Lee County Board Of County Commissioners
Agenda Item Summary

Blue Sheet No. 20060755

1. ACTION REQUESTED/PURPOSE:

Approve the Spanish Creek Preserve (SCP) Land Stewardship Plan.

2. WHAT ACTION ACCOMPLISHES:

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

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

4. Departmental Category: 11 C11B			**5. Meeting Date:** 6-20-2006
6. Agenda:	**7. Requirement/Purpose:** *(specify)*		**8. Request Initiated:**
X **Consent**		**Statute**	**Commissioner**
Administrative	X	**Ordinance** Lee Plan	**Department** Parks & Recreation
Appeals		**Admin. Code**	**Division**
Public		**Other**	**By: John Yarbrough, Director**
Walk-On			

9. Background:

A Land Stewardship Plan is necessary for appropriate and planned restoration, management and public use facility development of any Conservation 20/20 Preserve. The CLASAC (Conservation Lands Acquisition and Stewardship Advisory Committee) unanimously passed a motion on May 11, 2006, accepting the Spanish Creek Preserve Land Stewardship Plan.

The plan was available for public review on the internet, as well as at the Riverdale Branch Library. A public meeting was held June 1, 2006 with thirty-two neighbors and other interested parties attending. Attached is a summary of all verbal comments received with responses by staff or other representatives.

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.	
6-6-06				6/7/06		6/8/06	6/8/06	6/8/06	

11. Commission Action:

_____ **Approved**
_____ **Deferred**
_____ **Denied**
_____ **Other**

RECEIVED BY COUNTY ADMIN: 6/7/06 1:15 pm

COUNTY ADMIN FORWARDED TO: 6/28/06 3pm

Rec. by CoAtty Date: 6/7/06 Time: 9:50 am Forwarded To: 11:30 am 6/7/06

Summary of Public Comments Received on the Spanish Creek Preserve Land Stewardship Plan

The second draft of the **Spanish Creek Preserve (SCP) Land Stewardship Plan** was available for public comment from May 12th through June 1st, 2006. The plan was made available to the public through the Parks and Recreation website and at the Riverdale Branch Library. Citizens were informed of the plan through a combination of public service announcements on both radio and television, several articles in the News Press, the River Weekly, the Lehigh News Star, the Lehigh Acres Citizen, a legal advertisement in the News Press, and flyers passed out to many neighbors.

A public meeting was held on June 1, 2006, at 6:30 P.M. at the Alva Community Center. A brief presentation was provided and included background on the Preserve, proposed management activities and a timeline to complete these activities. Although Lee County Parks and Recreation staff did not receive any written comment cards, many verbal responses were received during the public comment period of the meeting. The informal Public Meeting Minutes covers concerns and issues raised during the public comment period.

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 Spanish Creek Preserve

Thursday, June 1, 2006, 6:30 pm, Alva Community Center
Staff members present: Sherry Furnari, Lynne Boyd, Cathy Olson (Conservation 20/20)
32 community members present

Sherry Furnari gave presentation on Preserve and what is proposed on the site.

Floor open for questions:

Will the flow of the creek be restored?
Clyde Dabbs (SFWMD) – The district will evaluate 3 – 5 alternative plans to provide hyrdrological restoration to the creek

Land owner has portions of the creek that run through her property that are either dry or a mosquito pit. Wants the flow restored to alleviate the problem.

Will the sludge and trash that has built up in the creek be removed before the flow is restored?
Clyde Dabbs – yes, they work in areas that are much dirtier than Spanish Creek and know what they are doing.

Where will you start the restoration?
Clyde Dabbs – The SFWMD property to the east of the Preserve will be used as a filter marsh and then released into the creek. Water will be controlled and only released during the dry season, not the peak season.

Why aren't you using the borrow pond to the northeast of the Preserve to re-hydrate the area?
Clyde Dabbs – It is on private property and SFWMD has no jurisdiction over it. Will try to work with land owner.

What made the creek stop flowing?
Clyde Dabbs - County line drainage district installed a series of ditches that diverted the water.

You are going to put a control structure on the ditch?
Clyde Dabbs – yes

Where does Spanish Creek flow through the Preseve?
Staff – showed on map and aerial photograph where the creek flows.

Are there any plans to utilize the borrow ponds for rehydrating the creek?

Staff – the only current plans we have are to remove the Brazilian pepper and possibly reslope the banks to create more wildlife habitat, particularly for wading birds.

If SFWMD is successful at negotiating with the groves to the north and the east, can you get more water into the ponds/preserve?
Staff - We would love to have water from the borrow pond to the northeast, it would rehydrate the wetlands and eventually reach the creek to create more flow.

Where is all of the water coming from if not from the drainage district?
Clyde Dabbs – not sure in this phase of planning

Where exactly is the public access going to be and how are you going to address the speeding and traffic on Persimmon Ridge Rd.?
Staff - The access point is in the northwest portion of the Preserve – located on map. We don't have any jurisdiction over speed limits, but as a land owner along the road, would be supportive of any way to enforce this. Suggest you contact DOT and your commissioner.

How much traffic are you going to bring to the road and are you charging for parking?
Staff - The plan only calls for 5 – 10 parking spaces and as of right now we would not charge for parking. Should not add to the traffic on the road.

Are you going to put a fence up to keep the hogs out?
Staff - Most likely the hogs will always find a way to get back in.

How do you get the pepper out of the swamp?
Staff - During the dry season, the stems will be treated with a basal bark treatment of herbicide.

Will there be camping?
Staff - No, there is camping at Caloosahatchee Regional Park.

Will there be four-wheelers?
Staff - No, only vehicular access is by staff, same for all 2020 preseves.

Should we get the county commissioners involved in the restoration process?
Staff - Yes, if you think they should be.

How do I get a copy of the plan?
Staff - Can contact on and have it printed or will be available on-line or at the library.

Spanish Creek Preserve
Public Meeting
Sign – In Sheet
June 1, 2006

Name	Phone Number	Email	How heard about meeting
John Mellor	239 275 0686	mellorrhsd@comcast.net	
Wm H Mellor	481 5542		News Press
STEVE SENTES	338-2929	SSENTES@SFWMD.GOV	News Press
Clyde Dabbs	338 2929	cdabbsjr@sfwmd	email
GARY PORTER	461-7449	PorterGPE@eagov.com	email
Brenda Wright	728-3777	rbwright777@earthlink.net	Neighbor.
Ruby Daniels	728-3292	danielsare@ssfcu.org member	For Sherry + Lynn
Wm. Hamilton	239 369-4782	wth2o@aol.com wah@duda.com	News-Press
Brian Watts	7282606	BrianWatts@earthlink.net	
Barbara Watts	"	" "	
Patty Walker	340-3904	pwalker@heritagelandco.com	NewsPress
Donna Daniels Murphy	728-3244		"
Mary Jane Oxnam	728-2874	Rotorn4007@yahoo.com	Creek Runs Thru 44 my 46 acres
Richard Oxnam	633-0186		
Ron Walker	7283503		
James D. English Jr.	694-1340		From a Neighbor
Wayne Rawan	728-3308		neighbor

Spanish Creek Preserve
Public Meeting
Sign – In Sheet
June 1, 2006

Name	Phone Number	Email	How heard about meeting
Richard Bull	352 256 5928	customisplayer@earthlink.net	Frank Green
Connie Bull	728 2173	N/A	" "
JoAnn Williams	239-728-3986		News Press
Colette Corwin	728-6693	Colnstash@earthlink.net	Ruby Daniel
STAN CORWIN	728-6693	COLNSTASH@EARTHLINK.NET	"
FRANK + Nancy Green	728-2669		Ruby Daniels
Kevin Higginson	936-9777	Khigginson@communityengineeringonline.com	Paper
DAMON Sheldon	239 369-4712	dpsheldon@aol.com	NEWSPAPER
ROB ANDRYS	728-2807	ROB@ANDRYS.ORG	FLYER
JOHN DULMER	461-3312	JJD@JOHNSONENG.COM	NEWSPAPER
LESLEE CHAPMAN	334-0046	LMC@JOHNSONENG.COM	NEWSPAPER
Paul Furbay			

Spanish Creek Preserve
Land Stewardship Plan

18500 Persimmon Ridge Road
Alva, FL 33920

2nd DRAFT - May 2006

CONSERVATION

20/20
LAND PROGRAM

Commission for Accreditation of Park and Recreation Agencies
CAPRA
ACCREDITED

Discover
LEE COUNTY
Parks & Recreation

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, and other Lee County staff for carefully reviewing the Spanish Creek Preserve (SCP) 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; Dean Cerdan, Lee County Parks and Recreation, for providing the plan on the Lee Parks website for public review; Jeff Morgan, Lee County Parks and Recreation, for printing assistance; Lee County Library System for making the plan available for public review and the Alva Community Center for providing a meeting space for public comments; long time residents James Daniels, Paul Furbay and Bryan Smith for providing their regional and local historical knowledge; and Mrs. Ruby Daniels for generously nominating her property to the C20/20 Program for long-term preservation and giving Land Stewardship staff her valuable time and historical knowledge regarding the property.

Lynne Boyd
Sherry Furnari

Table of Contents

List of Exhibits

List of Acronyms

C20/20	Conservation 20/20
CIP	Capital Improvement Program
CLDD	County Line Drainage District
DHR	Division of Historical Resources
FCT	Florida Communities Trust
FDACS	Florida Department of Agriculture and Consumer Services
FDEP	Florida Department of Environmental Protection
FDOF	Florida Division of Forestry
FDOT	Florida Department of Transportation
FLEPPC	Florida Exotic Pest Plant Council
FLUCCS	Florida Land Use, Cover and Forms Classification System
FNAI	Florida Natural Areas Inventory
FWC	Florida Fish and Wildlife Conservation Commission
IRC	Institute for Regional Conservation
LCNR	Lee County Natural Resources
LDOT	Lee County Department of Transportation
LSOM	Land Stewardship Operations Manual
LWCR	Lower West Coast Region
MU	management units
NWI	National Wetlands Inventory
PARI	Piper Archaeological Research, Inc.
SCP	Spanish Creek Preserve
SFWMD	South Florida Water Management District
TSA	tropical soda apple
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 the Lee County Department of Parks and Recreation and the Conservation 20/20 Program to conserve, protect and restore Spanish Creek Preserve to a productive, functional and viable ecosystem. The Preserve contains the northernmost seasonal headwaters of Spanish Creek. The primary stewardship objectives for Spanish Creek Preserve will be hydrologic improvements along Spanish Creek, restoring/prolonging the hydroperiod within wetland ecosystems, and enhancing the borrow ponds to become more natural systems with better wildlife habitat and to integrate with other hydrologic components of the Preserve. Maintaining the upland ecosystems with prescribed fire and removing all invasive exotic plants and animals will become ultimate objectives for the management of this Preserve. Along its' rustic trails, the Preserve will be a unique birding and outdoor learning experience for the local community due to its rural setting.

I. EXECUTIVE SUMMARY

Spanish Creek Preserve is located at 18500 Persimmon Ridge Road, Alva, Florida in northeast Lee County within Section 15, Township 43 South, Range 27 East. The Preserve is located less than one mile north of Alva Elementary and Middle Schools and the Alva Community Center. The 243-acre Preserve, nomination 260, was purchased through C20/20 in September 2005 for nearly $3.9 million. Mrs. Ruby Daniels, the former landowner, nominated it to the program in January 2004 so that it could be preserved. The Conservation 20/20 Program was established in 1996 after Lee County voters approved a referendum that increased property taxes by up to 0.5 mil for the purpose of purchasing and protecting environmentally sensitive lands.

The land where Spanish Creek Preserve is located today was created during the late Pliocene – early Pleistocene Epoch about 1 to 2 million years ago. This period is also known as the Ice Age, where huge ice sheets formed across Canada and the northern United States. Throughout much of Lee County, including the area where SCP is located, the Caloosahatchee and Fort Thompson units are somewhat indistinct and have been combined as undifferentiated Tertiary/Quaternary Sediments. 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. The natural elevations at SCP range from 12' along the creek to 16'. There is one small peak that reaches 18' in the southeast corner of the Preserve that is a natural fluctuation in elevation.

There are nine different soil types found at Spanish Creek Preserve. A common relationship for all of these soil types is that their slopes range from 0-2%. All soil types are nearly level and poorly drained with rapid permeability at the surface. Covering one-third of the Preserve, Copeland Sandy Loam is the most common soil type, which is found in freshwater wetland areas containing cypress and other hardwood species within northern portions of the Preserve. Boca Fine Sand is found on approximately one-quarter of the Preserve and is present in the south Florida flatwoods type communities within southern portions of the Preserve.

The Preserve contains twenty-one plant communities including wetland forested mixed, pine flatwoods, pine – mesic oak, unimproved pasture, and cypress. The seasonal headwaters of Spanish Creek are in the northern portion of the Preserve and the creek meanders through the Preserve for over a mile before reaching the lower branches of the creek and emptying into the Caloosahatchee River. Spanish Creek Preserve is also home to variety of animal species including warblers, woodpeckers, feral hogs, squirrels, bears, snakes, and gopher tortoises.

The Preserve lies within the Spanish Creek Watershed, its namesake, which covers a surface area of approximately 1.5 square-miles. Agriculture and development on surrounding lands have greatly altered sheetflow across the Preserve. Historically, during the summer rainy season, water would flow from the north from Charlotte County and pass over the Preserve as one giant slow moving river a few inches deep, eventually leading into Spanish Creek and then the Caloosahatchee River. Over the past 50 years, the surrounding lands have been developed, mainly into citrus groves with ditches and dikes, and roads have been created that alter the natural flow of water.

Although not all land alterations occurred on SCP, modifications made on adjacent properties directly influence it. According to interpretations based on aerial photography dating back to 1944, there don't appear to be many land uses or impacts, except for a couple of trails and the dredging/straightening of Spanish Creek in the midsection. This work occurred during the 1930's, before the Daniels family took possession of the property. Persimmon Ridge Road and North River Road were dirt trails then.

The Daniels and Babcock families ran their cattle operations within in a large area of Lee County that included SCP, which was referred to as Cow Prairie Cypress. Cattle roamed through water depths that ranged from 3-18" during the rainy season. During the 1950's, in association with cattle grazing operations, areas in the southeast portion of SCP were cleared and windrows were created.

During the 1960's, western areas of the Preserve were excavated and mined for aggregates. During the 1970's and 1980's, large watering holes (northeast of Preserve) were created to be able to pump water to the expanding citrus grove operations. During the late 1980's to early 1990's, there was a land exchange between the Daniels family, Lee County and the County Line Drainage District (CLDD). The South Florida Water Management District (SFWMD) and CLDD reportedly wanted to make a more direct route for water to drain from the land and out to the Caloosahatchee River. This land exchange provided CLDD with the necessary land to construct the drainage canal. Additional activities adjacent to SCP include single-family home construction along northern, western and southern parcels bordering the property. Currently, there is an active cattle lease with the previous landowner on the property.

Natural trends and disturbances influencing native communities and stewardship at SCP include hurricanes, occasional freezes and the cycling of wet and dry seasons. Since the Conservation 20/20 Program purchased the property, Hurricane Wilma passed through in 2005 knocking over several large oak trees.

In September 2005, SFWMD issued a statement of work to develop the Four Corners Watershed Plan. This plan was created to evaluate the issues in the area that relate to water supply, flood protection, water quality and natural

systems of the area. The Four Corners area is in the northeast portion of Lee County where Lee, Charlotte, Glades and Hendry Counties meet. Spanish Creek and Spanish Creek Preserve fall within this watershed. Lee County Division of Natural Resources has a budgeted Spanish Creek Restoration Capital Improvement Project (CIP) in the Lee County portions of the Four Corners area. These plans include rehydrating the area and diverting water from the north into Spanish Creek, including the northeastern areas of Spanish Creek Preserve.

Since there are two large Lee County Parks and Recreation facilities (Caloosahatchee Regional Park and Hickey's Creek Mitigation Park) less than four miles to the west and southwest of SCP, it will best serve as a community preserve. At a minimum, the Preserve will be open for hiking, bird watching and photography and trails will be maintained on some of the existing trails in the Preserve. The proposed nature trail will be marked and approximately 1 mile long. A kiosk with trail maps, wildlife information and other environmental educational literature will introduce and orient visitors to SCP.

The goal of this land stewardship plan is to identify Preserve resources, develop strategies to protect those resources and implement restoration activities to restore SCP to a productive, functional and viable ecosystem while insuring the Preserve will be managed in accordance with Lee County Parks and Recreation's Land Stewardship Operations Manual. Restoration and management activities at SCP will focus on improving hydrologic components, control of invasive exotic plant and animal species, maintaining upland ecosystems with prescribed fire or by other mechanical methods, enhancing wildlife habitat and public access for resource-based recreational opportunities. 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

Spanish Creek Preserve (SCP) was acquired as a single parcel in September 2005 through Lee County's Conservation 20/20 (C20/20) Program for $3,891,040. It is approximately 243 acres located along North River Road in the Alva community in the northeastern corner of Lee County. The Preserve consists of 21 plant communities and includes the headwaters of Spanish Creek. The dominant plant communities are pine flatwoods, wetlands forested mixed and pine-mesic oak.

Historic aerials (Figures 10-12) show human influences prior to the 1940's with the straightening and dredging of Spanish Creek. In 1944, the Daniels family acquired the property for $10 per acre from the Babcock family. They didn't permit pine tree harvesting activities on their land, which has allowed the trees to

mature into enormous, old growth slash pines trees. The property was mainly used for cattle grazing and portions of the Preserve were cleared for pasture in the 1950's. Surrounding land use changes have had the greatest influence on the Preserve, mainly by altering the historic hydrologic regime of the area. These alterations include land cleared for agriculture (mainly citrus), borrow pits and drainage canals that have drawn down the natural water levels in Spanish Creek and the wetlands on site.

Land stewardship challenges for the site include rehydrating the creek and wetland areas of the Preserve, invasive exotic plant control, reintroduction of fire in some portions of the Preserve, and regrading the littoral zones of the borrow ponds to create foraging grounds for wading birds. Public recreation amenities are proposed pending grant funding and may include a viewing deck on the borrow ponds and approximately 1 mile of hiking trails with educational signs.

The purpose of this stewardship plan is to define conservation goals for SCP 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 reviewing scientific literature and historical records to understand how the Preserve functions in the ecosystem, what 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

Spanish Creek Preserve is located at 18500 Persimmon Ridge Road, Alva, Florida in northeast Lee County within Section 15, Township 43 South, Range 27 East (Figure 1). The Preserve is located less than one mile north of Alva Elementary and Middle Schools and the Alva Community Center. It is approximately 243 acres that has historically been used by the Daniels family for cattle grazing. It is surrounded by rural residential, agricultural and conservation lands. The site is also approximately 1 mile north of the Caloosahatchee River and 1 mile southeast of Babcock Ranch.

The Preserve consists of 21 plant communities and includes the headwaters of Spanish Creek. The dominant plant communities are pine flatwoods, wetlands forested mixed and pine-mesic oak. These community designations are based on the Florida Land Use Cover and Forms Classification System (FLUCCS) (FDOT 1999). Figure 2 identifies the boundaries of SCP in a 2005 aerial photograph.

Figure 1: Location Map

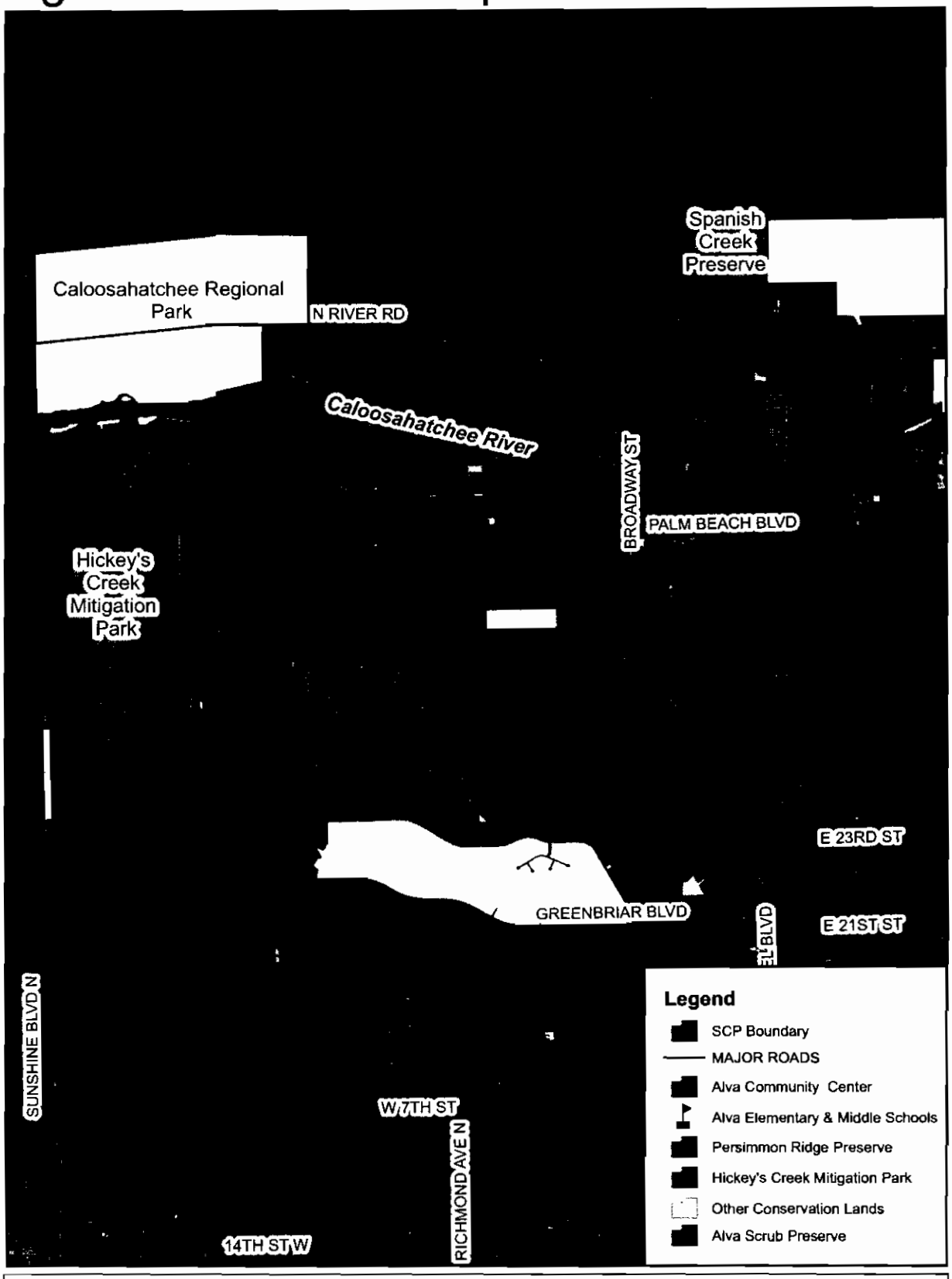
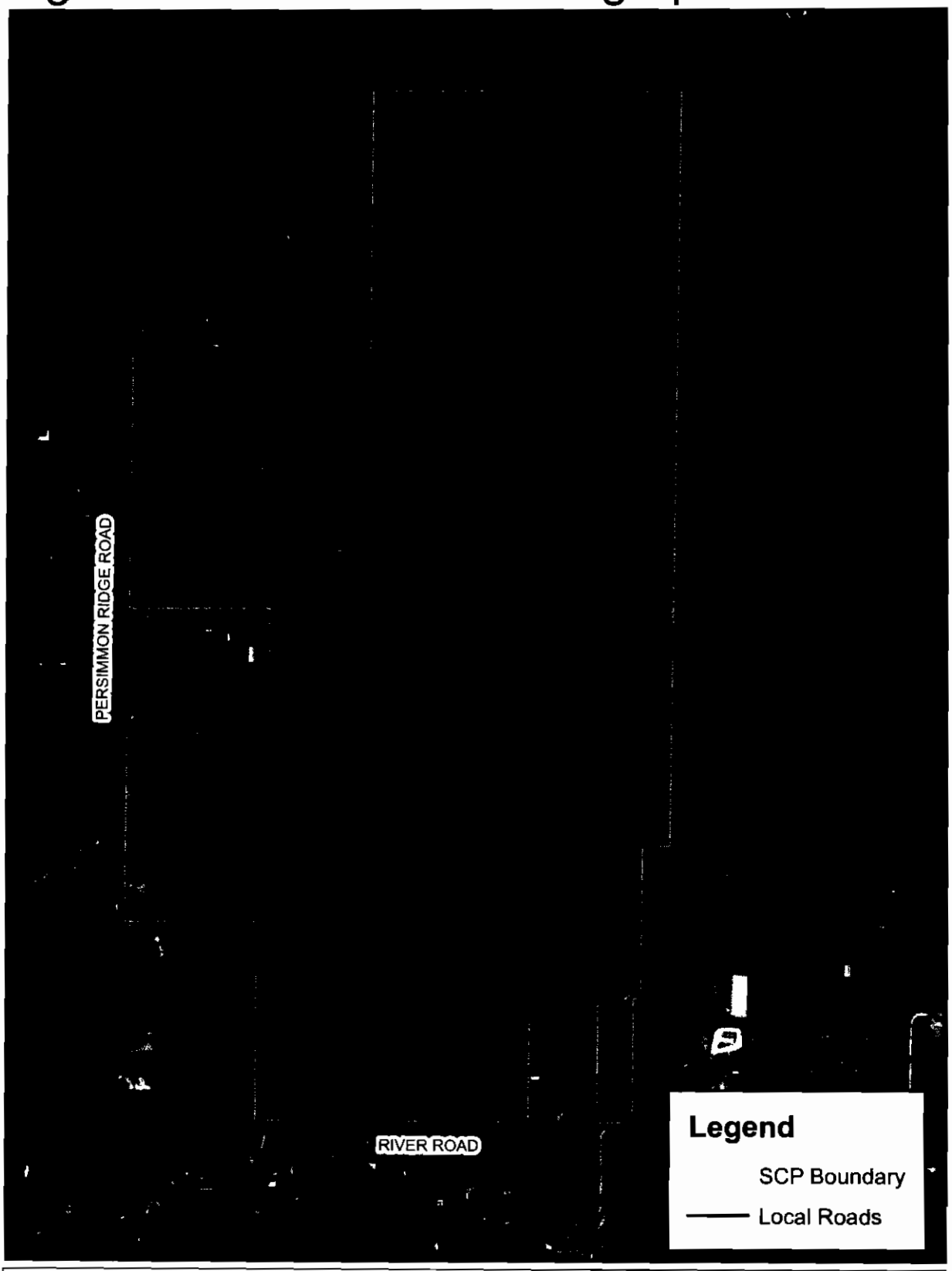


Figure 2: 2005 Aerial Photograph



IV. NATURAL RESOURCES DESCRIPTION

A. Physical Resources

i. Climate

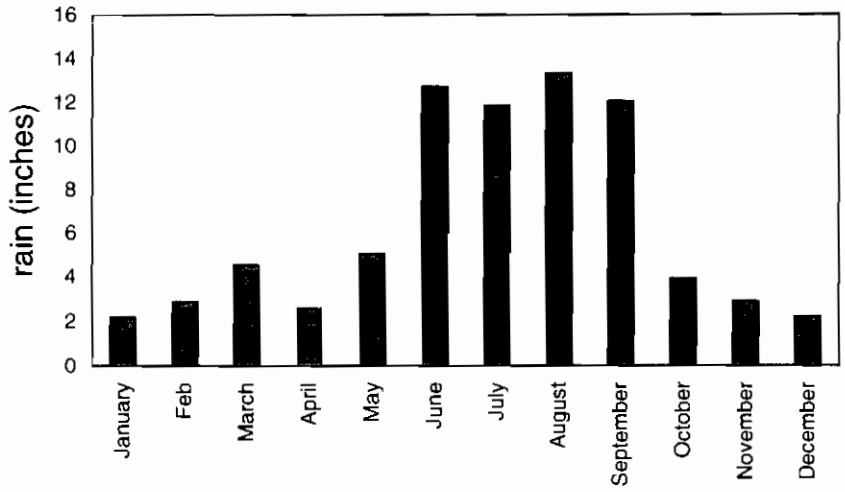
Southwest Florida has a humid, sub-tropical climate due to its maritime influence from the Caribbean Sea and the Gulf of Mexico. The mild temperatures encourage winter residents and tourists to visit the area. Temperate climate influences are exerted as well, with infrequent but significant freezes occurring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

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

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

The following chart depicts the rainfall data collected by Lee County Division of Natural Resources (LCNR) on a daily basis from the Alva rain gauge, located at the Alva Fire Department, approximately 1 mile southwest of Spanish Creek Preserve. Average annual rainfall from 1998 through 2005 was 78.2 inches, slightly higher than the average annual rainfall for the entire county (64.76 inches).

Alva Average Rainfall 1998-2005



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 non-native plant introduction and/or further dispersal, and increased wildfire severity to communities from increased fuel loads (dead vegetation). The effect of hurricanes on natural systems is compounded by the already present anthropogenic impacts. During 2004, Hurricane Charley brought tropical storm force winds and Hurricanes Frances and Jeanne brought hurricane force winds across the Preserve (Appendix A). C20/20 did not own the property during the 2004 hurricane season, so Land Stewardship staff does not know how much damage was incurred during these storms. In October 2005, Hurricane Wilma also passed through the area with hurricane force winds across the county. SCP suffered damage to a majority of the large oaks across the property. One large laurel oak (*Quercus laurifolia*) fell across the bridge over the creek on the southeast portion of the Preserve. Numerous other oaks and some large cypress trees were also damaged during this hurricane.

ii. Geology

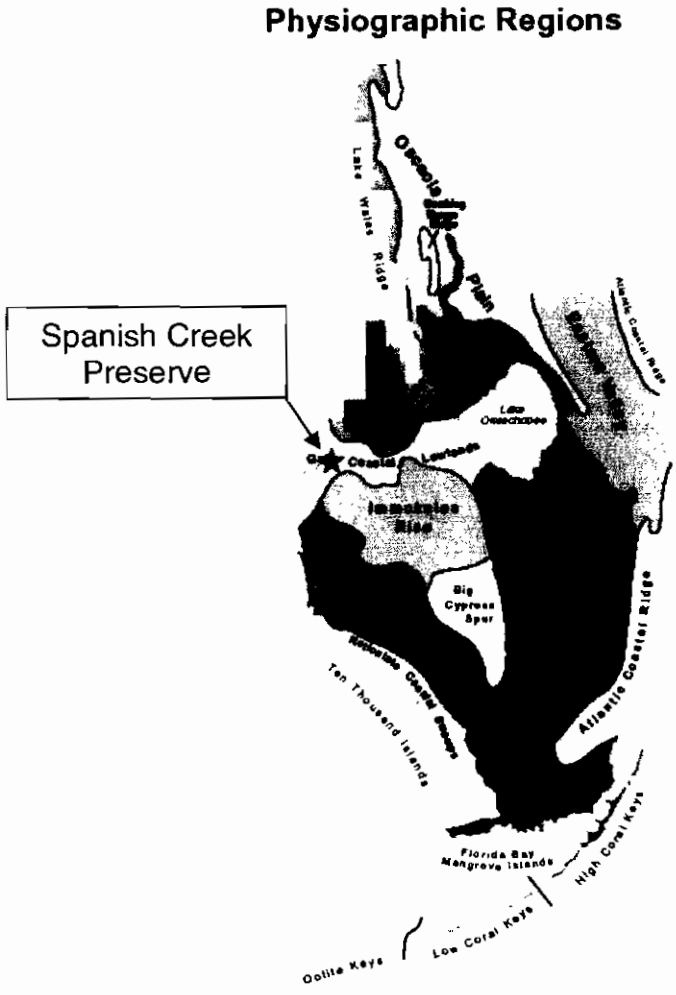
For millions of years, the Florida Platform was submerged in the ocean. Sediments accumulated upon it and hardened into sedimentary rock. Thirty-five (35) million years ago, portions of Florida rose above the ocean's surface and for the next 12 million years it alternated between emersion and submergence.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

The land where Spanish Creek Preserve is located today was created during the late Pliocene – early Pleistocene Epoch about 1 to 2 million years ago. This

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

Southwest Florida can be divided into ten major physiographic provinces. These are broad-scale subdivisions based on physical geography features such as terrain texture, rock type and geologic structure and history. Figure 3 illustrates where Spanish Creek Preserve lies within the Gulf Coastal Lowlands (Map from SFWMDb 2000).

Figure 3: Physiographic Regions of South Florida



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

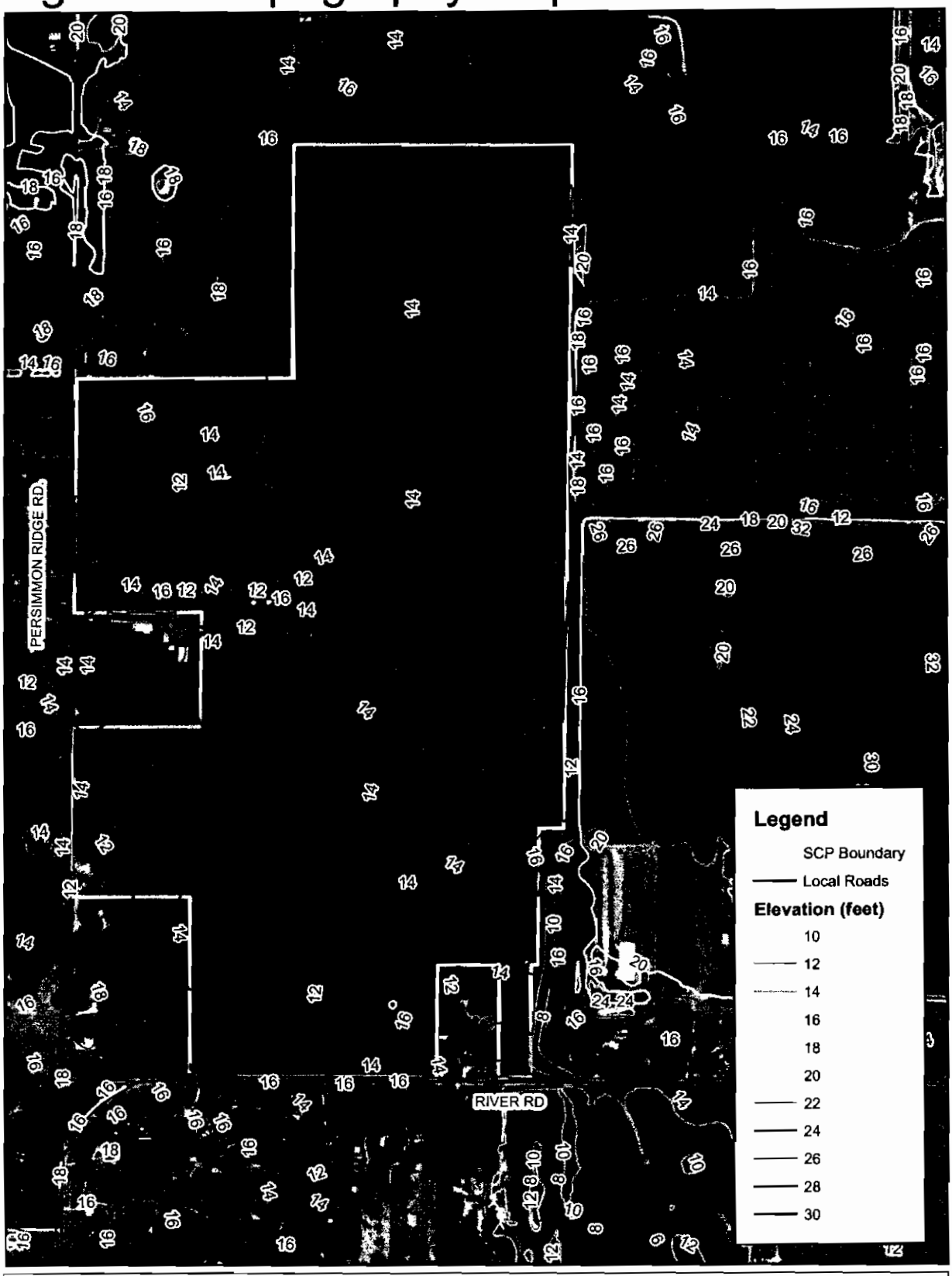
iii. Topography

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

The natural elevations at SCP range from 12' along the creek to 16' (Figure 4). Many of the changes in elevation are related to the borrow pits and the spoil piles

associated with them. There is one small peak that reaches 18' in the southeast corner of the Preserve that is a natural fluctuation in elevation.

Figure 4: Topography Map



iv. Soils

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

There are nine different soil types found at Spanish Creek Preserve (Figure 5 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, SCP is fundamentally 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 habitat restoration and probable recreational plan limitations and expense.

There are eight generalized range site categories in Lee County, four of which are found on SCP. Manmade areas are not included in range site categories. Note that these categories are not Florida Natural Areas Inventory (FNAI) or FLUCCS natural plant community designations, but rather they are used to group soil types and where they might occur. The four identified on the Preserve are:

- South Florida Flatwoods - Nearly level areas with scattered to numerous pine trees (*Pinus* spp.), saw palmetto (*Serenoa repens*), gallberry (*Ilex glabra*), and other woody plants.
- Cabbage Palm Flatwoods - Nearly level areas with scattered cabbage palm (*Sabal palmetto*) trees throughout the landscape.
- Slough - Open grassland where nearly level areas act as broad natural drainage courses in the flatwoods. The potential plant community is dominated by blue maidencane (*Amphicarpum muhlenbergianum*), chalky bluestem (*Andropogon virginicus var. glaucus*), and blue-joint panicum (*Panicum tenerum*).
- Freshwater marshes and ponds - Open grassland marshes or ponds (depressions) with the potential to produce significant amounts of various grasses, sedges, and rushes. Water fluctuates throughout the year.

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

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

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive

precipitation from long-duration storms. There are two hydrologic soil groups found on the Preserve:

- B - Soils having a moderate infiltration rate (low to moderate runoff potential) when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well-drained soils that have moderately fine texture to moderately coarse texture. Soils have a moderate rate of water transmission.
- D - Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist primarily 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. Soils have a 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 with engineering or modification the water table can be lowered sufficiently so that the soil fits in B. The Preserve has been impacted by hydrological alterations through a series of ditches and an adjacent roadway. Since there are different degrees of drainage or water table control, an onsite evaluation would be needed to determine the exact hydrologic group of the soil at each particular impacted location.

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

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

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

- Openland: Cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. Wildlife attracted includes

northern bobwhite quail (*Colinus virginianus*), sandhill cranes (*Grus canadensis*), hawks, various birds, and rabbits.

- Woodland: Deciduous plants, coniferous plants, grasses, legumes, and wild herbaceous plants. Wildlife attracted includes wild turkeys (*Meleagris gallopavo*), thrushes, woodpeckers, squirrels, foxes, raccoons (*Procyon lotor)*, white-tailed deer (*Odocoileus virginianus*), snakes, frogs, and bobcats (*Lynx rufus*).
- Wetland: Open, marshy or swampy shallow water areas. Wildlife attracted includes ducks, ibis, egrets, herons, shorebirds, snakes, frogs, alligators (*Alligator mississippiensis*), and otters (*Lutra canadensis*).
- Rangeland: Shrubs and wild herbaceous plants. Wildlife attracted includes white-tailed deer, bobwhite quail, opossums (*Didelphis virginiana*) and various birds.

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

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

Staff considers soil limitations that affect their suitability for recreational development. Although the Soil Survey of Lee County has other categories under recreation, these are not under consideration for this Preserve. The soils within the Preserve have all been identified as having severe limitations 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." Therefore, as a guideline, the soil types at SCP are fairly sensitive and restrictive and considerations by the impacts of hiking or management trails must be addressed. Recreational opportunities are further discussed in the Public Access and Resource-Based Recreation section.

Table 2: Soils Attributes

					Physical Attributes							*Biological Attributes*				
Soil Types	Map Symbol	Total Acres	% of Preserve	Habitats (Range Site)	Wetland Class (1)	Hydrologic Group (2)	Surface Permeability	Subsurface Permeability	Water Table within 10" of surface	Water Table below 10-40" of surface	% Organic Matter	Potential as habitat for wildlife in-- Openland	Woodland	Wetland	Rangeland	Limitations for Recreational Paths/Trails
Oldsmar Sand	33	24.3	10.02	south Florida flatwoods		B/D	rapid	rapid	1-3 months	> 6 months	1-2%	fair	fair	poor	--	Severe: wetness, too sandy
St. Augustine Sand, organic substratum	25	1.1	0.45	**		B	rapid	rapid	--	2-4 months	1-3%	very poor	very poor	poor	--	Severe: too sandy
Wabasso Sand	35	7.1	2.93	south Florida flatwoods		B/D	rapid	rapid	2-4 months	> 6 months	1-4%	poor	fair	poor	--	Severe: wetness, too sandy

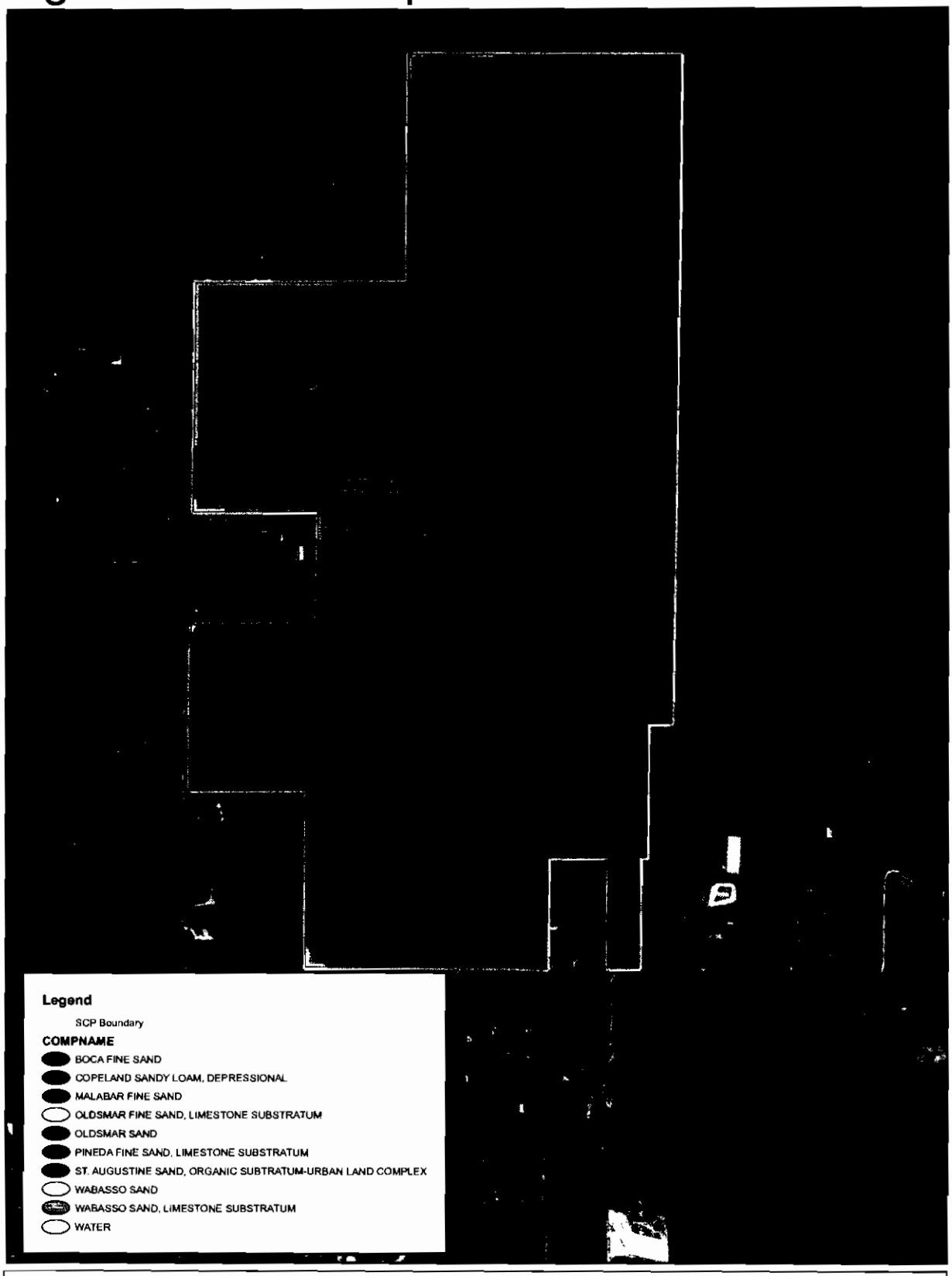
Color Key:
Dry
Wet

** - Soils do not support rangeland vegetation suitable for grazing

(1) S - Slough (sheet flow): A broad nearly level, poorly defined drainage way that is subject to sheet-flow during the rainy season.
P - Ponding: Standing water on soils in closed depressions. The water can be removed only by percolation or evapotranspiration.

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

Figure 5: Soils Map



v. Hydrologic Components and Watershed

Spanish Creek Preserve is within the north-central portion of the South Florida Water Management District's (SFWMD) Lower West Coast Region (LWCR). SCP falls within a subset of the combined LWCR and Lower East Coast Region, within the 1,400 square-mile Caloosahatchee Basin (SFWMDa 2000). The Preserve lies within the Spanish Creek Watershed, its namesake, which covers a surface area of approximately 1.5 square-miles. Figure 6 illustrates the location of SCP within the Spanish Creek Watershed.

Agriculture and development on surrounding lands have greatly altered sheetflow across the Preserve. Historically, during the summer rainy season, water would flow from the north on undeveloped lands in Charlotte County and pass over the Preserve as one giant slow moving river a few inches deep, eventually leading into Spanish Creek and then into the Caloosahatchee River. Over the past 50 years, the surrounding lands have been developed, mainly into citrus groves and other agriculture lands. The associated ditches, dikes, and roads alter the natural flow of water. The largest alteration to the area was a ditch created along the Charlotte and Lee County line by the CLDD. This ditch was created to redirect surface water flow and divert it into areas being used for agriculture, mainly citrus groves. The land to the north and east of SCP was developed with a series of ditches and canal that redirected the flow of water to the west into Cypress Creek and just to the east into the county line canal. All of these alterations have decreased aquifer recharge and increased storm water runoff into the river. These changes have also altered the overall ecology of the uplands, wetlands and also the estuary further down stream (SFWMDc 2005).

Borrow ponds (excavated pits) were also created during this time to produce fill for road building and to create water supplies for irrigation of groves. There are two complexes of borrow pits located on the western portion of the Preserve that total approximately 7 acres. These ponds were created in the early 1960's and provided fill for neighboring development and roads. These borrow ponds and the ones on adjacent lands draw down the natural ground water levels on the Preserve and its neighboring lands.

Prior to 1944, the northern reaches of Spanish Creek were straightened and dredged to divert water to the south and off the property. The upper reaches of the creek stay dry during the winter season while a natural spring feeds the southern portions of the creek and supplies water year round (Figure 7). The CLDD installed a canal during the early 1990's that runs along the entire eastern border and draws water off the Preserve. The natural reaches of Spanish Creek meet this canal in the southeastern corner of the Preserve. There is also a drainage canal along the eastern boundary of the Preserve. Land Stewardship

staff will work with LCNR and SFWMD to rehydrate the Preserve to mimic the historic hydrologic patterns.

In 1974, the United States Fish and Wildlife Service (USFWS) directed its Office of Biological Services to conduct an inventory of the nation's wetlands. This National Wetlands Inventory (NWI) became operational in 1977. Wetlands were identified on the photography by vegetation, visible hydrologic, and geographic, and subsequently classified in general accordance with the Classification of Wetlands and Deep Water Habitats of the United States (Cowardin et al. 1979). Figure 7 identifies 78 acres of palustrine forested wetlands at SCP. Palustrine systems are all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and in wetlands that occur in tidal areas where salinity due to ocean derived salts is below 0.5%. Forested wetlands are characterized by woody vegetation that is 6 meters (18 feet) tall or taller. These areas typically have an overstory of trees, an understory of young trees or shrubs and an herbaceous layer. The species that occur at Spanish Creek include primarily bald cypress (*Taxodium distichum*) with red maple (*Acer rubrum)* and the occasional pop ash (*Fraxinus caroliniana*).

Figure 6: Watershed Map

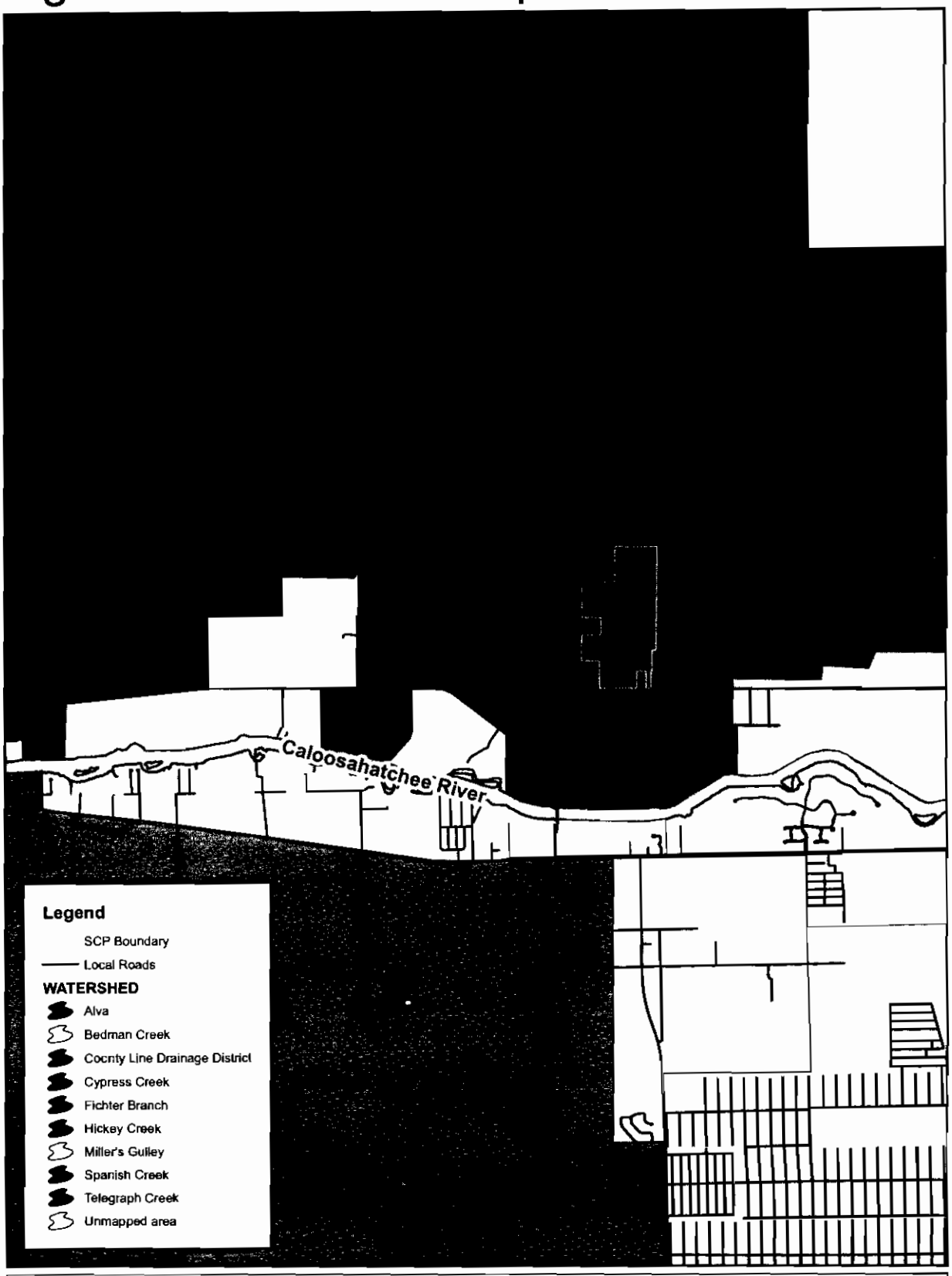
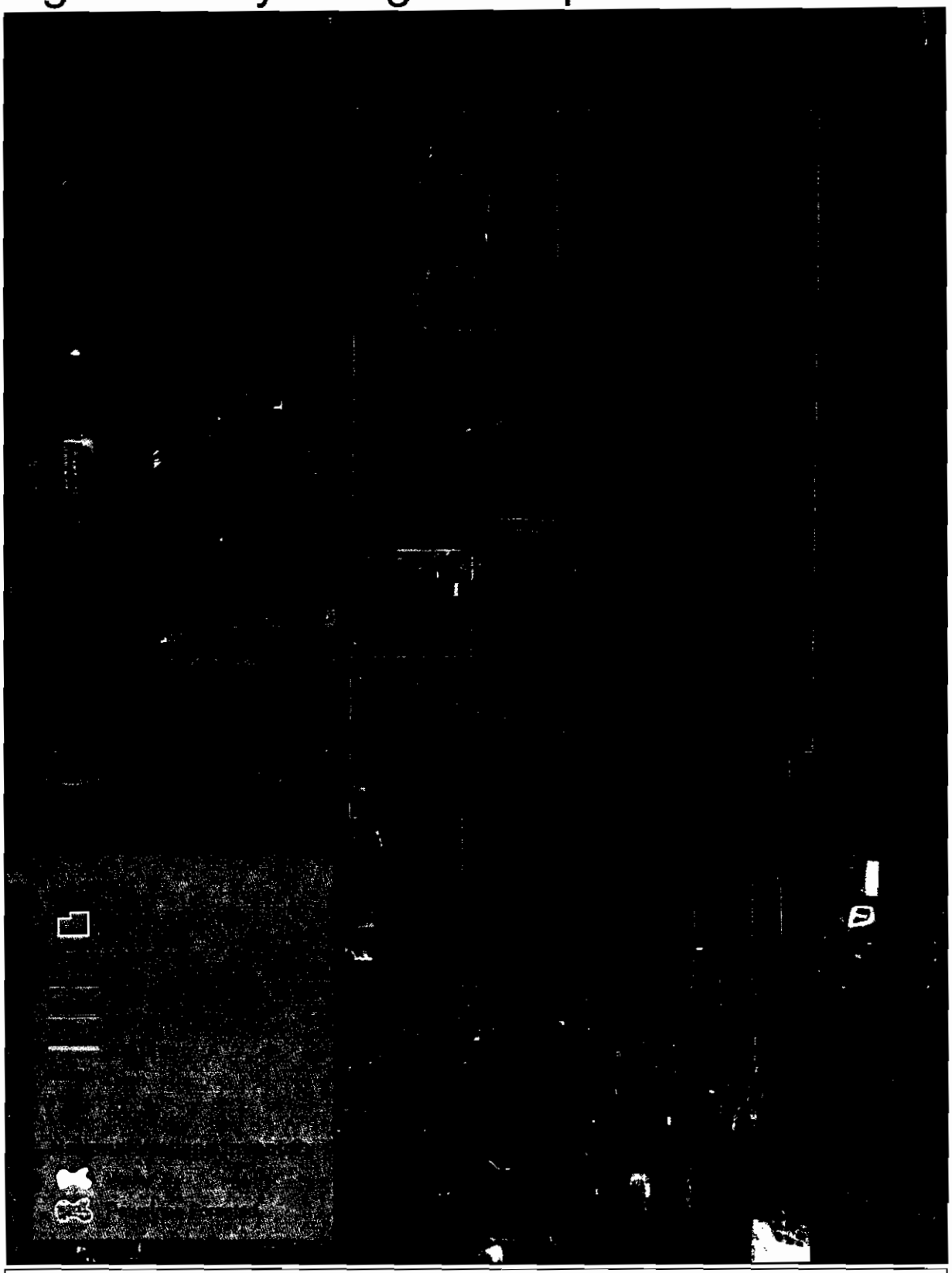


Figure 7: Hydrologic Components



B. Biological Resources

i. Ecosystem Function

Spanish Creek Preserve protects a substantial portion of Spanish Creek's natural stream bed. The seasonal headwaters of Spanish Creek are in the northern portion of the Preserve and the creek meanders through the Preserve for over a mile before reaching the lower branches of the creek and emptying into the Caloosahatchee River.

The Preserve is home to variety of bird species including warblers, vireos, and woodpeckers. Although a portion of the southeastern area is categorized as an unimproved pasture, this sandy, drier area is transforming into what resembles a scrub-like community containing dwarf wax myrtle (*Myrica cerifera*), shiny blueberry (*Vaccinium myrsinites*), threeawn/wiregrass (*Aristida spp.*), netted pawpaw (*Asimina reticulata*) and narrowleaf silkgrass (*Pityopsis graminifolia*). This portion of the Preserve is home to many gopher tortoises (*Gopherus polyphemus*). The majority of the remaining land contains a mix of south Florida slash pine (*Pinus elliottii* var *densa*), live oak (*Quercus virginiana*) and bald cypress.

Less than 10% of SCP contains cypress-dominated wetlands. These forested wetlands are productive ecosystems, which is related to hydrologic conditions. Healthy cypress communities capable of sustainable reproduction occur in depressions with a hydroperiod of approximately 250-290 days and maximum water levels of one to two feet (Duever et al. 1986). The lower hydroperiod and water level ranges produce smaller cypress and the upper ranges produce larger ones. There is some debate in the scientific community whether these two extremes represent two species of cypress (pond cypress (*Taxodium ascendens*) are small and bald cypress are large) or whether they represent the same species growing differently under different conditions.

The cypress trees mainly occur in either domes in the Preserve's western region or in wetland forested mixed communities in the northern region. Typically, the cypress domes, or heads, are depressions in which the largest cypress trees occur in the center and get progressively smaller from the center. Water drains only through the water table. The conditions for growth (long hydroperiod) are much better in the center as opposed to the edges due to more organic soils. The larger cypress trees populate the lower areas with longer hydroperiods. In the areas where the water is too deep for cypress, treeless ponds occur within the domes, supporting a variety of plants and wildlife. Two of the Preserve's larger cypress-dominated areas have been considerably impacted by human activities.

Animals count on the health and long-term viability of the cypress communities for nesting, breeding and feeding. The Florida cottonmouth (*Agkistrodon piscivorus conanti*) will climb upon mats of debris in the swamp ferns for sunning platforms. Yellow-crowned night herons (*Nyctanassa violacea*) build their nests in the trees and white ibis (*Eudocimus albus*) and great egrets (*Ardea alba*) roost in the canopy. To sustain the health of the cypress communities, water quality and quantity must be protected and improved.

Pine flatwoods serve as important habitat for a variety of birds, small mammals, reptiles and amphibians and some large mammals including white-tailed deer. Although many have not been documented at the Preserve, there are a number of rare wildlife species that primarily occur 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 beginning to negatively affect the native species. Following exotic plant removal and brush reduction, fire will be a valuable management tool at SCP.

ii. Natural Plant Communities

Spanish Creek Preserve consists of a variety of plant communities, the largest include wetland forested mixed, pine flatwoods, pine - mesic oak, unimproved pasture and cypress. SCP's ecosystems have been dramatically impacted by internal modifications and surrounding land uses that have slowly changed the composition of the plant communities as a result of the drier conditions. Spanish Creek Preserve's long-term dehydration and extensive disturbances presented the rationale for staff to delineate and classify the plant communities utilizing the FLUCCS (FDOT 1999) rather than FNAI's limited classification system (FNAI 1990). The codes below refer to this classification system. Staff delineated a total of twenty-one (21) communities and nearly 40% of the Preserve has been recognized as jurisdictional wetlands. Figure 8 illustrates the location of each community within the Preserve.

The following are descriptions of the plant communities and include the dominant plants and characteristic animals found within each community. A list of plant species identified during site inspections to SCP can be found in Appendix B. This list will be updated seasonally to identify plants in their inflorescence phase.

Urban and Built-up (100) class category identifies areas of intensive use with much of the land occupied by man-made structures.

- Extractive (160) – 7.8 acres, 3% coverage

Extractive areas encompass both surface and subsurface mining operations. Flooded pits and quarries, which may be part of a mining operation, are included in this category. Abandoned or inactive mining operations are a part of the extractive category until natural revegetation occurs. This community is located east of Persimmon Ridge Road.

A small number of aquatic plants were noted in the borrow pits including spatter dock (*Nuphar advena*), southern cattail (*Typha domingensis*), and algae. Animals seen include Seminole killifish (*Fundulus seminolis*), mosquitofish (*Gambusia holbrooki*), little blue heron (*Egretta caerulea*), and common moorhen (*Gallinula chloropus*).

Agricultural (200) class category identifies lands that were cultivated to produce food crops and livestock.

- Unimproved Pasture (212) – 24.9 acres, 10% coverage

This category includes cleared land with major stands of trees and brush where native grasses have been allowed to develop. Normally, this land will not be managed with brush control and/or fertilizer application. Until 2003 some areas were seldom mowed and fertilizer was last applied in 1992. This community is located in the southeastern portion of the Preserve.

This transitioning scrub like plant community is dominated by grasses, shrubs and herbaceous species that include wiregrasses, Leavenworth's tickseed (*Coreopsis leavenworthii*), dwarf wax myrtle, and smaller oaks.

Wildlife species including the prairie warbler (*Dendroica discolor*), tufted titmouse (*Baeolophus bicolor*), loggerhead strike (*Lanius ludovicianus*), northern bobwhite quail and gopher tortoises have been observed foraging in these open pastures.

- Unimproved Pasture, Disturbed (2129) – .3 acres, <1% coverage

This category includes cleared land with major stands of trees and brush where native grasses have been allowed to develop. This disturbed community is dominated by the invasive exotic cogon grass (*Imperata cylindrical*).

- Woodland Pastures (213) – 6.5 acres, 2.5% coverage

These areas of forest lands are used as pastures. Strong evidence of cattle activity is present. A section of this area still has an abandoned fence running

along the interior portion. This area is on an east central area of the Preserve, just north of the unimproved pasture.

Animal species such as southern black racer (*Coluber constrictor priapus*), gopher tortoise, Carolina wren (*Thryothorus ludovicianus*), and eastern phoebe (*Sayornis phoebe*) have been observed utilizing this area. Plants include large oak trees, slash pines, tall elephant's foot (*Elephantopus elatus*), saw palmetto, and caesarweed (*Urena lobata*).

- Woodland Pastures, Disturbed (2139) – 11.1 acres, 4.5% coverage

These areas of forest lands are used as pastures. Again, strong evidence of cattle activity is required. This area contains the cow well and windrows from earlier clearing activities. It is located just to the west of the unimproved pasture.

Animal species such as gopher tortoise, black racer, and northern cardinal (*Cardinalis cardinalis*) have been observed. Plant species include large oak trees, slash pines, saw palmetto, and Brazilian pepper (*Schinus terebinthifolius*) growing on the remaining estimated twenty-two spoil windrows.

Rangeland (300) class category identifies lands where the potential vegetation is predominantly grasses, forbs or shrubs and is capable of being grazed.

- Mixed Rangeland (330) – 3.3 acres, 1% coverage

Mixed rangeland occurs when more than one-third intermixture of either grassland or shrub-brushland range species occurs. This area contains a variety of grasses, saw palmetto, laurel oak, and tall caesarweed. There are two locations; both are along the western boundary of the Preserve. Animals noted are yellow-rumped warbler (*Dendroica coronata*), northern mockingbird (*Mimus polyglottos*), and turkey vulture (*Cathartes aura*).

Upland Forest (400) class category contains upland areas which support a tree canopy closure of ten percent or more and include only xeric and mesic forest communities.

- Pine Flatwoods (411) – 31.4 acres, 13% coverage

FLUCCS identifies pine flatwoods as areas that contain slash pines in moister sites where slash pines are less fire-resistant than longleaf pines. FNAI identifies upland pine flatwoods communities as mesic flatwoods, which occur on relatively flat, moderately to poorly drained soils. Standing water is common for brief periods during the rainy season. Mesic flatwoods are characterized as having an open canopy with widely spaced pine trees and a dense ground cover of herbs and shrubs.

This community is located in the southwest portion of the Preserve. This pine flatwoods community contains large, old growth slash pines, saw palmetto, wax myrtle, gallberry, and a variety of herbs and shrubs. Hydrological disturbances and fire suppression have allowed large laurel and live oak trees to invade, consequently enclosing the mid-story tier and escalating a thick layer of needle duff. Animal such as eastern gray squirrel (*Sciurus carolinensis*), red-bellied woodpecker (*Melanerpes carolinus*), pileated woodpecker, and blue jay (*Cyanocitta cristata*) were observed here.

Historically, natural fire probably burned in these communities every 1-8 years (FNAI 1990). Without frequent fires mesic flatwoods will succeed into hardwood-dominated forests whose closed canopy will gradually eliminate the groundcover of herbs and shrubs. On the other hand, too frequent or too hot fires would eliminate pine recruitment and eventually transform the mesic flatwoods into palmetto prairie.

- Pine – Mesic Oak (414) – 25.7 acres, 10% coverage

On moister sites, slash, longleaf and loblolly pine grow in strong association with a wide variety of mesic oaks and other hardwood species. This community is in a centralized area of the Preserve. Gallberry, wax myrtle, and several patches of tall saw palmetto are among the common understory species. Animals observed include brown anoles (*Anolis sagrei*), southern black racer, downy woodpecker, and blue jay.

- Brazilian Pepper (422) – 6.9 acres, 3% coverage

The invasive, exotic Brazilian pepper is typically found on disturbed sites, along borrow pits, fences, ditches (borrow areas), spoil piles, and disturbed portions of Spanish Creek. Although Brazilian pepper can be found in all management units, its greatest density is along the eastern fence line and surrounding the northwestern excavated borrow ponds. Animals observed using dense Brazilian pepper areas include American robin (*Turdus migratorius*), white-eyed vireo (*Vireo griseus*) and brown anole.

- Temperate Hardwood (425) – 10.9 acres, 4% coverage

This forest cover type is often referred to as either low or temperate hammock. This community is located south of the borrow ponds and west of the creek. Plants noted are common components of this community such as swamp bay (*Persea palustris*), oaks, American beauty berry (*Callicarpa americana*), cabbage palm, dahoon holly (*Ilex cassine*), and red cedar (*Juniperus virginiana*). Animals noted in the area include eastern indigo snake (*Drymarchon corais couperi*), raccoon (*Procyon lotor*), and black-and-white warbler (*Mniotilta varia*).

- Live Oak (427) – 17.5 acres, 7% coverage

Often referred to as upland temperate hammock, this forest community is one in which live oak is either pure or predominate. This community is common

along the upper banks of Florida's lakes and streams. SCP's live oak communities are located in southern areas of the Preserve and along the creek. Spanish moss (*Tillandsia usneoides*), caesarweed, cabbage palm, and saw palmetto are some plants noted within this community. Animals noted include eastern indigo snake and blue-gray gnatcatcher (*Poloiptila caerulea*).

- Live Oak - Disturbed (4279) – 2.2 acres, 1% coverage

This disturbed area was previously cleared and has grown back with large live and laurel oak trees, Brazilian pepper, caesarweed, and poison ivy (*Toxicodendron radicans*). This community is located in southeastern areas of the Preserve.

- Upland Scrub, Pine and Hardwoods (436) – 1.9 acres, 1% coverage

This scrub category represents a conglomeration of species found in the upland area. These areas have no one dominate species and usually consist of a disturbed site that has regenerated naturally. This community is located in western areas of the Preserve along Persimmon Ridge Road. Plants include oaks, saw palmetto, wild grape vine (*Vitis rotundifolia*), and gallberry.

Water (500) locations are without emergent vegetation or observable submerged vegetation. By definition, Spanish Creek does not technically fall into this category. Spanish Creek's stream bed has been affected by long-term hydrological impacts that have allowed some emergent vegetation to grow within the creek bed. Land Stewardship staff is taking future rehydration projects into consideration by placing it into this category.

- Streams and Waterways (510) – 1.0 acres, <1% coverage

This category includes rivers, creeks, canals, and other linear water bodies. Spanish Creek runs through the center of the Preserve. One unique feature noted near a southern point of the creek is spot where the water source seeps from the ground, similar to a spring. Naturally, once the water table dropped below this point, the water stopped percolating from the ground.

Plants noted growing in the creek bed are lizard's tail (*Saururus cernuus*), Brazilian pepper, cypress, cabbage palm, and a couple of small patches of Japanese climbing fern (*Lygodium japonicum*). Animals include the exotic giant ram's horn snail (*Marisa cornuarietis*) and golden topminnow (*Fundulus chrysotus*).

Wetlands (600) areas are locations where the water table is at, near or above the land surface for a significant time of the year. This hydrological regime usually allows aquatic or hydrophytic vegetation to become established, although alluvial and tidal flats may be non-vegetated.

- Stream and Lake Swamps (Bottomland) (615) – 2.7 acres, 1% coverage

This community, often referred to as bottomland or stream hardwoods, is usually found on but not restricted to river, creek and lake flood plains or overflow areas. This location is at the northern boundary of the Preserve with a lower elevation and more open canopy than adjacent areas. Plants noted here are pop ash, red maple, coastalplain willow (*Salix caroliniana*), and cypress.

- Cypress (621) – 22.3 acres, 9% coverage

This community is composed of bald and pond cypress (*Taxodium ascendens*), which is either pure or predominant. Cypress communities are scattered throughout the Preserve. Most of these areas are dominated by bald and pond cypress with scattered willow, southern shield fern (*Thelypteris kunthii*), climbing hempvine (*Mikania scandens*), and several airplant species (*Tillandsia spp.*). Animals found here include blue-headed vireo (*Vireo solitarius*), pileated woodpecker, and feral hog (*Sus scrofa*).

By FNAI standards, these cypress locations would be identified as dome swamps, which are characterized as shallow, forested, usually circular depressions that generally present a domed profile because smaller trees grow in the shallower waters at the outer edge, while taller trees grow in the center. Dome swamps may function as reservoirs that recharge the aquifer when adjacent water tables drop during drought periods. Normal hydroperiod is usually 200 to 300 days per year, deepest and longest in the center. Normal fire cycle might be as short as 3 to 5 years along the outer edge and as long as 100 to 150 years towards the center.

- Cypress-Pine-Cabbage Palm (624) – 1.7 acres, <1% coverage

A transition between moist upland pine flatwoods and hydric cypress sites, this community has a combination of cypress, slash pine and/or cabbage palms. This area was originally cypress dominated, but the roadway acts like a dam causing the drier conditions. Additional plants include southern shield fern and dahoon holly.

- Wetland Forested Mixed (630) – 56.6 acres, 23% coverage

This category includes mixed wetlands forest communities in which neither hardwoods nor conifers achieve a 66 percent dominance of the crown canopy composition. This community is located in the north, along the creek and historic Joe Draw branch (partially dredged), which is west of the creek. Typically, this community would occur between moist upland pine flatwoods to hydric cypress sites. As a result of the drier conditions, the cypress dominated areas at the northern end of the Preserve are changing.

Plants in this area include red maple, bald cypress, pop ash, Walter's viburnum (*Viburnum obovatum*), coastalplain willow, and several varieties of

wild citrus trees. Animals include green anole (*Anolis carolinensis*), downy woodpecker, and southern leopard frog (*Rana utricularia*).

Barren Land (700) has very little or no native vegetation and limited potential to support vegetative communities. In the case of SCP, these areas have been altered by human activities and FNAI does not recognize or classify these altered areas.

- Disturbed Land (740) – .3 acres, <1% coverage

Disturbed lands are those areas that have been changed primarily due to human activities other than mining. This category is along the western boundary of the Preserve and adjacent to Persimmon Ridge Road where a ditch was dug.

Plants here include cabbage palm, wax myrtle, Brazilian pepper, and wild grape vine.

- Borrow Areas (742) - .5 acres, <1% coverage

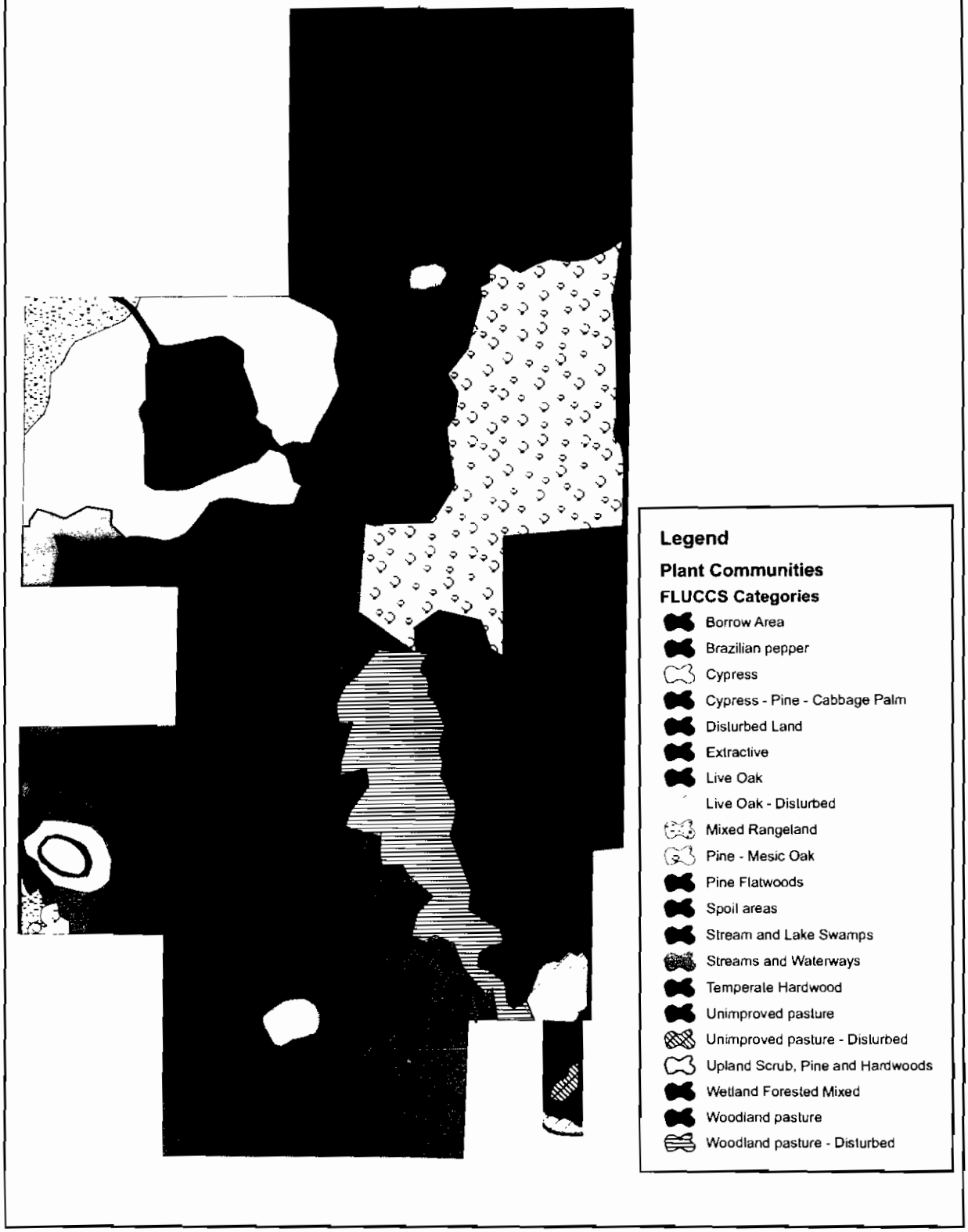
Borrow areas are sites that have been disturbed by humans to excavate a location for many purposes. Specifically, SCP's borrow areas include the three ditches (two were originally low lying overflow streams) and a cow well that was dug out in southern area of the Preserve.

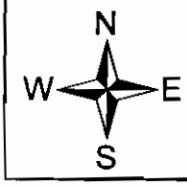
Plants noted include Brazilian pepper, cabbage palm and caesarweed.

- Spoil Areas (743) – 8.5 acres, 3% coverage

Typically, spoil areas contain the material dug from borrow areas, ditches, canals, etc. These locations at the Preserve include the area surrounding the excavated ponds, areas along the creek, ditches, cow well, and the round berm around the cypress. Plants include Chinese ladder brake fern (*Pteris vittata*), red cedar, hackberry (*Celtis laevigata*), Brazilian pepper, and cabbage palm. A Wilson's snipe (*Gallinago delicate*) was observed along the shoreline between the spoil area and excavated borrow ponds.

Figure 8: Natural Plant Communities





Spanish Creek Preserve

0 180 360 720 1,080 1,440 1,800 Feet

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

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

iii. Fauna

Since Spanish Creek Preserve was only acquired in 2005, the number of species present on site may appear lower than on other preserves of similar size, but will likely increase with additional Land Stewardship staff visitation. See Appendix C for a list of wildlife documented at the Preserve. Wildlife species were recorded during field work and from interviewing the previous landowner and current cattle rancher (Daniels and Furbay 2005). 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). Of primary concern is the feral hog. Signs of damage from the hogs including soil disturbance and vegetation damage are apparent in the understory of the hydric hammock.

Table 3: Exotic Wildlife at Spanish Creek Preserve

Scientific Name	**Common Name**
Osteopilus septentrionalis	Cuban treefrog
Anolis sagrei	brown anole
Sus scrofa	feral hog
Marisa cornuarietis	giant ram's horn snail

Wildlife management at the Preserve will focus on providing optimal habitat for native species. Restoration of the disturbed areas, hydrological restoration, control of invasive exotic plants and application of prescribed fire will be critical restoration components to provide improved habitat for wildlife. Spanish Creek 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 Spanish Creek 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 hiking trails in certain areas and enforcement of no littering, no weapons and no motorized vehicles regulations.

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

Scientific Name	Common Name	USFWS	FWC	FNAI	Occurrence
REPTILES					
Alligator mississippiensis	American alligator	T (S/A)	SSC	G5/S4	confirmed
Drymarchon corais couperi	eastern indigo snake	T	T	G4T3/S3	confirmed
Gopherus polyphemus	gopher tortoise		SSC	G3/S3	confirmed
BIRDS					
Aramus guarauna	limpkin		SSC	G5/S3	confirmed
Egretta caerulea	little blue heron		SSC	G5/S4	confirmed
Rostrhamus sociabilis plumbeus	Everglades snail kite	E	E	G4G5T2/S2	confirmed
MAMMALS					
Sciurus niger shermani	Sherman's fox squirrel		SSC	G5T2/S2	confirmed
Ursus americanus floridanus	Florida black bear		T	G5T2/S2	confirmed

KEY

USFWS – U.S. Fish & Wildlife Service	**FNAI** – Florida Natural Areas Inventory
FWC – Florida Fish & Wildlife Conservation Commission	
	G – Global rarity of the species
E – Endangered	**S** – State rarity of the species
T – Threatened	**T** – Subspecies of special population
T S/A – Threatened due to Similarity of Appearance	
SSC – Species of Special Concern	**1** – Critically imperiled
	2 – Imperiled
	3 – Rare, restricted or otherwise vulnerable to extinction
	4 – Apparently secure
	5 – Demonstrateably secure

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

Scientific Name	Common Name	USFWS	FDA	IRC	FNAI	Occurrence
PLANTS						
Berchemia scandens	rattan vine			I		confirmed
Campsis radicans	trumpet creeper			CI		confirmed
Carphephorus corymbosus	Florida paintbrush			R		confirmed
Coreopsis floridana	Florida tickseed			I		confirmed
Diosporus virginiana	persimmon			R		confirmed
Elephantopus elatus	tall elephant's foot			R		confirmed
Encyclia tampensis	Florida butterfly orchid		CE			confirmed
Fraxinus caroliniana	pop ash			R		confirmed
Habenaria quinqueseta	longhorn false reinorchid			R		confirmed
Morus rubra	red mulberry			R		confirmed
Osmunda regalis var. spectabilis	royal fern		CE	R		confirmed
Saururus cernuus	lizard's tail			R		confirmed
Tillandsia fasciculate var. densispica	stiff-leaved wild pine		E			confirmed
Tillandsia utriculata	giant airplant, giant wild-pine		E			confirmed
Viburnum obovatum	Walter's viburnum			I		confirmed

KEY

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

Wildlife Species

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

American Alligator

American alligators (*Alligator mississippiensis*) have recovered dramatically from overhunting since the 1960's 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 the southwest Florida area is loss of habitat from the 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 close proximity to homes adjacent to freshwater wetland ponds.

Eastern Indigo Snake

The eastern indigo snake is a large, iridescent black snake with a red, coral, or white throat (record length, 8.6 feet). This species is found in a large spectrum of communities throughout Florida and southern Georgia, often associated with gopher tortoise burrows. The eastern indigo is state and federally listed as threatened throughout its range due to habitat loss, degradation and fragmentation. Although it is now illegal to possess this animal without the proper permits, the pet trade is a historic cause for the decline of this species. The most common causes of mortality are human caused, either by people who kill them because they are afraid of snakes or accidental highway mortality. The indigo snake utilizes a home range of approximately 125-250 acres, and the males are territorial during the breeding season. The indigo snake feeds diurnally on fish, frogs, toads, lizards, snakes, small turtles, birds, and small mammals, often around the edge of wetlands. The eastern indigo snake breeds from November through April, then lays 5-10 eggs in May or June (USFWS 1982). In November 2005, staff also observed a large (5-6') indigo snake during a site evaluation visit. This species was described onsite by the former landowner and cattle rancher (Daniels and Furbay 2005).

Gopher Tortoise

Gopher tortoises are in decline throughout their range due to loss and degradation of habitat and are state listed as a species of special concern. As a species dependant on dry, upland communities much of their habitat has been lost to urban and residential development, agriculture, citrus groves, mining and

pine plantations. Additional threats include a highly contagious respiratory disease and human consumption.

Although no formal census has been conducted, gopher tortoises have been observed primarily in southern portions of SCP. They have been seen along the berm/fence line near the southwest boundary, in berms of the old windrows and scattered within areas of the improved pasture. Exotic plant removal and prescribed burning will benefit this species.

Limpkin

The limpkin (*Aramus guarauna*) is a large, long-billed, long-legged wader of swamps and marshes. Its bill is heavy and slightly decurved, allowing easy access to its preferred food, the apple snail (*Pomacea paludosa*). Pollution, hydrological disruptions, and an increase in invasive plants threaten the health of the apple snail population and hence the limpkin. Limpkins are state listed as a species of special concern. In January 2006, one limpkin was spotted perched on the bow of an abandoned boat in a borrow pond.

Little Blue Heron

The little blue heron's (*Egretta caerulea*) decline is due to loss of freshwater wetlands and alteration of their natural hydroperiod in wetlands used for foraging and exposure to pesticides and heavy metal contamination. Illegal killing may occur since this species regularly forages at commercial fish farms and hatcheries. Little blue herons are state listed as a species of special concern.

Everglades Snail Kite

The Everglades snail kite (*Rostrhamus sociabilis plumbeus*), the subspecies of the snail kite in the United States, is endangered because many of the marshlands that serve as its habitat have been drained for development, which in turn has caused diminishing numbers of the kite's prey species, the apple snail. Success in locating apple snails is further obstructed by the introduction of exotic plants such as water lettuce, which hinders foraging. Apple snails have also suffered from agricultural runoff, eutrophication, pesticides and other pollutants.

There were only 65 snail kites left when the Endangered Species Act was passed in 1973. The preservation of this species has managed a comeback resulting in a 1997 population of 995 birds. "Kite eggs have been found in all months of the year, but most birds generally breed from December to June in south Florida and March to August in central Florida. During the late 1980s, snail kites expanded their nesting range to include Lake Kissimmee, Lake Tohopekaliga, East Lake Tohopekaliga, the upper St. Johns marshes in Indian River County, and several smaller wetlands in Lee, Hendry, and Okeechobee counties. Most of this recolonizing of the kite's former nesting range was

associated with drought conditions in the Everglades and at Lake Okeechobee" (FWC 2003). In June 2006, a snail kite was spotted flying overhead near the remnant cypress head and borrow ponds area.

Sherman's Fox Squirrel

The Sherman's fox squirrel (*Sciurus niger shermani*) is in decline throughout its range primarily due to loss and degradation of habitat. The former landowner had sighted fox squirrels on the property before Lee County acquired this Preserve. A couple of squirrel nests have been observed and could possibly be utilized by fox squirrels. In general, much of the fox squirrel's pine-oak habitat has been converted to agriculture and development. Sherman's fox squirrels are state listed as a species of special concern. Additionally, regular burn regimes of 2-5 years during the growing season (April-July) are critical to maintain their habitat with an open canopy with minimal understory. Exotic plant removal/control and the implementation of regular prescribed burning will improve the habitat for this species.

Florida Black Bear

This species faces numerous challenges including poaching, roadkill mortality, low reproductive rate and most importantly loss of habitat to timber harvesting, development and other uses. Florida black bears are state listed as threatened. "Long-term conservation of the Florida black bear (*Ursus americanus floridanus*) is dependent upon preservation of large contiguous woodlands." Scientists with FWC have found the average home range for female black bears is almost 7,000 acres and males average over 42,000 acres (Humphrey 1992).

Spanish Creek Preserve is not large enough to support black bears, but it would be an excellent foraging site, or portion of a larger home range for black bears. The Preserve could also serve as a safe corridor for the travel of black bears throughout a larger conservation area. Scientists have found that large scale winter burning reduces the diversity of food available to bears as compared to growing season burns (Humphrey 1992). Prescribed burns conducted in the late spring would not only be beneficial to bears, but to several other species listed above. Bears have been sighted on the Preserve by the previous landowner.

Plant Species

In addition to designated wildlife, Spanish Creek Preserve provides habitat for several listed plant species. There are at least four state listed plant species at SCP. The following is a brief summary of each designated plant species explaining why they are in decline, typical habitats where they are located and management recommendations.

Florida butterfly orchid

Although locally abundant (Brown 2002), the Florida butterfly orchid (*Encyclia tampensis*) is designated as Commercially Exploited by the FDA. A plant that is designated as "Commercially Exploited" is considered to be threatened by commercial use.

Royal fern

Royal fern *(Osmunda regalis var. spectabilis)* is listed as commercially exploited by FDA. It has been identified in hydrologically stressed cypress-dominated plant communities at SCP.

Stiff-leaved wild pine

Stiff-leaved wild pine (*Tillandsia fasciculata var. densispica*) is an endangered species listed by FDA and is also known as the cardinal airplant. It is found in hammocks, cypress swamps, and pinelands and has been documented in SCP. Threats to this plant include illegal collecting, habitat destruction and the Mexican bromeliad weevil (Save 2003).

Giant airplant

Giant airplant (*Tillandsia utriculata*) is another bromeliad considered to have been quite common in Florida before the arrival of the Mexican bromeliad weevil and is now listed as endangered by FDA. 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 2003). Currently, scientists are researching biological control agents for the exotic weevil. Staff will follow the research developments and work with scientists in the future if it is determined that these insects are affecting epiphytes and the United States Department of Agriculture (USDA) is in need of release sites.

The majority of the designated plant species (see Table 4) were provided by IRC, which is not a regulatory agency. IRC's designation was either received from their 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 SCP, 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 SCP:

- Restrict recreational activities such as off-road vehicle use and equestrian to avoid impacts to rare plant populations.
- 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 since 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 will also help 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 B or C. When any of the designed 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 Activities			Management Recommendations
Scientific Name	Common Name	Exotic Control	Hydrologic Restoration	Prescribed Fire	Mark Location
Alligator mississippiensis	American alligator	x	x		x
Gopherus polyphemus	gopher tortoise	x		x	x
Drymarchon corais couperi	eastern indigo snake	x		x	x
Aramus guarauna	limpkin	x	x		
Egretta caerulea	little blue heron	x	x		
Rostrhamus sociabilis plumbeus	Everglades snail kite	x	x		
Sciurus niger shermani	Sherman's fox squirrel	x		x	x
Ursus americanus floridanus	Florida black bear	x		x	
FLORA SPECIES					
Encyclia tampensis	Florida butterfly orchid	x	x		
Osmunda regalis var. spectabilis	royal fern	x	x		
Tillandsia fasciculate var. densispica	stiff-leaved wild pine	x			
Tillandsia utriculata	giant airplant	x			

Restoration Activities:

Activities on the Preserve that will benefit and protect designated species for the long term.

Explanation of Management Recommendations:

Mark Location – location of individual plants, nest sites or burrows will be GPSed for land stewardship staff knowledge and protection during restoration activities.

v. Biological Diversity

Biodiversity at Spanish Creek Preserve varies depending on the community, but should increase significantly after stewardship activities have been put into practice (i.e. invasive exotic plant removal, hydrological restoration, prescribed fire). The plant communities range from drier live oak areas that are rarely flooded, to Spanish Creek that seasonally should contain water, and includes several excavated borrow ponds that always contain water. Along the banks of the disturbed and dehydrated Spanish Creek are slash pines, cypress, Brazilian pepper, pop ash, and laurel oak trees. Rare bird species such as limpkins and

little blue herons were observed along the steep borrow pond edges attempting to feed on congregations of fish, and a large foraging flock of American robins was noted eating Brazilian pepper berries that lined this disturbed area, thus likely spreading this invasive exotic plant. The protection of native plants and improvement of hydrologic components across the landscape and through the natural creek will enhance the overall biodiversity of the Preserve.

Many species of animals not only inhabit, but also frequently visit the Preserve. Currently 144 plant species (39 exotic) and 79 animal species (4 exotic) have been documented. Eighteen of the 39 exotic plant species (46%) are on the Florida Exotic Pest Plant Council's 2005 List of Invasive Species (FLEPPC 2005).

The integrity and diversity of SCP 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 fencing and signs to eliminate illegal access to the Preserve and protect fragile ecosystems.
- Install a maintenance access point along the west side of the Preserve.
- Improve hydrologic flow and hydroperiod and create littoral shelves on the numerous excavated borrow ponds.
- Remove or modify unnecessary ditches and berms.
- Implement a prescribed fire program to closely mimic the natural fire regimes for different plant communities to increase plant diversity and insure the canopies remain open.
- 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.

C. Cultural Resources

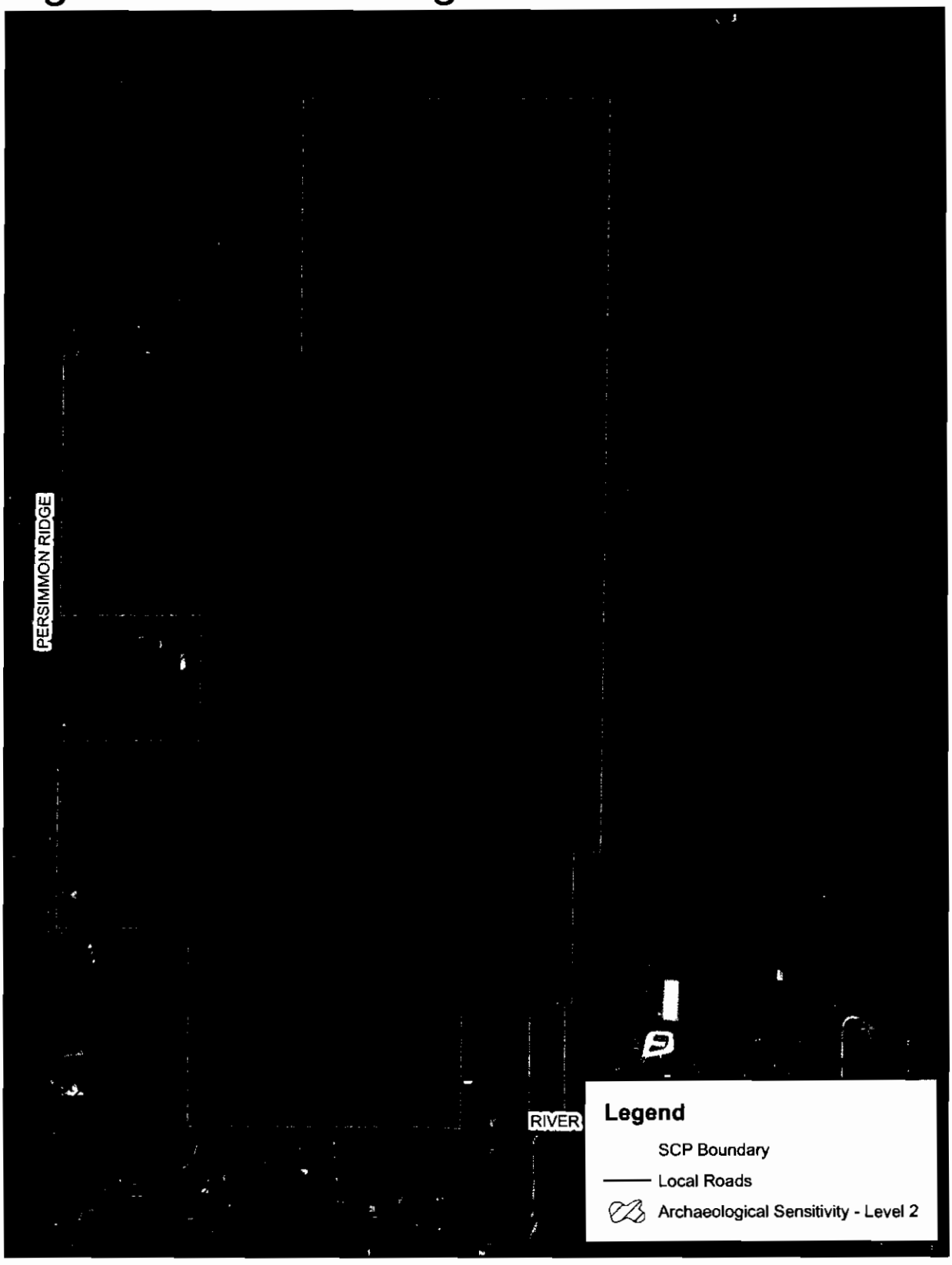
i. Archaeological Features

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. Approximately ninety percent of Spanish Creek Preserve lies within the study's "Sensitivity Level 2" area (Figure 9). The study defines this level as "areas that contain known archaeological sites that have not

been assessed for significance and/or conform to the site predictive model in such a way that there is a high likelihood that unrecorded sites of potential significance are present. If these areas are to be impacted, then they should be subjected to a cultural resource assessment survey by a qualified professional archaeologist in order to 1) determine the presence of any archaeological sites in the impact area and/or 2) assess the significance of these sites" (Austin 1987).

There has already been some soil disturbance on SCP with the creation of several large borrow pits, areas prepared for cattle grazing operations, construction of small ditches and berms, and modifications to and a bridge over Spanish Creek. These disturbances have occurred throughout various regions of the site, including within the Sensitivity Level 2 areas. A professional archaeologist will be hired to conduct a survey of the area to be impacted if restoration projects require any major soil disturbance. 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 9: Archaeological Features



ii. Land Use History

Although not all elements of the land use history discussed below occurred on SCP, modifications made on adjacent properties directly influence it. Historically, during the late nineteenth century until the 1930's, intense logging was common in the southern mixed forest in south Florida, which virtually eliminated all virgin stands of slash pine. These logging activities did not occur in any areas of SCP.

Historical activities were derived from aerial photographs taken between 1944 and 2002, speaking with several individuals including the former property owner and now current neighbor and Licensee (Ruby Daniels), brother-in-law to former owner (James Daniels), cattle rancher and neighbor (Paul Furbay), local area resident (Bryan Smith) and/or the Phase I Environmental Site Assessment report (WRS 2005).

During the 1930's and 1940's, the locals cooled off and had fun swimming in a deep area of Spanish Creek (on SCP) that was referred to as Lee's wash-hole. Persimmon Ridge Road and North River Road were dirt trails then. At one time the trail in the central part of the Preserve (Figure 10) ran east to Ft. Denaud. Here, the locals gathered to socialize and unwind from the hard chores of the times, the Seminoles traded their goods and fiddlers played music as part of the entertainment. In addition, there was a turpentine still that operated on the west side of the road (Persimmon Ridge) for this region of the county and prisoners were part of the work force.

According to interpretations based on aerial photography dating back to 1944 (Figure 10), there are not many land uses or impacts on the Preserve, except for several trails and the dredging/straightening of Spanish Creek in the midsection. Spoil piles are noted along both sides of the creek bed from this dredging. This work occurred during the 1930's, before the family took possession of the property and was reportedly performed by the Soil Conservation Service. In 1944, the Daniels family acquired the property for $10 per acre from the Babcock family. At one time the Daniels family owned approximately 1,000 acres in this region of the county. Although they didn't permit pine tree harvesting activities on their land, which has allowed the trees to mature into enormous, old growth slash pines trees, enough of the cypress trees were logged from the property between 1944 and 1947 by Paul O'Bannon to eventually pay for the land. The interior walls of the old homestead still contain some of the logged cypress boards.

The Daniels and Babcock families ran their cattle operations in this expansive northeast area of the county, which was referred to as Cow Prairie Cypress. Cattle roamed through water depths that ranged from 3-18" during the rainy season.

Unfortunately, the 1953 aerial photograph (Figure 11) only includes the southern portion of SCP. Some notable differences are that the pasture in the southeast was being treated or mowed and a ditch leading south to the road from the creek was being installed.

In association with cattle grazing operations, the 1958 photograph shows a square field that was cleared and known as MacDaniels Field (Figure 12). Other areas in the southeast were cleared and windrows were created. The windrows contained the cleared vegetation and plowed up soils. A small northwest section along Persimmon Ridge Road was used for cattle grazing.

Many activities occurred during the 1960's, on and adjacent to SCP. To the north, citrus groves (primarily Golden Groves) expanded to nearly 3,700 acres as people bought 10-acre strips to farm. Several northwest areas were excavated and mined for aggregates. On SCP, most of these mined areas were dug in the center of or next to a large cypress head. A cow well was dug adjacent to the cleared pasture. A 400-acre parcel to the east (SFWMD) was used to receive spoil soils dredged from the Caloosahatchee River (see Figure 15).

During the 1970's and 1980's, large watering holes (northeast of Preserve) were created to be able to pump water to the expanding citrus grove operations. In a 1974 photograph, a canal was dug (running NE – SW) on the property in the southeast pasture area. It drained water from northeast areas through the Daniels property into the creek, then out to the river.

Another area near, but not directly connected to the SCP, was reportedly used as an Alva dumpsite. This less than one acre satellite dump was operational during the late 1950's to early 1970's and is on disturbed property to the southeast of SCP on the south side of North River Road, east of Spanish Creek (refer to County Owned Land on Figure 15). In addition, there is reportedly a cow dipping vat in this area.

During the late 1980's to early 1990's, there was a land exchange between the Daniels family, Lee County and the CLDD. CLDD purchased 5-acres from Lee County and exchanged 2.3 acres with the Daniels family. Reportedly the SFWMD and CLDD wanted to make a more direct route for water to drain from the land and out to the Caloosahatchee River. This land exchange provided CLDD with the necessary land to construct the new drainage canal along the eastern boundary of the Preserve. The exchanged parcels are located in the southeastern area of the Preserve. The CLDD contracted a company to build the wooden bridge over the newly exchanged piece of land to allow the Daniels family continued access to their property over Spanish Creek. Consequently, the District removed the smaller NE-SW canal that ran across the Daniels property. Additional activities adjacent to SCP include single-family homes being

constructed along northern, western and southern out parcels bordering the property.

A couple of years ago, there was a break in the fence along the eastern perimeter along the canal and a gate was installed to make it easier to retrieve the cattle from the adjacent property owner's orange grove. This gate is not used by CLDD to maintain the drainage canal.

Since the Conservation 20/20 Program purchased the property, Hurricane Wilma passed through in October 2005 knocking over several large oaks trees and damaging a small section of fencing.

Figure 10: 1944 Historical Aerial Photograph

Figure 11: 1953 Historical Aerial Photograph

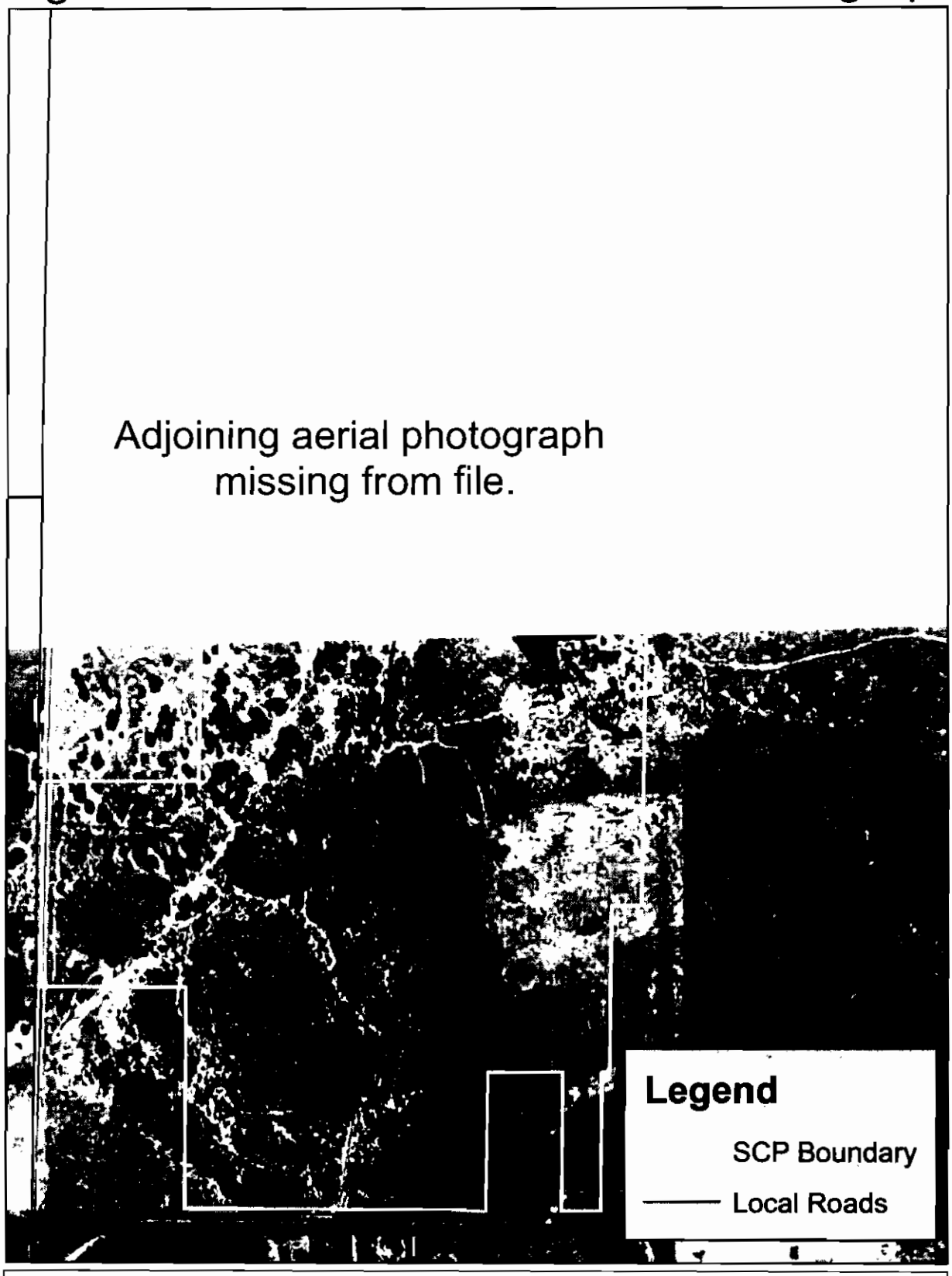
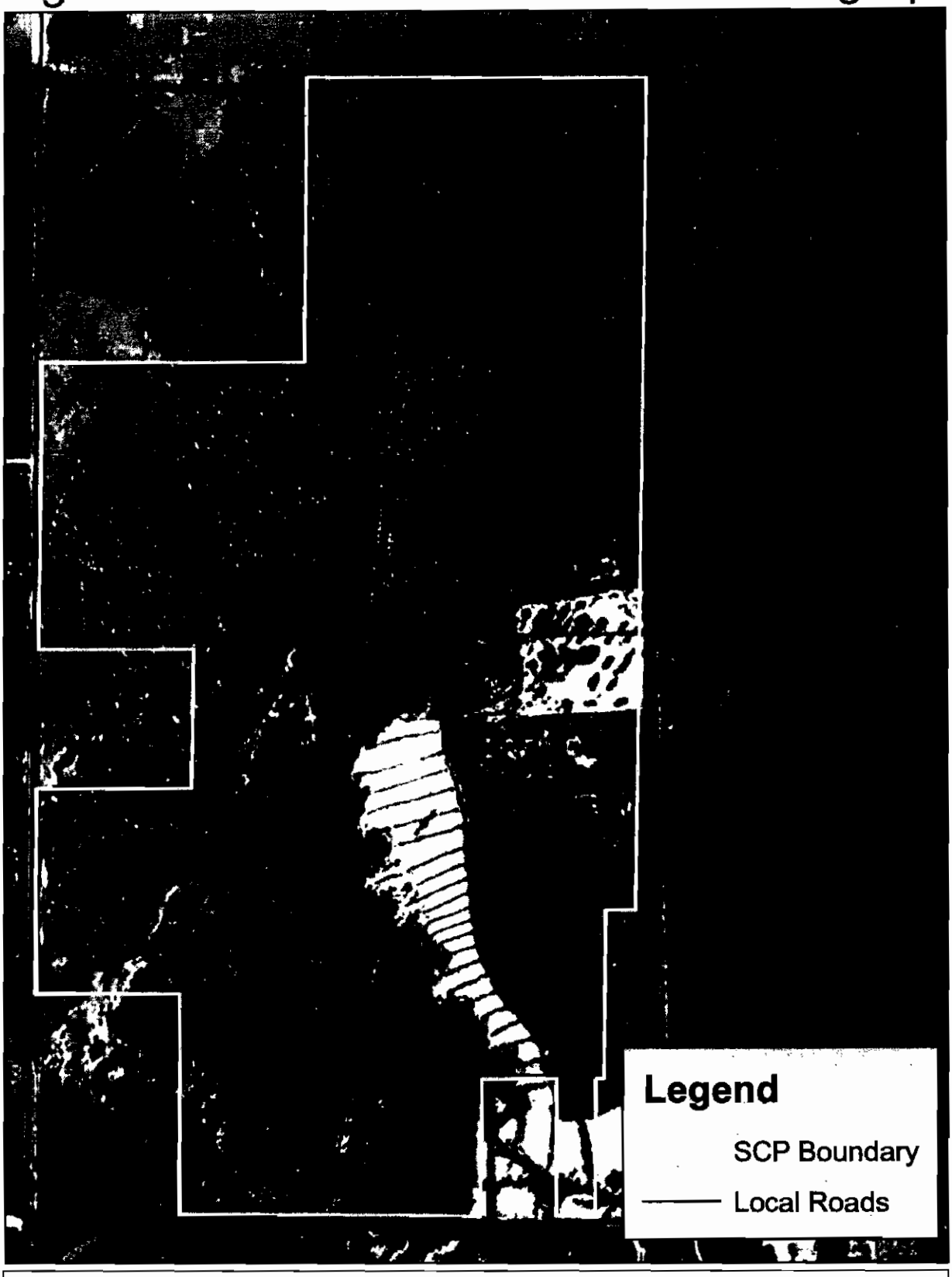


Figure 12: 1958 Historical Aerial Photograph



iii. Public Interest

Spanish Creek Preserve was purchased for its environmentally sensitive lands, potential to provide water quality enhancements, storage of floodwaters and flood protection in Alva. The site was purchased with the knowledge that North River Road and its associated right-of-way may be widened in the future. After hydrologic restoration, the Preserve will be instrumental in providing storage of floodwaters and improving water quality flowing into Spanish Creek and eventually into the Caloosahatchee River. Restoration of the Spanish Creek oxbow and Joe Draw will also improve water quality benefits of this natural creek (CRS 2004).

After hydrological restoration efforts have been performed, SCP will become wetter and since there are two large Lee County Parks and Recreation facilities (Caloosahatchee Regional Park and Hickey's Creek Mitigation Park) less than four miles to the west and southwest of SCP, it will best serve as a community preserve. At a minimum, the Preserve will be open for hiking, bird watching and photography and trails will be maintained on existing trails in the Preserve. Refer to the Public Access and Resource-Based Recreation section for additional amenities information. This will lead to increased use and trash, but Land Stewardship staff will work with neighboring residents if they wish to form a volunteer group for the Preserve.

V. FACTORS INFLUENCING MANAGEMENT

A. Natural Trends and Disturbances

Natural trends and disturbances influencing native communities and stewardship at SCP include hurricanes, wildfire, occasional freezes and the cycling wet and dry seasons. Implementation of the Management Action Plan will take all of these factors and their influence on projects at the SCP 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 staff are developing a wildland firefighting protocol for County preserves. The FDOF was provided a map of the Preserve showing the locations of gates, firebreaks, management units and water sources. The FDOF will utilize existing firebreaks to contain wildfires at SCP whenever possible. No new firebreaks, such as plow lines, will be created unless there is

potential for the wildfire to harm property outside the Preserve boundary. This agreement between FDOF and the County will protect SCP from the potential damage associated with emergency firefighting equipment. Land Stewardship staff will lead periodic site visits in order to familiarize FDOF with SCP and current management efforts. A comprehensive C20/20 fire plan, to be completed in the spring 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 SCP 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. The timing of prescribed burns will also be influenced by seasonal rain, weather and wind patterns.

B. Internal Influences

Several human influences have impacted SCP. Many of these influences can be attributed to off-site road construction projects, various hydrological manipulation efforts, or cattle ranching operations. See Figure 13 for approximate location of some of these features.

Hydrological impacts include the channelization of Spanish Creek and excavation of several ditches, which drain water from the site. The remaining spoil piles from these efforts are staggered intermittently along the ditches (borrow areas) and creek. West of the creek, the mining operations removed fill for road construction projects and left behind elevated spoil areas around the excavated pits. Most of these ditches and borrow ponds restrict or prevent natural sheet flow and also affect on-site water table levels. The reason for installing a berm of spoil around a southwestern cypress head remains unknown, but it too prevents the natural sheetflow from the surrounding plant communities from entering into the depths of the cypress head. Large hackberry (*Celtis laevigata*) and citrus trees have become established on the man-made elevated berm.

Many invasive exotic plants disrupt the natural systems and impact the native species on the Preserve. Brazilian pepper patches are adjacent to fences, roads, dredged ditches, and mined areas (borrow ponds) whereas caesarweed is scattered throughout all plant communities, most likely spread by cattle and hogs. Initial exotic plant removal efforts along with follow-up maintenance will

greatly enhance the natural plant communities and wildlife habitats. Scattered citrus trees have become established throughout many areas of the Preserve as a result of wildlife dispersing the seeds from the nearby citrus groves. Land Stewardship staff believes that once the area is rehydrated, wetter conditions will control the unwanted citrus and potentially other susceptible invasive exotic plants.

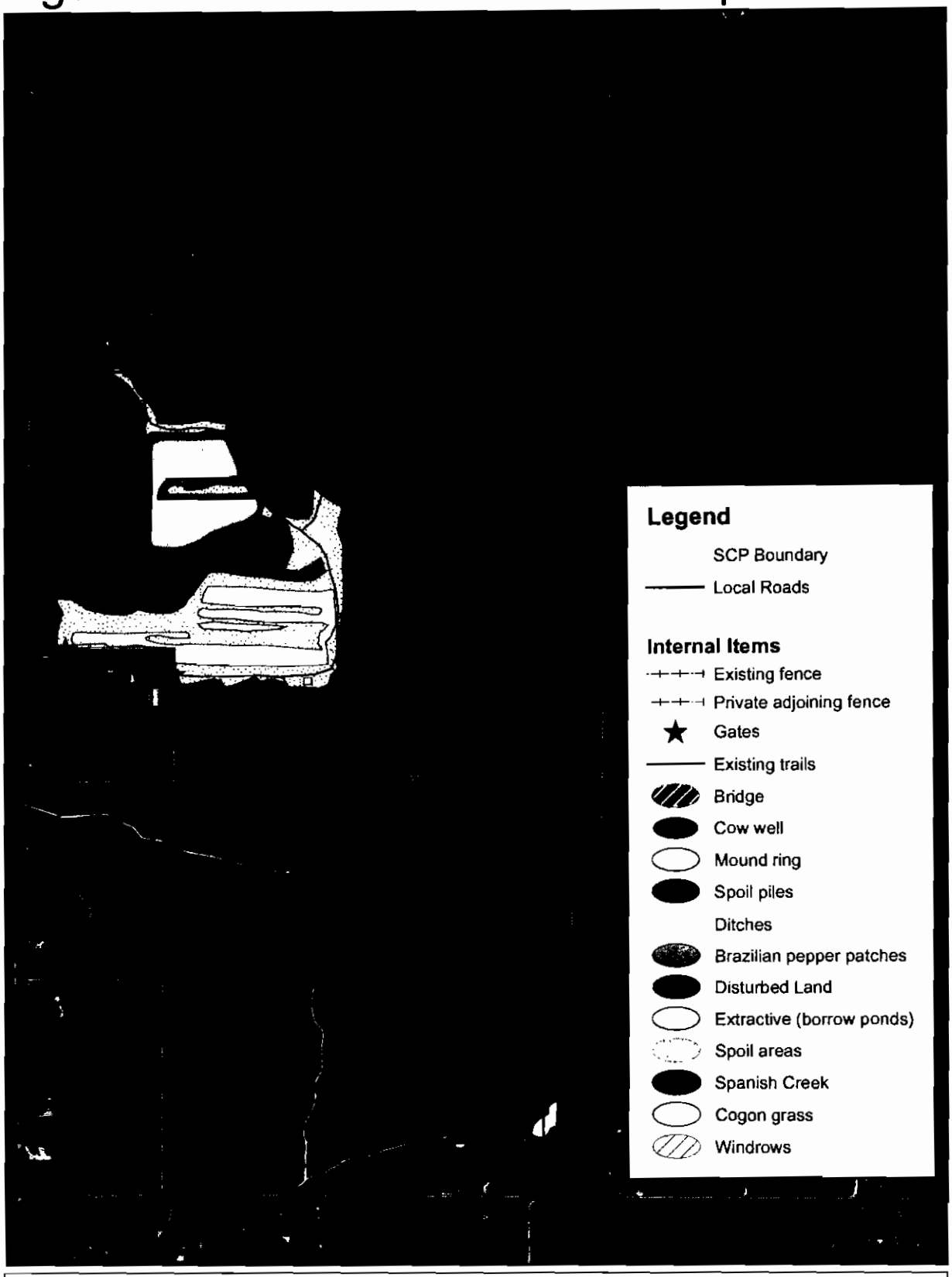
One unique location of pine flatwoods has gigantic specimens of old growth slash pine trees that, due to the lack of fire, have become overgrown with hardwoods and a thick layer of duff (pine needles). Vegetation reduction measures will need to be implemented to reestablish a healthier pine flatwoods community and to be able to reintroduce a fire regime. After restoration projects are completed in management units that contain fire dependent communities, a prescribed fire management program will be implemented. This will aid conservation measures by inhibiting exotic plant regrowth and return an essential fire regime for fire dependent plants and animals for long-term sustainability. Implementing an appropriate fire regime within the landscape will help prevent the sometimes-devastating affects of wildfires and possibly avoid the need for FDOF to intervene with bulldozers and plows.

Exotic animals can have a detrimental affect on native species. For example, feral hogs consume ground-nesting bird eggs and disturb soil and sensitive vegetation during rutting activities, which can provide optimal substrate for invasive exotic plant growth. Exotic snails, fish and amphibians can compete with native fauna for habitat and food. A range of removal methods will be considered for problematic invasive exotic animals found on the Preserve.

The Preserve's only legal access point is located off North River Road. During the late 1980's, in connection with the installation of a canal project for the CLDD, a 50-ton capacity wooden bridge was installed over Spanish Creek to allow the property owner continued access. Although there are other gates along the perimeter of the Preserve, access would need to be obtained through private property.

Lastly, several internal influences are directly related to cattle grazing operations. Windrows (filled with dirt and supporting mature vegetation) and a cow well remain from when an area was cleared for grazing operations during the 1950's (see Figure 12). In addition, several locations have interior fencing. One central section of fencing appears to have been abandoned long ago, while another smaller section of fencing and a gate stretches from east to west near a southeast area of the Preserve, just north of the creek. The internal fencing allows the rancher to restrict cattle to smaller grazing units. Once cattle operations end, all of the interior fencing and gate will be removed.

Figure 13: Internal Influences Map



C. External Influences

SCP is located within the Alva Community, an area designated by the Lee County Board of County Commissioners as one of the 22 planning communities designed to capture the unique character of this area of the county. The Alva Community is predominantly designated as Rural, Open Lands, or Density Reduction/ Groundwater Resource. Residents satisfy most of their commercial needs by traveling to more urbanized communities to the west and south. This community is expected to remain largely rural and agricultural through 2020 and "the Alva Community will also strive to protect its historic resources" (Lee County 2004).

Two local roads and utility power lines run along the west (Persimmon Ridge Road) and south (North River Road) boundaries of the Preserve. During the acquisition phase of SCP, it was noted that there was a potential for North River Road to be expanded into a four-lane road in the future. According to the Lee County Department of Transportation (LDOT) website (http://lee-county.com/publicworks/pdf/Planning/Maps/CIP_Map1005.pdf), there are no current major road improvement projects planned for this area through 2010.

To the north and northeast, the expansive agricultural operations and local infrastructure affect the region's hydrologic features (refer to Hydrologic Components and Watershed section) and introduces exotic plants (citrus). The most northern locations of the Preserve have the highest density of wild citrus growing in areas that are still regarded as wetlands. Land Stewardship staff has observed a considerable number of cabbage palms that have become established in the designated wetlands. The creek has become dangerously dehydrated as well. These hydrological impacts are also directly related to another external influence; the CLDD canal that runs along the eastern boundary of the Preserve. The canal and associated berm (grassy road) prohibit the historic hydrological flow from reaching the Preserve. Staff noted an approximate 4-5' difference in elevation between the Preserve (in the northeast) and the grassy road, which acts as a dam.

D. Legal Obligations and Constraints

i. Permitting

Land stewardship activities at Spanish Creek Preserve may involve obtaining permits from regulatory agencies. The proposed hydrologic improvements to the site may require permits from the Florida Department of Environmental Protection (FDEP), the United States Army Corps of Engineers (USACOE) and SFWMD. Once invasive exotic plants have been removed and controlled in the

upland portions of the Preserve and fuel loads have been reduced, prescribed fire may be used as a management tool, requiring burn authorization from the FDOF.

ii. Other Legal Constraints

There is an approximately 25 foot road right of way easement on the western boundary of the Preserve along Persimmon Ridge Road. The Preserve boundary goes almost to the edge of pavement and includes this right of way. The existing fence line falls in this right of way along with an overhead electric line.

In September 2005, a year long cattle lease was drafted (Appendix D) for the entire Preserve. As a consideration of the License for Cattle Grazing, this lease may be terminated with a 30-day written notice to the Licensee. At this Preserve, the Licensee is the former landowner whom has been very respectful to prevent harmful environmental impacts by limiting the number of cattle, their duration onsite, and maintaining fence lines. Land Stewardship staff recommends that the lease continue on a yearly basis with the above 30-day consideration. All Lee County cattle leases expire each September to simplify coordination between the parties.

iii. Relationship to Other Plans

In September 2005, SFWMD issued a statement of work to develop the Four Corners Watershed Plan (Appendix E). This plan was created to evaluate the issues in the area that relate to water supply, flood protection, water quality and natural systems of the area. The Four Corners Watershed is the area east of SR 31, south of CR 74, north of the Caloosahatchee River and west of SR 29. This is the area in the northeast portion of Lee County where Lee, Charlotte, Glades and Hendry County meet. Spanish Creek and Spanish Creek Preserve fall within this watershed. SFWMD staff recognizes that the water management problems they are dealing with today are due to the disruption of the historic flow ways. These disruptions can be minimized by restoring the historic surface flow patterns as much as possible (SFWMDc 2005). The objectives of this plan are to:

- Mitigate flooding issues in Cypress Creek.
- Mitigate flooding issues in the area east of the County Line ditch.
- Restore environmental flows in Spanish Creek.
- Maintain existing flows and water levels in the wetlands along Jacks Branch north of the project area.

LCNR has a budgeted Spanish Creek Restoration Capital Improvement Project (CIP) in the Lee County portions of the Four Corners area. These plans include

rehydrating the area and diverting water from the north into Spanish Creek, including northeastern areas of Spanish Creek Preserve. The plans also include possibly using two county owned parcels, 10 acres each, on the south side of North River Road to improve water quality to the Caloosahatchee River. Land Stewardship staff will work with LCNR staff to coordinate work in this area.

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

- The growth patterns of the County will continue to be dictated by the Future Land Use map.
- The continued protection of the County's natural resource base.
- The diversification of the County's traditional economic base.
- The expansion of cultural, educational and recreational opportunities.
- A significant expansion in the County's physical and social infrastructure.

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

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

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

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

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

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

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

Chapter VII, Goal 107: RESOURCE PROTECTION provides to manage the county's wetland and upland ecosystems so as to maintain and enhance native habitats, floral and faunal species diversity, water quality, and natural surface water characteristics. **Objective 107.1: RESOURCE MANAGEMENT PLAN** provides the county will continue to implement a resource management program that ensures the long-term protection and enhancement of the natural upland and

wetland habitats through the retention of interconnected, functioning, and maintainable hydroecological systems where the remaining wetlands and uplands function as a productive unit resembling the original landscape. (Amended by Ordinance No. 94-30, 00-22) Under **Policy 107.1.1.4e** the county (or other appropriate agency) will prepare a management plan for each acquired site for the long-term maintenance and enhancement of its health and environmental integrity.

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

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

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

Chapter VII, Objective 107.11: FLORIDA PANTHER AND BLACK BEAR provides that County staff will develop measures to protect the Florida panther and black bear through greenbelt and acquisition strategies. (Amended by Ordinance No. 92-48, 00-22)

Chapter VII, Goal 114: WETLANDS provides that the county maintains and enforces a regulatory program for development in wetlands that is cost-effective, complements federal and state permitting processes, and protects the fragile ecological characteristics of wetland systems. (Amended by Ordinance No. 94-30) **Objective 114.1** provides that the natural functions of wetlands and wetland

systems will be protected and conserved through the enforcement of the county's wetland protection regulations and the goals, objectives, and policies in this plan. "Wetlands" include all of those lands, whether shown on the Future Land Use Map or not, that are identified as wetlands in accordance with F.S. 373.019(17) through the use of the unified state delineation methodology described in FAC Chapter 17-340, as ratified and amended by F.S. 373.4211. (Amended by Ordinance No. 94-30, 00-22)

E. Management Constraints

The principle stewardship constraints for SCP include limited funding, exotic plant control, the brief dry season and access to the Preserve. A Florida Communities Trust (FCT) grant is being written to cover the costs of creating public access and resource-based recreation, but funding for management activities is limited. There may be funding assistance available from the LCNR and the SFWMD to rehydrate the Preserve. Rehydrating the Preserve will be one step in the control of invasive exotic plants.

Currently, the only vehicular access to the Preserve is from the southeast corner on North River Road and crossing the wooden bridge over Spanish Creek. This only allows access to the eastern portions of the Preserve. When public access is created along the western side along Persimmon Ridge Road, this will allow vehicular access to the western portions of the Preserve without having to cross the creek. The bridge across the creek in the southeast corner of the Preserve will be maintained for vehicular access by Land Stewardship staff only.

F. Public Access and Resource-Based Recreation

The Preserve is currently a Category 4 Resource Protection and Restoration Preserve. This means the Preserve does not provide regular public access due to the active cattle lease. Once this stewardship plan is complete and public access is created to the Preserve, it will be changed to a Category 2 Intermediate Use Preserve. In May 2006, a FCT grant will be submitted, and if awarded, the program will receive funding for public access and recreation at Spanish Creek Preserve. Included in this grant request are plans for approximately 1 mile of marked trails, an observation deck / fishing pier on one of the borrow ponds, a small primitive parking area in the northwestern portion of the Preserve, and approximately 10 educational signs including a possible kiosk at the entrance. If the grant is not awarded, staff will seek other outside funding or revisit the proposed recreation on site. See Figure 14 for the Proposed Master Site Plan.

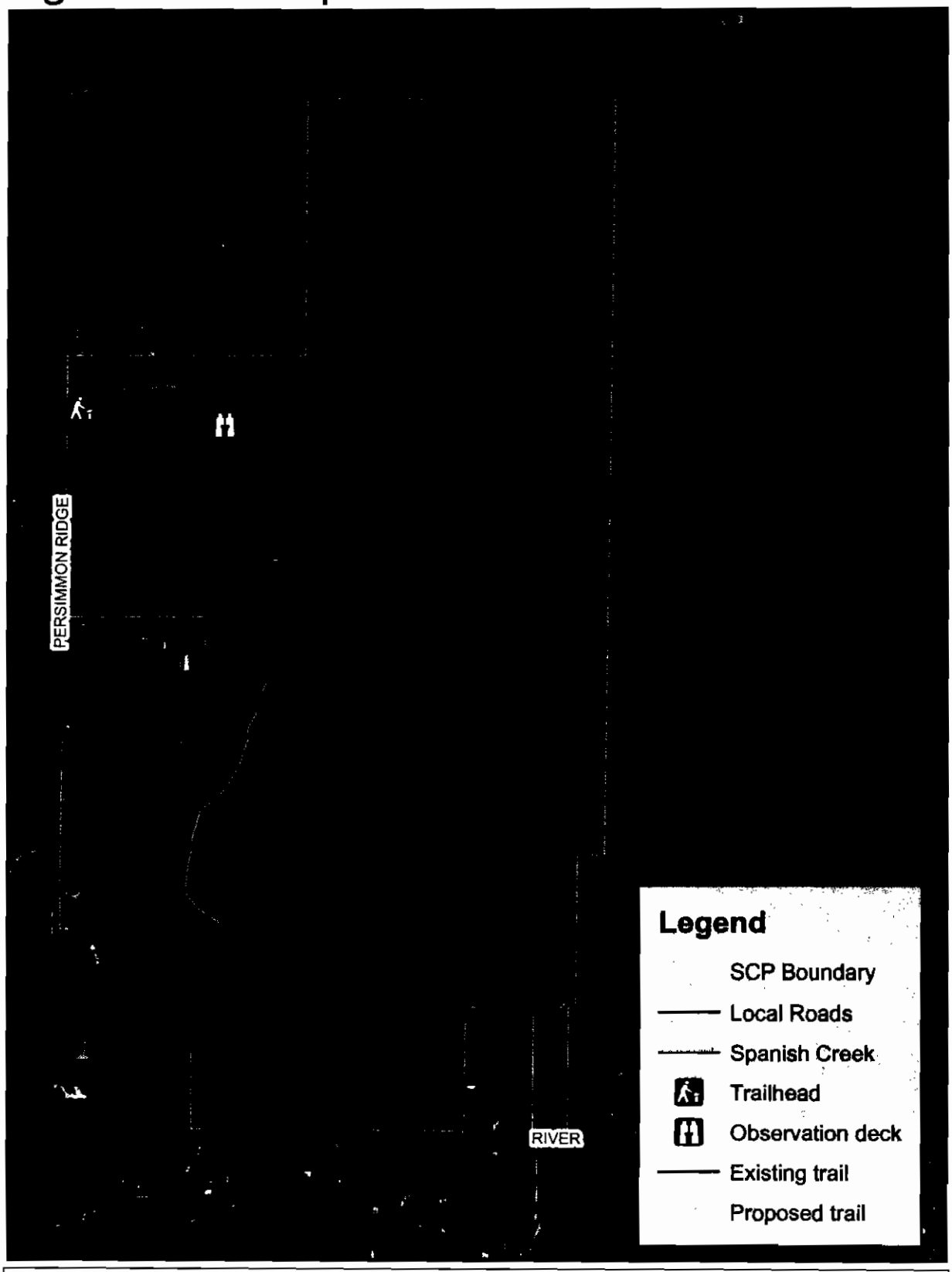
Periodically, small portions of the trail may have standing water throughout the wet season, but the trail may remain open for visitors to make the effort if they choose. The entire Preserve will be closed during certain restoration activities or

prescribed fires. A kiosk at the entrance to the Preserve will alert visitors of any current or upcoming trail closures.

Staff recognizes the possible hazards involved with an active cattle lease and allowing public access. Therefore, in order to minimize future disturbance to the restored creek bed and the need to separate visitors from cattle operations, Land Stewardship staff recommends that public access only be allowed west of the creek, while cattle remain within the pasture area east of the creek.

Staff will attempt to provide for the needs of the public, keeping in consideration the lack of daily staff to protect and maintain public use amenities. A strong volunteer group will be encouraged to form to assist staff with trail maintenance, wildlife monitoring and other land stewardship projects.

Figure 14: Proposed Master Site Plan



G. Acquisition

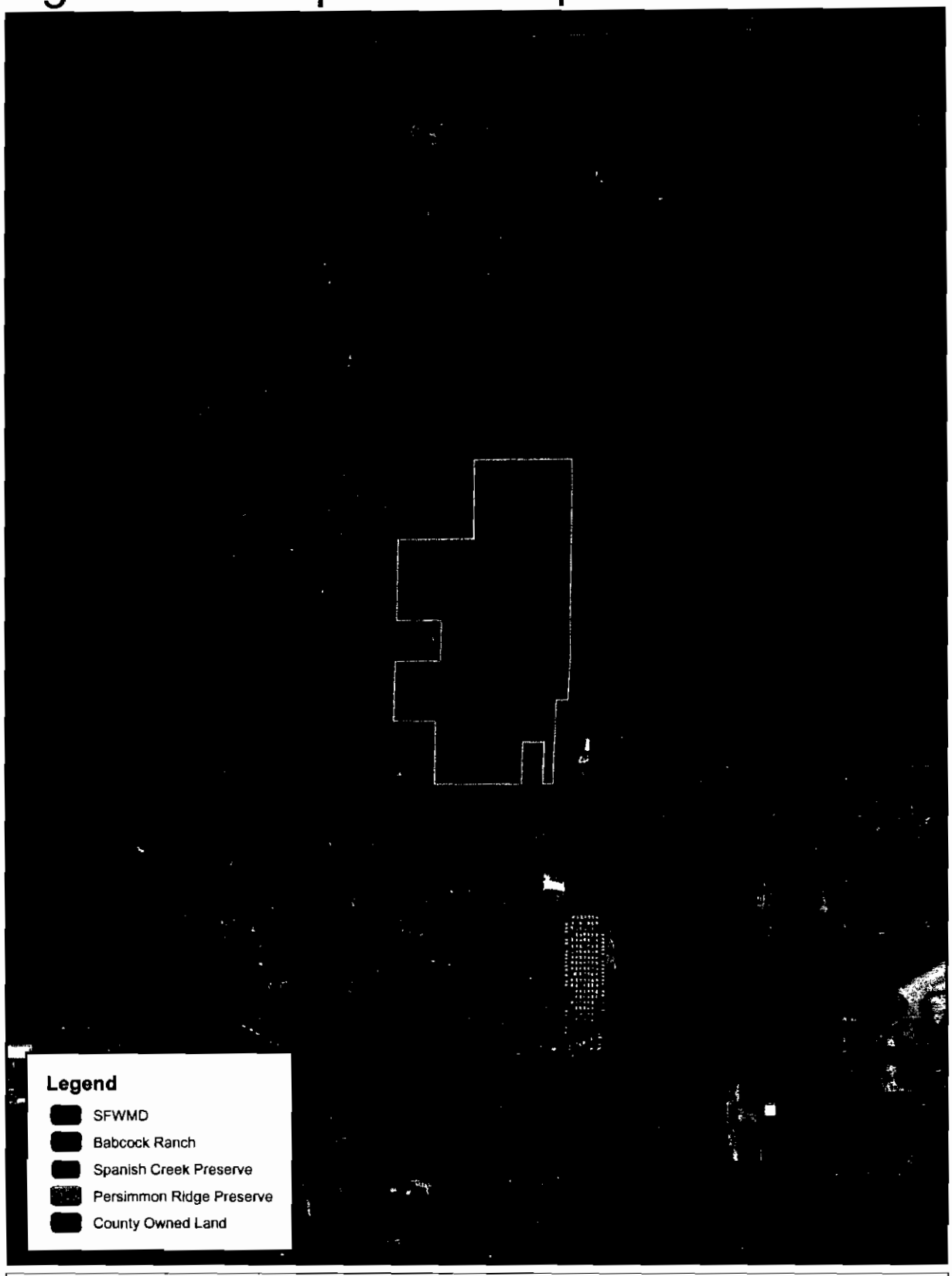
Spanish Creek Preserve, nomination 260, was purchased through C20/20 in September 2005 for $3,891,040. It was nominated to the program in January 2004 by Ruby Daniels, the former landowner. The headwaters of Spanish Creek are in the northern portion of the Preserve and it contains nearly 100 acres of relatively undisturbed mixed hardwood wetlands. The Preserve lies within the limits of LCNR and SFWMD's restoration project for the Four Corners area and also in the area for the regional study for the Comprehensive Everglades Restoration Plan. This property was an important addition to the program because it provides storage for floodwaters and helps improve water quality that flows into the Caloosahatchee River.

Additional conservation lands in the area include the 40-acre Persimmon Ridge Preserve located west of Persimmon Ridge Road across from SCP (Figure 15). Lee County purchased this piece in the 1960's. At one time there were plans for a community park with swimming in the borrow pond areas. This idea has been abandoned. Currently, the Preserve is managed as a relocation site for gopher tortoises from private development. The 5,620-acre portion of Babcock Ranch, in Lee County, is located approximately 1 mile to the northwest. Lee County is currently working with the state to purchase this property for conservation land. At this time, there are plans for other parts of Babcock Ranch (the western portions within Lee County) to be developed.

SFWMD owns a 400-acre parcel directly to the east of the Preserve that was used as a spoil site when the Caloosahatchee River was dredged in the early 1960's. The site is approximately 10 feet higher than natural elevations at SCP (see Figure 4). This area is dominated by Brazilian pepper monoculture. The District has plans to restore this property as part of the Four Corners Watershed Plan. The county also owns two 10-acre tracts on the south side of North River Road, one of which was acquired by the county through non-payment of taxes. Land Stewardship staff is looking into the management of these two parcels to coordinate with restoration efforts in the area.

Currently, the future land uses for the Preserve are "Rural" and "Wetlands." The STRAP numbers for the 243.19-acre parcel are 15-43-27-00-00004.0000; 00006.0030; 00004.0030. Land Stewardship staff recommends that the future land use be changed to "Conservation Lands" and the zoning category be changed to "Environmentally Critical." The Preserve is zoned "Agriculture" and is surrounded by lands zoned agriculture. See Appendix F for Future Land Use and Zoning Maps.

Figure 15: Acquisition Map



VI. MANAGEMENT ACTION PLAN

A. Management Unit Descriptions

Spanish Creek Preserve has been divided into seven (7) management units (MU) to better organize and achieve management goals. Figure 16 delineates the management units that were created based on existing trails, the creek and plant communities.

- Management Unit 1 – 52.1 acres
  Management Unit 1 is located in the northern section of the Preserve. It is bordered by the property boundary on the west, north, and east sides and south by MU 2 & 3. The majority of this unit is wetland forested mixed and less than 6 acres of other communities with Spanish Creek running through the center. The northwestern part of the unit contains some disturbed areas that were once used as a trail.

  The Brazilian pepper is larger along the creek due to prior dredging activities. Other exotics present in this unit include caesarweed, guava (*Psidium guajava*) and wild citrus in less than 15% cover. A portion of the hiking trail system may be in this unit. Management activities will focus on exotic plant control and rehydration efforts.

- Management Unit 2 – 46.1 acres
  Management Unit 2 is located in the northwest corner. It is bordered to the north by the property boundary, the west by Persimmon Ridge Road, the south by section of the property line and MU 4 and the east by a portion of Spanish Creek and cypress plant community. Nearly half of the unit is disturbed land that was once grazed and excavated for aggregates. Spoil soils, berms, piles, and borrow ponds affect the hydrological flow of the area. The other half consists mainly of cypress and upland scrub, pine and hardwoods.

  Exotic plant species present include Brazilian pepper, caesarweed, guava, tropical soda apple (*Solanum viarum*), Japanese climbing fern, and Surinam cherry (*Eugenia uniflora*) in less than 20% cover. A new maintenance gate, public access point, and portions of the hiking trail system will be installed in this unit. Management activities will focus on exotic plant control, hydrological restoration projects, and public access.

- Management Unit 3 – 34.1 acres
  Management Unit 3 is located in the eastern central part of the Preserve. This unit is bordered to the north by MU 1, to the east by the property

boundary and drainage canal, to the south by MUs 5 & 6 and to the west by Spanish Creek and a portion of MU 1. This unit contains pine – mesic oak (26 acres), woodland pasture (7 acres), and small sections of the creek and pasture.

The primary exotic plant species present include Brazilian pepper, caesarweed, rosary pea (*Abrus precatorius*) and hairy indigo (*Indigofera hirsuta*) in less than 15% cover. Management activities will focus on exotic control, brush control strategies, enhancement of gopher tortoise habitat, and prescribed fire.

- Management Unit 4 – 23.4 acres
  Management Unit 4 is located in a western part of the Preserve. This unit is bordered to the north by MU 2, to the west by Persimmon Ridge Road, to the south by MU 7 and east by Spanish Creek. This unit primarily contains temperate hardwood (9 acres), wetland forested mixed (5 acres), live oak (5 acres), cypress (2 acres), a small section of the creek and smaller patches of five other plant communities.

  The primary exotic plant species present include Brazilian pepper, caesarweed, rosary pea, Surinam cherry, strawberry guava (*Psidium cattleianum)* and Java plum (*Syzygium cumini*) in less than 15% cover. A portion of the hiking trail system may be in this unit. Management activities will focus on exotic control, hydrological restoration, and fence and/or fire break installation along the perimeter.

- Management Unit 5 – 20.1 acres
  Management Unit 5 is located in the central part of the Preserve. This unit is bordered to the north by MU 3, to the east by MU 6, to the south by the property boundary, and to the west along a large section of Spanish Creek. This unit contains the disturbed woodland pasture (7 acres), live oak (6 acres), wetland forested mixed (3 acres), temperate hardwood (2 acres), pine flatwoods (1 acre), nearly ½ mile of the creek bed, and pasture (1 acre).

  Exotic plant species present include Brazilian pepper, caesarweed, rosary pea, Japanese climbing fern, and balsam pear (*Momordica charantia*) in less than 10% cover. Management activities will focus on exotic control (animal and plant), fire break installation along the perimeter, and brush control strategies targeting the aggressive wild grape vine. Only small portions of this unit are fire dependant.

- Management Unit 6 – 27.4 acres
  Management Unit 6 is located in the southeastern area of the Preserve. This unit is bordered to the north by MU 3, to the east by the property boundary and drainage canal, to the south by North River Road, and to

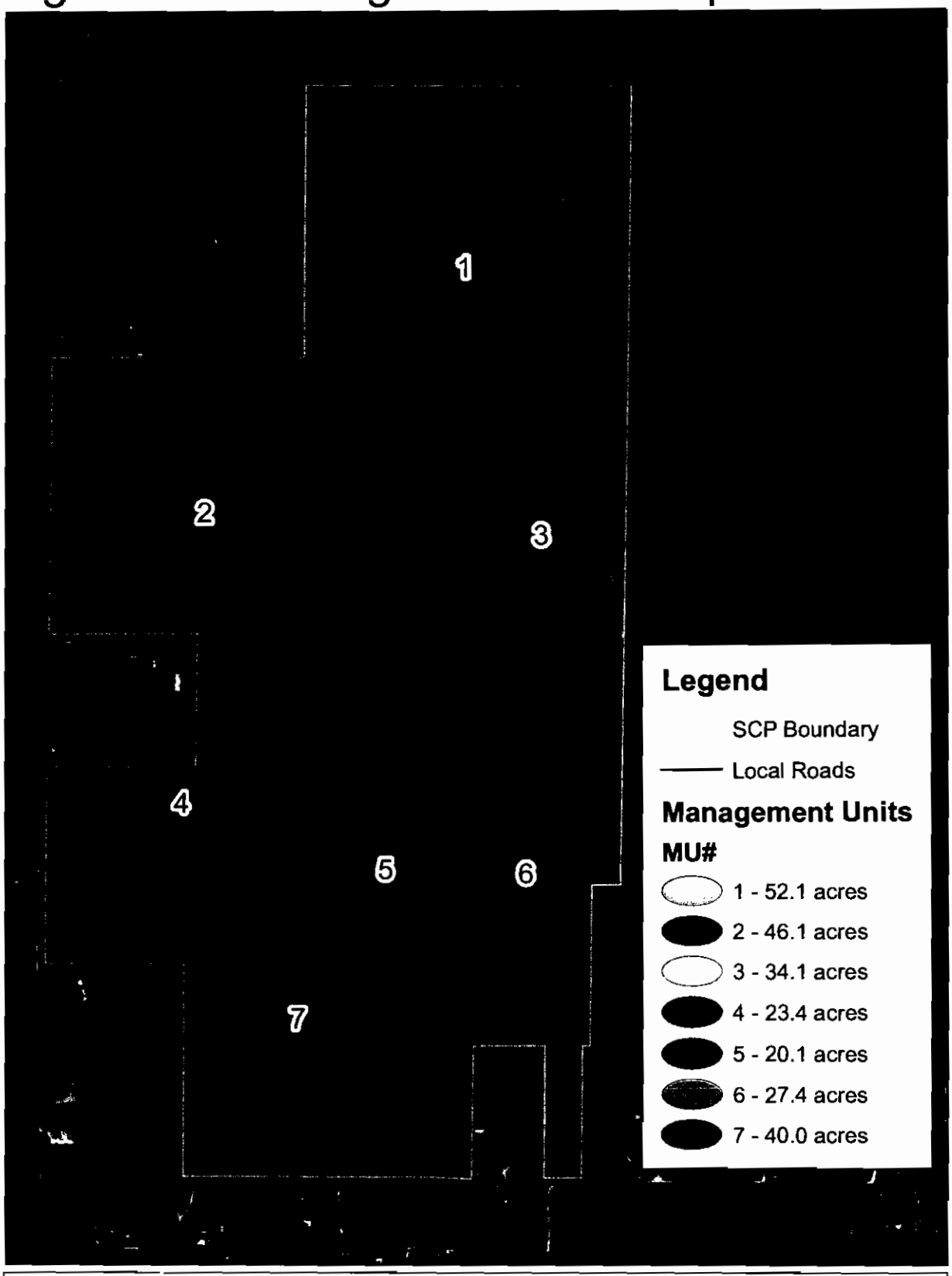
the west by MU 5. This unit contains unimproved pasture (23 acres), disturbed live oak (2 acres), disturbed unimproved pasture (<1 acre), Brazilian pepper (<1 acre), and a small section of the creek that dissects this unit at the south end.

The primary exotic plant species present include Brazilian pepper, caesarweed, rosary pea, cogon grass, bahia (*Paspalum notatum var. saurae*), tropical soda apple, and Guinea grass (*Panicum maximum*) in less than 20% cover. Management activities will focus on exotic control, habitat enhancement for gopher tortoises, and prescribed fire.

- Management Unit 7 – 40.0 acres
  Management Unit 7 is located in the southwestern portion of the Preserve. This unit is bordered to the north by MUs 4 & 5 and a portion of the creek, to the east and west by the property boundary, and to the south by North River Road. This unit contains pine flatwoods (29 acres), live oak (7 acres), wetland forested mixed (1 acre), cypress (1 acre), and borrow areas (< 1 acre - a ditch and dredged natural overflow area).

  The primary exotic plant species present include Brazilian pepper, caesarweed, and rosary pea in less than 10% cover. Management activities will focus on exotic control, brush control, fence and/ fire break installation along the perimeter, and prescribed fire.

Figure 16: Management Unit Map



B. Goals and Strategies

The long-term goals for the Preserve follow, but 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 our goals in a timely manner. The primary management objective will be to rehydrate the Preserve, which will involve working closely with SFWMD and LCNR.

Natural Resource Management

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

Outside Consultants

- PD&E for an observation deck / fishing pier

Overall Protection

- Install firebreaks
- Boundary signs
- Install additional fencing and west access gate
- Assess cattle lease
- Change Future Land Use and Zoning designations

Public Use

- Recreation
- Trail maintenance

Volunteers

- Assist volunteer groups

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

Natural Resource Management

Hydrologic Restoration

As previously mentioned, SFWMD and LCNR have plans to restore the natural hydrologic regime in the Four Corners area. Land Stewardship staff will be

active with the development of these plans hoping to implement the following restoration projects into the entire plan:

- Rehydrating northern portions of the Preserve and allowing more water to flow into Spanish Creek. This will help in the first steps of exotic plant control. Species such as the wild citrus, rosary pea, guava and caesarweed should be easily controlled with higher water levels on the Preserve. Increasing water levels will protect and improve the natural plant communities on the Preserve.
- Creating gradual slopes and fish trap areas along the littoral zones within the borrow ponds to increase foraging habitats for wading birds and other wildlife.
- Retaining water in the southern portions of Spanish Creek during low flows. There is an existing channel that flows south out of Spanish Creek towards North River Road in the south central area of the Preserve. If congruent with LCNR plans, staff will research placing a small earthen dam at the convergence point of the creek and this channel to contain water in the creek at times of low flow. The dam will allow water to crest over at high flow and keep the areas to the south hydrated.

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 SCP, a Prescription Form (located in the LSOM) will be filled out by Land Stewardship staff, reviewed by the contractor(s) and filed appropriately. All contractors involved in these projects will be required to fill out the Daily Report Control Form (located in the LSOM) and filed appropriately by staff.

The following are the species of greatest concern on the Preserve:

- Brazilian pepper monocultures (approximately 7 acres):
  In areas where Brazilian pepper is the only species present, a mulching machine will be used to remove the trees. Follow-up treatment will consist of an application of an appropriate herbicide mixture to the foliage of any resprouts or seedlings.

- Surinam cherry and guava:
  These two species have become established in disturbed areas in the northern portions of the Preserve. The Surinam cherry is especially prevalent in areas where large oak trees have been blown over and gaps have been created where more light reaches the forest floor. There is a large guava tree just to the north of the Preserve which may be one of the off site seed sources for this species. Both species will be controlled using a basal bark treatment of the appropriate herbicide.

- Tropical soda apple:
  Tropical soda apple (TSA) is present along abandoned farm roads and disturbed areas around the Preserve. TSA is usually spread from cattle eating hay infested with seeds, but can also be spread by wildlife species. If not controlled, TSA can easily spread. Control methods will include a foliar spray of the appropriate herbicide.

- Caesarweed:
  Caesarweed is widespread across the Preserve. It is most abundant on old roads, under large oak trees in the pasture and in areas with soil disturbance. Patches of thick caesarweed will be foliar sprayed with the appropriate herbicide in an attempt to control it throughout the Preserve.

- Rosary pea:
  Rosary pea is scattered throughout the drier areas including the pine-mesic oak, live oak and upland scrub areas. A test treatment of foliar spraying with an appropriate herbicide will be used to determine if it is an effective method. Staff will also utilize hand pulling and seed collection when possible on site inspections and work days.

- Japanese climbing fern:
  Climbing fern is located in various areas along the creek and near the borrow ponds. All patches found will be foliar sprayed with the appropriate herbicide and hand pulled if spores are not present.

Exotic animal control

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

The second exotic animal species of concern is the giant ram's horn snail. This snail was introduced to the U.S. to control weeds and water hyacinth (*Eichhornia*

crassipes) by eating their roots and also to eat other snails that may possibly spread disease to humans (Williams 2005). It is not known if these snails will destroy native plant populations and/or compete with native snails. Staff will hand collect and destroy any snail shells found on site inspections or staff work days.

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

Prescribed fire management

A prescribed fire program will be implemented to closely mimic the natural fire regimes for the different plant communities to increase plant diversity and insure the canopies remain open. Once restoration projects are completed in management units that contain fire dependent communities, a prescribed fire management program will be implemented after the creation of appropriate fire lines/breaks. The timing of prescribed burning will be influenced by seasonal rain and wind patterns. The Conservation 20/20 Burn Team Coordinator is coordinating with the FDOF and FWC to finalize the C20/20-wide Fire Management Plan that will apply to all Preserves.

Monitor and protect listed species

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

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

Brush/fuel reduction

There are three areas of the Preserve that may require the fuel loads to be mechanically reduced before prescribed fire is conducted. The first area is in the center of the Preserve in MU 3. This area has high (10 feet) and dense saw palmettos. This area will receive mechanical thinning. The palmettos will be mowed in place to reduce the density and fuel loads for future prescribed burns, and to reduce the chance of a wildfire crowning into the slash pine trees. If necessary, some oak trees may be cut to make room for the equipment to

maneuver in this area. The second area is in the southwestern portion of the Preserve in MU 7. This area has a mix of pine and large oaks with large amounts of ladder fuels (mostly pine needles in cabbage palms) and a large amount of leaf litter on the forest floor. Land Stewardship staff will work with local FDOF staff to determine the best methods of fuel reduction in this area. The third area is along the eastern edge of MU 5. There are several large slash pines and other vegetation (some damaged/dying from Hurricane Wilma's winds) that are covered with wild grape vine that need to be removed. This edge needs to be cleaned up to remove the ladder and heavy fuel loads.

Outside Consultants

PD&E for an observation deck / fishing pier

An engineering firm will need to be hired to apply for all appropriate permits, provide design/engineering plans and the construction of an observation deck / fishing pier at the northern most borrow pond.

Overall Protection

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 is an old firebreak on the southern boundary of the Preserve that will need to be cleared of low lying limbs and removed. This break turns north at the western boundary and is cleared for approximately 500'. New firebreaks need to be installed along the western boundary continuing north until the vegetation is too wet to carry fire. This is also true for the eastern boundary along the canal north of the pasture. A firebreak will not be installed along the northern boundary due to the wet conditions along this line.

Boundary signs

Since acquisition, staff has installed boundary signs along the western boundary on Persimmon Ridge Road and along the southern boundary on North River Road. Signs need to be posted on the northern and eastern boundaries. C20/20 Rangers will check for boundary signs during the patrols and replace them immediately if possible or report the problem to the C20/20 Supervisor. Boundary signs will be placed every 200-300' along roadsides and 500' elsewhere.

Install additional fencing and west access gate

Additional perimeter fencing (~1/2 mile) should be installed along western portions of the Preserve. These areas include from the southwest corner

continuing north along the boundary to the corner and then west back to Persimmon Ridge Road. An additional portion of fencing is needed along the outparcel in the central western portion of the Preserve along Persimmon Ridge Road. Only the east/west line along the southern boundary of this parcel needs fencing (see Figure 13). A west access gate along Persimmon Ridge Road will be installed to serve a dual purpose for stewardship access and as a future public access.

Assess cattle lease

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

Change Future Land Use and Zoning designations

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

Public Use

Amenities discussed in the recreation section of this plan, including a trailhead, trailhead signage, hiking trails and a possible wildlife observation/fishing platform that will be coordinated with funding and exotic plant removal efforts. Trail maintenance will be coordinated as needed.

Volunteers

Assist volunteer groups

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

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

If there is interest from the community to form a volunteer group, staff will work with them to assist with the many diverse stewardship activities that will be

associated with this Preserve, such as trail maintenance, wildlife monitoring, and other land stewardship projects.

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

VII. PROJECTED TIMETABLE FOR IMPLEMENTATION

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

Management Activity	Jun-06	Sep-06	Dec-06	Mar-07	Jun-07	Sep-07	Dec-07	Mar-08	Jun-08	Sep-08	Dec-08	Mar-09	Jun-09	Sep-09	Dec-09	Mar-10	Jun-10	Sep-10	Dec-10	Mar-11	Jun-11	2011 or later
Natural Resource Management																						
Exotic Plants																						
Initial exotic plant control																		X	→	→		
Fire																						
Mechanical brush reduction																3,5,7						
Install fire breaks												X										
Implementation of Fire Management Plan																				X		
Hydrologic Components																						
Hydrologic Restoration						X	→	→	→	→												
Regrade littoral zones of borrow pits						X	→															
Maintenance (On-going/Annual)																						
Follow up exotic plant control																•						X
Exotic animal removal				snail	hog	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
Fire break mow/disk																X				X		
Overall Protection																						
Install boundary signs				X																		
Install additional fencing/access gate				X																		
Assess cattle lease		X				X				X				X				X				X
Change Future Land Use/Zoning categories					X																	
Public Use																						
Create trailhead/trails									X													
Educational sign/kiosk installation									X													
Construction of observation deck / fishing pier											X											
Trail maintenance												X				X				X		
Volunteers																						
Assist volunteer group										X												

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

→ = project continues

Timetable is based on obtaining necessary funding for numerous land stewardship projects.

Implementation of these goals may also be delayed due to changes in staff, extreme weather conditions or a change in priorities on properties managed by Lee County.

VIII. FINANCIAL CONSIDERATIONS

There is a 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. Possible funding for these projects may be requested through grants from agencies such as SFWMD, FDEP, Florida Department of Community Affairs (FCT grant), and USFWS as well as mitigation opportunities. Projected costs and funding sources are listed in Appendix G.

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X. APPENDICES

Appendix A: 2004 Tropical Systems Map

Appendix B: Plant Sightings

Appendix C: Wildlife Sightings

Appendix D: License for Cattle Grazing

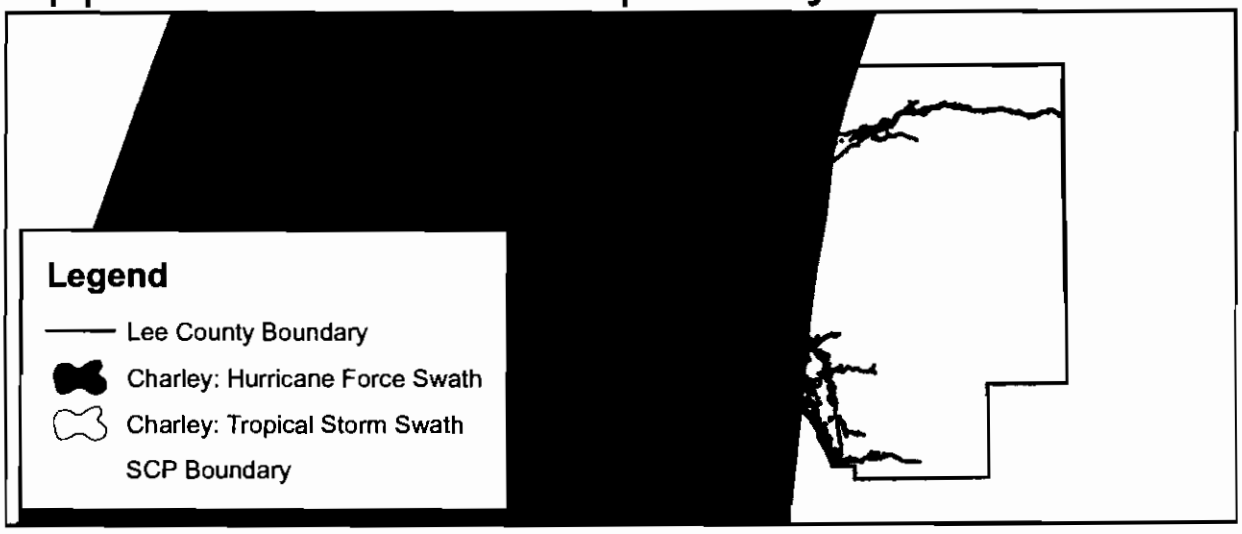
Appendix E: Four Corners Watershed Plan

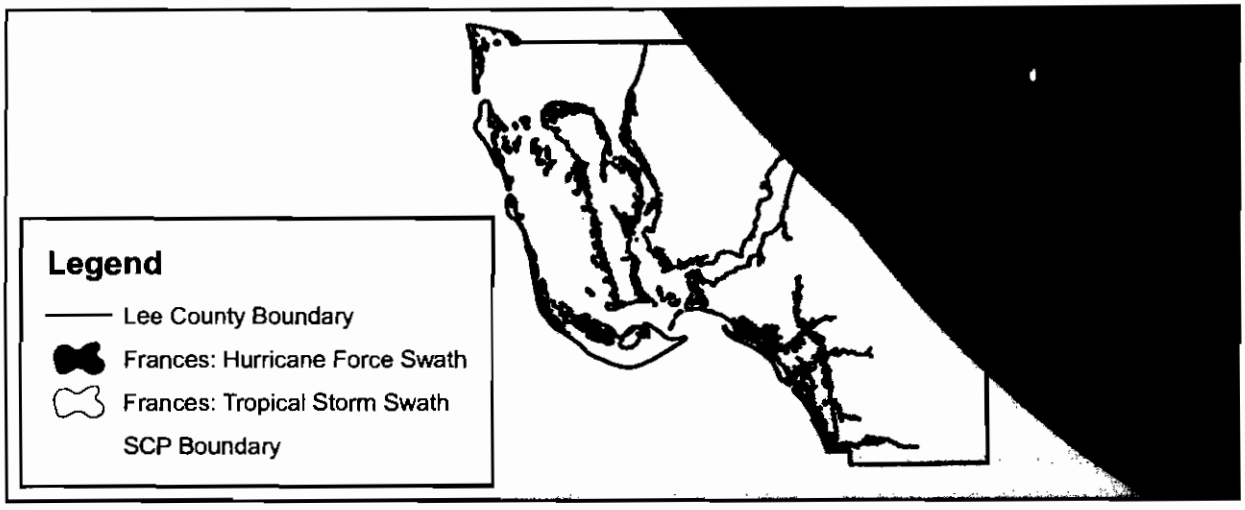
Appendix F: Future Land Use and Zoning Maps

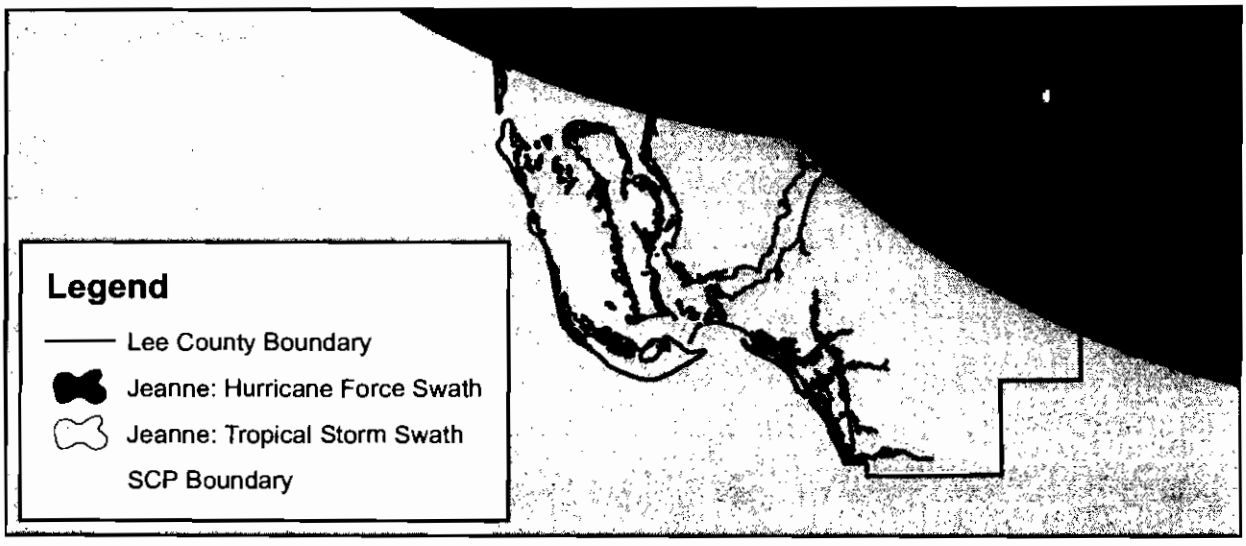
Appendix G: Projected Costs and Funding Sources

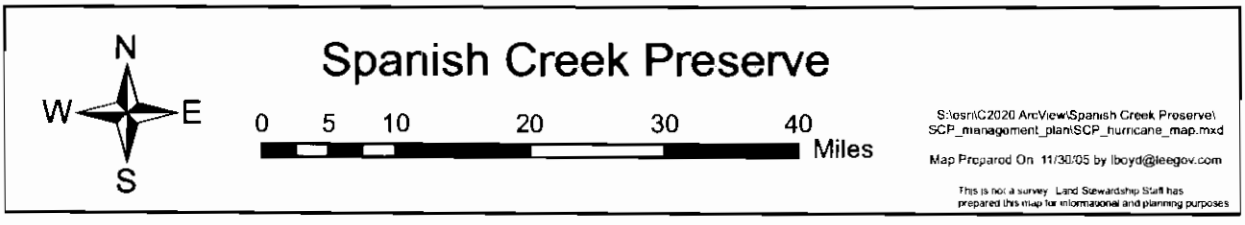
Appendix A: 2004 Tropical Systems Map

Appendix A: 2004 Tropical Systems









Appendix B: Plant Sightings

Appendix B: Plant Sightings at Spanish Creek Preserve

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

Scientific Name	Common Name	Native Status	EPPC	FDA	IRC
Family: Nephrolepidaceae (sword fern)					
Nephrolepis exaltata	wild Boston fern	Native			
Family: Osmundaceae (royal fern)					
Osmunda regalis var. spectabilis	royal fern	Native		CE	R
Family: Polypodiaceae (polypody)					
Phlebodium aureum	golden polypody	Native			
Pleopeltis polypodioides	resurrection fern	Native			
Family: Psilotaceae (whisk-fern)					
Psilotum nudum	whisk-fern	Native			
Family: Pteridaceae (brake fern)					
Acrostichum danaeifolium	giant leather fern	Native			
Pteris vittata	Chinese ladder brake fern	Exotic	II		
Family: Selaginellaceae (curly-grass)					
Lygodium japonicum	Japanese climbing fern	Exotic	I		
Family: Thelypteridaceae (marsh fern)					
Thelypteris kunthii	southern shield fern	Native			
Family: Vittariaceae (shoestring fern)					
Vittaria lineata	shoestring fern	Native			
Family: Cupressaceae (cedar)					
Juniperus virginiana	red cedar	Native			
Taxodium ascendens	pond cypress	Native			
Taxodium distichum	bald cypress	Native			
Family: Pinaceae (pine)					
Pinus elliottii var. *densa*	south Florida slash pine	Native			
Family: Amaryllidaceae (amaryllis)					
Crinum americanum	string-lily	Native			
Family: Arecaceae (palm)					
Sabal palmetto	cabbage palm	Native			
Serenoa repens	saw palmetto	Native			
Family: Bromeliaceae (pineapple)					
Tillandsia fasciculata var. densispica	stiff-leaved wild-pine, cardinal airplant	Native		E	
Tillandsia recurvata	ball-moss	Native			
Tillandsia setacea	thin-leaved wild-pine, southern needleleaf	Native			
Tillandsia usneoides	Spanish-moss	Native			
Tillandsia utriculata	giant wild pine	Native		E	
Family: Commelinaceae (spiderwort)					
Commelina diffusa	common dayflower	Exotic			
Family: Cyperaceae (sedge)					
Eleocharis interstincta	knotted spikerush	Native			
Fimbristylis spp.	fringe rush	Native			
Rhynchospora colorata	starrush whitetop	Native			
Scirpus spp.	bulrush	Native			

Appendix B: Plant Sightings at Spanish Creek Preserve (continued)

Scientific Name	Common Name	Native Status	EPPC	FDA	IRC
Family: Orchidaceae (orchid)					
Encyclia tampensis	Florida butterfly orchid	Native		CE	
Habenaria quinqueseta	longhorn false reinorchid	Native			R
Oeceoclades maculata	monk orchid	Exotic			
Sacoila lanceolata var. lanceolata	leafless beaked ladiestresses	Native			
Family: Poaceae (grass)					
Andropogon glomeratus var. pumilus	common bushy bluestem	Native			
Aristida spp.	threeawn/wiregrass	Native			
Arundo donex	giant reed	Exotic			
Cenchrus spinifex	coastal sandbur	Native			
Dactyloctenium aegyptium	Durban crowfoot grass	Exotic			
Eustachys spp.	finger grass	Native			
Fimbristylis cymosa	hurricane grass	Native			
Imperata cylindrica	cogon grass	Exotic	I		
Oplismenus hirtellus	woodsgrass	Native			
Panicum maximum	Guinea grass	Exotic	II		
Panicum repens	torpedo grass	Exotic	I		
Paspalum notatum var. saurae	bahia	Exotic			
Phragmites australis	common reed	Native			
Rhynchelytrum repens	rose natal grass	Exotic	I		
Setaria glauca	yellow foxtail	Native			
Sporobolus indicus	smutgrass	Exotic			
Family: Ruscaceae (butcher's broom)					
Sansevieria hyacinthoides	bowstring hemp	Exotic	II		
Family: Smilacaceae (smilax)					
Smilax auriculata	earleaf greenbriar	Native			
Smilax bona-nox	saw greenbrier	Native			
Smilax tamnoides	bristly greenbrier	Native			
Smilax laurifolia	bamboo vine	Native			
Family: Typhaceae (cattail)					
Typha latifolia	broadleaf cattail	Native			
Typha domingensis	southern cattail	Native			
Family: Acanthaceae (acanthus)					
Justicia brandegeana	shrimpplant	Exotic			
Family: Adoxaceae (moschatel)					
Viburnum obovatum	Walter's viburnum	Native			I
Family: Anacardiaceae (cashew)					
Rhus copallinum	winged sumac	Native			
Schinus terebinthifolius	Brazilian pepper	Exotic	I		
Toxicodendron radicans	poison ivy	Native			
Family: Annonaceae (custard-apple)					
Annona glarbra	pond apple	Native			
Asimina reticulata	netted pawpaw	Native			
Family: Apocynaceae (dogbane)					
Sarcostemma clausum	white twinevine	Native			
Family: Aquifoliaceae (holly)					
Ilex cassine	dahoon holly	Native			
Ilex glabra	gallberry	Native			

Appendix B: Plant Sightings at Spanish Creek Preserve (continued)

Scientific Name	Common Name	Native Status	EPPC	FDA	IRC
Family: Araliaceae (ginseng)					
Centella asiatica	spadeleaf	Native			
Hydrocotyle spp.	marshpennywort	Native			
Family: Asteraceae (aster)					
Ambrosia artemisiifolia	common ragweed	Native			
Baccharis halimifolia	saltbush, groundsel tree	Native			
Bidens alba	beggarticks	Native			
Carphephorus corymbosus	Florida paintbrush	Native			R
Coreopsis floridana	Florida tickseed	Native			I
Coreopsis leavenworthii	Leavenworth's tickseed	Native			
Elephantopus elatus	tall elephant's foot	Native			R
Emilia sonchifolia	lilac tassleflower	Exotic			
Eupatorium capillifolium	dog fennel	Native			
Heterotheca subaxillaris	camphorweed	Native			
Mikania scandens	climbing hempvine	Native			
Pluchea rosea	rosy camphorweed	Native			
Pityopsis graminifolia	narrowleaf silkgrass	Native			
Tridax procumbens	coatbuttons	Exotic			
Family: Bignoniaceae (trumpet creeper)					
Campsis radicans	trumpet creeper	Native			CI
Family: Cactaceae (cactus)					
Opuntia humifusa	prickly pear cactus	Native			
Family: Caryophyllaceae (pink)					
Drymaria cordata	West Indian chickweed	Native			
Family: Celtidaceae (hackberry)					
Celtis laevigata	hackberry	Native			
Family: Clusiaceae (mangosteen)					
Hypericum hypericoides	St. Andrew's-cross	Native			
Family: Cucurbitaceae (gourd)					
Momordica charantia	balsampear	Exotic			
Family: Droseraceae (sundew)					
Drosera spp.	sundew	Native			
Family: Ebonaceae (ebony)					
Diosporus virginiana	persimmon	Native			R
Family: Ericaceae (heath)					
Lyonia fruticosa	coastalplain staggerbush	Native			
Vaccinium myrsinites	shiny blueberry	Native			
Family: Euphorbiaceae (spurge)					
Bischofia javanica	bishopwood	Exotic	I		
Phyllanthus urinaria	chamber bitter	Exotic			
Family: Fabaceae (pea)					
Abrus precatorius	rosary pea	Exotic	I		
Crotalaria spectabilis	showy rattlebox	Exotic			
Desmodium incanum	zarzabacoa comun, beggarweed	Exotic			
Erythrina herbacea	coral bean	Native			
Indigofera hirsuta	hairy indigo	Exotic			
Mimosa strigillosa	powderpuff	Native			

Appendix B: Plant Sightings at Spanish Creek Preserve (continued)

Scientific Name	Common Name	Native Status	EPPC	FDA	IRC
Family: Fagaceae (beech)					
Quercus laurifolia	laurel oak	Native			
Quercus virginiana	live oak	Native			
Family: Lamiaceae (mint)					
Callicarpa americana	American beautyberry	Native			
Family: Lauraceae (laurel)					
Cassytha filiformis	love vine	Native			
Persea palustris	swamp bay	Native			
Family: Loganaceae (logania)					
Mitreola petiolata	lax hornpod	Native			
Family: Magnoliaceae (magnolia)					
Magnolia grandiflora	southern magnolia	Native			
Family: Malvaceae (mallow)					
Melochia corchorifolia	chocolateweed	Exotic			
Sida acuta	common wireweed	Native			
Sida rhombifolia	Indian hemp	Native			
Urena lobata	caesarweed	Exotic	II		
Family: Moraceae (mulberry)					
Morus rubra	red mulberry	Native			R
Ficus aurea	strangler fig	Native			
Family: Myricaceae (bayberry)					
Myrica cerifera	wax myrtle	Native			
Family: Myrsinaceae (myrsine)					
Rapanea punctata	myrsine	Native			
Family: Myrtaceae (myrtle)					
Eugenia uniflora	Surinam cherry	Exotic	I		
Syzygium cumini	Java plum	Exotic	I		
Psidium cattleianum	strawberry guava	Exotic	I		
Psidium guajava	guava	Exotic	I		
Family: Nymphaeaceae (waterlily)					
Nuphar advena	spatter dock	Native			
Family: Oleaceae (olive)					
Fraxinus caroliniana	pop ash	Native			R
Family: Orobanchaceae (broomrape)					
Buchnera americana	American bluehearts	Native			
Family: Passifloraceae (passionflower)					
Passiflora suberosa	corkystem passionflower	Native			
Family: Petiveriacea e (guinea hen weed)					
Rivina humilis	rouge plant	Native			
Family: Phytolaccaceae (pokeweed)					
Phytolacca americana	American pokeweed	Native			
Family: Proteaceae (protea)					
Grevillea robusta	silkoak	Exotic			
Family: Rhamnaceae (buckthorn)					
Berchemia scandens	rattan vine	Native			I
Family: Rosaceae (rose)					
Rubus argutus	sawtooth blackberry	Native			

Appendix B: Plant Sightings at Spanish Creek Preserve (continued)

Scientific Name	Common Name	Native Status	EPPC	FDA	IRC
Family: Rubiaceae (madder)					
Psychotria nervosa	wild coffee	Native			
Psychotria sulzneri	shortleaf wild coffee	Native			
Richardia scabra	rough Mexican clover	Exotic			
Family: Rutaceae (citrus)					
Citrus x. aurantium	grapefruit	Exotic			
Citrus x. limon	lemon	Exotic			
Citrus sinensis	orange	Exotic			
Citrus retriculata	tangarine	Exotic			
Family: Salicaceae (willow)					
Salix caroliniana	coastalplain willow	Native			
Family: Sapindaceae (soapberry)					
Acer rubrum	red maple	Native			
Cupaniopsis anacardioides	carrotwood	Exotic	I		
Saururus cernuus	lizard's tail	Native			R
Family: Solanaceae (nightshade)					
Solanum viarum	tropical soda apple	Exotic	I		
Family: Urticaceae (nettle)					
Parietaria floridana	Florida pellitory	Native			
Family: Verbenaceae (vervain)					
Lantana camara	lantana	Exotic	I		
Family: Vitaceae (grape)					
Parthenocissus quinquefolia	Virginia creeper	Native			
Vitis aestivalis	summer grape	Native			
Vitis shuttleworthii	calloose grape	Native			
Vitis rotundifolia	muscadine (wild grape vine)	Native			

Florida EPPC Status (Exotic Pest Plant Council)
I = species that are invading and disrupting native plant communities
II = species that have shown a potential to disrupt native plant communities

FDA (Florida Department of Agriculture and Consumer Services)
E = Endangered
CE = Commercially Exploited

IRC (Institute for Regional Conservation)
CI = Critically Imperiled
I = Imperiled
R = Rare

Appendix C: Wildlife Sightings

Appendix C: Wildlife Sightings at Spanish Creek Preserve

Scientific Name	Common Name	Designated Status	
		FWC	FWS
BIRDS			
Family: Ardeidae (herons, egrets, bitterns)			
Ardea alba	great egret		
Ardea herodius	great blue heron		
Egretta caerulea	little blue heron	SSC	
Bubulcus ibis	cattle egret		
Family: Cathartidae (new world vultures)			
Cathartes aura	turkey vulture		
Coragyps atratus	black vulture		
Family: Pandionidae (ospreys)			
Pandion haliaetus	osprey		
Family: Accipitridae (raptors)			
Elanoides forficatus	swallow-tailed kite		
Rostrhamus sociabilis plumbeus	Everglades snail kite	E	E
Subfamily: Buteoninae			
Buteo lineatus	red-shouldered hawk		
Family: Phasianidae (pheasants, grouse, turkey, and allies)			
Subfamily: Meleagridinae			
Meleagris gallopavo	wild turkey		
Subamily: Odontophoridae			
Colinus virginianus	northern bobwhite quail		
Family: Rallidae (rails)			
Gallinula chloropus	common moorhen		
Family: Aramidae (limpkin)			
Aramus guarauna	limpkin	SSC	
Family: Scolopacidae (sandpipers)			
Gallinago delicata	Wilson's snipe		
Family: Columbidae (pigeons and doves)			
Zenaida macroura	mourning dove		
Families: Strigidae and Tytonidae (true and barn owls)			
Otus asio	eastern screech owl		
Strix varia	barred owl		
Family: Picidae (woodpeckers)			
Dryocopus pileatus	pileated woodpecker		
Melanerpes carolinus	red-bellied woodpecker		
Picoides pubescens	downy woodpecker		
Family: Tyrannidae (tryant flycatchers)			
Myiarchus crinitus	great crested flycatcher		
Sayornis phoebe	eastern phoebe		
Family: Hirundinidae (swallows)			
Tachycineta bicolor	tree swallow		
Family: Laniidae (shrikes)			
Lanius ludovicianus	loggerhead shrike		
Family: Vireonidae (vireos)			
Vireo griseus	white-eyed vireo		
Vireo solitarius	blue-headed vireo		

Appendix C: Wildlife Sightings at Spanish Creek Preserve (continued)

Scientific Name	Common Name	Designated Status FWC	FWS
BIRDS (continued)			
Family: Corvidae (crows, jays, etc.)			
Corvus brachyrhyncos	American crow		
Corvus ossifragus	fish crow		
Cyanocitta cristata	blue jay		
Family: Paridae (chickadees and titmice)			
Baeolophus bicolor	tufted titmouse		
Family: Tryglodyhdae (wrens)			
Thryothorus ludovicianus	Carolina wren		
Family: Sylviidae			
Subfamily: Polioptilinae (gnatcatchers)			
Poloiptila caerulea	blue-gray gnatcatcher		
Family: Turdidae (thrushes)			
Turdus migratorius	American robin		
Family: Mimidae (mockingbirds and thrashers)			
Dumetella carolinensis	gray catbird		
Mimus polyglottos	northern mockingbird		
Toxostoma rufum	brown thrasher		
Family: Parulidae (wood-warblers)			
Dendroica coronata	yellow-rumped warbler		
Dendroica discolor	prairie warbler		
Geothlypis trichas	common yellowthroat		
Mniotilta varia	black-and-white warbler		
Parula americana	northern parula		
Families: Fringillidae, Emberizidae, Cardinalidae			
(grosbeaks, finches, sparrows, buntings)			
Cardinalis cardinalis	northern cardinal		
Pipilo erythrophthalmus	eastern towhee		
Family: Icteridae (blackbirds, orioles, etc.)			
Quiscalus quiscula	common grackle		
Agelaius phoeniceus	red-winged blackbird		
AMPHIBIANS			
Family: Hylidae (treefrogs)			
Hyla femoralis	pine woods treefrog		
Osteopilus septentrionalis	Cuban treefrog *		
Family: Ranidae (true frogs)			
Rana utricularia	southern leopard frog		
REPTILES			
Family: Alligatoridae (alligator)			
Alligator mississippiensis	American alligator	SSC	T
Family: Testudinidae (gopher tortoises)			
Gopherus polyphemus	gopher tortoise	SSC	
Family: Polychrotidae (anoles)			
Anolis carolinensis	green anole		
Anolis sagrei	brown anole *		

Appendix C: Wildlife Sightings at Spanish Creek Preserve (continued)

Scientific Name	Common Name	Designated Status FWC	FWS
REPTILES (continued)			
Family: Colubridae (colubrids)			
Coluber constrictor priapus	southern black racer		
Drymarchon corais couperi	eastern indigo snake	T	T
Family: Elapidae (coral)			
Micrurus fulvius fulvius	eastern coral snake		
Family: Lampropeltinae (king, rat, and bull snakes)			
Cemophora coccinea coccinea	Florida scarlet snake		
MAMMALS			
Family: Didelphidae (opossums)			
Didelphis virginiana	Virginia opossum		
Family: Canidae (wolves, foxes, and coyote)			
Canis latrans	coyote		
Vulpes vulpes	red fox		
Family: Felidae (cats)			
Lynx rufus	bobcat		
Family: Procyonidae (raccoons)			
Procyon lotor	raccoon		
Family: Suidae (pigs and worthogs)			
Sus scrofa	feral hog *		
Family: Sciuridae (squirrels)			
Sciurus carolinensis	eastern gray squirrel		
Sciurus niger shermani	Sherman's fox squirrel	SSC	
Family: Ursidae (bears)			
Ursus americanus floridanus	Florida black bear	T	
BUTTERFLIES			
Family: Papilionidae (swallowtail and kin)			
Subfamily: Papilioninae (swallowtails)			
Papilio cresphontes	giant swallowtail		
Family: Nymphalidae (brush-footed)			
Subfamily: Nymphalinae (true brush-foots)			
Anartia jatrophae	white peacock		
Subfamily: Heliconiinae (longwings and fritillaries)			
Agraulis vanillae	gulf fritillary		
Heliconius charitonius tuckeri	zebra longwing		
FISHES			
Family: Poecilidae (livebearers)			
Gambusia holbrooki	mosquitofish		
Family: Fundulidae (topminnows and killifish)			
Fundulus chrysotus	golden topminnow		
Fundulus seminolis	Seminole killifish		
GRASSHOPPERS			
Family: Acrididae (grasshoppers)			
Romalea guttata	eastern lubber grasshopper		

Appendix C: Wildlife Sightings at Spanish Creek Preserve (continued)

Scientific Name	Common Name	Designated Status FWC	FWS
INSECTS AND SPIDERS			
Family: Araneidae (orb weavers)			
Nephila clavipes	golden-silk spider		
Gasteracantha elipsoides	crablike spiny orb weaver		
Elaphidionoides villosus	southeastern gray twig pruner		
Family: Mutillidae (wingless wasps)			
Dasymutilla occidentalis	red velvet ant		
SNAILS			
Family: Ampullariidae (aka: Pillidae)			
Marisa cornuarietis	giant ram's horn snail *		

KEY:

FWC= Florida Fish & Wildlife Conservation Commission
FWS= U.S. Fish & Wildlife Service

E= Endangered
T= Threatened
SSC= Species of Special Concern

*** = Non-native**

Appendix D: License for Cattle Grazing

Memorandum
from the
Division of County Lands

Date: September 20, 2005

To: Jim Green
Parks and Recreation

From: Paul R. Ehrnfelt
Property Acquisition Assistant

SUBJECT: Conservation Lands Program, Project 8800
Parcel 260 Spanish Creek Preserve
License for Cattle Grazing proj #0277

Enclosed is the License for Cattle Grazing executed by Ruby Daniels, along with the check for $243.00 made payable to the Lee County Board of County Commissioners.

Please forward a fully executed copy to me for our file.

LICENSE FOR CATTLE GRAZING

This agreement is made this 9th day of September, 2005, by and between LEE COUNTY, a political subdivision of the State of Florida, whose address is P.O. Box 398, Fort Myers, Florida 33902-0398, hereinafter called the Licensor, and RUBY DANIELS, an individual, whose address is 18100 Persimmon Ridge Road, Alva, Florida 33920, Telephone 239-728-3292, hereinafter called the Licensee.

WITNESSETH:

Licensor, in consideration of the fee paid, covenants and agreements set forth to be paid, kept and performed by the Licensee, does hereby grant the Licensee an exclusive grazing permit for the grazing of cattle described as follows to wit:

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

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

1. In consideration of this Agreement, Licensee agrees to pay Licensor the total sum of $243.00 in consideration of the ability to use the property for cattle grazing.

2. This License is not assignable to any other party.

3. This License shall extend for an initial term of one (1) year, commencing upon the sale of subject property to Licensor, which at expiration of such term may be renewable upon the concurrence of both parties, and/or may be revocable by the Licensor giving the Licensee thirty (30) days written notice to remove the cattle from the premises. In no event shall the License term extend for more than 25 years.

4. Licensee will not use the lands for any other purpose than cattle grazing.

5. Licensee will maintain at least a four-strand barbed wire fence around the perimeter of the property. The fence remains the property of the Licensor.

6. Licensee agrees to keep the fence in excellent state of repair at all times during the term of this Agreement.

7. It is mutually agreed that this Agreement may be canceled with 48 hours verbal notice if the Licensee allows any of his cattle to stray into the environs of the county known as Lee County and said cattle are not returned to the confines of the property described in Exhibit "A" within 48 hours.

8. Licensee covenants and agrees to file an annual personal property tax return with the County of Lee, State of Florida, as required by law.

9. All section corners, quarter corners, and other survey monuments lying in the premises will be properly flagged by the Licensor. Licensee agrees to bear full survey costs of resetting these monuments in the event they are disturbed in any way.

10. Licensee hereby releases the Licensor from any and all damages to both persons and property, and will hold Licensor harmless from all such damages during the term of this Agreement.

Signed and sealed the date above written.

ATTEST:
CHARLIE GREEN, CLERK OF COURT

By: _____
Deputy Clerk

LICENSOR
LEE COUNTY BOARD OF
COUNTY COMMISSIONERS

By: _____
John Yarbrough, Director
Department of Parks and Recreation

APPROVED AS TO FORM BY:

_____
Office of the County Attorney

LICENSEE

Witness

Ruby Daniels

Angela Bowling
Printed Name

Witness

Chris Keene
Printed Name

STATE OF FLORIDA) ss:
COUNTY OF LEE)

The foregoing instrument was acknowledged before me this 7 day of Sept., 2005, by Ruby Daniels, an individual, who [ ] is personally known to me or [✓] has produced FL DL as identification and did (did not) take an oath.

Notary Public

SHERI DOWNING
MY COMMISSION # DD 189199
EXPIRES: March 3, 2007
Bonded Thru Notary Public Underwriters

Sheri Downing
(Printed Name)

My Commission Expires: 3/3/07

EXHIBIT A

THE ABOVE DESCRIBED PARCEL BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

A parcel of land lying within the East one-half of Section 15, Township 43 South, Range 27 East, Lee County, Florida being more particularly described as follows: Commence at the Northeast corner of said Section 15 as the Point of Beginning and run S00°52'50"W a distance of 2563.88 feet to the Southeast corner of the Northeast one-quarter of said Section 15; Thence S00°53'02"W, along the East line of the Southeast one-quarter of said Section 15, a distance of 1171.62 feet to the Northeast corner of a certain parcel of land described in Official Records Book 2121, Page 2509, Public Records of Lee County, Florida; Thence along the boundary of said Official Records Book 2121, Page 2509, the following courses and distances, N88°54'47"W a distance of 135.00 feet and S00°53'00"W a distance of 752.65 feet to the Southwest corner thereof; Thence N89°35'47"W, along the North line of the Southeast one-quarter of the Southeast one-quarter of the Southeast one-quarter of said Section 15, a distance of 31.38 feet to the Northeast corner of the West one-half of the East one-half of the Southeast one-quarter of the Southeast one-quarter of the Southeast one-quarter of said Section 15; Thence S00°52'43"W, along the East line of the West one-half of the East one-half of the Southeast one-quarter of the Southeast one-quarter of the Southeast one-quarter of said Section 15, a distance of 615.83 feet to the occupied and maintained right-of-way line for County Road No. 78 (said point being 25.00 feet North of the South line of the Southeast one-quarter of said Section 15); Thence N89°34'40"W, along said occupied and maintained right-of-way line (said right-of-way line being parallel with the South line of the Southeast one-quarter of said Section 15), a distance of 166.31 feet to a point on the West line of the West one-half of the East one-half of the Southeast one-quarter of the Southeast one-quarter of the Southeast one-quarter of said Section 15; Thence N00°52'25"E a distance of 615.78 feet to the Northeast corner of the West one-half of the Southeast one-quarter of the Southeast one-quarter of the Southeast one-quarter of said Section 15 (also being the Northeast corner of a certain parcel of land described in Official Records Book 2573, Page 2172, Public Records of Lee County, Florida); Thence N89°35'47"W a distance of 332.73 feet to the Northwest corner of said Official Records Book 2573, Page 2172; Thence S00°51'49"W, along the West line of said Official Records Book 2573, Page 2172 (also being the West line of the Southeast one-quarter of the Southeast one-quarter of the Southeast one-quarter of said Section 15), a distance of 615.87 feet to the occupied and maintained right-of-way line for County Road No. 78; Thence N89°34'40"W, along said occupied and maintained right-of-way line (said line being 25.00 feet North of, and parallel with, the South line of the Southeast one-quarter of said Section 15), a distance of 1330.46 feet to a point on the East line of the Southwest one-quarter of the Southeast one-quarter of the Southeast one-quarter of said Section 15; Thence N00°49'23"E, along the East line of the Southwest one-quarter of the Southwest one-quarter of the Southeast one-quarter of said Section 15 (and the Northerly extension thereof), a distance of 978.73 feet; Thence N89°35'47"W, parallel with the North line of the Southwest one-quarter of the Southwest one-quarter of the Southeast one-quarter of said Section 15, a distance of 665.58 feet to a point on the West line of the Southwest one-quarter of said Section 15; Thence N00°48'10"E, along the West line of the Southwest one-quarter of said Section 15, a distance of 931.56 feet; Thence S89°39'06"E, parallel with the North line of the Southeast one-quarter of said Section 15, a distance of 700.02 feet; Thence N00°48'10"E, parallel with the West line of the Southeast one-quarter of said Section 15, a distance of 625.02 feet to a point on the North line of the Southeast one-quarter of said Section 15; Thence N89°39'06"W a distance of 700.02 feet to the Northwest corner of the Southeast one-quarter of said Section 15; Thence N00°47'58"E, along the West line of the Northeast one-quarter of said Section 15, a distance of 1279.86 feet to the Northwest corner of the Southwest one-quarter of the Northeast one-quarter of said Section 15; Thence S89°41'46"E a distance of 1166.54 feet to the Southwest corner of the East one-half of the East one-half of the Northwest one-quarter of the Northeast one-quarter of said Section 15; Thence N00°50'06"E a distance of 1280.77 feet to the Northwest corner of the East one-half of the East one-half of the Northwest one-quarter of the Northeast one-quarter of said Section 15; Thence S89°44'25"E, along the North line of the Northeast one-quarter of said Section 15, a distance of 1500.87 feet to the Point of Beginning.

Containing 243.19 acres.

Subject to right-of-way for Persimmon Ridge Road.

Subject to easements, restrictions, reservations and rights-of-way of record.

Appendix E: Four Corners Watershed Plan

Statement of Work
Four Corners Watershed Plan

1.0 Background

The rapid changes of the Four Corners area have stimulated significant concerns regarding the water and environmental resources of the region. A comprehensive evaluation of the myriad issues relating to the water supply, flood protection, water quality and natural systems of the Four Corners watershed, primarily the areas east of SR 31, south of CR 74, north of the Caloosahatchee and west of SR 29, is necessary to develop a multi-functional water management plan (Figure 1).

The natural surface flow patterns in the region have undergone drastic changes due to the evolution of mostly agricultural and some residential development. Historic flow ways in the region followed the natural drainage features emanating from just north of CR 74 through a series of strands, sloughs and more broadly as surface sheet flows south to the Caloosahatchee. These natural features consisted of a series of flat wetlands or swamps connected by shallow drainage ways or sloughs, and were divided by low ridges that were dry for a portion of the year, and overtopped by water in periods of seasonal high rainfall. Characteristic of natural strands, the historic water flows were extremely slow due to vegetation and physical geography. Hydroperiods extended well into the winter/spring dry season.

Historically the water flowed north to south with the slope becoming steeper as it approached the Caloosahatchee. However, as land areas began to be developed, the typical "ditch, dike and drain" development resulted in a series of canals, dikes and numerous roads that tended to over drain the water table and drastically altered the flow patterns of the natural basins. Such combinations of development events have greatly reduced aquifer recharge and contributed to concentrating stormwater runoff instead of allowing sheet flow across the land. With the change in flow characteristics came associated environmental impacts on the overall ecology of the uplands, wetlands and ultimately the estuary as more of the water entered the Caloosahatchee as point flow instead of overland flow.

The summer/wet seasons bring flooding to this region with some unprecedented floods. Record rainfall and prolonged flooding necessitates temporary closing of some roadways and loss of crops. There have been considerable alterations to the natural surface water regime and its impact on the natural system in this area.

Previous Planning Activities

Prepared in 1991 and 1992, the Lee County Surface Water Master Plan developed preliminary water management plans for a number of watersheds and gave detailed inventories and evaluation of a number of resources of eastern Lee County (Trout Creek, Otter Creek, and Telegraph Creek). The Surface Water Management Plan for the Four Corners Area was completed in 1996 and covered the portion of this watershed lying

within Hendry County. Most of the previous studies inventoried and analyzed the hydrologic – hydraulic characteristics of each basin separately and recommended plans for water management of the individual basin components. However, none of the earlier studies looked at a composite plan treating the historic Four Corners watershed as an integrated unit.

Recognizing that today's water management problems are related to the disruption of the historic flow ways, it is expected that many such problems and impacts can be minimized by trying to reassemble these historic surface flow patterns to an extent reasonably possible. The development of a comprehensive hydrologic-hydraulic model of the entire Four Corners hydrologic region and its associated river/creek systems as a single interrelated unit is necessary to evaluate the existing system and to analyze the effectiveness of alternative water management strategies in improving flood protection and restoring historic water flows where appropriate.

To that end, the District contracted DHI to construct a site-specific model for the Four Corners area from the C-43 sub-regional model. Improvements were made within the site-specific model to include data obtained that has particular relevance within the Four Corners area. The site-specific model domain is shown in Figure 2. Previously recommended improvements to the County Line Drainage ditch were evaluated using the site-specific model. Comparison of recommendations of the 1996 Surface Water Master Plan to the existing conditions model run shows that simulated water levels in Cypress Creek would not change with the implementation of the plan. This alternative does not have a significant effect on water levels in Cypress Creek because it does not include a significant conveyance from Cypress Creek headwaters to the County Line Ditch.

Using strategies suggested by concerned citizens and the District, an alternative to address regional issues was developed and evaluated by DHI using the site-specific model. The objectives of the project alternative were to:

1. Mitigate flooding issues in Cypress Creek.
2. Mitigate flooding issues in the area east of the County Line Ditch.
3. Restore environmental flows in Spanish Creek.
4. Maintain existing flows and water levels in the wetlands along Jacks Branch north of the project area.

The site-specific model data sets are complete and available for use in this plan finalization and permitting project.

2.0 OBJECTIVES

The goal of the Four Corners Watershed Plan project is to build upon the County Line Ditch Final Design Recommendation (Craig A. Smith & Associates, June 20, 2001) in light of the analysis by DHI (December 2004), which indicated that the 2001 plan needed improvement. The Consultant will build upon the previous studies to select a preferred alternative that will provide:

1. No impact to or an improvement of existing levels of flood protection in the developed and developing area consistent with the four Counties Comprehensive Plans, and State and Regional Growth Management Plans;
2. Restoration of flows that were disconnected by construction of the County Line Drainage District;
3. Improvement of water quality prior to discharging into the Caloosahatchee River;
4. Restoration of the ecological integrity of the ecosystem where practicable;
5. Improvement of water retention and aquifer recharge potential; and
6. Coordination with other regional studies and CERP.

The recommended alternative shall balance the needs for water quality, water supply, natural resources and flood control levels of service in the Four Corners area.

3.0 SCOPE OF WORK

The work in this project will involve four phases; Phases 1 and 2 will be completed in FY05. Phases 3 and 4 will be completed in FY06 pending District Governing Board approval of the budget request.

In Phase 1, the Consultant shall obtain necessary background data and develop/refine hydrologic and hydraulic models of the study area. Phase 2 will inelude application of the models developed in Phase 1 to evaluate the performance of existing water management facilities in the study area, the identification of existing problems and the development and assessment of alternative facilities and systems. A recommended plan for implementing a preferred alternative will be prepared in Phase 2. Phase 3 will inelude final design and permitting. Phase 4 includes construction management and inspection

4.0 WORK BREAKDOWN STRUCTURE

This section deseribes the work and deliverables for eaeh task of the Four Corners watershed plan. The Consultant shall provide the District copies of all documents and reports obtained during the course of completing this work order. All models, plans and data used and created by the Consultant in this work order shall be provided to the District in a printed and digital format compatible with Mierosoft Office products and/or compatible with District modeling, IT and GIS requirements.

PHASE 1 – DATA COLLECTION, NATURAL SYSTEMS MODELING, AND EXISTING CONDITIONS MODELING

Task 1.1 – Work Plan, Project Orientation, Progress Meetings

Within two weeks of the date of execution of this work order, the Consultant shall develop and submit a draft Work Plan for District review and comment. The Work Plan shall expand upon this scope of work, further detailing descriptions of the tasks, methods, schedule and costs proposed for each task. The Work Plan shall identify the objectives for the model to be developed. Within one week following the delivery of the draft Work Plan, the Consultant shall incorporate District comments and coordinate a project kick-off meeting between County representatives, South Florida Water Management District (SFWMD or District), and local stakeholders. This meeting shall serve to introduce project representatives, establish lines of communication, and to discuss general expectations as defined by the Work Plan. Project representatives will meet with Project Team Members at the District's Lower West Coast Service Center located in Fort Myers, Florida. The Consultant shall plan and organize the meeting in consultation with the District Project Manager.

The Consultant shall provide the Project Manager with brief monthly progress reports describing the status of each task scheduled for the reporting period, including proposed start/finish dates and actual and/or anticipated start/finish dates. Departures from the proposed schedule and problems that have been encountered shall be discussed, and proposed solutions and any other relevant information shall be presented by the Consultant. The proposed format for the progress reports shall be provided in the Work Plan. The final Work Plan shall constitute the first progress report.

The Consultant shall arrange and attend regular progress and coordination meetings. The coordination meetings shall be held by teleconference once every two weeks, or as needed, and the Consultant shall prepare and distribute minutes of the meetings. Once per quarter, the Consultant will travel to attend a meeting at the District's Lower West Coast Service Center located in Fort Myers, Florida. The kick-off meeting will constitute the first progress and coordination meeting.

Deliverables for Task 1.1 - Draft work plan, final work plan, monthly progress reports, and meeting minutes

Task 1.2 – Initial Data Collection

The Consultant shall identify, review and compile data relevant to the development of the Four Corners Watershed Management Model using data sources such as previous hydrologic and hydraulic studies, the District's, Lee County's and other available GIS databases, as well as information provided by other agencies (NRCS, NWI). The Consultant shall review the existing sub basin studies for information regarding the surface and ground water flow characteristics of the region and identify the available format of the data, whether in electronic or other forms. The Consultant shall assess the

availability of the information in the District GIS database; particularly topography, land use and land cover, soils, and locations of meteorological, surface and groundwater monitoring stations. The Consultant shall assemble the data in formats adaptable to the hydrologic-hydraulic model using Arc Hydro and including metadata compatible with District metadata requirements. The Consultant shall be responsible for developing the interface/interpolation algorithms to incorporate the GIS data into the model(s). It is therefore necessary that the model(s) be developed in an environment compatible with the District's present operating systems and the Arc Hydro Enhanced (AHED).

Deliverable for Task 1.2 - Under Task 1.2, the Consultant shall produce and deliver a comprehensive memorandum on the available hydrologic, hydraulie and environmental information of the Four Corners planning region, including descriptions of surface water and groundwater hydrology, topography, land use, soils, general geology, and historical flow patterns.

The Consultant shall provide five (5) copies of draft memorandum within five (5) weeks of execution of this work order. The District will review and request revisions within two weeks of reeeipt of the deliverable. Five copies of the final deliverable, which incorporates the revisions requested by the District, shall be due within two (2) weeks from the Consultant's receipt of the District's comments.

Task 1.3 – Initial Site Visit

The Consultant shall meet District staff at the Four Cornes site. Visual reconnaissance and photographs shall be provided by the Consultant be used to document site characteristics, to help verify the setup of the hydrologic/hydraulic model, and to help identify gaps in the existing available survey information.

Deliverable for Task 1.3 - Site photographs in electronic (.jpg) format with a short description for each photo and a map showing the locations of the photos.

Task 1.4 – Aerial Surveys

Historic flow ways in the Four Corners region followed the natural strands, sloughs and more broadly as surface sheet flows south to the Caloosahatchee. These natural features consisted of a series of flat wetlands or swamps connected by shallow drainage ways or sloughs, and were divided by low ridges that were dry for a portion of the year, and overtopped by water in periods of seasonal high rainfall. Despite the ditching and diking that has occurred in the area, food flow rates and flow directions continue to be influenced by subtle differences in topography. Accurate and detailed topographic mapping is therefore nccessary in order to prepare reliable hydrologic and hydraulic modeling of the existing system and design alternatives for proposed improvements. However, accurate and sufficiently detailed topographic mapping is reportedly unavailable for the Four Corners area.

The Consultant shall conduct aerial photogrammetric surveys of an approximately 18-square mile area in and around the County Line Drainage District (CLDD). The aerial survey shall extend approximately one-half mile north and one-half mile east of the Lee County lines, approximately one mile west of a north-south line coinciding with the western boundary of the CLDD, and south to the banks of the Caloosahatchee River. The Consultant shall prepare one-foot contours of the aerial survey area meeting or exceeding national map accuracy standards. The aerial imagery shall be panehromatic at a resolution suitable for viewing at 1"=50' seale. The contour mapping shall be of sufficient horizontal and vertical detail to accurately define the dikes, spoil berms, canals, ditches, creeks, sloughs, wetlands, and roadway embankments within the bounds of the aerial survey, and visible at a horizontal scale of 1"=200'.

Deliverables for Task 1.4 – Rectified aerial photographs and contour mapping, in digital format (PDF and GIS shape files) and one paper copy. Also supply digital files of the points and breaklines, suitable for generation of a TIN or gridded surface.

Task 1.5 – Ground Surveys

This task consists of two parts; the initial surveying includes cross sections of Spanish Creek at selected locations (for input to the hydrologic model) and the setting of control points (targets) for the aerial surveying task. The second part includes additional survey and mapping necessary to develop a base map for construction plans. Prior to the commeneement of field work, the Consultant shall develop a survey plan for the project.

The Consultant shall prepare 1"=100' scale base maps for the proposed construction plans. The base maps shall include the topographic contours developed in the previous task, plus the locations of existing property lines, easements, right-of-way lines, section corners, bench marks, water control struetures, buildings, fences, pavement, above-ground utilities and utility markers, ditch/canal/stream top of bank, toe of slope and flowlines, wetland jurisdictional lines, and elevations of normal pool and seasonal high water levels as staked in the field by the environmental subconsultant.

Under this task the Consultant shall also provide testing and ground-truthing of the aerial surveys, along with GPS survey of elevation points needed to supplement the aerial surveys in areas where vegetative cover limits the applieability of photogrammetric methods, and/or additional vertical accuracy is required.

Deliverables for Task 1.5 – 1"=100' base maps in AutoCAD format. Electronic files and one (1) signed and sealed paper copy. Also supply a copy of the digital line data in a format easily importable into ESRI ArcGIS.

Task 1.6 - Modeling Feasibility Assessment

The Consultant shall evaluate the two existing models that are available (i.e. the Craig A. Smith and Asssociates AdICPR model and the DHI Site-Specific model of the study area). The Consultant shall identify weaknesses and limitations of previous models for

use in this application as well as the ability to handle the required alternative simulations. The Consultant shall address if the previously developed DHI Site-Specific model can be used in this application as is, with some modifications, or not at all.

The model should have the capability of simulating rainfall-runoff processes in wetlands and natural areas as well as in developed (urban and agrieultural) areas and to route flows through a full network of open channels (including single channels, dendrite and fully looped systems) with simulation of floodplain storage areas and complex boundary conditions including gated and uncontrolled spillways, bridges, culverts, levees and be linked with groundwater. The design event shall be eonsistent with state and federal criteria for permitting. The model should also have the capability of simulating unique south Florida characteristics of flat terrain, sandy soils with high permeability, high water table and tail water constraints. The model should also have the capability to provide sueh numerieal outputs as peak river conveyanee capaeities, energy losses, depth and duration of inundation, storage volumes, and such graphieal user interface as flood profiles, aerial extent of flooding, delineated floodplains, and floodway attenuation in wetlands.

Deliverable for Task 1.6 - The Consultant shall submit five (5) eopies of a technieal memorandum outlining the feasibility of hydrologic-hydraulie modeling of the study area with specific reeommendations for the software packages to be used for the project. The Distriet will review and request revisions within two (2) weeks of receipt of the deliverable. Five (5) copies of the final deliverable with revisions requested by the District are due from the Consultant within two (2) weeks from the receipt of the District's comments.

Task 1.7 – Existing Conditions Model Development

Based on the recommendation of the modeling feasibility assessment, the Consultant shall prepare a model representing existing conditions within the study area. It is anticipated that the model domain will be similar to the recently completed DHI site-specific model. The existing conditions model shall consist of (1) a hydrologic model for each basin to represent wetland, natural state and developed area characteristics and (2) a comprehensive hydrologic-hydraulic routing model for the Four Corners watershed, representing existing canals, levees, culverts, and flow control structures. The model shall meet the technical and completeness standards necessary to obtain construction permits from the appropriate agencies.

The Consultant shall review and refine reasonable values of important model parameters in the rainfall-runoff process. Because there are no known streamflow gages within the study area, the model shall be qualitatively calibrated by comparing simulation results with previous modeling results from the calibrated C-43 subregional model prepared by DHI. The Consultant shall refine the model to correct for any insufficiencies identified during this exercise. The Consultant shall conduct a sensitivity analysis of important model parameters and comment on any peculiarities discovered during the modeling effort.

The existing conditions model simulations shall span a minimum of three years, to include a wet year, a dry year, and an average year. The Consultant shall also simulate up to five design storms, including the 25-year and 100-year flood events. Based on the results of the existing conditions model simulations, the Consultant shall prepare 25-year and 100-year floodplain maps of the Four Corners area. The area included in the floodplain mapping shall generally coincide with the area covered by the aerial topographic mapping completed in Task 1.4. As a further qualitative check of the model results, the Consultant shall compare the floodplain maps to documented instances of flooding.

Deliverable for Task 1.7 - The Consultant shall prepare and submit a brief memorandum describing the data sources, methods, and results of this task. The content of this memorandum shall be incorporated into the model report submitted at the end of Phase 1.

Task 1.8 – Natural Systems Model Development and Model Report

The Consultant shall develop a natural systems model of the Four Corners watershed. The natural systems model will be similar to the existing conditions model, but the ditches, canals, and dikes within and around the County Line Drainage District will be removed from the model input. The natural systems model will be used by the Consultant to identify pre-development drainage patterns, and to estimate pre-development water levels and hydroperiods. These estimates will guide the development of improvement alternatives and will support the permitting of the selected alternative.

The pre-development topography shall be based on the 1927 one-foot contour mapping prepared by the U.S. Army Corps of Engineers (USACE). Historical vegetation cover and land use will be photointerpreted from 1950's aerial photographs. The natural systems model simulation will span a minimum of three years, to include a wet year, a dry year, and an average year. The model results shall be used by the Consultant to prepare a map depicting the simulated natural system hydroperiods for the Four Corners Watershed. The Consultant shall compare the map results to the expected hydroperiods that would have supported the historical vegetation cover. It is understood that predicted hydroperiods and water levels for this task are available from the Pre Development Natural System Vegetation Mapping Project of the District. The Consultant shall obtain and review this information, and recommend any refinements that may be necessary to support the objectives of the Four Corners project.

Deliverable for Task 1.8 – The deliverables for Task 1.8 shall be a technical report by the Consultant summarizing the modeling feasibility assessment, the existing conditions model development and calibration, and the development and calibration of the natural systems model. The report shall include full documentation of the 1927 one-foot contour mapping used. The report shall describe the model input, calibration process, sensitivity analysis, and problems encountered and their resolution. The model report shall include a summary of the model results, including maps of the 25-year and 100-year floodplains.

The Consultant shall submit five (5) copies of the draft model report. The District will review and request revisions within two (2) weeks of receipt of the deliverable. Five (5) copies of the final deliverable including revisions requested by the District are due within (2) weeks from the receipt of the District's comments.

PHASE 2 – EXISTING CONDITIONS ASSESSMENT AND EVALUATION OF PROPOSED ALTERNATIVES

One of the primary purposes of this phase is to use the information from Phase 1 to identify the deficieneies within the existing system that need to be eorrected to restore the natural flow patterns of the watershed. A potential solution to the regional problem was evaluated in the Four County Corners Flood Control Study prepared by DHI for the District dated December 17, 2004. The recommended solution in that report was a combination of the restoration of Spanish Creek flows, eonstruction of the collector swale north of the County Line Dike, improvement of the County Line ditch and replacement of undersized bridges across Jacks Braneh. It is anticipated that the reeommended solution that results from this analysis will include these recommendations as well as other components needed to meet the project objectives.

Task 2.1 – Alternative Evaluation

The Consultant shall use the hydrologic model to evaluate alternatives and develop a regional water and environmental management plan for the Four Corners region. The Consultant shall develop a range of alternative structural/nonstructural measures; evaluate their effectiveness in achieving the desired objectives of the project; conduct a comparative analysis of the performance of each alternative; and reeommend a cost effective plan that meets the project objectives. The Consultant will perform six alternative runs in an effort to optimize the final design. It is anticipated that the six alternative runs shall eonsist of various combinations of the following components:

1. Construction of the County Line Drainage Ditch;
2. Construction of a collector swale north of the County Line Dike;
3. Restoration of Spanish Creek flows by constructing a single flowway through the County Line Drainage District, re-connecting the areas north of the County Line Dike to the north branch of Spanish Creek;
4. Restoration of Spanish Creek flows by constructing an additional flowway through the County Line Drainage District that would re-conneet Jack's Branch to the eastern branch of Spanish Creek, by approximately following the alignment of the historic slough that existed prior to construction of the CLDD; and
5. Replacement of the bridge across Jacks Branch, one mile north of the Hendry/Glades County line.

Deliverable for Task 2.1 – The Consultant shall prepare a brief memorandum describing the alternatives to be considered, and the criteria for evaluating the alternatives. The

memorandum shall be reviewed and approved by the District prior to completing the six simulations of project alternatives.

Task 2.2 – Selection of Preferred Alternative and Preliminary Design Report

The Consultant shall review all the alternatives and make a recommendation as to the most efficient plan. An incremental as well as full-scale approaeh to restoration of the historic flow patterns shall be considered by the Consultant.

Deliverable for Task 2.2 - The Consultant shall prepare a Preliminary Design Report (PDR) documenting the design alternatives simulated in Task 2.1. The PDR will inelude conceptual schematics and a conceptual eost estimate for each alternative. The report will discuss the evaluation and selection of the preferred alternative. The document shall summarize the evaluation process undertaken to produce the final design recommendation. The PDR shall also include a more detailed discussion of the selected final plan, a conceptual design drawing of the final plan, a preliminary cost estimate, and a prioritized schedule for project plan implementation... The Consultant shall submit five (5) copies of the draft PDR within six months of the execution of this work order. The District will review and request revisions within two (2) weeks of receipt of the deliverable. Five (5) copies of the final PDR including revisions requested by the District are due within (2) weeks from the receipt of the District's comments.

STOP/GO POINT: The Consultant shall not proceed with the following tasks until the District Project Manager confirms in writing authorization to proceed.

PHASE 3 – FINAL DESIGN AND PERMITTING

The Consultant shall prepare a set of construction plans for the Four Corners Watershed Plan Project. This work effort includes the design needed to provide complete construction plans and specifications for the project with sufficient information to allow for constructing and permitting. The improvements shall be designed in aceordance with the SFWMD design standards and the corresponding County subdivision criteria unless otherwise directed by the District. These plans are for the use of the Contractor to bid and build the projeet and for the District to ensure the project is built as designed and to specifications. The Consultant shall provide 30%, 60%, 90% and 100% progress review submittals, in half size (11 inches x 17 inches) format. Each submittal shall contain the information items listed in the appropriate District Progress Review Submittal checklist. A copy of the appropriate checklist shall accompany each submittal with a certifieation signed by the Consultant's Project Manager certifying that the submittal completely addresses the required items as listed on the checklist. Each review submittal shall include an internal Quality Assurance and Quality Control plans set (11 inches x 17 inches) prepared by the Consultant. Full size (22 inches x 34 inches) signed and sealed plans and electronic (AutoCAD) files (also supply the plan files in a format easily importable into ArcGIS) shall be submitted with the final plan submittal. Plan and profile sheets shall be prepared by the Consulstant at a scale of 1"=100'. Proposed

channel cross sections shall be depicted on 500' intervals. It is assumed that no more than 34 drawings will be required.

The Consultant shall provide responses to the comments of the permitting agencies. The design drawings shall be updated by the Consultant as required to address agency comments. Once the necessary permits have been secured, the Consultant shall prepare bid documents and advertise them in accordance with all local ordinances and state laws.

Task 3.1 – 30% (Preliminary) Design Plans

3.1.1 Utility Location Plans and Coordination – The Consultant shall coordinate with all affected utility providers within the project limits by furnishing plans at the 30% review stage to the utilities for review, confirmation of utility location and relocation purposes. In the development of the plans the Consultant shall incorporate and consider the input provided by each affected utility. Each utility shall also be provided one copy of the final construction plans by the Consultant.

3.1.2 Geotechnical Engineering – The Geotechnical Engineering Study Report prepared in January 2004 by Intercounty Laboratories – USL, Inc. shall provide the necessary geotechnical information to support the design of the County Line Ditch. The Consultant shall provide the additional geotechnical engineering services necessary to support the final design of the other components of the Four Corners Project.

3.1.3 Wetland Surveys – The Consultant's wetland scientists shall visit the site for the purpose of determining and staking the limits of SFWMD and USACE jurisdictional wetlands that may be impacted by the project. The Consultant shall also estimate the seasonal high and normal pool water levels within the jurisdictional wetlands. The Consultant shall visually survey the limits of the proposed improvements for other protected habitats. The information obtained from the environmental surveys shall be field surveyed and depicted on the 30% design plans by the Consultant. The Consultant shall schedule a meeting with appropriate agency representatives in the field in order to obtain review and approval of the wetland limits and water levels.

Note: This work order does not include ecological consulting or permitting related to protected species impacts.

3.1.4 Preliminary Design Plans – The 30% design plans provided by the Consultant shall include preliminary plan and profile alignments for the proposed improvements, in addition to the items provided on the survey base mapping. The 30% design plan submittal shall also include a preliminary cover sheet and a key sheet for the plan and profile drawings.

3.1.5 Cost Estimate – The Consultant shall prepare and submit with the 30% plans, an Engineer's preliminary opinion of construction cost for the project. The cost construction quantities and unit costs shall be estimated using standard engineering methods.

Task 3.2 – 60% Design Plans and Draft Permit Applications

3.2.1 60% Design Plans – In addition to the information provided in the 30% submittal, the 60% design plans shall include cross section sheets depicting existing and proposed channel sections. Unless otherwise noted in the approved Work Plan, the cross sections shall be drawn by the Consultant at a horizontal scale of 1"=50' and a vertical scale of 1"=5'. The 60% design plans shall also include draft general notes, delineation and quantification of wetland impact areas, design of proposed wetland mitigation areas, an erosion control plan, and draft details of water control structures.

The draft permit applications shall be submitted by the Consultant to the permitting agencies following completion of the 60% Design Plans.

3.2.2 Cost Estimate – The Consultant shall prepare and submit with the 60% plans, an updated engineer's preliminary opinion of construction cost for the project, based on the 60% design.

3.2.3 Hydrologic/Hydraulic Model Update – The Consultant shall update the hydrologic/hydraulic model prepared in Phase 1, to reflect the design refinements incorporated in the 60% plans.

Task 3.3 – 90% Design Plans and Draft Specifications

3.3.1 – 90% Design Plans – In addition to the information provided on the 60% design plans, the 90% plans shall include additional details necessary to complete the project including, but not limited to, utility conflict/relocation details, structural details, fence details, and wetland planting plans. The 90% plans provided by the Consultant shall also include modifications necessary to address the concerns of permitting agencies.

3.3.2 – Cost Estimate – The Consultant shall prepare and submit with the 90% plans, an updated engineer's preliminary opinion of construction cost for the project, based on the 90% design.

3.3.3 – Draft Specifications – The Consultant shall provide a complete set of technical specifications and special provisions to be included in the bid documents for the Four Corners Watershed Plan Project. The technical specifications shall be based on the District's standard specifications, and modified as necessary to meet the requirements of the Four Corners project. The draft documents shall be provided by the Consultant in MS Word format. The special provisions shall clearly identify the responsible entity for each permit condition in each regulatory permit.

3.3.5 – Draft Bid Documents – The Consultant shall prepare and submit draft bid documents with the 90% submittal.

Task 3.4 – Final (100%) Construction Plans, Specifications, and Bid Documents

Upon receiving the District's review comments on the 90% submittal, the Consultant shall prepare final (100%) construction plans and specifications. The Consultant shall prepare final bid documents for the District's use in soliciting construction services. The Consultant shall also provide a final Engineer's estimate of construction cost, an estimated project schedule for completion of eonstruetion services, and an operation and maintenance guidance memorandum for the completed project. The Consultant shall attend all pre-bid meetings and, summarize and evaluate the contractor's bids in a brief memorandum. The memorandum will include the Consultant's recommendation for awarding the Contract.

Task 3.5 – Permit Applications

3.5.1 – Draft Permit Applications – The Consultant shall prepare draft permit applieations to the County governments having jurisdietion over the project. A draft Environmental Resource Permit (ERP) application will be prepared and submitted by the Consultant to the either the Florida Department of Environmental Protection (FDEP) and the SFWMD. The ERP application shall also be submitted directly to the USACE Jacksonville District.

3.5.2 - Permit Drawing and Mapping – The Consultant shall prepare specialized permit drawings and mapping. The doeuments will be provided as both hard-copy drawings and maps to accompany permit applications and as CAD/GIS files on CD-ROM. These doeuments will reflect the requirements to obtain USACE (8.5" x 11" black & white) and District permits. Research necessary for proper notification to adjacent property owners is also included in this subtask.

3.5.3 – Pre-Application Meetings and Requests for Additional Information (RAI) Responses – The Consultant shall prepare responses to the as necessary for the permit application to be deemed complete. The Consultant shall attend two (2) agency pre-application meetings (onc with either FDEP or SFWMD, and one with the USACE).

Task 3.6 – Meetings

The Consultant shall attend additional meetings that are beyond regular progress meetings that may be necessary to eoordinate the project's activities with other agencies and interested parties. This task includes arranging and attending a utility coordination meeting, and one or more meetings with regulatory agencies to resolve permitting issues (not including the pre-application meetings). The Consultant shall prepare and distribute meeting minutes following each of these meetings. It is assumed that this task will require no more than 48 hours of senior-level and 8 hours of principal-level time.

Task 3.7 – QA/QC Construction Plans and Permit Applications

The Consultant's Lead Engineer/Project Manager shall be responsible for conducting QA/QC reviews of the construction plans and permit applications submitted at each milestone. The Consultant's project manager shall maintain records of all QA/QC reviews for the duration of the project.

PHASE 4 – CONSTRUCTION MANAGEMENT AND INSPECTION

The Consultant shall provide construction phase services including attending the pre-bid meeting and the pre-construction meeting, reviewing shop drawings, construction inspection, and preparing the final as-built certification.

5.0 PERFORMANCE

The Consultant's performance for the terms and condition of CN040922-WO02 shall be evaluated at the following frequencies:

1. 90 Day
2. 180 days thereafter
3. Final
4. Additional evaluations as determined by the Project Manager

A Running Average Score ≥ 3.0 is required to maintain active contract status.

6.0 DEFINITIONS

Consultant: The term Consultant will be used to refer to any individual or group of individuals that are employed by the prime Consultant and all sub-contractors on the team.

Final Deliverable: Any final deliverable required for this work order must be approved by the District Project Manager. The project manager will give approval only after the drafts have undergone appropriate reviews and acceptable responses to comments have been made by the Consultant.

Project Team: The project team will be composed of individuals from local agencies, District staff with knowledge of the subject area, and possibly other state and federal agencies. The team will provide local knowledge of issues and potential projects in the basin and will review and comment on draft deliverables prior to final acceptance.

Project Manager: The term refers to the District Project Manager. The Project Manager will be the primary point of contact with the Consultant and will assist in identifying appropriate technical points of the contract. Final acceptance of contract deliverables will be provided only by the Project Manager.

South Florida Water Management District: referred to as "SFWMD" and "District" in this document.

8.0 PAYMENT AND DELIVERABLE SCHEDULE

Invoices shall be submitted monthly upon completion, receipt and acceptance by the District of progress reports and/or other scheduled deliverables, and in accordance with the Payment and Deliverable Schedule. Payments based on percentage of completion of deliverables may be authorized by the District's Project Manager provided a proportionate amount of work has been completed. Each monthly invoice shall be accompanied by a progress report, unless it is submitted with or following one or more of the other deliverables. Total payment by the District for all work completed herein shall not exceed the amount of $675,210.

FOUR CORNERS WATERSHED PLAN
PAYMENT AND DELIVERABLE SCHEDULE

Task / Deliverable FY05	TOTAL FEE	DELIVERABLE DUE DATE[1]
Phase 1 - Data Collection, Existing Conditions Model and Natural Systems Model		
1.1 Work Plan, Project Orientation, Progress Meetings	$22,776	5 Weeks
1.2 Initial Data Collection	$10,048	9 Weeks
1.3 Initial Site Visit	$6,074	2 Weeks
1.4 Aerial Surveys	$189,312	12 Weeks
1.5 Ground Surveys	$91,560	34 Weeks
1.6 Modeling Feasibility Assessment	$6,832	12 Weeks
1.7 Existing Conditions Model Development	$31,848	18 Weeks
1.8 Natural Systems Model Development and Model Report	$25,620	24 Weeks
Subtotal, Phase 1	**$384,070**	
Phase 2 - Existing Conditions Assessment and Evaluation of Proposed Alternatives		
2.1 Alternative Evaluation	$25,010	26 Weeks
2.2 Selection of Preferred Alternative and PDR	$21,738	30 Weeks
Subtotal, Phase 2	**$46,748**	
Total FY05	**$430,818**	

[1] **Date is in weeks from Work Order Execution**
Note: All costs are firm fixed price by deliverable and include transportation and materials.

FOUR CORNERS WATERSHED PLAN
PAYMENT AND DELIVERABLE SCHEDULE

Task / Deliverable FY06/07	TOTAL[2] FEE	DELIVERABLE DUE DATE[1]
Phase 3 - Final Design and Permitting		
3.1 30% (Preliminary) Design Plans (34 sheets, 10 copies)		
3.1.1 Utility Location Plans and Coordination		36 Weeks
3.1.2 Geotechnical Engineering		
3.1.3 Environmental Surveys		
3.1.4 Preliminary Design Plans		
3.1.5 Cost Estimate		
3.2 60% Design Plans and Draft Permit Applications 3.2.1 Draft Design Plans 3.2.2 Cost Estimate 3.2.3 Update Hydrologic / Hydraulic Model		42 Weeks
3.3 90% Design Plans and Draft Specifications		
3.3.1 Draft Design Plans		48 Weeks
3.3.2 Cost Estimate		
3.3.3 Draft Specifications		
3.3.5 Draft Bid Documents		
3.4 Final (100%) Construction Plans, Specs, and Bid Docs		52 Weeks
3.5 Permit Applications		
3.5.1 Draft Permit Applications (ERP, USACE, EPA, County) at 60% Plans		42 Weeks
3.5.2 Permit Drawings and Mapping		
3.5.3 RAI Responses		48 Weeks
3.6 Meetings		
3.7 QA/QC, Construction Plans and Permit Applications		
Subtotal, Task 3		
Phase 4 - Construction Management/Inspection		
4.1 Pre-Bid Meeting		
4.2 Pre-Construction Meeting		
4.3 Review Shop Drawings		
4.4 Construction Inspection (includes onsite meetings)		
4.5 As-Build Engineer's Certification		104 Weeks
Subtotal, Task 4 **Total FY06/07** **Total Project**		

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[1] Due dates are in weeks from Work Order Execution
[2] Costs shown are contingent upon Governing Board approval of FY06 and FY07 funding.
Note: All costs are firm fixed price by deliverable and include transportation and materials.

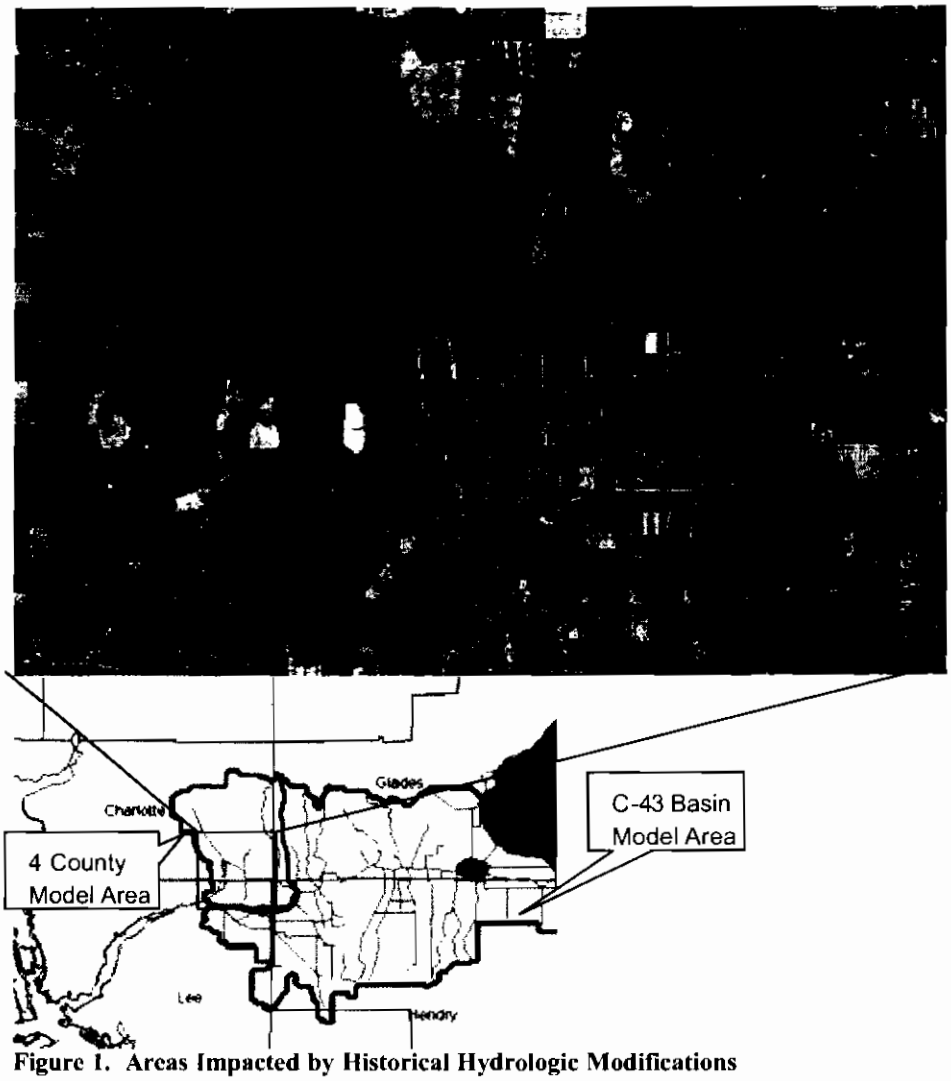
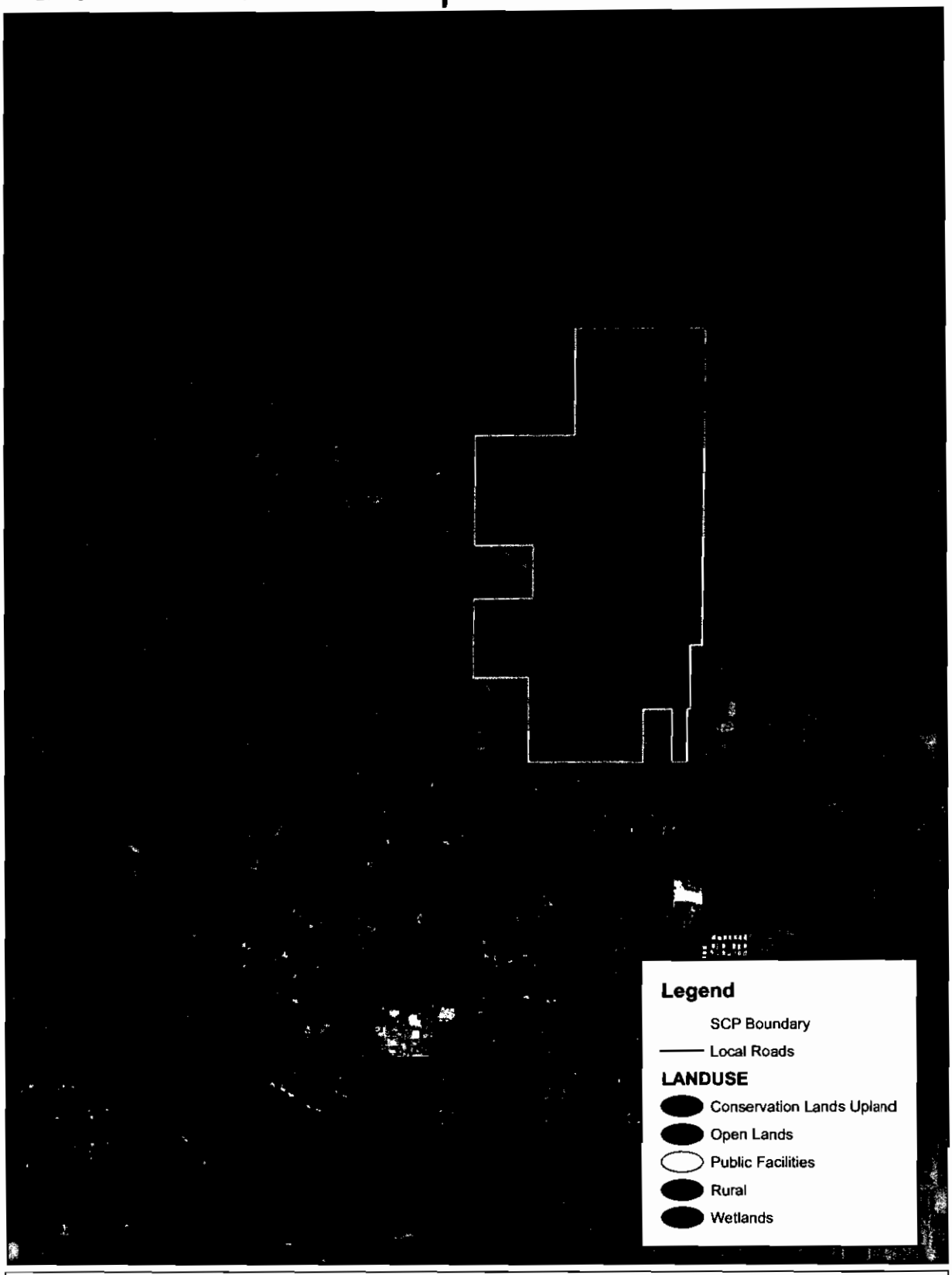


Figure 1. Areas Impacted by Historical Hydrologic Modifications

Appendix F: Future Land Use and Zoning Maps

Future Land Use Map



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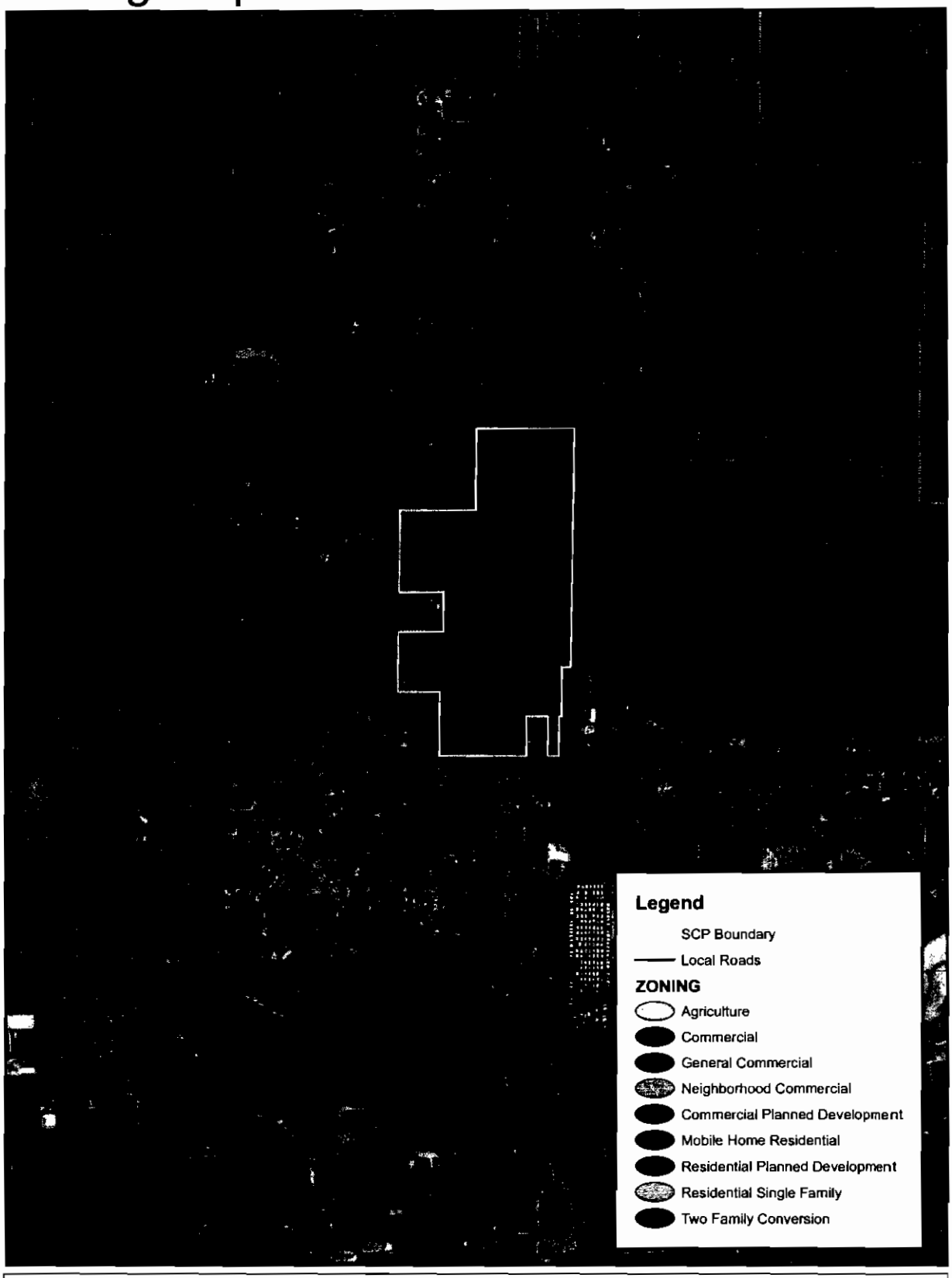
Map Prepared On: 01/06/06 by lboyd@cogov.com

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

Zoning Map



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Map Prepared On 01/06/06 by lboyd@leegov.com

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

Appendix G: Projected Costs and Funding Sources

Appendix G: 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, FCT	$325,000
Hydrologic restoration/enhancement	SFWMD, LC DNR, FCT	$375,000
Install fire breaks	C20/20, DOF, mitigation	$7,500
Mechanical brush reduction		$15,500

total $723,000

Overall Protection

Item	Possible Funding Source	Estimated Costs
1/2 mile of fencing and west access gate	C20/20	$22,000
Minor debris removal		$100
Preserve & Boundary signs		$400

total $22,500

Public Access

Item	Possible Funding Source	Estimated Costs
Hire Consultant for Design and Permitting of Facilities	Conservation 20/20, LC P&R, Recreational Trails Program, FCT, and other appropriate grants.	$25,000
Fishing pier/observation deck		$15,000
Crushed shell at trail head		$7,500
Clearing for trail		in-house
10 Educational signs		$1,700
10 Trail markers		$350
Informational Kiosk		$4,000

total $53,550

TOTAL COST ESTIMATE **$799,050**

Site Management and Maintenance

Item	Possible Funding Source	Estimated Costs
Exotic Plant Control	C20/20	$20,000
Prescribed Fire Regime	LC P&R, C20/20	in-house
Mow trails	C20/20	in-house
Feral hog trapping	C20/20	$1,000
Fence Repairs	C20/20	$500

Yearly Maintenance Estimate **$21,500**

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