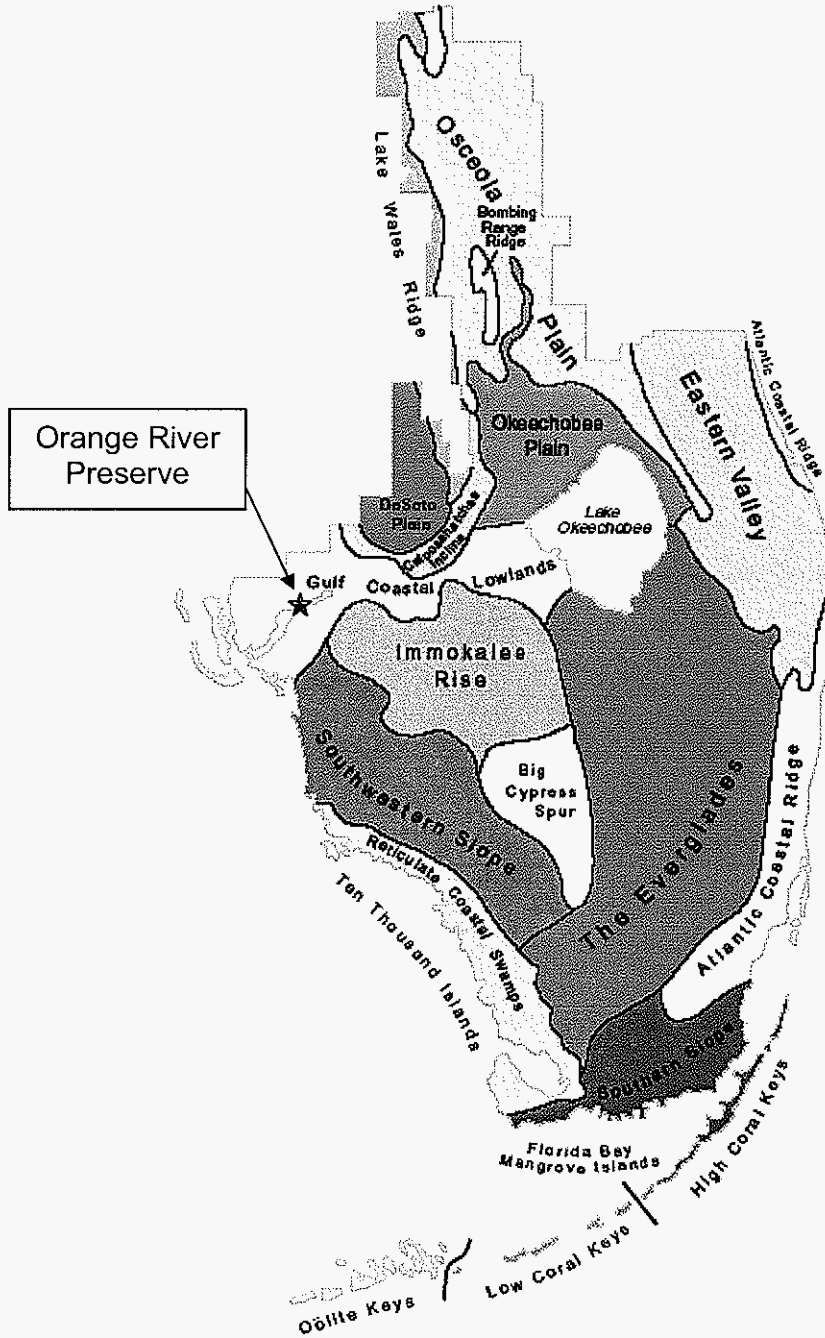
For millions of years, the Florida Platform was submerged in the ocean. Sediments accumulated upon it and hardened into sedimentary rock. Thirty-five million years ago, portions of Florida rose above the surface and for the next 12 million years it alternated between emersion and submergence. From 23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

Orange River Preserve lies in the Tamiami Formation lithostratigraphic unit. Lithostratigraphic units are differentiated by the conditions under which they were formed and the specific interval of geologic time. The Tamiami Formation was created during the Pliocene Epoch between 5.3 million and 1.8 million years ago. The Tamiami Formation contains a mix of fine to coarse-grained sand, sandy clay, fossiliferous sand and fossiliferous limestone. Phosphate is present throughout as are fossils, particularly barnacles, mollusks, corals, sea urchins, and smaller marine life.

Southwest Florida can be divided into 10 major physiographic provinces (Figure 3, 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. Orange River Preserve lies within the Gulf Coastal Lowlands. The Gulf Coastal Lowlands are found in northwest Lee County as well as most of Charlotte and Sarasota Counties to the north. This region is characterized as a gently southwestward sloping plain composed of deposited sediments. These sediments are aligned parallel to the coastline, which indicates they were formed by marine forces.

Figure 3: Physiographic Regions

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).

Natural elevations at ORP range from seven feet at the northeast corner and slope in a general southwesterly direction towards the river to 1+ feet (Figure 4). The contour lines correspond fairly closely with the plant communities found at the Preserve.

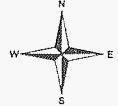
The entire Preserve lies within the Coastal High Hazard Area and storm surge forecasts predict that the Preserve would be partially inundated during tropical storms and Category 1 hurricanes and completely flooded for Category 2-5 hurricanes (Figure 5).

Figure 4: Topography

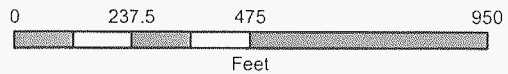


Figure 5: Tropical Storm Surge Areas





Orange River Preserve



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Feet

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Map Prepared On: 05/02/06 by iwewerka@ieegov.com
This is not a survey. Land Stewardship Staff has prepared this map for informational and planning purposes.

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 Orange River Preserve (Figure 6 and Table 2). A common relationship for all of these soil types is that their slopes range from 0-2%. Slope is "the inclination of the land surface from the horizon." Essentially, ORP is level. 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, two of which are found on ORP. 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:

- south Florida flatwoods - Nearly level areas with scattered to numerous pine trees, saw palmetto (*Serenoa repens*), gallberry (*Ilex glabra*), and other woody plants.

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.

Note that some of the soil types are shown as having dual hydrologic groups, such as B/D. A B/D listing means that under natural conditions the soil belongs to D, but by artificial methods the water table can be lowered sufficiently so that the soil fits in B. The Preserve has been impacted by hydrological alterations of berms, ditches and roadways. Because there are different degrees of drainage or water table control, an onsite evaluation would be needed to determine the exact hydrologic group of the soil at each particular impacted location.

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

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

Soils affect the type, quality and quantity of food and cover for wildlife. Wildlife diversity and abundance are also influenced by distribution of food, cover, and water. Wildlife habitat may be created or improved by planting appropriate vegetation, maintaining existing plant communities and promoting the natural establishment of desired vegetation. The soils of Lee County occur in 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." In particular, paths and trails for "hiking and horseback riding should require little or no cutting and filling" plus "should not be subject to flooding more than once a year during the period of use." These limitations will be essential for any future plans if a boardwalk connection from Manatee Park is created.

Figure 6: Soils Map

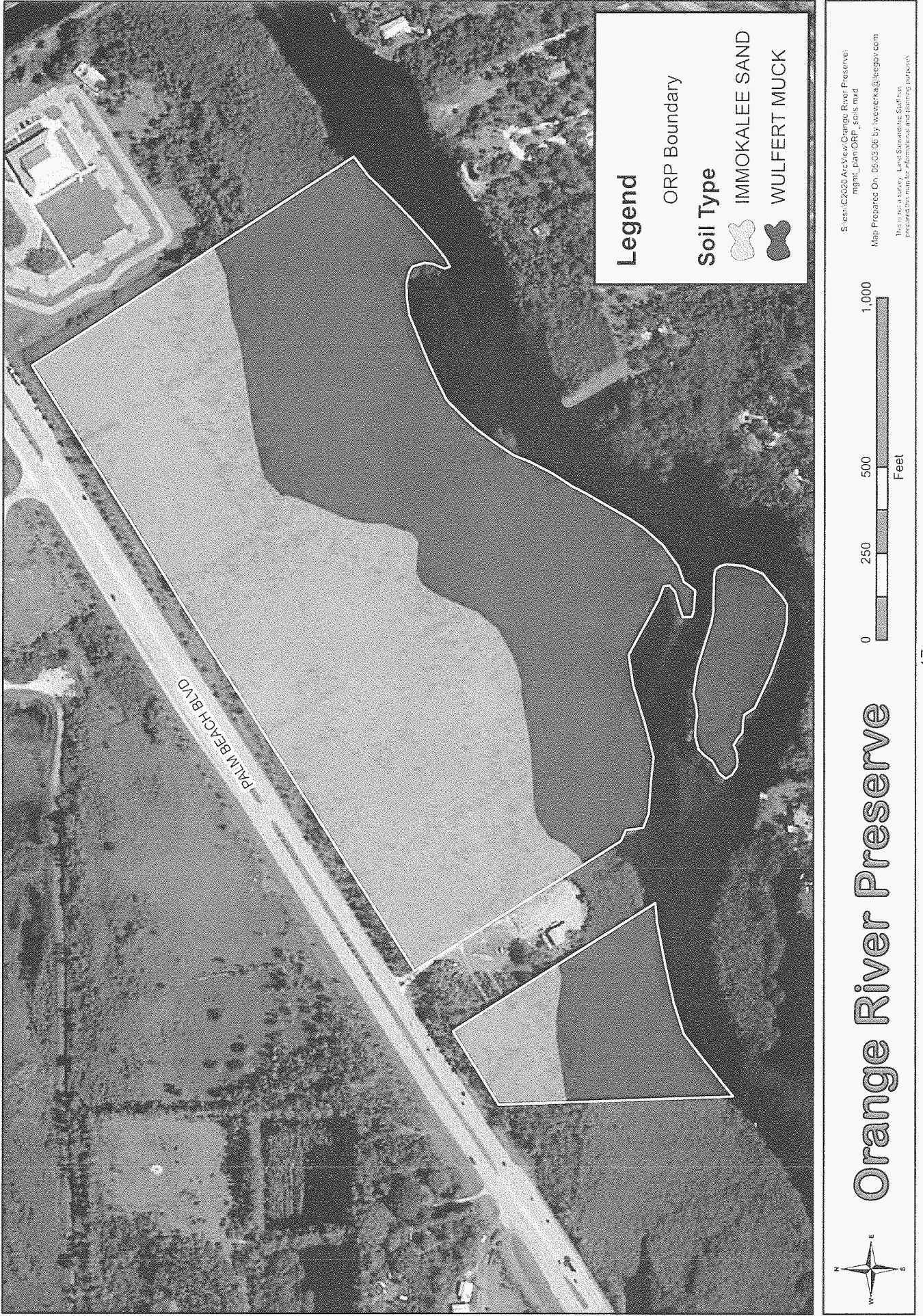


Table 2: Soil Types

Soil Types	Map Symbol	Total Acres	% of Preserve	Habitats (Range Site)	Physical Attributes							Biological Attributes				Limitations for Recreational Paths & Trails
					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--				
												Openland	Woodland	Wetland	Rangeland	
Immokalee Sand	28	29.20	50	south Florida flatwoods		B/D	rapid	rapid	1-3 months	2-6 months	1-2%	poor	poor	poor	--	Severe: wetness, too sandy
Wulfert Muck	23	29.28	50	saltwater marsh	F	D	rapid	rapid	water table fluctuates with tide & area subject to tidal flooding		--	very poor	very poor	fair	--	Severe: wetness, excessive humus

Color Key:

Wet

Saturated

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

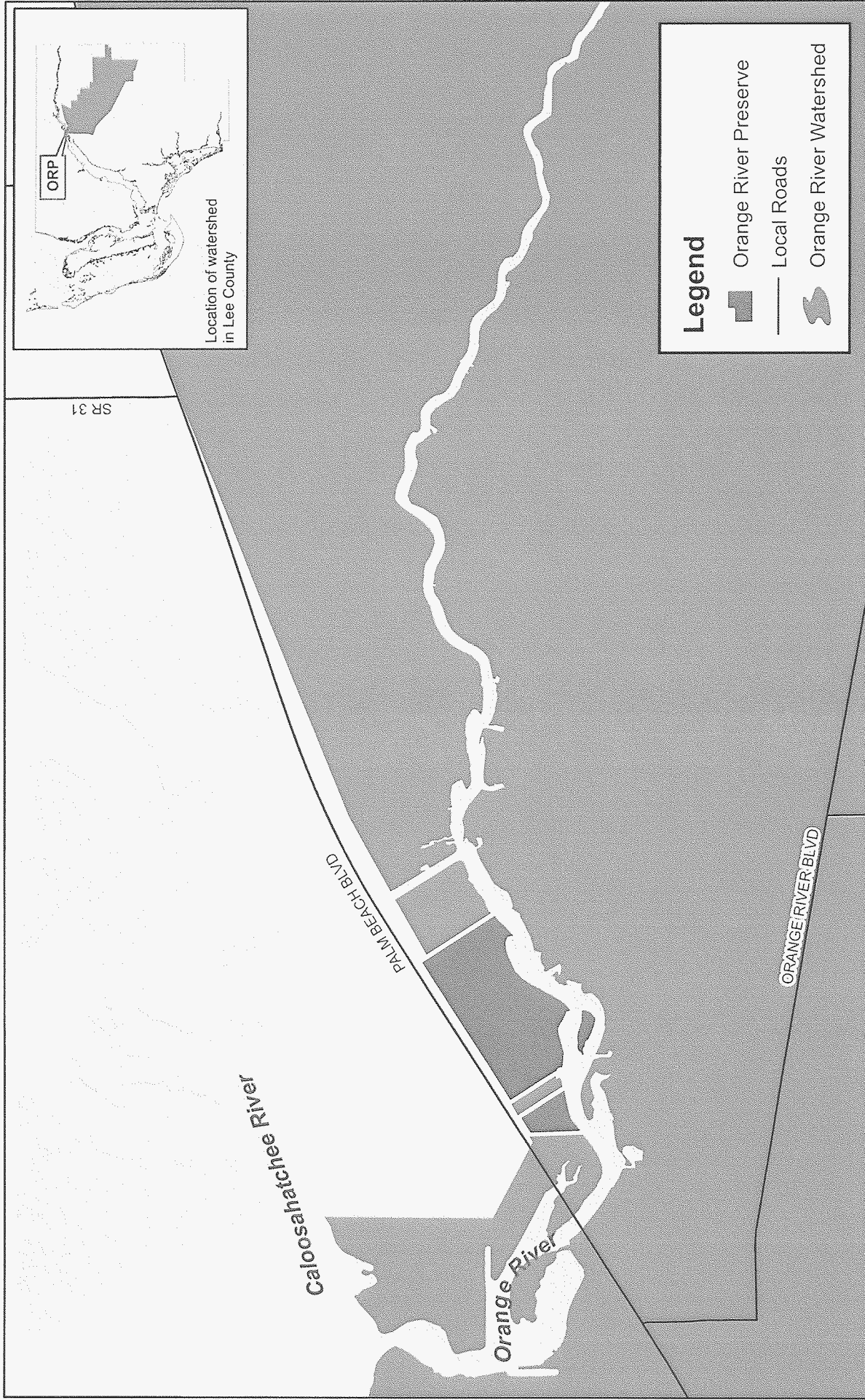
(2) B - Soils having a moderate infiltration rate (low to moderate runoff potential) when thoroughly wet.
 D - Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet.

v. Hydrologic Components and Watershed




The primary hydrologic influence on ORP is the Orange River. The Orange River flows downstream to the Caloosahatchee River and eventually into the Gulf of Mexico. This causes the river to rise and fall with the tide, making a significant portion of the Preserve periodically inundated with water. Orange River Preserve is within the northwest portion of the South Florida Water Management District's (SFWMD) Lower West Coast Region. The Preserve lies on the north boundary of the Orange River Watershed, which covers approximately 77 square-miles (Figure 7).

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 became operational in 1977. Wetlands were defined by plants (hydrophytes), soils (hydric soils) and frequency of flooding, and subsequently classified in general accordance with the Classification of Wetlands and Deep Water Habitats of the United States (Cowardin et al. 1979). Figure 8 identifies 29 acres of 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. They have low-energy wave action and the water regimes and chemistry are influenced by tides, precipitation, freshwater runoff from land areas, evaporation and wind. Scrub-shrub wetlands are dominated by woody vegetation less than 20 feet tall.

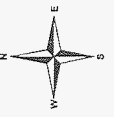
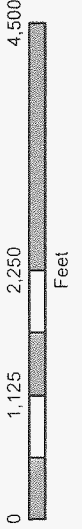
Figure 7: Watershed Map



Legend

-  Orange River Preserve
-  Local Roads
-  Orange River Watershed

Stiles-C2020 ArcView-Orange River Preserve
 final_plan_ORP_watershed.mxd
 Map Prepared On: 05/03/06 by hievetka@tcgpo.com
 This is a survey of land. It is not a guarantee of title.
 Proceed with caution and please do not rely on this map.

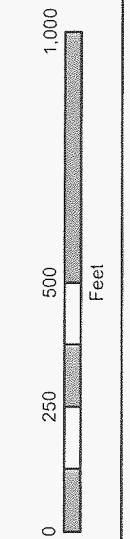



Orange River Preserve

Figure 8: Wetlands Map



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Map Prepared On: 05/04/06 by: lweverka@ecg.gov.com
This is not a survey. Land Stewardship Staff has prepared this map for informational and planning purposes.



 **Orange River Preserve**

B. Biological Resources

i. Ecosystem Function

Tidal swamps, such as those found on the southern fringes of ORP, are significant plant communities because they function as nursery grounds for most of Florida's commercially and recreationally important fish and shellfish. Mangroves also provide breeding grounds for substantial populations of wading birds, shorebirds and other animals (FNAI 1990). Mangroves can produce up to 80% of the total organic material available in the aquatic food web through the continuous shedding of their leaves and other plant components (FNAI 1990). The shoreline of the Preserve contains a mix of both estuarine and freshwater species as there is a shared influence from the freshwater flow of the Orange River and tidal influence of the Gulf of Mexico via the Caloosahatchee River.

The pine flatwoods at ORP also serve as important habitat for a variety of birds, small mammals, reptiles and amphibians. Although many have not been documented at the Preserve, there are a number of rare wildlife species that occur primarily in the flatwoods. There are also numerous rare plants, including some endemic species, which are found exclusively in pine flatwoods. During a severe flood, the flatwoods serve as a water storage area to help protect adjacent landowners from flooding (Tiner 1998).

Fire is an important part of pine flatwoods. Florida has more thunderstorm days per year than anywhere else in the country and, in turn, one of the highest frequencies of lightning strikes of any region in the United States. Fire shapes ecosystem processes in the flatwoods including creation of soil conditions suitable for germination of seeds of some species, turnover of litter, humus and nutrients, reduction of competition from hardwoods and increasing the hardiness of some species (Myers and Ewel 1990). A number of exotic plant species are present on the Preserve and are negatively affecting the native species. Following exotic plant removal and brush reduction, fire may be a valuable management tool at ORP.

ii. Natural Plant Communities

Orange River Preserve consists of three plant communities described by the Florida Natural Areas Inventory. Figure 9 illustrates the location of each community within the Preserve. The natural communities found at ORP are defined using the Florida Natural Area's Guide to the Natural Communities of Florida (1990). Appendix A contains a list of plant species identified by Land Stewardship staff during the numerous site inspections. This list, however is not necessarily a comprehensive list for the entire Preserve.

Tidal Swamp Community – 27 acres, 45% coverage of ORP

Tidal swamps are characterized as dense forests located along shorelines with low wave energy in southern Florida. The dominant plants in this community are white mangrove (*Laguncularia racemosa*), black mangrove (*Avicennia germinans*), red mangrove (*Rhizophora mangle*) and buttonwood (*Conocarpus erectus*). The dominant species of mangrove found in different areas is dependant on abiotic factors such as tidal flushing and salinity. This is the dominant community at ORP and is characterized as a narrow fringe swamp located along a waterway. The five physical factors that greatly influence this community are water temperature, salinity, tidal fluctuation, substrate, and wave energy.

A variety of animals were documented in this community including osprey (*Pandion haliaetus*), bald eagle (*Haliaeetus leucocephalus*), yellow-crowned night heron (*Nyctanassa violacea*), red-bellied woodpecker (*Melanerpes carolinus*), and great blue herons (*Ardea herodias*).

Scrubby Flatwoods Community – 19 acres, 32% coverage of ORP

The scrubby flatwoods at ORP are found in northern portions of the Preserve. Synonyms for this community include xeric flatwoods or dry flatwoods. Scrubby flatwoods are characterized by an open canopy of widely scattered pine trees with a sparse, shrubby understory. Plants typically found are south Florida slash pine (*Pinus elliottii* var. *densa*), myrtle oak (*Quercus myrtifolia*), wiregrass (*Aristida stricta*), saw palmetto and tarflower (*Bejaria racemosa*). The white sandy soil found here is typically several feet deep and drains rapidly. These areas usually do not flood even under extremely wet conditions. Naturally occurring fire returns every 8 to 25 years. This return interval is longer than mesic flatwoods due to the lack of ground vegetation and abundance of non-combustible scrub-oak leaf litter that is present. The scrubby flatwoods at ORP are overgrown due to lack of fire and have very few open, sandy patches.

Wildlife seen here include the southern black racer (*Coluber constrictor priapus*), swallow-tailed kite (*Elanoides forficatus*) and yellow-rumped warbler (*Dendroica coronata*).

Scrubby Flatwoods – Melaleuca dominated – 7 acres, 11.5% coverage of ORP

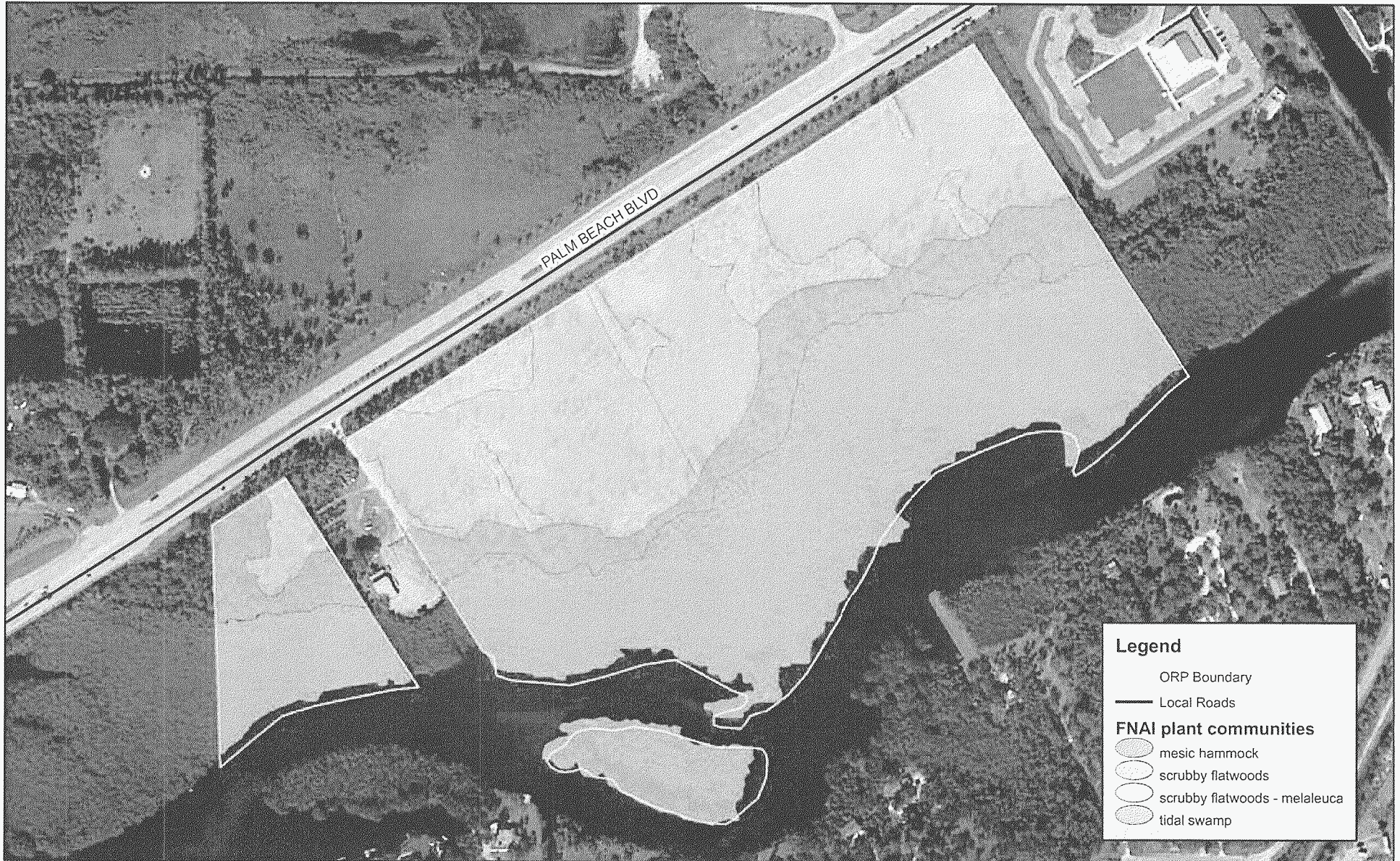
These portions of the preserve are areas within the scrubby flatwoods that are dominated by melaleuca. The majority of the areas were disturbed and have regenerated into melaleuca monocultures. There are very few plants in the understory.

Mesic Hammock Community – 7 acres, 11.5% coverage of ORP

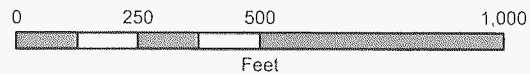
Mesic hammocks are characterized by having an open or closed canopy dominated by live oak (*Quercus virginiana*) with cabbage palm (*Sabal palmetto*) present in the canopy or subcanopy. They can have a dense understory of saw palmetto, beautyberry (*Callicarpa americana*) and wax myrtle (*Myrica cerifera*) with other tropical shrubs mixed in. They usually occur on the fringes of rivers, swamps, marshes or lakes. Other plant species that occur in the hammock community at ORP are swamp bay (*Persea palustris*), swamp fern (*Blechnum serrulatum*) and Virginia chain fern (*Woodwardia virginica*).

Wildlife species seen here include the eastern cottontail (*Sylvilagus floridanus*) and blue jay (*Cyanocitta cristata*).

Figure 9: Natural Plant Communities



Orange River Preserve



Legend

- ORP Boundary
- Local Roads
- FNAI plant communities**
- mesic hammock
- scrubby flatwoods
- scrubby flatwoods - melaleuca
- tidal swamp

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Map Prepared On: 05/12/06 by lboyd@leegov.com
This is not a survey. Land Stewards Staff has prepared this map for informational and planning purposes.

iii. Fauna

Orange River Preserve is small and bordered to the south and west by the Orange River and to the north by Palm Beach Boulevard (S.R. 80). These two aspects create barriers for large wildlife, excluding birds, to immigrate to the Preserve. For this reason and its small size, the total wildlife numbers are not very high when compared with other county Preserves, but a number of wildlife species can still be seen here. See Appendix B for a list of wildlife documented at the Preserve. Wildlife species were recorded during field work and site inspections. Future sightings through site inspections and possible Lee County Bird Patrol volunteers will continue to be recorded. There are also several exotic wildlife species that have been documented at the Preserve (Table 3). Another exotic animal, the feral hog (*Sus scrofa*), is of high concern, but has not been noted on the Preserve. If this species becomes a problem, proper management measures will be used to control it.

Table 3: Exotic Wildlife at Orange River Preserve

<u>Scientific Name</u>	<u>Common Name</u>
<i>Osteopilus septentrionalis</i>	Cuban treefrog
<i>Eleutherodactylus planirostris planirostris</i>	greenhouse frog
<i>Anolis sagrei</i>	brown anole
<i>Dasyopus novemcinctus</i>	nine-banded armadillo

Wildlife management at the Preserve will focus on providing optimal habitat for native species. Restoration of the disturbed areas, control of invasive exotic plants and application of prescribed fire will be critical restoration components to provide improved habitat for wildlife. Orange River Preserve is part of a countywide quarterly site inspection program for all Conservation 20/20 Preserves. A copy of the site inspection form is available in the Land Stewardship Operations Manual (LSOM). These inspections allow staff to monitor for any impacts and/or changes to each preserve and include lists of all animal sightings and new plant species that are found. If, during these inspections, staff finds FNAI listed species, they will be reported using the appropriate forms.

iv. Designated Species

There are a variety of designated animal and plant species (Table 4) found at Orange River Preserve. Although all native plant and animal species found at the Preserve have some protection due to the preservation of this property, certain species need additional attention. For stewardship purposes, all plants and animals listed by the USFWS, Florida Fish and Wildlife Conservation Commission (FWC), Florida Department of Agriculture and Consumer Services (FDACS), the Institute for Regional Conservation (IRC) and FNAI will be given special consideration.

Typically, designated species will benefit from proper management of the biological communities in which they occur. However, some species may require additional measures to ensure their protection. Management practices likely to benefit wildlife at the Preserve include exotic plant control, hydrological restoration, prescribed burning, trash removal, wildlife monitoring, feral animal control, restricting maintenance and enforcement of no littering, no weapons and no motorized vehicles regulations.

In 2006, Land Stewardship staff was asked to evaluate Conservation 20/20 preserves for possible gopher tortoise relocations that may be needed for future public infrastructure projects. FWC studies indicate that for a viable population of 40-50 tortoises, a minimum of 35 acres of suitable habitat must be available (Cox 1987). Orange River Preserve was considered unsuitable, due to its small amount of upland acreage, isolation and proximity to roads.

Table 4: Listed Species Found at ORP and Their Designated Status

Scientific Name	Common Name	USFWS	FWC	FNAI	FDACS	IRC	Occurrence
REPTILES							
<i>Alligator mississippiensis</i>	American alligator	T (S/A)	SSC	G5/S4			confirmed
MAMMALS							
<i>Trichechus manatus</i>	West Indian manatee	E	E	G2/S2			expected
BIRDS							
<i>Egretta caerulea</i>	little blue heron		SSC	SSC			expected
<i>Egretta tricolor</i>	tricolored heron		SSC	G5/S4			expected
<i>Egretta thula</i>	snowy egret		SSC	G5/S3			expected
<i>Pandion haliaetus</i>	osprey			G5/S3S4			expected
<i>Elanoides forficatus</i>	swallow-tailed kite			G5/S2			confirmed
<i>Haliaeetus leucocephalis</i>	bald eagle	T		G4/S3			confirmed
PLANTS							
<i>Woodwardia virginica</i>	Virginia chain fern					R	confirmed
<i>Tillandsia fasciculata</i>	cardinal airplant				E		confirmed
<i>Tillandsia utriculata</i>	giant airplant				E		confirmed
<i>Andropogon glomeratus</i> var. <i>glaucoptis</i>	purple bluestem					R	confirmed
<i>Andropogon virginicus</i> var. <i>glaucus</i>	chalky bluestem					R	confirmed
<i>Amaranthus australis</i>	southern amaranth					R	confirmed
<i>Elephantopus elatus</i>	tall elephantsfoot					R	confirmed
<i>Bejaria racemosa</i>	tarflower					R	confirmed
<i>Quercus minima</i>	dwarf live oak					R	confirmed
<i>Fraxinus caroliniana</i>	pop ash					R	confirmed

Key

<p>USFWS - U.S. Fish & Wildlife Service FWC - Florida Fish and Wildlife Conservation Commission FDACS - Florida Department of Agriculture and Consumer Services E - Endangered T - Threatened CE - Commercially Exploited SSC - Species of Special Concern IRC - The Institute for Regional Conservation CI - Critically Imperiled, I - Imperiled, R - Rare</p>	<p>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 - Demonstrately secure</p>
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Wildlife Species

The following is a brief summary of each designated wildlife species explaining why they are in decline. Unless stated otherwise, the reasons for the species decline and the management recommendations were obtained from Hipes et al. (2001). Management recommendations are located on Table 5.

American Alligator

American alligators have recovered dramatically from overhunting since the 1960s but remain listed by USFWS as threatened by similarity of appearance to the crocodile and by FWC as species of special concern. There are even some populations large enough to support limited harvests. Pollution and destruction of wetlands are currently the main threat to this species. Another threat becoming more prevalent in southwest Florida is loss of habitat from development and uneducated humans either feeding alligators or feeling threatened by their presence. Many alligators are relocated or killed by wildlife officials or authorized trappers because of their size or proximity to homes adjacent to freshwater wetland ponds.

West Indian Manatee

Manatees are known to swim in the waters of the Caloosahatchee and Orange Rivers in the warm water from the power plant to the northeast of the Preserve. Their slow movement to warmer inland waters in the winter makes them susceptible to collisions with boats, which are often fatal. Although the manatee's overall populations appears steady, it is threatened by increased boat traffic and expanding development in Florida.

Little Blue Heron, Tricolored Heron, Snowy Egret

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

Osprey

The osprey is found on or near rivers, large lakes and coastal areas where nesting sites are suitable. Their decline has been documented in the latter half of the 1900s is probably due to eggshell thinning from the use of certain pesticides as well as possible reduced food availability. Ospreys have not been confirmed as using the Preserve, but are known to use the Orange River for feeding.

Swallow-tailed Kite

Swallow-tailed kites migrate to Southwest Florida from South America in late February/early March for their nesting season that lasts through late July/early September. In the early 1900s, swallow-tailed kites were confirmed nesters in 21 states; today they are only found in seven southeastern states. Nests are found in the tallest pine or cypress trees in open habitats and are made of small sticks, moss and lichens. Habitat loss of nesting sites through development and conversion to agriculture are the major threats to this species.

Bald Eagle

Bald eagle numbers have steadily increased in Florida after a low of 120 active nests in 1973. Still, loss of habitat and human disturbance due to development is a primary concern for this species. Although there are no trees large enough for eagles to nest on the Preserve, they are known to be in the area and it is possible they use the Orange River as a feeding grounds.

Plant Species

In addition to designated wildlife, Orange River Preserve provides habitat for several listed plant species. There are at least two state listed plant species at ORP. The following is a brief summary of each designated plant species explaining why they are in decline, typical habitats in which they are located and management recommendations.

Cardinal airplant

Cardinal airplant (*Tillandsia fasciculata* var. *densispica*) is an endangered species listed by FDACS and is also known as the stiff-leaved wild pine. It is found in hammocks, cypress swamps, and pinelands and has been documented in ORP. Threats to this plant include illegal collecting, habitat destruction and the Mexican bromeliad weevil (*Metamasius callizona*) (Save 2004).

Giant airplant

Giant airplant (*Tillandsia utriculata*) is another bromeliad considered to have been quite common in Florida before the arrival of the Mexican bromeliad weevil and is now listed as endangered by FDACS. Another common name for this bromeliad is giant wild-pine. This species is typically found in hammocks and pinelands. In addition to the weevil, illegal collecting and habitat destruction threaten this species (Save 2004). Currently, scientists are researching biological control agents for the exotic weevil. Staff will follow the research developments and work with scientists in the future if it is determined that

these insects are affecting epiphytes and the United States Department of Agriculture (USDA) is in need of release sites.

The majority of the designated plant species (see Table 4) were provided by IRC, which is not a regulatory agency. IRC's designation was either received from its book (Gann 2002) or Internet website

(<http://www.regionalconservation.org/ircs/database/search/QuickSearch.asp>).

However, the scientists working for this Institute have conducted a tremendous amount of field work and research documenting plants occurring in conservation areas in the 10 southernmost counties of Florida. This initial floristic inventory allowed the IRC to rank plant species to indicate how rare/common these plants are in protected areas. At ORP, numerous 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 ORP:

- Insure 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.
- Trap wild hogs, which can completely destroy the above ground vegetation and disturb all the soil in an area where they are feeding.

- Initiate prescribed fire in communities that are fire adapted because fire as a management tool is extremely critical for the protection of many rare plants.
- Divide the site so the entire area is not burned during the same year to protect these communities.

Table 5 outlines some specific management and restoration activities at the Preserve that will be taken to protect the designated wildlife and plant species. 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 or burrows are discovered on the Preserve, a map will be created, for staff use only, to assist with planning for restoration activities.

Table 5: Management Recommendations for Designated Species

Fauna Species		Restoration Activity	Management Recommendations
<u>Scientific Name</u>	<u>Common Name</u>	<u>Exotic Control</u>	<u>Mark Nest Location</u>
<i>Alligator mississippiensis</i>	American alligator	X	X
<i>Trichechus manatus</i>	West Indian manatee		
<i>Egretta caerulea</i>	little blue heron	X	
<i>Egretta tricolor</i>	tricolored heron	X	
<i>Egretta thula</i>	snowy egret	X	
<i>Pandion haliaetus</i>	osprey	X	
<i>Elanoides forficatus</i>	swallow-tailed kite	X	X
<i>Haliaeetus leucocephalus</i>	bald eagle	X	X
Flora Species			
<i>Tillandsia fasciculata</i>	cardinal airplant	X	
<i>Tillandsia utriculata</i>	giant airplant	X	

v. Biological Diversity

Biodiversity at Orange River Preserve varies depending on the community, but should increase significantly after stewardship activities have been put into practice (i.e. invasive exotic plant removal, prescribed fire). The plant communities range from dry scrubby flatwoods to tidal swamps with mangroves that are typically flooded. Bird species, including yellow crowned night-herons and great blue herons, use these mangroves for roosting and foraging. The protection of native plants and plant communities will enhance the overall biodiversity of the Preserve.

Many species of animals not only inhabit, but also frequently visit the Preserve. Currently 83 plant species (16 exotic) and 28 animal species have been documented on the Preserve. Twelve of the 16 exotic plant species (75%) are on the Florida Exotic Pest Plant Council's 2005 List of Invasive Species (FLEPPC 2005).

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

- Control of invasive exotic vegetation followed by annual maintenance to provide more suitable habitat for native aquatic and terrestrial species.
- Maintain boundaries with signs and fencing, if necessary, to eliminate illegal access to the Preserve and protect fragile ecosystems.
- Implement a prescribed fire program to closely mimic the natural fire regimes for different plant communities to increase plant diversity and ensure the canopies remain open. If prescribed fire is not a reasonable fuel reduction method due to the Preserve's location, mechanical methods may be used.
- Install fire lines along the perimeter.
- Remove any debris and prevent future dumping on site.
- Control invasive exotic animal populations to reduce their impacts on the herbaceous plants, native animals and soils.
- Conduct on-going species surveys utilizing volunteers and staff to catalog and monitor the diversity that is present.
- Prevent removal of vegetation, including palmetto berry picking.

C. Cultural Resources

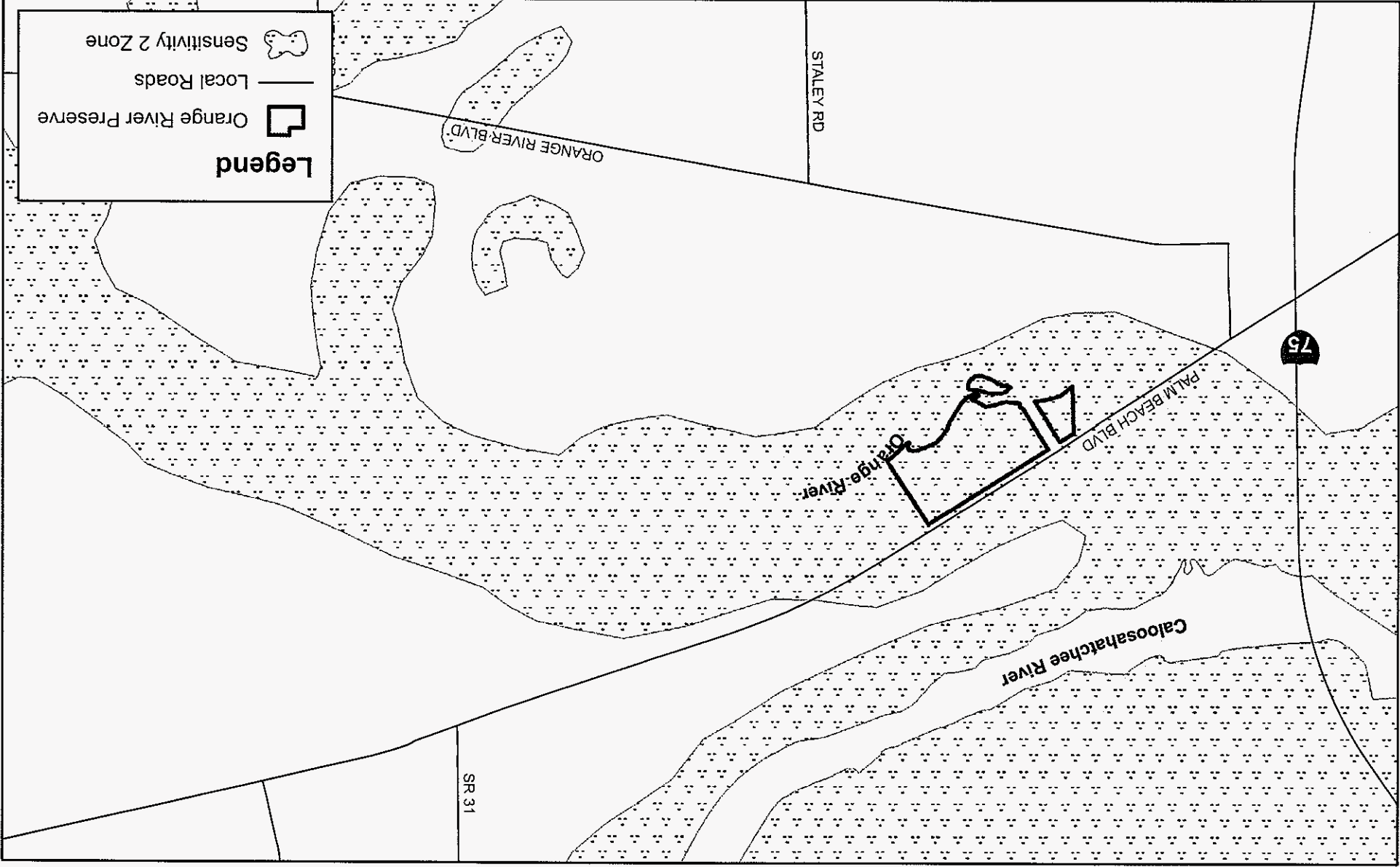
i. Archaeological Features

In 1987, Piper Archaeological Research, Inc. (PARI) conducted an archaeological site inventory of Lee County. They were able to identify an additional 53 sites increasing the total number of known archaeological sites in Lee County to 204. PARI created a site predictive model and archaeological sensitivity map for the county that highlighted potential areas likely to contain additional archaeological sites. Orange River Preserve, and all the land along the banks of the Orange River lie within the study's "Sensitivity Level 2" area (Figure 10). The study defines this level as "areas that contain known archaeological sites that have not been assessed for significance and/or conform to the site predictive model in such a way that there is a high likelihood that unrecorded sites of potential significance are present. If these areas are to be impacted, then they should be subjected to a cultural resource assessment survey by a qualified

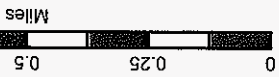
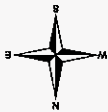
professional archaeologist in order to 1) determine the presence of any archaeological sites in the impact area and/or 2) assess the significance of these sites" (Austin 1987).

In the unlikely event of a restoration project at ORP requiring any major soil disturbance, a professional archaeologist will be hired to conduct a survey of the area to be impacted. If evidence of shell middens or other artifacts are found in the area, the Division of Historical Resources (DHR) will be immediately contacted and protection procedures will comply with the provision of Chapter 267, Florida Statutes, Sections 267.061 2(a) and (b). Collection of artifacts and/or any disturbance of the archaeological site will be prohibited unless prior authorization has been obtained from the DHR. Any potential site will be managed in coordination with recommendations from the DHR and, if necessary, the site will be kept confidential with periodic monitoring for impacts. If any significant archaeological resources are found and confidentiality is not found to be necessary, they may be incorporated into a public education program.

Figure 10: Archaeological Features



Orange River Preserve



ii. Land Use History

Orange River Preserve 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, between 1944 (Figure 11), and 1953 (Figure 12) Palm Beach Boulevard (State Road 80) was constructed along the northern boundary of the Preserve. By 1958 (Figure 13) FPL's Orange River Substation was constructed.

According to later aerial photographs, the primary disturbances to the Preserve occurred in the early 1970's when several jeep trails were apparent in the center flatwoods areas, but had become overgrown by the mid 1980's. The 1986 aerials show five cleared lines stretching from Palm Beach Boulevard to the mangrove fringe as well as another cleared line running parallel to Palm Beach Boulevard, approximately 350 feet inside ORP's boundary. Although Stewardship staff speculates that the clearing was conducted in preparation for either subdividing or developing the property, no evidence was found to support this hypothesis. By 1999, melaleuca trees invaded many of these cleared lines.

Outside of the Preserve boundaries, the primary changes to adjacent lands include the clearing of the out parcel between the west and east sides of ORP (1975) and the construction of Lee County's Manatee Park and the Crossroads Baptist Church on the east boundary in the 1990's.

Figure 11: 1944 Historical Aerial Photograph

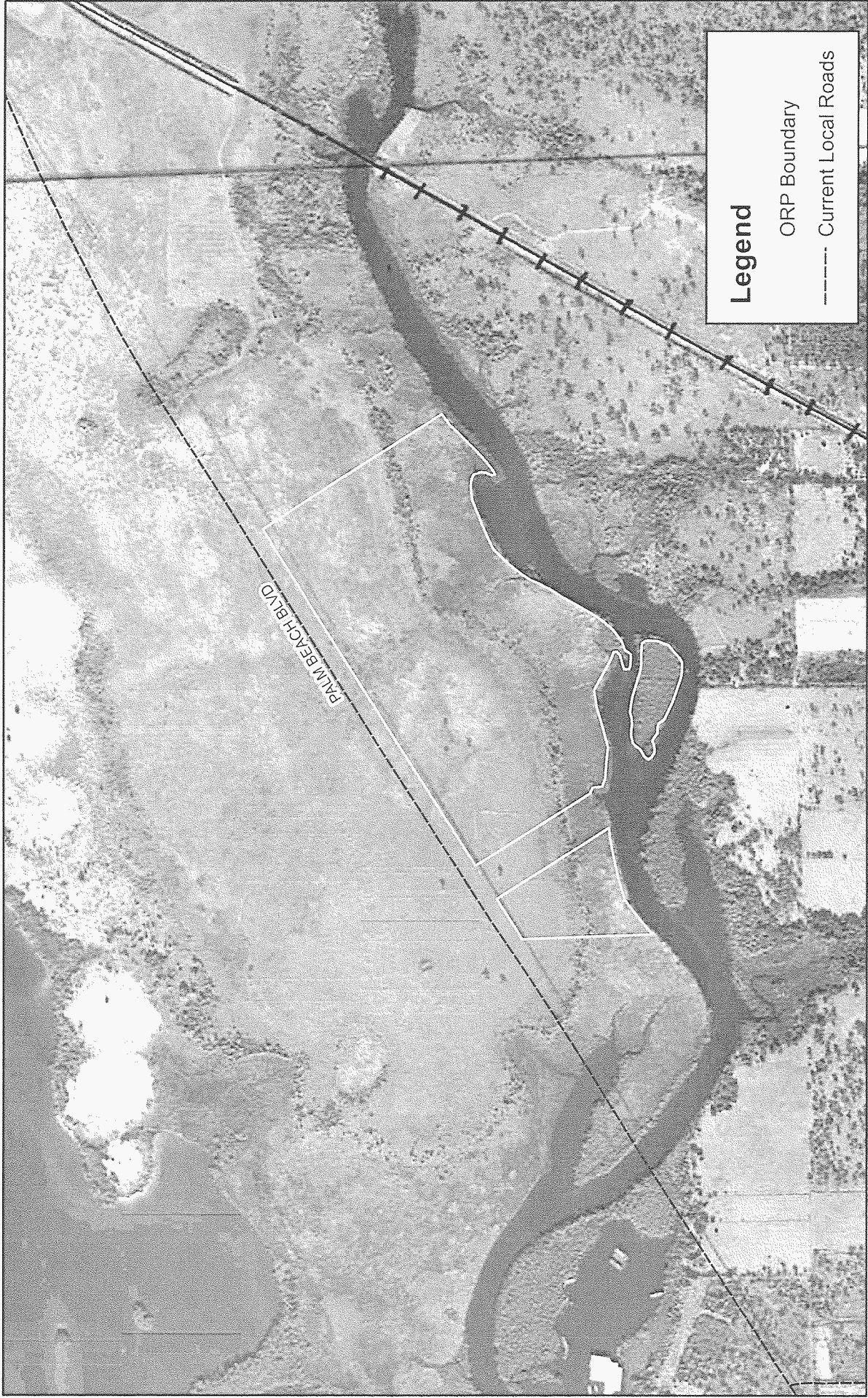
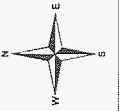
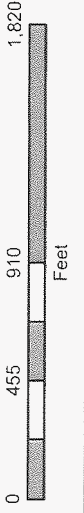


Figure 12: 1953 Historical Aerial Photograph

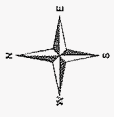


Orange River Preserve

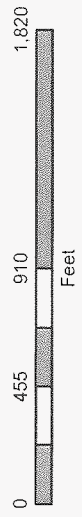


S:\sr\IC2020 AcView\Orange River Preserve\mgmt_plan\ORP_1953.mxd
Map Prepared On: 06/07/08 by: weverka@fcgov.com
This is not a survey. Landward Engineering Staff has prepared this map for informational and planning purposes.

Figure 13: 1958 Historical Aerial Photograph



Orange River Preserve



S:\csf\12020 ArcView\Orange River Preserve\mipnt_plan_ORP_1958.mxd
Map Prepared On: 06/07/06 by lwvwrka@ecgov.com
This is not a survey. Land Stewardship is not a prepared by map for informational and planning purposes.

iii. Public Interest

Since Lee County acquired ORP, there has been minimal contact by the public concerning the property. The landowner of the outparcel between the east and west portions of the Preserve requested that staff contact him before conducting exotic tree removal activities so that he can coordinate fence construction on his property to take place at the same time.

V. FACTORS INFLUENCING MANAGEMENT

A. Natural Trends and Disturbances

Natural trends and disturbances influencing native communities and stewardship at ORP include hurricanes, floods, wildfire, occasional freezes and the cycling wet and dry seasons. Implementation of the Management Action Plan will take each of these factors and their influence on projects at the Preserve into consideration. For example, a tropical storm or hurricane could damage large amounts of vegetation. It may be necessary to remove or mulch downed vegetation following a hurricane if the debris increases the chance of negative impacts to wildlife habitat or public safety from a wildfire.

Wildfires caused by lightning strikes are natural occurrences in Florida. The Florida Division of Forestry (FDOF) – Caloosahatchee District – and Lee County Department of Parks and Recreation are developing a wildland firefighting protocol for County preserves. The FDOF was provided a map of the Preserve. No new firebreaks, such as plow lines, will be created unless there is potential for the wildfire to harm property outside the Preserve boundary and if the fire weather conditions are such that resources are available to sit and wait on site. This agreement between FDOF and the County will protect ORP from the potential damage associated with emergency firefighting equipment. Land Stewardship staff will lead periodic site visits in order to familiarize FDOF with ORP and current management efforts. A comprehensive C20/20 fire plan, to be completed in the fall of 2006, will help decrease the impact of catastrophic wildfires on the Preserve and neighboring lands. Fire lines on the perimeter of the Preserve, as well as those created once burn units are established will be kept clear of debris and disked or mowed a minimum of once a year during the onset of the dry (wildfire) season.

Stewardship (invasive exotic plant control, prescribed burning, etc.) of ORP is influenced by seasonal hydroperiods. The 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. The use of heavy equipment will be limited to the dry season for the majority of the site. Only hand crews will be used for exotic plant control projects in the mangrove swamp communities. The timing of prescribed burns will also be influenced by seasonal rain, weather and wind patterns.

B. Internal Influences

Lack of fire or the use of other management techniques for brush control have allowed the saw palmetto to grow in dense monocultures that are typically much higher than normal; more than six feet in some areas. The majority of the flatwoods at ORP have low plant diversity, and therefore have low habitat value for wildlife. The heavy fuel load also creates a danger for a catastrophic wildfire that would be difficult to control. A combination of both mechanical techniques and prescribed fires will be essential for long-term sustainability of these fire-dependant communities by creating a mosaic of both open and vegetated areas. Land Stewardship staff would like to partner with the FDOF whose offices are approximately one-half mile to the east to possibly use this preserve as a demonstration area to show the importance of fuel management and the benefits of fire on the landscape.

Many invasive exotic plants (primarily melaleuca and Brazilian pepper (*Schinus terebinthifolius*)) disrupt the functionality and limit the natural biodiversity of the Preserve. Initial exotic plant removal efforts along with follow-up maintenance will greatly enhance the natural plant communities and wildlife habitats.

Exotic animals can have a detrimental effect on native flora and fauna. For example according to FWC (2001), feral cats in Florida can potentially kill 271 million small mammals and 68 million birds each year. Few exotic (and no feral) animals have been documented at ORP. A range of removal methods will be considered for problematic invasive exotic or feral animals found on the Preserve in the future.

C. External Influences

As mentioned in several previous sections, an outparcel dividing the west and east sections of ORP exists. This had not caused any management concerns, but staff will continue to monitor these as well as the other boundaries for any potential problems. The property to the west of ORP is currently undeveloped tidal swamp and flatwoods and has been nominated to the C20/20 program for acquisition (Figure 14). Initially, this nomination was included in the Orange River Landing Residential Planned Development (RPD).

A second external influence is the sporadic illegal public use of the Preserve, including littering, saw palmetto berry picking, and homeless camps. These problems have already been reduced with the addition of two C20/20 Rangers who are able to respond

quickly to problems observed during routine site inspections. The primary litter problems for ORP are associated with Palm Beach Boulevard, most of which does not actually fall within the Preserve boundaries. Monofilament line could be a problem on the south boundary of ORP, and on every other site inspection, staff uses a canoe to paddle and pick up any debris that is found.

D. Legal Obligations and Constraints

i. Permitting

Land stewardship activities at Orange River Preserve may involve obtaining permits from several regulatory agencies. Exotic plant removal in the mangrove swamp community may require obtaining a de minimis permit from the Florida Department of Environmental Protection (FDEP) due to the possibility of injury to mangroves as well as possible permits from the United States Army Corps of Engineers (USACOE). Obtaining a FDOF burn permit will be necessary for conducting prescribed burns in the flatwoods community.

ii. 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." 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 three chapters that affect the management of ORP are **Chapter II – Future Land Use**, **Chapter V – Parks, Recreation and Open Space**, and **Chapter VII – Conservation and Coastal Management**.

Chapter II, Policy 1.4.6 states that Conservation Lands include 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, trailhead 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. Conservation 20/20 lands designated as conservation are also subject to more stringent use provisions of the 2020 Program or the 2020 ordinances. (Added by Ordinance No. 98-09, Amended by Ordinance No. 02-02)

Chapter 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 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 ORP 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.

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," 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 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 ORP include limited funding and the brief dry season for conducting land stewardship activities, especially prescribed burning, as urbanization surrounds the Preserve. Although C20/20 has a management fund, it is inadequate to fulfill the restoration activities for this and the other preserves. Efforts to obtain additional funding through grants and/or monies budgeted for mitigation of County infrastructure projects will be pursued. These funds will be used to supplement the operations budget to meet the restoration goals in a timely manner.

Although ORP's entire north boundary lies along S.R. 80, there is no vehicular access into the Preserve. Access from the river is very limited due to the sensitivity of the wetlands and mangroves along the shore. At this time, there are no vehicular access points planned, but after exotic removal, some trails may be created in disturbed areas. Another constraint will be smoke management if using prescribed fire. Palm Beach Blvd. (S.R. 80) is the northern boundary of the Preserve, Interstate 75 is approximately one mile to the west and Orange River Blvd. is approximately one mile south of the Preserve on the south side of the river. Due to the heavy volume of traffic, they would all be considered "smoke sensitive areas." Careful planning when writing burn prescriptions will help ease this problem.

F. Public Access and Resource-Based Recreation

The majority of the historic recreation that occurred at ORP has been from illegal uses. Before Lee County purchased the property, a homeless camp was set up on the northern portion of the Preserve along S.R. 80. Since Lee County has purchased the Preserve, additional homeless camps have been documented and removed on several occasions. There also has been evidence of saw palmetto berry picking. The Parks and Recreation Ordinance, 02-12 (<http://www.lee-county.com/ordinances/PDF/2002/02-12.pdf>) prohibits both of these activities.

Currently, ORP is classified as a Category 3 Limited Use Preserve. Category 3 preserves are intended to be more "neighborhood" preserves. Lee County's Department of Parks and Recreation is exploring the possibility of building a bridge for manatee viewing over the FPL canal and a boardwalk connection to the Preserve. These plans will be subject to obtaining permission from FPL, the Crossroads Baptist Church whose land is located between the two areas, successfully applying for permits and obtaining funding from an outside source, such as the Tourist Development Council. This conceptual plan (Appendix E) will not encumber Conservation 20/20 funds, with the exception of marking a trail system that would be established in the disturbed areas following restoration work. This would allow more visitors to access ORP without impacting it with parking areas or other amenities.

G. Acquisition

Orange River Preserve (STRAP numbers 35-43-25-00-00004.0000, 35-43-25-00-00006.0000 and 35-43-25-00-00008.0000) was purchased through the Conservation 20/20 program on March 28, 2002, for \$1,750,000 after being nominated to the program in December 1999. The parcel was purchased to provide a buffer for the Orange River. Mangrove swamps in southwest Florida are rapidly being lost to development and are important to protect for manatees, which congregate here in the winter season and other wildlife species. Additionally, a mangrove fringe provides an important filter for water draining into the Orange River.

There are several other protected areas in the vicinity of Orange River Preserve. Manatee Park east of ORP is heavily utilized in the winter by the public for viewing manatees. To the north of the Caloosahatchee River lies Conservation 20/20's Caloosahatchee Creeks Preserve, which is approximately 1,290 acres and includes pine flatwoods, wetlands and mangrove fringes. There are additional state owned conservation lands on the north shore of the Caloosahatchee River bordering Interstate 75 and the Caloosahatchee River National Wildlife Refuge.

There were three other nominations to the C20/20 program in the vicinity of Orange River Preserve that were not acquired for a variety of reasons (Figure 14). Nomination 132 is 22 acres located farther upstream, east of Manatee Park. It was two separate parcels and contained approximately 3,000 feet of river frontage. The nomination was moved to secondary review but withdrawn when Division of County Lands and the land owner could not agree on a price. Nomination 143 is a 10 acre outparcel located between the two pieces of ORP. This parcel was withdrawn when the landowner entered an agreement with another buyer. The parcel is now a truck outfitters stock yard. Nomination 192 is 10 acres to the west of the Preserve and contiguous with the western parcel. The parcel is mainly wetlands and mangrove fringe. The nomination was withdrawn because the asking price was much higher than the market value and the owner decided to retain ownership. Additional nominations along the Orange River, or re-nominations of these parcels could extend the Preserve boundary.

Currently, the future land use categories for the Preserve are "Suburban" (30 acres) and "Wetlands" (30 acres). ORP is zoned as agriculture "Ag-2" (6 acres of wetlands and 2 acres of uplands) and commercial "C-1A" (53.5 acres) (Appendix C). Land Stewardship staff recommends that the future land use be changed to "Conservation Lands" and the zoning category be changed to "Environmentally Critical."

VI. MANAGEMENT ACTION PLAN

A. Management Unit Descriptions

Orange River Preserve has been divided into four management units (MU) to better organize and achieve management goals. Figure 15 delineates the management units that were created based on Preserve boundaries, existing trails and plant communities.

Management Unit 1 – 6.0 acres

Management Unit 1 consists of the western parcel of the Preserve. It contains a combination of tidal swamp, mesic hammock and scrubby flatwoods communities. MU 1 is bordered to the west by private property, the north by S.R. 80, the east by private property and the south by the Orange River. Stewardship activities in this unit will focus on exotic plant control, shoreline protection and fuel reduction.

Management Unit 2 – 31.2 acres

Management Unit 2 is located in the center of the Preserve. It contains a mixture of tidal swamp, mesic hammock, scrubby flatwoods and scrubby flatwoods with melaleuca. MU 2 is bordered to the west by private property, north by S.R. 80, east by MU 3 and the south by the Orange River. Stewardship activities in this unit will focus on exotic plant control, shoreline protection and fuel reduction in the flatwoods areas. In the future, trails may be marked in this area.

Management Unit 3 – 20.2 acres

Management Unit 3 is located on the western portion of the Preserve. It contains a mixture of tidal swamp, mesic hammock, scrubby flatwoods and scrubby flatwoods with melaleuca. It is bordered to the west by MU 2, the north by S.R. 80, the east by private property and the south by the Orange River. Stewardship activities in this unit will focus on exotic plant control, shoreline protection and fuel reduction in the flatwoods areas. In the future, trails may be marked in this area.

Management Unit 4 – 2.4 acres

Management Unit 4 is an island in the Orange River just south of the mainland portions of the Preserve. The plant community on the island is tidal swamp. Stewardship activities here will focus on exotic plant control and shoreline protection.

Figure 15: Management Unit Map



B. Goals and Strategies

While the following are the long-term goals for the Preserve, funding is currently not available to conduct all of these activities. Grants and/or monies budgeted to mitigate public infrastructure projects will be used to supplement the operations budget to meet goals in a timely manner. The primary management objectives will be to control exotic plants and reduce fuel levels in the flatwoods areas.

Natural Resource Management

- Exotic plant control and maintenance
- Exotic animal control
- Monitor and protect listed species
- Brush/fuel reduction
- Prescribed fire management
- Debris removal

Overall Protection

- Install firebreaks
- Install boundary signs, patrol for unauthorized use and possible fencing
- Change Land Use and Zoning

The following is a description of how each of these goals will be conducted, the success criteria used to measure the accomplishment of each goal and a projected timetable outlining when and in which units 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 in each management unit. The goal is to remove/control these exotic species, followed with semi-annual or as needed treatments of resprouts and new seedlings. This goal will bring the entire Preserve to a maintenance level, defined as less than 5% invasive exotic plant coverage.

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

The following outlines exotic plant control techniques that may be used on the Preserve:

- Uplands habitat with moderate to heavy infestations:
Mechanical removal will be used in appropriate communities and during suitable seasons in areas where the exotics occur as monotypic stands or are higher than 50% of the vegetation cover. Equipment and appropriate season will be chosen so that soil disturbance and compaction are minimized. Removal will focus on the following species: melaleuca, Brazilian pepper, earleaf acacia (*Acacia auriculiformis*) and Java plum (*Syzygium cumini*). Follow-up treatment will consist of an application of an appropriate herbicide mixture to the foliage of any resprouts or seedlings. Land Stewardship staff will evaluate the need for replanting on a case-by-case basis.
- Uplands with light to moderate infestations:
Hand removal will be used for control in areas where invasive plants are sporadic and below 50% of the vegetation cover. Specific methodology will depend on stem size, plant type and season, but generally the stem will be cut near the ground and the stump will be sprayed with appropriate herbicide, or a foliar application will be sprayed on the entire plant (particularly with grasses and broadleaf plants). Hand pulling will be used when possible with appropriate species in order to minimize herbicide use. Some locations may receive basal bark treatment, for example small clusters of Brazilian pepper. Cut stems may be piled to facilitate future burning, chipping or removal from site. No replanting will be needed due to the presence of native vegetation and the native seed bank.
- Wetlands with light to moderate infestations:
Hand crews will need to hike in on foot and either foliar, girdle, or cut-stump treat the exotics with the appropriate herbicide. Follow-up treatments will be conducted on an annual basis.

Exotic animal control

The species Land Stewardship staff is primarily concerned with is the feral hog, although to date no hogs have been noted on the Preserve. Currently, the only acceptable method of hog removal on Conservation 20/20 Preserves is trapping. Removing all hogs is an unreasonable goal; therefore a control program will need to be continuous on a long-term basis. If necessary, a hog removal program will be established at the Preserve. Staff will investigate the feasibility to control other exotic

species listed in Table 3. If practical, a methodology will be established and implemented.

Although not noted at ORP, this Preserve, like other C20/20 preserves, does not contain and will not 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).

Monitor and protect listed species

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

ORP is part of a countywide quarterly site inspection program conducted on all Conservation 20/20 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.

Brush/fuel reduction

Heavy fuel loads in the flatwoods have created the danger of a catastrophic wildfire that may be difficult to control. A combination of both mechanical techniques and prescribed fires will be essential for long-term sustainability of these fire-dependant communities by creating a mosaic of both open and vegetated areas. Land Stewardship staff would like to partner with FDOF to possibly use this preserve as a demonstration area to show the importance of fuel management and the benefits of fire on the landscape.

Prescribed fire management

Once fuel loads are reduced and restoration projects are complete, a prescribed fire program will be implemented in each fire dependent MU to closely mimic the natural fire regimes for the different plant communities in order to increase plant diversity and ensure the canopies remain open. The timing of prescribed burning will be influenced by seasonal rain and wind patterns. The Conservation 20/20 Burn Team Coordinator is coordinating with the FDOF and FWC to finalize the C20/20-wide Fire Management Plan that will apply to all Preserves.

Install firebreaks

Fire breaks will be created where needed to reduce the potential damage to areas outside the Preserve from a wildfire or prescribed fire. There are currently no firebreaks on the Preserve. New firebreaks will be installed on the east and west boundaries of the outparcel from Palm Beach Boulevard to the mangrove area. It is possible a fireline may need to be installed on the western boundary, but currently there are no plans for development on the neighboring parcel.

Debris removal

Debris removal will be an ongoing project at ORP. During quarterly site inspections, small objects that are encountered will be removed, including the shoreline along the Orange River. If necessary, additional debris clean-ups will be organized with the Parks and Recreation Land Stewardship volunteers.

Overall Protection

Boundary signs and fencing

Boundary signs have been installed along the northern and western boundaries. The eastern boundary needs to be posted once the survey line is found. C20/20 Rangers will check boundary signs during the patrols for unauthorized use issues and replace them immediately if possible or report the problem to the C20/20 Supervisor. Boundary signs will be placed every 200-300 feet along roadsides and 500 feet elsewhere.

There is currently no fence at the Preserve. Unless unauthorized access becomes a problem, no fence will be installed. If unauthorized access becomes a problem, fences will be installed in the upland areas.

Change Land Use and Zoning

Staff will coordinate with Lee County Division of Planning staff to discuss the zoning of ORP. The zoning should be changed from "Agriculture" and "Commercial" to "Environmentally Critical." The Land Use category should be changed from "Suburban" and "Wetlands" to "Conservation Lands Uplands" and "Conservation Lands Wetlands."

VII. PROJECTED TIMETABLE FOR IMPLEMENTATION

Prioritized Projected Timetable for Implementation of the Management Action Plan (Dec 2006 – Sept 2011)

Management Activity	Dec-06	Mar-07	Jun-07	Sep-07	Dec-07	Mar-08	Jun-08	Sep-08	Dec-08	Mar-09	Jun-09	Sep-09	Dec-09	Mar-10	Jun-10	Sep-10	Dec-10	Mar-11	Jun-11	Sep-11	2012 or later	
Natural Resource Management																						
Exotic Plants																						
Initial exotic plant control																			X			
Fire																						
Mechanical brush reduction																				X		
Create fire breaks											X											
Implementation of Rx FMP																						X
Maintenance (On-going/Annual)																						
Follow up exotic plant control																				X		
Exotic animal removal																						
Fire break mow/disk															X				X			
Overall Protection																						
Install preserve boundary signs					X																	
Change Zoning categories				X																		

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

III. FINANCIAL CONSIDERATIONS

There is a perpetual management fund established for all Conservation 20/20 preserves. Monies from this fund primarily serve to meet the operational needs of the Management section of the C20/20 Program, but a certain amount of this fund will be set aside for planned restoration projects. There is currently no outside funding available for this preserve. Monies will be supplemented through grants from agencies such as FDEP, FDOF and USFWS as well as pursuing mitigation opportunities from Lee County and other public entities. Projected costs and funding sources are listed in Appendix D.

IX. LITERATURE CITED

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X. APPENDICES

Appendix A: Plant Sightings at Orange River Preserve

Appendix B: Wildlife Sightings at Orange River Preserve

Appendix C: Future Land Use and Zoning Maps

Appendix D: Projected Costs and Funding Sources

Appendix E: Conceptual Boardwalk Map

Appendix A: Plant Sightings at Orange River Preserve

Appendix A: Plant Sightings at Orange River Preserve

Common and scientific names from this list were obtained from Wunderlin and Hansen, 2003

Scientific Name	Common Name	Native Status	EPPC	FDA	IRC
Family: Blechnaceae (midsorus fern)					
<i>Blechnum serrulatum</i>	swamp fern	native			
<i>Woodwardia virginica</i>	Virginia chain fern	native			R
Family: Dennstaedtiaceae (cuplet fern)					
<i>Pteridium aquilinum</i> var. <i>caudatum</i>	lacy bracken	native			
Family: Nephrolepidaceae (sword fern)					
<i>Nephrolepis cordifolia</i>	tuberous sword fern	exotic	I		
Family: Polypodiaceae (polypody)					
<i>Pleopeltis polypodioides</i>	resurrection fern	native			
Family: Pteridaceae (brake fern)					
<i>Acrostichum danaeifolium</i>	giant leather fern	native			
Family: Pinaceae (pine)					
<i>Pinus elliotii</i> var. <i>densa</i>	south Florida slash pine	native			
Family: Araceae (arum)					
<i>Colocasia esculenta</i>	wild taro	exotic	I		
Family: Arecaceae (palm)					
<i>Sabal palmetto</i>	cabbage palm	native			
<i>Serenoa repens</i>	saw palmetto	native			
Family: Bromeliaceae (pineapple)					
<i>Tillandsia fasciculata</i>	cardinal airplant	native			E
<i>Tillandsia recurvata</i>	ballmoss	native			
<i>Tillandsia setacea</i>	southern needleleaf	native			
<i>Tillandsia usneoides</i>	Spanish moss	native			
<i>Tillandsia utriculata</i>	giant airplant	native			E
Family: Cyperaceae (sedge)					
<i>Cyperus erythrorhizos</i>	redroot flatsedge	native			
<i>Rhynchospora wrightiana</i>	Wright's beaksedge	native			
Family: Eriocaulaceae (pipewort)					
<i>Syngonanthus flavidulus</i>	yellow hatpins	native			
Family: Orchidaceae (orchid)					
<i>Habenaria floribunda</i>	toothpetal false reinorchid	native			
Family: Poaceae (grass)					
<i>Andropogon glomeratus</i> var. <i>glaucopis</i>	purple bluestem	native			R
<i>Andropogon virginicus</i> var. <i>glaucus</i>	chalky bluestem	native			R
<i>Aristida beyrichiana</i>	wiregrass	native			
<i>Dichantherium ensifolium</i>	cypress witchgrass	native			
<i>Setaria parviflora</i>	knotroot foxtail	native			
Family: Smilacaceae (smilax)					
<i>Smilax auriculata</i>	earleaf greenbriar	native			
Family: Amaranthaceae (amaranth)					
<i>Alternanthera philoxeroides</i>	alligatorweed	exotic	II		
<i>Amaranthus australis</i>	southern amaranth	native			R
Family: Anacardiaceae (cashew)					
<i>Rhus copallinum</i>	winged sumac	native			
<i>Schinus terebinthifolius</i>	Brazilian pepper	exotic	I		
Family: Annonaceae (custard-apple)					
<i>Annona glabra</i>	pondapple	native			
<i>Asimina reticulata</i>	netted pawpaw	native			

Appendix A: Plant Sightings at Orange River Preserve (continued)

Scientific Name	Common Name	Native Status	EPPC	FDA	IRC
Family: Apocynaceae (dogbane)					
<i>Cryptostegia madagascariensis</i>	Madagascar rubbervine	exotic	II		
<i>Rhabdadenia biflora</i>	mangrovevine	native			
<i>Sarcostemma clausum</i>	white twinevine	native			
Family: Aquifoliaceae (holly)					
<i>Ilex glabra</i>	galberry	native			
Family: Asteraceae (aster)					
<i>Bidens alba</i>	beggarticks	native			
<i>Conyza canadensis</i> var. <i>pusilla</i>	dwarf Canadian horseweed	native			
<i>Elephantopus elatus</i>	tall elephantsfoot	native			R
<i>Erechtites hieraciifolius</i>	fireweed	native			
<i>Eupatorium capillifolium</i>	dogfennel	native			
<i>Euthamia graminifolia</i>	flattop goldenrod	native			
<i>Pluchea odorata</i>	sweetscent	native			
<i>Pterocaulon pycnostachyum</i>	blackroot	native			
Family: Avicenniaceae (black mangrove)					
<i>Avicennia germinans</i>	black mangrove	native			
Family: Combretaceae (combretum)					
<i>Conocarpus erectus</i>	buttonwood	native			
<i>Laguncularia racemosa</i>	white mangrove	native			
Family: Convolvulaceae (morning-glory)					
<i>Ipomoea alba</i>	moonflowers	native			
Family: Ericaceae (heath)					
<i>Bejaria racemosa</i>	tarflower	native			R
<i>Lyonia fruticosa</i>	rusty staggerbush	native			
<i>Lyonia lucida</i>	fetterbush	native			
<i>Vaccinium myrsinites</i>	shiny blueberry	native			
Family: Fabaceae (pea)					
<i>Acacia auriculiformis</i>	earleaf acacia	exotic	I		
<i>Galactia elliotii</i>	Elliott's milkpea	native			
<i>Indigofera hirsuta</i>	hairy indigo	exotic			
<i>Senna pendula</i>	valamuerto	exotic	I		
Family: Fagaceae (beech)					
<i>Quercus elliotii</i>	running oak	native			
<i>Quercus laurifolia</i>	laurel oak	native			
<i>Quercus minima</i>	dwarf live oak	native			R
<i>Quercus myrtifolia</i>	myrtle oak	native			
<i>Quercus virginiana</i>	live oak	native			
Family: Lamiaceae (mint)					
<i>Callicarpa americana</i>	beautyberry	native			
Family: Lauraceae (laurel)					
<i>Persea palustris</i>	swamp bay	native			
Family: Malvaceae (mallow)					
<i>Hibiscus grandiflorus</i>	swamp rosemallow	native			
<i>Kosteletzkya virginica</i>	Virginia saltmarsh mallow	native			
<i>Urena lobata</i>	Caesarweed	exotic	II		
Family: Melastomataceae (melastome)					
<i>Rhexia</i> ssp.	meadowbeauty	native			

Appendix A: Plant Sightings at Orange River Preserve (continued)

Scientific Name	Common Name	Native Status	EPPC	FDA	IRC
Family: Meliaceae (mahogany)					
<i>Melia azedarach</i>	Chinaberrytree	exotic	II		
Family: Moraceae (mulberry)					
<i>Ficus aurea</i>	strangler fig	native			
<i>Ficus citrifolia</i>	wild banyan tree	native			
Family: Myricaceae (bayberry)					
<i>Myrica cerifera</i>	wax myrtle	native			
Family: Myrsinaceae (myrsine)					
<i>Rapanea punctata</i>	myrsine	native			
Family: Myrtaceae (myrtle)					
<i>Melaleuca quinquenervia</i>	punktree	exotic	I		
<i>Syzygium cumini</i>	Java plum	exotic	I		
Family: Nyctaginaceae (four-o'clock)					
<i>Bougainvillea spp.</i> Comm. ex Juss.	bougainvillea	exotic			
Family: Oleaceae (olax)					
<i>Fraxinus caroliniana</i>	pop ash	native			R
Family: Rhizophoraceae (mangrove)					
<i>Rhizophora mangle</i>	red mangrove	native			
Family: Rubiaceae (madder)					
<i>Spermacoce prostrata</i>	prostrate false buttonweed	native			
<i>Spermacoce verticillata</i>	shrubby false buttonweed	exotic			
Family: Sapindaceae (soapberry)					
<i>Cupaniopsis anacardioides</i>	carrotwood	exotic	I		
Family: Verbenaceae (vervain)					
<i>Lantana camara</i>	lantana	exotic	I		
Family: Vitaceae (grape)					
<i>Ampelopsis arborea</i>	peppervine	native			
<i>Parthenocissus quinquefolia</i>	Virginia creeper	native			
<i>Vitis rotundifolia</i>	muscadine grape	native			

Key

Florida EPPC Status

I = species that are invading and disrupting native plant communities

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

FDA (Florida Department of Agriculture and Consumer Services)

E = Endangered

CE = Commercially Exploited

IRC (Institute for Regional Conservation)

CI = Critically Imperiled

I = Imperiled

R = Rare

Appendix B: Wildlife Sightings at Orange River Preserve

Appendix B: Wildlife Sightings at Orange River Preserve

Scientific Name	Common Name	Designated Status	
		FWS	FWC
Amphibians			
Family: Leptodactylidae (tropical frogs)			
<i>Eleutherodactylus planirostris planirostos</i>	greenhouse frog*		
Family: Hylidae (treefrogs)			
<i>Hyla cinerea</i>	green treefrog*		
<i>Osteopilus septentrionalis</i>	Cuban treefrog*		
Reptiles			
Family: Alligatoridae (alligators and caimans)			
<i>Alligator mississippiensis</i>	American alligator	SSC	T S/A
Family: Polychridae (anoles)			
<i>Anolis sagrei</i>	brown anole*		
Family: Colubridae (colubrids)			
<i>Coluber constrictor priapus</i>	southern black racer		
Birds			
Family: Anhingidae (anhingas)			
<i>Anhinga anhinga</i>	anhinga		
Family: Ardeidae (herons egrets and bitterns)			
<i>Ardea herodias</i>	great blue heron		
<i>Butorides virescens</i>	green heron		
<i>Nyctanassa violacea</i>	yellow-crowned night heron		
Family: Cathartidae (new world vultures)			
<i>Coragyps atratus</i>	black vulture		
<i>Cathartes aura</i>	turkey vulture		
Family: Accipitridae (raptors)			
<i>Elanoides forficatus</i>	swallow-tailed kite		
<i>Haliaeetus leucocephalis</i>	bald eagle	T	
Family: Picidae (woodpeckers)			
<i>Melanerpes erythrocephelus</i>	red-bellied woodpecker		
<i>Dryocopus pileatus</i>	pileated woodpecker		
Family: Corvidae (jays)			
<i>Cyanocitta cristata</i>	blue jay		
<i>Corvus brachyrhynchos</i>	American crow		
Family: Hirundinidae (swallows)			
<i>Tachycineta bicolor</i>	tree swallow		
Family: Tryglodytidae (wrens)			
<i>Thryothorus ludovicianus</i>	Carolina wren		
Family: Sylviidae (gnatcatchers)			
<i>Polioptila caerulea</i>	blue-gray gnatcatcher		
Family: Mimidae 319			
<i>Dumetella carolinensis</i>	gray catbird		
Family: Parulidae (warblers)			
<i>Dendroica coronata</i>	yellow-rumped warbler		
<i>Dendroica discolor</i>	prairie warbler		
Family: Cardinalidae (cardinals)			
<i>Cardinalis cardinalis</i>	northern cardinal		
Family: Icteridae (Icterids)			
<i>Quiscalus quiscula</i>	common grackle		

Appendix B: Wildlife Sightings at Orange River Preserve (continued)

Scientific Name	Common Name	Designated Status	
		FWS	FWC
Mammals			
Family: Trichechidae (manatees)			
<i>Trichechus manatus</i>	West Indian manatee	E	E
Family: Leporidae (rabbits and hares)			
<i>Sylvilagus floridanus</i>	eastern cottontail		
Family: Sciuridae (squirrel)			
<i>Sciurus carolinensis</i>	eastern gray squirrel		
Family: Dasypodidae			
<i>Dasypus novemcinctus</i>	nine-banded armadillo*		

KEY:

FWS= U.S. Fish & Wildlife Service

FWC= Florida Fish & Wildlife Conservation Commission

E= Endangered

T= Threatened

T S/A= Threatened due to similarity of appearance

SSC= Species of Special Concern

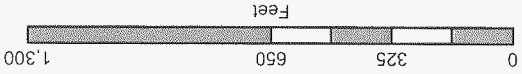
* = Non-native

Appendix C: Future Land Use and Zoning Maps

Future Land Use Map

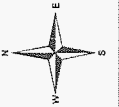


Orange River Preserve

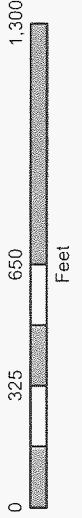


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Map Prepared On: 06/05/2016 by: bloyd@ecogov.com
This is not a survey. Land Development Staff has prepared this map for informational and planning purposes.

Zoning Map



Orange River Preserve



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Map Prepared On: 06/06/06 by: boyde@legor.com
This is a survey. Land Stewardship Solutions prepared this map for information and planning purposes.

Appendix D: Projected Costs and Funding Sources

Appendix D - Projected Costs and Funding Sources Table

Resource Enhancement and Protection

Item	Possible Funding Source	Estimated Costs
Invasive exotic plant control	USFWS, DEP-BIPM, mitigation, C20/20	\$95,000
Install fire breaks	C20/20, FDOF	\$1,000
Brush reduction		\$2,500

TOTAL COST ESTIMATE **\$98,500**

Site Management and Maintenance

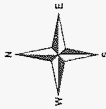
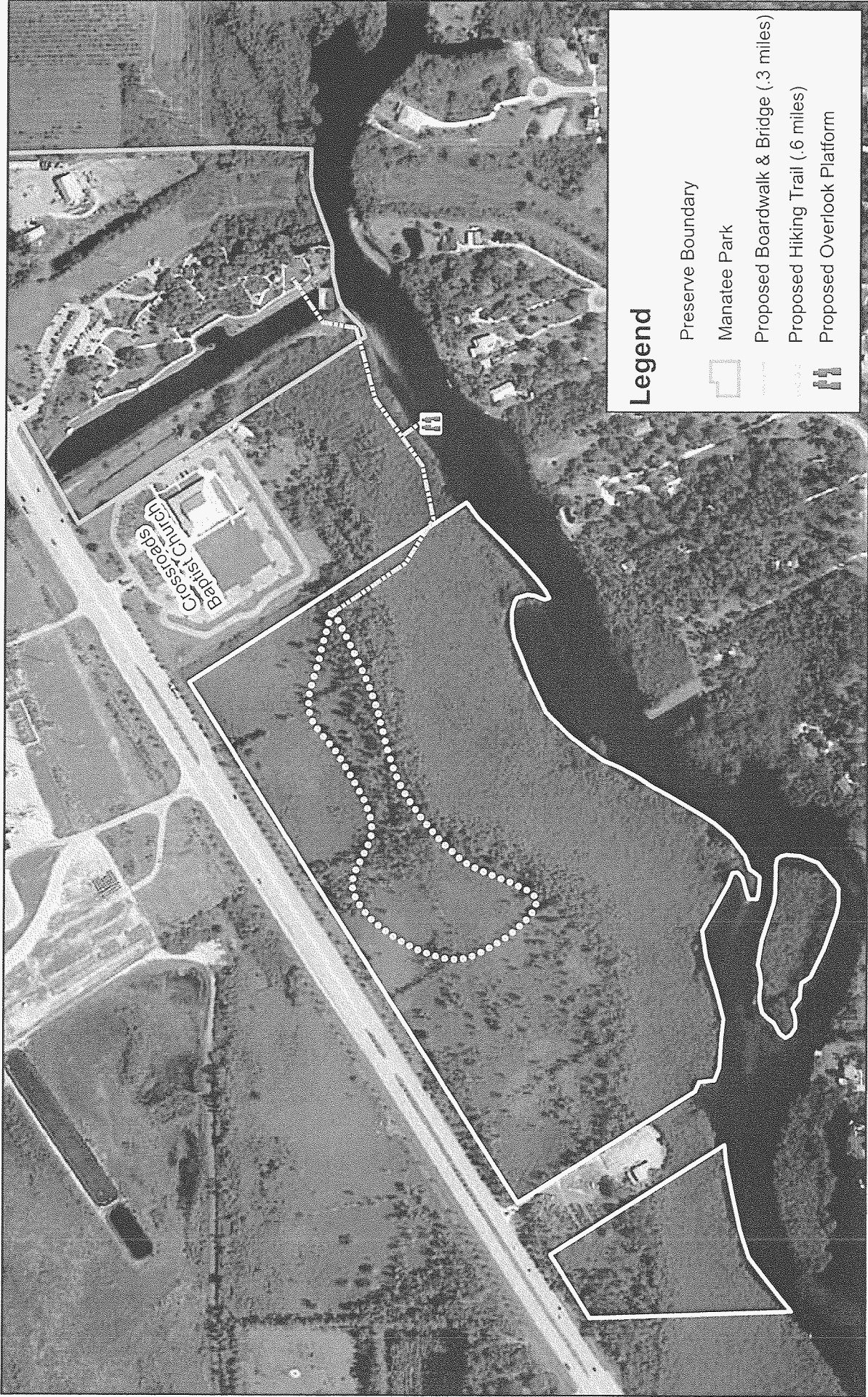
Item	Possible Funding Source	Estimated Costs
Exotic Plant Control	C20/20	\$8,500
Prescribed Fire Regime	LC P&R, C20/20	In-house
Assorted Repairs		\$100

Yearly Maintenance Estimate **\$8,600**

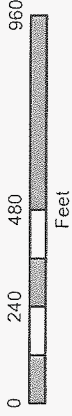
*All costs are rough estimates based on information currently available.
Every effort will be made to not exceed this budget by more than 10%.*

Appendix E: Conceptual Boardwalk Map

Appendix E: Master Site Plan / Conceptual Trail Map



Orange River Preserve



Legend

- Preserve Boundary
- Manatee Park
- Proposed Boardwalk & Bridge (.3 miles)
- Proposed Hiking Trail (.6 miles)
- Proposed Overlook Platform

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Map Prepared On: 05/29/06 by: wew@fla.gov
This is not a survey. Just Edwards & Kelcey has prepared this map for informational and planning purposes.