

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

Blue Sheet No. 2002 1399

1. REQUESTED MOTION:

ACTION REQUESTED: Presentation by Carol Wehle, South Florida Water Management District Department Director for Southwest Florida Issues, on watershed initiatives for Charlotte Harbor, Caloosahatchee River and Estero Bay. The presentation is to take place immediately after County Attorney items on the regularly scheduled agenda.

WHY ACTION IS NECESSARY: To inform the BoCC on the SFWMD's 2003-2004 initiatives.

WHAT ACTION ACCOMPLISHES: Provides information to the Board on the SFWMD's watershed initiatives.

**2. DEPARTMENTAL CATEGORY:
COMMISSION DISTRICT #**

9:30

3. MEETING DATE:

12-17-2002

4. AGENDA:

- CONSENT
- ADMINISTRATIVE
- APPEALS
- PUBLIC WALK ON
- TIME REQUIRED:

**5. REQUIREMENT/PURPOSE:
(Specify)**

- STATUTE
- ORDINANCE
- ADMIN. CODE
- OTHER

6. REQUESTOR OF INFORMATION:

- A. COMMISSIONER W
- B. DEPARTMENT Smart Growth
- C. DIVISION Daltry
- BY: Wayne Daltry

7. BACKGROUND:

Please see the attached documents for more information.

8. MANAGEMENT RECOMMENDATIONS:

9. RECOMMENDED APPROVAL:

A Department Director	B Purchasing or Contracts	C Human Resources	D Other	E County Attorney	F Budget Services				G County Manager
				<i>[Signature]</i>	OA RK for TD 12/4	OM 12/4/02	Risk 12/04/02	GC 12-4-02	<i>[Signature]</i> 12-5-02

10. COMMISSION ACTION:

- APPROVED
- DENIED
- DEFERRED
- OTHER

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12/5/02



Estero Bay
INITIATIVE

South Florida Water Management District
Fiscal Year 2003-2004

The Estero Bay Basin Initiative
Fiscal Year 2003-2004

South Florida Water Management District
Fort Myers, Florida

2002

Contents

Introduction – The District.....	1
Introduction – The Estero Bay Basin.....	3
Capital Projects – Surface Water Restoration.....	7
Assessment Projects.....	9

The Estero Bay Basin

Fiscal Year 2003 – 2004

Introduction – The District

Water is Florida's most important natural resource and is central to our quality of life. The mission of the South Florida Water Management District (District) is to manage and protect water resources of the region by balancing and improving water quality, flood control, natural systems and water supply.

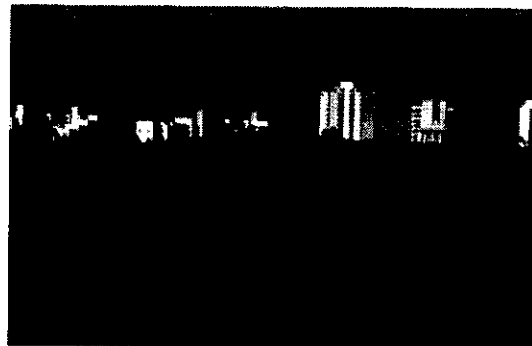
The South Florida Water Management District is the oldest District, starting in 1949 when the Florida Legislature created the Central and Southern Flood Control District, the predecessor to the South Florida Water Management District. In 1972, with the Florida Water Resources Act (Chapter 373), the state created five water management districts, with expanded responsibilities for regional water resource management and environmental protection.

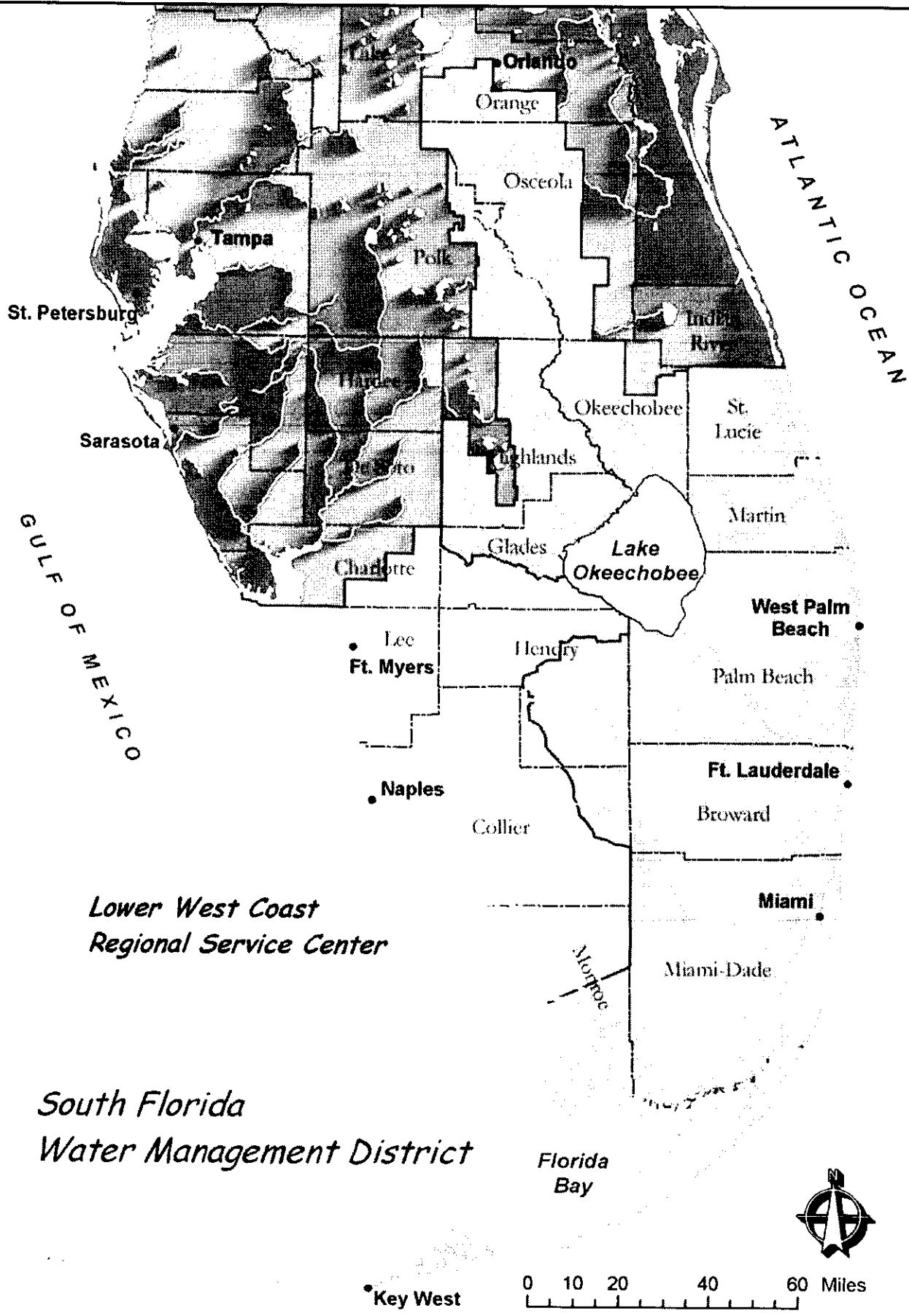
Today, we operate and maintain this massive project, which includes 1,800 miles of canals and levees, 25 major pumping stations and about 200 larger and 2,000 smaller water control structures.

The District spans 16 counties with a total population of about six million residents. This geographic region covers 17,930 square miles and includes vast areas of agricultural lands, water conservation areas, and areas of enormous urban growth and development.

The District also contains some very significant natural systems. Lake Okeechobee is the "liquid heart" of South Florida. It is a large, shallow lake located in south central Florida with a surface area of 730 square miles and is the second-largest freshwater lake in the continental United States. The Kissimmee River, which historically meandered approximately 103 miles from Lake Kissimmee to Lake Okeechobee but was channelized between 1962 and 1971, is now being restored to reverse the loss of ecosystem function. And the world's most famous wetland, "The River of Grass", The Everglades, home to 56 federally-listed threatened or endangered species including the Florida panther, the American crocodile and the wood stork.

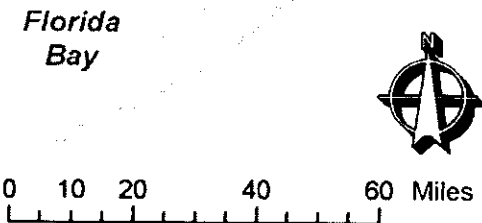
By working with our Federal, state and private partners we can achieve our vision to be the world's premier water resource agency and create an ecosystem that can be enjoyed by everyone.





*Lower West Coast
Regional Service Center*

*South Florida
Water Management District*



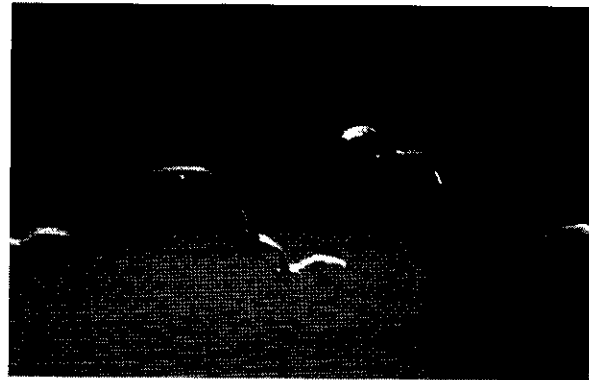
Introduction – The Estero Bay Basin

The Estero Bay Basin, a priority watershed, extends from the Cocohatchee Canal/River Watershed in Collier County north to the Caloosahatchee Watershed in Lee County, with the Immokalee Ridge in Collier County as the easterly edge and the bay as the westerly boundary. The Estero Bay Basin covers approximately 400 square miles and contains the Imperial River, Estero River, Halfway Creek, Spring Creek; all classified as Outstanding Florida Waters; Mullock Creek/Ten Mile Canal/Six Mile Slough, Hendry Creek and Cow Slough.

Historical Overview

Estero Bay is the State of Florida's oldest Aquatic Preserve and a National Wildlife Refuge. The Bay is also the site of the landmark U.S. Supreme Court Case, *Bob Graham vs. The Estuaries*, in which the State successfully upheld its environmental planning laws. The Estero Bay watershed encompasses parts of three counties Lee, Collier and Hendry, but it's primarily within Lee County. Its shoreline is largely intact, its barrier island is largely developed although with significant stretches in natural condition, and its watershed is rapidly urbanizing. Portions of the watershed, though, are subject to county regulation as recharge areas, and part of the upper watershed is entering public management through a public/private partnership known as the Corkscrew Regional Ecosystem Watershed Land and Water Trust. Each county is in full compliance with Florida's Growth Management Act.

The Bay has long been recognized as needing investment in reestablishing its hydrologic regime. This was first identified in the Governor and Cabinet's Charlotte Harbor Resource Planning and Management Plan (1982), The Estero Bay Plan (resulting from the siting of Florida Gulf Coast University) which established the Estero Bay Agency for Bay Management (1994), and the National Estuary Program's Comprehensive Conservation Management Plan (2000). The South Florida Water Management District has a SWIM Plan pending for the part of the Bay within the jurisdiction of Lee County.



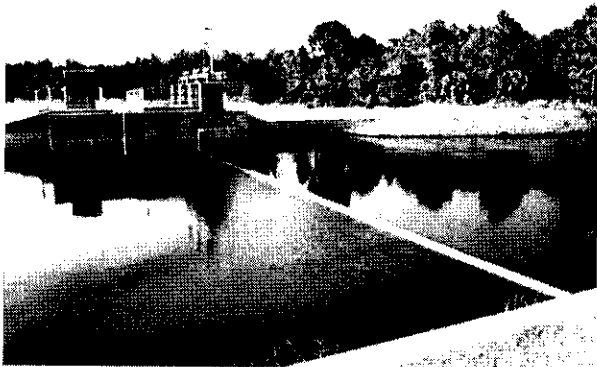
Citizen Involvement

Estero Bay Buddies
Estero Bay Agency on Bay Management
Charlotte Harbor National Estuarine Program Water Enhancement & Restoration Coalition
Ostego Bay Foundation

Key Efforts

- Completed the South Lee County Watershed Plan (covers 90% of Estero Bay Basin) that balances the three components of flooding, water supply and environmental preservation

- Environmental Restoration of rivers and creeks in the basin by removing exotic vegetation
- Reconnection of the historical flow way for Halfway Creek, 1) restore connection through new development 2) remove old agricultural berm 3) eradicate exotics from old agricultural ditch 4) reslope sides of ditch and replant with native vegetation 5) at the end, remove old Florida Power & Light bridge
- Replacement of undersized Imperial Bonita Estates Bridge on the Imperial River
- Replacement of temporary weir on the Kehl Canal with an operable structure



- Preservation of historical flow way to the Cocohatchee Canal through the permitting process
- Protected approximately 25,000 acres in the headwaters of Estero Bay Basin through land acquisition
- Lee County designated a large portion of the eastern part of the county as DRGR, density reduction/groundwater recharge areas
- Completion of the Six Mile Cypress Watershed Plan and partial implementation by re-establishing historical flow way corridors through developer contributions and Lee County/ SFWMD projects

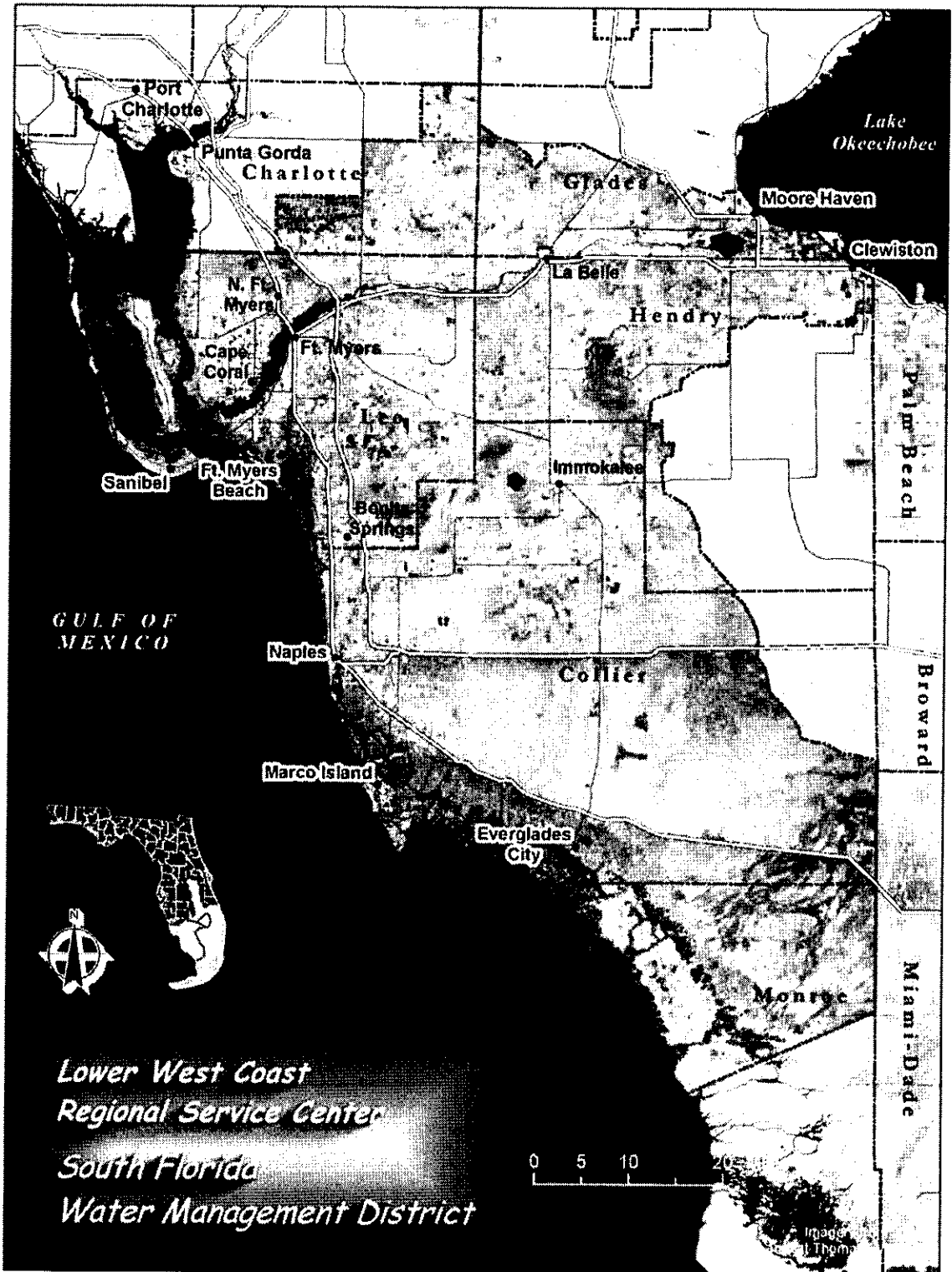
Estero Bay Basin Partners

The District has formed cooperative partnerships with federal, state, county and city governments;

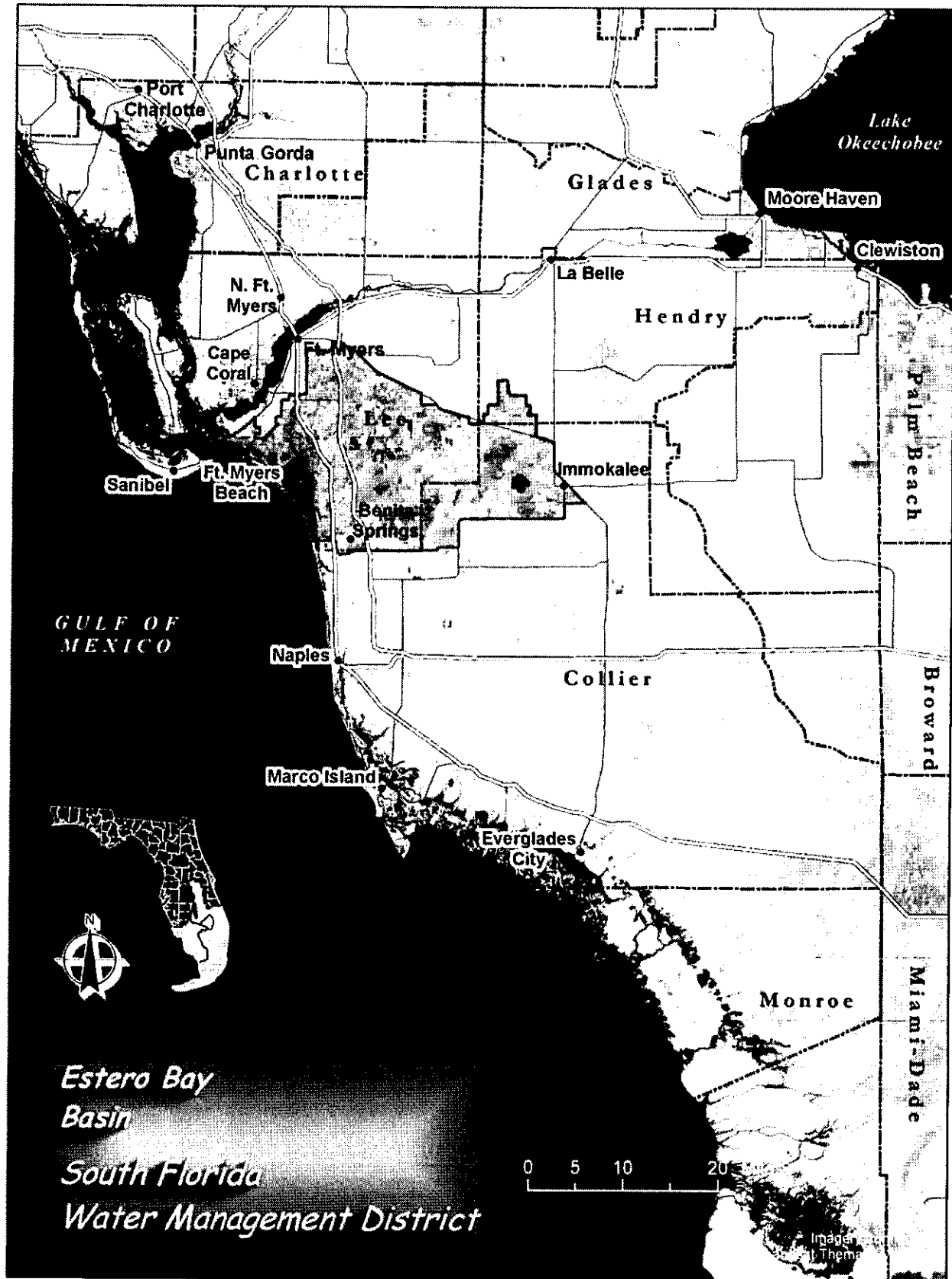
developers; citizen support groups; environmental organizations; and other nonprofit institutes. The list of partners include the Department of Interior, Army Corps of Engineers, Florida Power & Light, Lee County, The City of Fort Myers, The City of Bonita Springs, Corkscrew Audubon, Florida Department of Environmental Protection, Estero Bay Buddies.

Totals of This Basin

Project costs (2002-2005):	\$30,000,000
Funding request (2002-2003)	\$ 5,100,000
Funding requests (2002-2005)	\$20,100,000
Project match (1998-2002):	\$11,000,000



*Lower West Coast
Regional Service Center
South Florida
Water Management District*



Capital Projects – Surface Water Restoration

City of Bonita Springs Stormwater Retrofits

Budget Request: \$500,000

Project Partners: City of Bonita Springs

Project Status: 2004 - 2009

Description: This project will help fund the construction of surface water treatment systems in the older parts of the city. Areas within the City of Bonita Springs have been identified in the City's Stormwater Master Plan as needing retrofitted with a stormwater system that will reduce flooding and treat the stormwater prior to being discharged into the Imperial River which is an Outstanding Florida Water. The City is moving forward with approving the recommendations and funding to start design.

10 Mile Canal Filter Marshes

Budget Request: \$1,000,000

Project Partners: Lee County and Private Companies

Project Status: Year 2 of 5

Description: The 10 mile canal was constructed in 1920s to capture the water flowing from the east and divert it to Estero Bay. It now collects runoff from a historical industrial area that was built prior to surface water management rules and regulations. The South Florida Water Management district has joined with Lee County and a group of private companies to build the first segment of the filter marsh to provide water quality to the canal water prior to the discharge to Estero Bay. The funds requested will build more of the filter marsh segments and assist

Lee County in creating a linear park adjacent to the canal.



Restoration of Imperial River Flow way

Budget Request: \$1,500,000

Project Partners: City of Bonita Springs, Lee County

Project Status: Year 2 of 6

Description: Lee County experienced extensive flooding in the summer of 1995. Since then the South Florida Water Management District and Lee County have joined forces to lessen the flooding. Removing the exotic vegetation and junk debris from the river bottom has environmentally restored the Imperial River. The next step is to acquire some of the adjacent lands along the river and recreate the historical flood plain, by removing the extra fill material and replanting the area for stabilization. The District has identified some parcels that have been purchased and are to be purchased by Lee County or the District for this restoration. The requested funding would be used to purchase some remaining parcels and restore the natural floodplain area.

Restoration of Southern CREW

Budget Request: \$750,000

Project Partners: City of Bonita Springs, Lee County

Project Status: Year 5 of 10

Description: The South Florida Water Management District started purchasing environmentally sensitive lands within eastern Bonita (Southern CREW) in 1997. This area, even though it has 6" or more of surface water each summer, was beginning to be developed by single family home sites. The land was subdivided in the 1960's into 5 and 10 acre lots. Presently the District has acquired approximately 70% of the 4,760 acres through willing sellers and condemnation. As the land is purchased, the exotic vegetation is treated and as a larger tract is fully acquired the District will perform a controlled burn to restore the area. The funds requested will be used to remove the dirt roadways, berms and house pads to unblock the sheet flow. After the area is restored, the District will open the area for passive recreation such as hiking, camping and possible horseback riding trails.



Stabilization of River and Creek Banks

Budget Request: \$100,000

Project Partners: City of Bonita Springs, Lee County

Project Status: Year 1 of 3

Description: The Imperial River, Estero River and Halfway Creek have been cleaned of the exotic vegetation. The Brazilian Peppers were so thick and massive that much of the native vegetation has been choked out. After removal of the pepper, some of the herbaceous vegetation grew back but the woody vegetation needs to be replanted for the bank stabilization. The requested funding would be used to purchase woody vegetation such as pond apple trees and replant them along the banks of the river and creek systems.



South Eagle Ridge Flow way

Budget Request: \$750,000

Project Partners: Lee County, Private Developments, and Private Developers

Project Status: Year 1 of 2

Description: The historical flow way has been altered with adjacent development. The proposal is to install culverts within severely restricted areas in order to connect flows from the eastern portion of the basin (east of I-75) to the Six Mile Cypress Slough.

Assessment Projects

Spatial Modeling to Determine Optimal Freshwater Inflows into the Estuarine Habitats of Estero Bay

Budget Request: \$300,000

Project Partners: UF, FGCU

Project Status: Year 1 of 2

Description: In 1999, a research plan for Estero Bay (part of the Estero Bay and Watershed Assessment) was proposed. As part of this plan, valued ecosystem components for Estero Bay were identified. These were submerged aquatic vegetation, shellfish, and oligohaline habitat. One goal set for the Bay is to "register the location, size, and duration of oligohaline habitats to pre-development conditions". In order to meet this goal, there may be necessary modifications in the quantity and timing of freshwater inflows into the Bay.

In addition, the SFWMD is responsible for the establishment of minimum flows for surface waters, where the minimum flow is the limit at which withdrawals would be significantly harmful to the water resources or ecology of an area. MFL's for Estero Bay are mandated for 2006.

In order to set targets for these freshwater inflows, this project will focus on gaining an understanding of how changes in inflow affect estuarine species, including fish and invertebrates important for sport and commercial fisheries, tourism, and the local economy.

The scientists at the University of Florida and Florida Gulf Coast University will work together to create a Habitat Suitability Model for Estero

Bay. The University of Florida will run the model to test different hydrologic alternatives that they established working with SFWMD Staff.



Submerged Aquatic Vegetation (SAV) Restoration

Budget Requested: \$50,000

Project Partner: Sanibel Captiva Conservation Foundation

Project Status: Year 1 of 5

Description: Submerged Aquatic Vegetation (SAV) is a form of seagrasses and are the mainstay of habitat that estuarine organisms associate with for a variety of reasons. SAV's serve as a primary food resource for a multitude of grazing animals (e.g. mollusk and

crustaceans as well as manatees). They also serve as a nursery habitat for the larvae and young of many of the dominant estuarine organisms. Moreover, SAVs serve as sites of refuge from predators (they also serve as sites where predators can lie in wait for prey!) and thus play an integral role in the dynamics of the estuarine ecosystem.

A number of natural and human-induced activities have interfered with the ability of SAVs to sustain a normal, healthy condition in Estero Bay. Severe storms, dredging, boating, salinity alterations, and dock construction are just some of the many events that have interfered with the normal growth process.

A large-scale restoration initiative to help replace the SAV is a significant way to expedite the recovery of this natural and dynamic ecosystem to a highly productive, naturally sustainable estuarine ecosystem. The restoration efforts will examine each of the species of SAV (e.g., tape grass, turtle grass, manatee grass, shoal grass, etc.) and align the known life history requirements of these species with the environmental conditions currently found in the estuary. Subsequently trial restorations, based on the placement in the areas that assure the highest level of success, will be conducted. Evaluations of these initial plantings, with successive evaluation of ambient environmental conditions will further increase the probability of success of subsequent plantings. Thus the project continues to development a database of restoration success/failure-based data that allows an increase in the probability of successive subsequent restoration efforts.

Six Mile Slough Model modifications

Budget Requested: \$50,000

Project Partner: Lee County

Project Status: Year 1 of 2

Description: A dynamic two-dimensional model (SHEET2D) of the slough was established in 1995 as part of an application for a project adjacent to it. The purpose of the model was to analyze the water elevations and aid in the analysis of compensating storage needs. The SHEET2D model allows the slough to be analyzed in a more dynamic and comprehensive way than the earlier work. The model built upon information in the Six Mile Cypress Slough Master Plan completed in 1990. The Master Plan was accomplished with a combination of two one-dimensional models, HEC-1 and HEC-2. Flows were calculated from the results of the HEC-1 and used as input to the static HEC-2 model. The SHEET2D model used most of the watershed information from the earlier HEC-1 in the form of inflow hydrographs. There has been significant development in portions of the 35 square miles that contribute directly to the slough over the past twelve years. Some of the hydrographs are no longer valid due to changes in the watershed.

The West Coast Service Center Permitting Staff is now requesting use of this model for projects along the slough. There are several changes that have occurred since the model was first established and some errors have been found. In order for the community to rely on this model for future compensating storage analysis, the model must be updated and corrected. The revised model will then be available for use and

updating by the community as additional projects are planned, designed and constructed.

Restoration of Shellfish and Fish Habitat in Estero Bay Aquatic and State Buffer Preserve

Budget Requested: \$100,000

Project Partner: Florida Gulf Coast University

Project Status: Ongoing

Description: To accommodate population growth in SW Florida, resource managers have been forced to develop and manage watersheds, thereby compromising the habitat of aquatic organisms and impacting estuarine ecosystems. These estuaries provide critical feeding, spawning and nurseries for ecologically and economically important fish and shellfish, including oysters (*Crassostrea virginica*). Individually oysters filter 4-34 liters of water per hour, removing phytoplankton, sediments, pollutants, and microorganisms from the water column. This process promotes the growth of submerged aquatic vegetation such as sea grasses. In addition, oyster reefs provide a complex, three-dimensional, reef structure serving as nesting habitat and/or refuge, attracts numerous species of invertebrates and fishes (e.g., blue crab, stone crabs, mud crabs, grass shrimps, blennies, gobies, killifishes, skillettfish). Furthermore, many of these organisms serve as forage for important fisheries species (e.g., snook, sheephead, grouper, redfish, spotted sea trout, black drum), birds (e.g., oyster catchers, pelicans, osprey), and mammals (e.g., raccoons). Oysters are not only important fisheries species, but oyster reefs serve as essential fish habitat and their protection and

restoration should therefore be a focus of resource managers.



Records from Southwest Florida suggest that oyster growth and distribution has decreased drastically since the 1960". Restoration of oyster reefs in this watershed will indirectly restore the water quality of Estero Bay that drains 293 square miles of watershed, by the enhanced filtration rate of restored and enhanced oyster reefs. With the support from SFWMD and the Charlotte Harbor National Estuary Program, we have already identified areas in the Estero Bay that are conducive to the production of healthy oyster reefs. In collaboration with the Lee County School District, Florida Sea Grant and the City of Cape Coral, we will educate and involve the general public as well as high school and undergraduate

students in a community-based restoration of oyster reefs in the Estero Bay State Aquatic and State Buffer Preserve. We intend to utilize community volunteers to create, maintain, restore and enhance oyster-shell reefs in order to establish healthy living-oyster reefs.

Currently, Florida Gulf Coast University has a budget of \$20,000 to restore pilot oyster reefs in the Estero Bay Aquatic and State Buffer Preserve. This project attempts, through public education and involvement, to restore and/or enhance oyster reefs, thereby improving habitat availability and water quality within the Estero Bay. Reef-restoration efforts will include "oyster gardening" by local citizens.

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**The
Caloosahatchee Basin
Initiative**

**South Florida Water Management District
Fiscal Year 2003 - 2004**

The Caloosahatchee Basin Initiative
Fiscal Year 2003-2004

South Florida Water Management District
Fort Myers, Florida

2002

Contents

Introduction – The District..... 1

Introduction – The
Caloosahatchee Basin..... 3

Capital Projects – Surface Water Restoration..... 7

Water Resource Development
Projects..... 12

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The Caloosahatchee Basin

Fiscal Year 2002 – 2003

Introduction – The District

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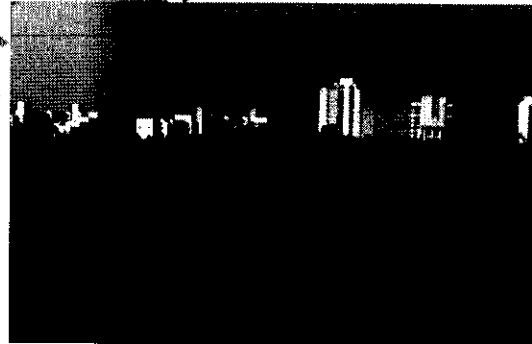
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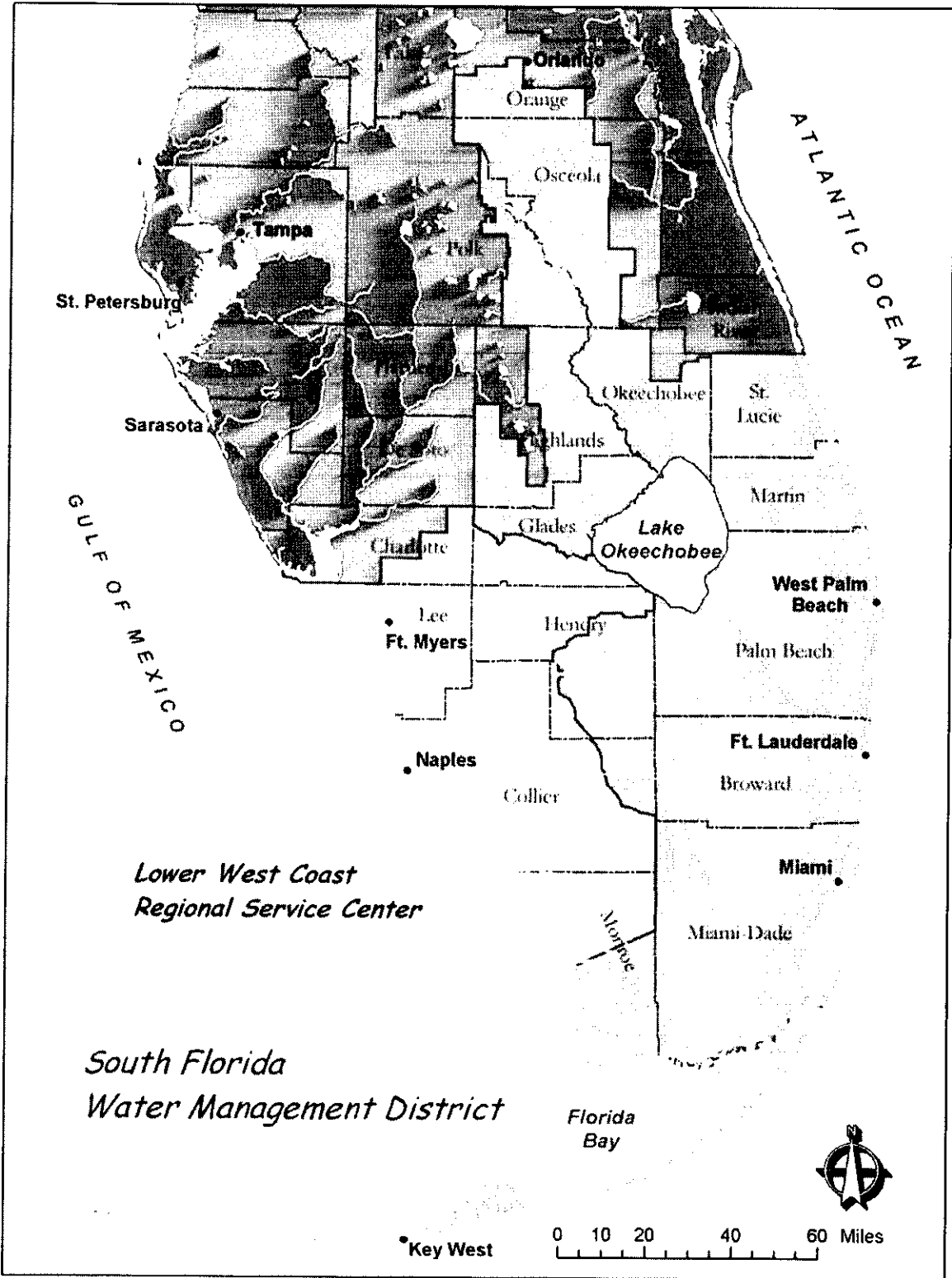
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By working with our Federal, state and private partners we can achieve our vision to be the world's premier water resource agency and create an ecosystem that can be enjoyed by everyone.





Introduction – The Caloosahatchee Basin

The Caloosahatchee River extends 105 kilometers (km) from Lake Okeechobee to San Carlos Bay. The freshwater systems of the Caloosahatchee River are divided into two distinct hydrologic units, East and West Basins. These basins include parts of Lee, Charlotte, Collier, Glades, and Hendry Counties. Tributary drainage in the East Basin is more intricate than in the West Basin. Irrigation is the most important water use in this area and is controlled by an extensive network of canals that recharge the water table during the dry season and drain potential floodwaters during the wet season. Land use in the West Basin is also largely agricultural. The Caloosahatchee River also serves as an important source of drinking water in the West Basin.

The Tidal Caloosahatchee Basin includes portions of Lee and Charlotte Counties. The estuary length between Franklin Lock and Shell Point is 42 km and is bordered by Fort Myers on the south shore and Cape Coral on the north shore. Water discharges from the Caloosahatchee passes Shell Point and enters the Gulf of Mexico at San Carlos Bay. Because of the irregular, long, slender shape of the system, slight changes in wind, tide, runoff, or precipitation can have dramatic effects on several estuarine features such as flow, water depth, salinity, and turbidity, making characterization of the system difficult.

Historical Overview

The hydrology of the Caloosahatchee Basin has been strongly affected by land and canal development during the past 100 years. In pre-development times, the Caloosahatchee River was a sinuous river extending from Beautiful Island to a waterfall at the west-end of Lake Flirt. A sawgrass marsh extended from Lake Flirt to Lake Okeechobee. The pre-development landscape had few tributaries east of LaBelle and Twelve-mile Slough connected the Okaloacoochee Slough to the Orange River. The area east of LaBelle is very flat and there were few creeks to provide drainage. In the 1880s, the Disston canal was dug from Lake Flirt to Lake Okeechobee to provide a navigable channel for steamboats from Lake Kissimmee through Lake Okeechobee to the Gulf of Mexico (COE, 1957). The channel was enlarged to a 6-foot depth and 90-foot width during the period 1910 to 1930, and three locks were constructed along the canal in 1918 to improve navigation.

Citizen Involvement

Caloosahatchee River watch

Charlotte Harbour National Estuarine Program, Watershed Council

Key Efforts

Completed the Caloosahatchee Water Management Plan that balances the three components of flooding, water supply and environmental preservation.

Environmental Restoration of rivers and creeks in the basin by removing exotic vegetation Protected approximately xxx acres in the headwaters of Okaloacoochee Basin through land acquisition

Caloosahatchee Basin Partners

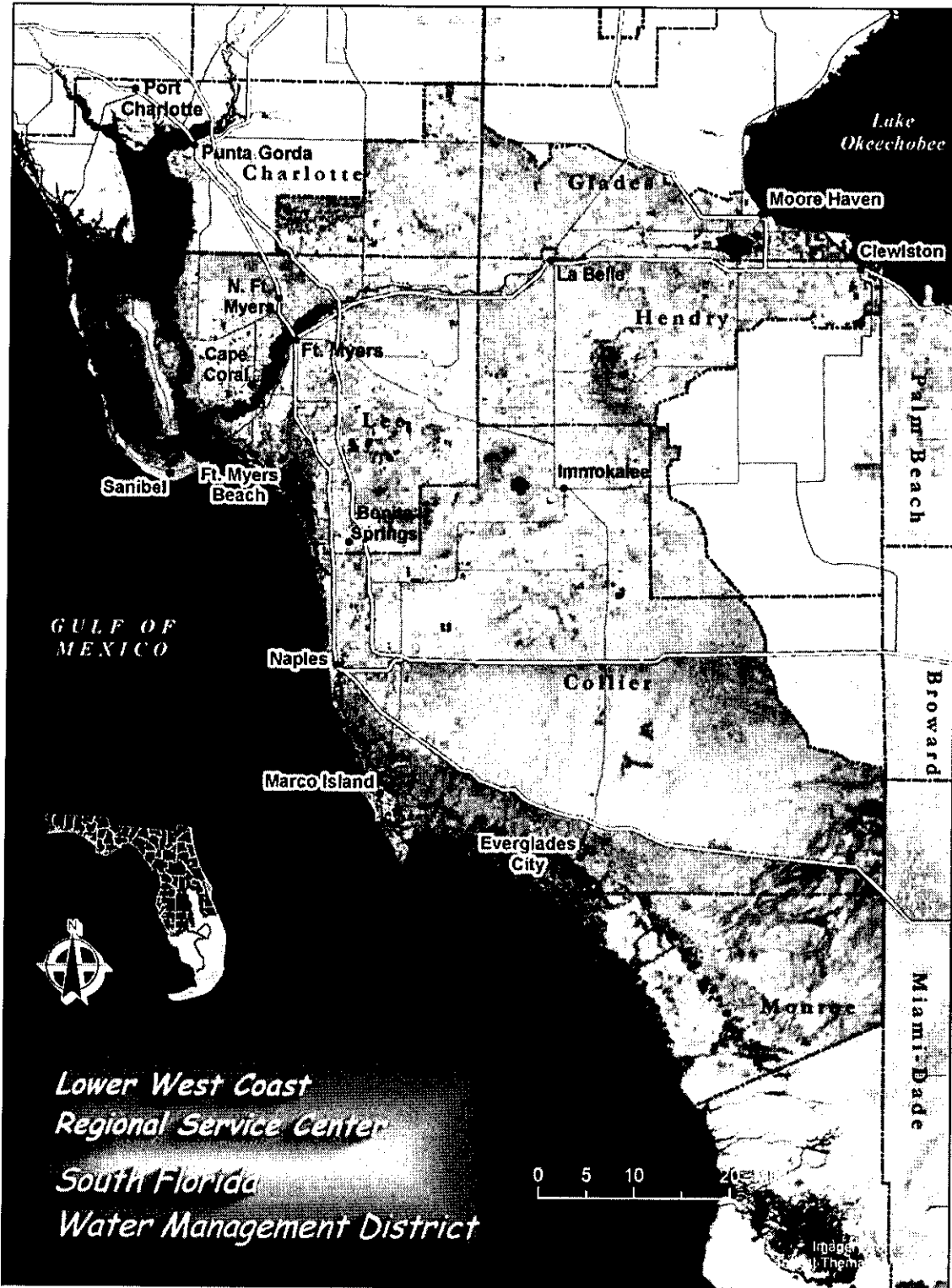
The District has formed cooperative partnerships with federal, state, county and city governments; developers; citizen support groups; environmental organizations; and other nonprofit institutes. The list of partners include the Department of Interior, Army Corps of Engineers, Florida Power & Light, Lee County, The City of Fort Myers, Corkscrew Audubon, Florida Department of Environmental Protection, Caloosahatchee Riverwatch.

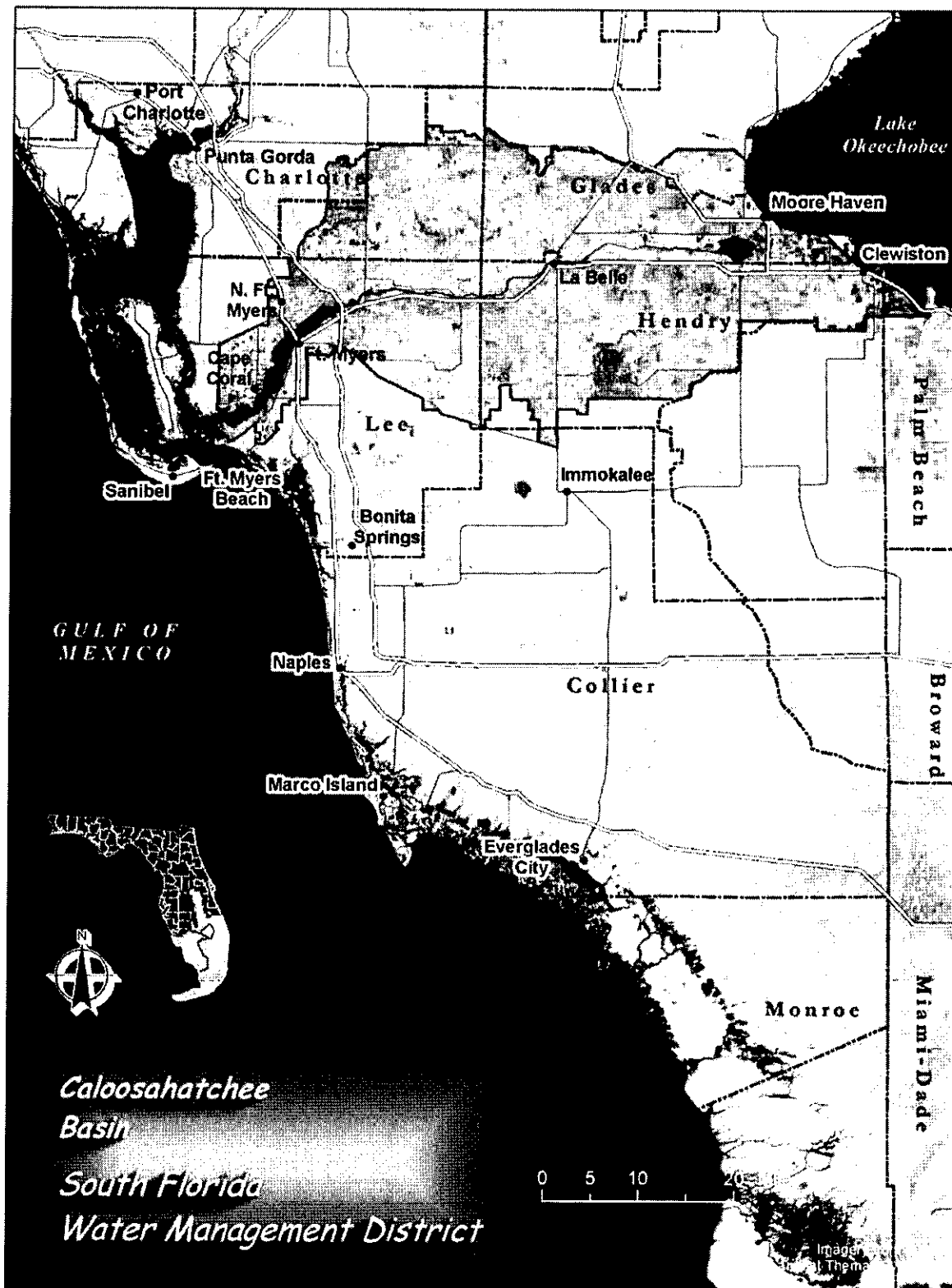
Totals of This Basin

Project costs (2002-2005) \$39,445,000.00
Funding request (2002-2003) 39,445,000.00
Funding Requests (2000-2005)
\$120,445,000.00
Project match (1998-2000): \$2,500,000.00

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Capital Projects – Surface Water Restoration

City of LaBelle Stormwater Retrofits

Budget Request: \$500,000 per year for 3 years

Project Partners: City of LaBelle

Project Status: proposed

Description: This project will help fund the construction of surface water treatment systems in the older parts of the city. The City is moving forward with approving the recommendations and funding to start design. (NEED DETAILS FROM LABELLE

LaBelle Nature Park

Budget Request: \$50,000 (need development by LaBelle Environmental Center Committee)

Project Partners: City of LaBelle, Hendry County, Watershed Council

Project Status: proposed

Description: A local volunteer group has proposed developing the LaBelle Nature Park on land owned by the District. This park would serve as an environmental center for the community. This property borders one of the Caloosahatchee oxbows. This project could include a demonstration of the proposed oxbow restoration. Mr. Phil Pelltier of the LaBelle/Hendry Parks and Recreation Department has developed preliminary plans for transitioning the existing undeveloped property into a usable recreational park and environmental education resource.

Telegraph Cypress Water Management

Budget Request: \$36,000,000 per year for 5 years

Project Partners: Lee County, Charlotte County, TCWMD, Babcock

Project Status: proposed

Description: This project will purchase the property and develop a long-term management plan.

Cecil Webb WMA

Priority Rating: zero

Budget Request: \$250,000 per year for ten years

Project Partner: Florida Game and Freshwater Fish Commission

Project Status: Proposed

Description: The District has been working with representatives of the Florida Game and Freshwater Fish Commission for the past 8 to 10 years seeking solutions to decrease the long term ponding realized within the Cecil Webb/ Babcock Wild Life Management Area. A number of possibilities exist to improve water management. For example, alternate areas could be cycled through wet or dry periods as desired.

Surface water flows in time of flood could be better directed toward the least stressed outfall channels. The natural topographic features for such a system are in place. The 105 square mile Webb area is bisected in an east-west direction by Tucker's Grade. The grade, located on a Township line, forms a

significant topographic feature, which lies halfway between CR-74 and the Lee County line. Tucker's Grade in conjunction with the SAL grade (running almost north-south) must be the key natural features in any overall water management plan. Tucker's and SAL grades already exist as controls of normal sheet flow. By providing culverted control structures and paved fords, strategically located impoundment could be created. This project should begin with a monitoring and modeling program designed to come up with water management alternatives.

Four Corner's

Priority Rating: 0

Budget Request: \$1,500,000 per year for Five years

Project Partner: Hendry County, Lee County, Glades County, Charlotte County

Project Status: Ongoing

The Four Corners project is flood protection project located at the intersection of Hendry, Lee, Glades and Charlotte Counties. The recognized land use within this planning boundary was predominately historical farming operations constructed prior to water quality requirements. To address this issue along with the water supply and flood control issues, the project design was modified and expanded from the initial planning recommendations to one that includes among other features a wider swale/ flowway with control structures. The modified project design also results in

improved flow velocities resulting in significant water quality benefits over existing conditions. The changes are also expected to improve storage within the basin, increase the water recharge to the aquifer and effect water quality improvements to the Caloosahatchee River, a system under consideration for TMDL development by the DEP. The project achieves these additional benefits while meeting its primary objective of resolving the recurring drainage and flood control problems in the Spanish Creek, Jack's Branch, Bee Branch, Ft. Denaud Branch, Cypress Creek.

The project is a recommendation in the Hendry County Surface Water Management Plan, Four Corners Area.

Harn's Marsh Lehigh Acres

Priority Rating: 0

Budget Request: \$300,000 per year for Five years

Project Partner: East County Water Control District, Lee County

Project Status: Ongoing

Lehigh Acres is located within the service area of the East County Water Control District. East County Water Control District (ECWCD) was created on May 5, 1958. It encompasses over 63,000 acres of land and approximately 311 miles of canals. ECWCD is a political sub-division of the State of Florida and is funded through the collection of an acreage tax. East County Water Control District is requesting a state

appropriation in the form of a member project. The Harn's Marsh Restoration project is a result of a comprehensive hydrologic study of the area to identify problems and solutions. Harn's Marsh is a 578 acre flood detention facility within ECWCD boundaries. The following problems and solutions were identified.

The control weir at the South Marsh will be rebuilt to accept flows at a lower elevation. The existing marsh inlet structures will be equipped with automated staff and rainfall gauges and drawdown gates. The drawdown gates will only be opened when large storms such as Hurricanes are expected and will release water to provide additional flood protection. Normally, these gates will be closed to provide maximum dry season storage. Lowering the intake point for the south Marsh will expand the storage is by 230 acres. This will provide a potential to store 1,450 acre feet of water.

Construction of a control weir at the outlet of Harn's Marsh into the Orange River which will raise water levels in Harn's Marsh, restrict flows from Harn's Marsh and lower peak flow discharge into the Orange River at least 20% for the 25 year design storm. The control weirs in Able Canal which discharge into Harn's Marsh will be repaired, modified or replaced to allow flexible operation to provide maximum flood storage in the marsh. Separate wet and dry season control elevations will be maintained by ECWCD. A pump will be added to lift water to the cypress head during dry periods. A

systematic maintenance schedule will be established to manage the cattails and remove exotic vegetation, such as Brazilian Pepper and Java Plum. Higher water levels year round due to these improvements will provide the best management practices for the Marsh. A caretaker house will be built at the entrance to Harn's Marsh and rented to a wildlife or law enforcement officer at a reduced rate to establish a presence on site to discourage trespassing and vandalism.

The ECWCD hopes to allow limited, responsible civic groups access to enjoy the Marsh. The improvements will create an additional 1450 acre feet of storage and longer detention times in Harn's Marsh and will improve water quality being discharged into the Orange and eventually Caloosahatchee rivers.

ELCARP East Lee County Aquifer Recharge Program

Priority Rating: zero

Budget Request: \$200,000 per year for 3 years

Project Partner: East County Water Control District, Lee County,

Project Status: Ongoing

The East County Water Control District (ECWCD) is a special District created under Chapter 298, Florida Statutes. ECWCD is responsible for the water management system for approximately 70,000 acres in eastern Lee & western Henry County. The East Lee County Aquifer Recharge Project (ELCARP) project was a collaborative effort

by Lee County, East County Water Control District and South FWMD recommended a number of structural improvements to the drainage system. EICARP recommended raising water levels for 9,084 acres in the Hendry Canal, Willow Lakes and Nine-Mile Canal basins. The project facilitates aquifer recharge in the area.

This project is approximately half completed. ECWCD has recently approached the District with plans to expand the boundary of the project.

City of Clewiston – Stormwater Treatment Improvements

Priority Rating: zero

Budget Request: \$170,000 per year for Five years

Project Partner: City of Clewiston, XXX Drainage District

Project Status: Ongoing

The City of Clewiston is proposing to provide a master storm water treatment area for lands within the municipality. Attached is a sketch showing the City of Clewiston, major drainage features within the city, the proposed stormwater treatment area, and the SFWMD facilities which accept storm water runoff discharged by the city. The city of Clewiston is located along the shore of Lake Okeechobee. The city contains approximately 3,000 acres. The majority of the city is located within an area platted and developed in 1920. This area has little or no storm water treatment facilities. Land uses vary and encompass residential, commercial

and industrial uses. A small portion of the city has been developed in more recent years. These areas are commercial and residential. In this smaller area, storm runoff is typically treated onsite prior to discharge. The remainder of the city is agricultural. These areas are predominantly improved pasture and sugar cane production. These areas discharge without storm water treatment.

The City of Clewiston proposes to provide a master storm water treatment area for the entire city. The area will treat runoff from the older section of town, which currently has little or no treatment, and the system will provide treatment for the areas of town not yet developed. The system will be similar to the large residential developments, which utilize a master storm water treatment area. The city has identified an area of undeveloped land adjacent to the city's northern boundary. The tract is bound by the USACOE Lake Okeechobee levee (Hoover Dike) and the SFWMD's Canal C-20. The tract has two owners: United States Sugar Corp. and the State of Florida. The City of Clewiston and the Clewiston Drainage District would jointly permit the proposed storm water treatment area. The existing Clewiston Drainage pumps will be relocated to discharge across the C-21 Canal into the storm water treatment area. The storm water treatment area would utilize detention and plant uptake to treat runoff. Discharge from this basin could then be routed by the SFWMD utilizing the existing structures to the same receiving bodies. land is owned by

the trustees TIFF, C21 bisected old lakeshore new levee. Appraisal value \$200.00 an acre 728.4 acres = \$145,680.00)

Western Acres

Storm Water System Retrofit

Priority Rating: zero

Budget Request: \$100,000 per year for ten years

Project Partner: Lee County

Project Status: Proposed

Western Acres is located in North Fort Myers east of U.S. 41 in north Lee County within Section 9, 10 & 11, Township 43 South, Range 24 East. Western Acres is an older subdivision comprised of 5 acre parcels (approximately 65) without any internal positive drainage system. A gravity outfall discharge for the area has not been identified nor established, resulting in seasonal flooding and standing water. To

provide an outfall for the area would require clearing, grading and installation of a small structure in the southeast corner of the subdivision.

Lee County's Natural Resources Division, with funds made available by South Florida Water Management District and Lee County will be performing drainage system improvements in the Western Acres Subdivision, North Fort Myers. The purpose of this project as follows: Establish a hydraulic connection between Western Acres and the existing conveyance to the south by installing a weir at a strategic location in the southeast quadrant of the subdivision. Construct new swales and improve existing swales to direct flow to the new outfall structure.

Assessment Projects – Estuarine Restoration

Spatial Modeling to Determine Optimal Freshwater Inflows into the Estuarine Habitats of Caloosahatchee

Budget Request: \$100,000

Project Partners: UF, FGCU

Project Status: Year 1 of 2

Description: In 1999, a research plan for Caloosahatchee (part of the Caloosahatchee and Watershed Assessment) was proposed. As part of this plan, valued ecosystem components for Caloosahatchee were identified. These

were submerged aquatic vegetation, shellfish, and oligohaline habitat. One goal set for the Bay is to "register the location, size, and duration of oligohaline habitats to pre-development conditions". In order to meet this goal, there may be necessary modifications in the quantity and timing of freshwater inflows into the Bay.

In addition, the SFWMD is responsible for the establishment of minimum flows for surface waters, where the minimum flow is the limit at which withdrawals would be significantly harmful to the water resources or ecology of an area.

MFL's for Caloosahatchee are mandated for 2006.

In order to set targets for these freshwater inflows, this project will focus on gaining an understanding of how changes in inflow affect estuarine species, including fish and invertebrates important for sport and commercial fisheries, tourism, and the local economy.

The scientists at the University of Florida and Florida Gulf Coast University will work together to create a Habitat Suitability Model for Caloosahatchee. The University of Florida will run the model to test different hydrologic alternatives that they established working with SFWMD Staff.

Caloosahatchee Oxbow Restoration

Priority Ranking:

2003-04 Budget Request: \$ 75,000.

Total Project Cost: \$ 375,000.

Project Partner: Ecosystem Specialists and Caloosahatchee Coalition Partners [Coalition Partners include Lee County as local sponsor, Caloosahatchee River Citizens Association (CRCA), Southwest Florida Watershed Council, Inc., West Coast Inland Navigation District (WCIND), Florida Sea Grant, Southwest Florida Regional Planning Council (SWFRPC) and Florida Marine Industry Association].

Project status: year 1 of 5

The Caloosahatchee oxbows are all that remain of the original, narrow meandering river following the channel dredging conducted by the US Army Corps

of Engineers in the 1930's and 1950's. Prior to the channelization and dredging the river bends slowed the water facilitating the deposition of sediment and absorption of nutrients in the water column and providing habitat for native fauna and flora. Following the channelization activity water flowed directly down the straight, deepened channel, which features eroding, vertical banks without littoral habitat. Today these historic, remnant meanders represent the only aquatic habitat left in the riverine system suitable to serve these same critical functions. However, the channelization has diverted the historic flows from the oxbows, which has reduced healthy flushing resulting in problems with sedimentation and exotic species propagation.

Ecosystem Specialists and CRCA have developed an inventory and database of information regarding the oxbows of the Caloosahatchee with documentation of changes in the specific sites over time. Of the 35 oxbows between WP Franklin Lock in eastern Lee County and SR 29 in LaBelle, Hendry County, 18-20 are in need of restoration assistance to restore aquatic productivity and function. Each oxbow has unique properties that require specific solutions. A plan has been developed and is currently in permitting for an oxbow in Hendry county, identified as oxbow 24 on the attached Oxbow Location map. Since a portion of the cost has been offset in the process underway this would be an ideal initial candidate for initial restoration funding.

In this particular example, an earthen road was installed many years ago connecting the mainland to island. The road effectively stagnated the oxbow by eliminating flow. As exotic vegetation prospered and died a layer of fine muck sediments added to the problem. However, this oxbow supports a very positive orientation to the flow of the channel and could easily be restored to a self-sustaining condition by removal of sediments and the fill road to restore flushing depths. Littoral zone planting will help to stabilize and enhance the aquatic productivity of the system. The coalition partnership was developed to support funding and action to enhance and correct problems in the river.

Submerged Aquatic Vegetation (SAV) Restoration

Budget Requested: \$50,000

Project Partner: Snail Captiva

Conservation Foundation

Project Status: Year 1 of 5

Description: Submerged Aquatic

Vegetation (SAV) is a form of seagrasses and are the mainstay of habitat that estuarine organisms associate with for a variety of reasons. SAV's serve as a primary food resource for a multitude of grazing animals (e.g. mollusk and crustaceans as well as manatees). They also serve as a nursery habitat for the larvae and young of many of the dominant estuarine organisms. Moreover, SAVs serve as sites of refuge from predators (they

also serve as sites where predators can lie in wait for prey!) and thus play an integral role in the dynamics of the estuarine ecosystem.

A number of natural and human-induced activities have interfered with the ability of SAVs to sustain a normal, healthy condition in Caloosahatchee. Severe storms, dredging, boating, salinity alterations, and dock construction are just some of the many events that have interfered with the normal growth process.

A large-scale restoration initiative to help replace the SAV is a significant way to expedite the recovery of this natural and dynamic ecosystem to a highly productive, naturally sustainable estuarine ecosystem. The restoration efforts will examine each of the species of SAV (e.g., tape grass, turtle grass, manatee grass, shoal grass, etc.) and align the known life history requirements of these species with the environmental conditions currently found in the estuary. Subsequently trial restorations, based on the placement in the areas that assure the highest level of success, will be conducted. Evaluations of these initial plantings, with successive evaluation of ambient environmental conditions will further increase the probability of success of subsequent plantings. Thus the project continues to development a database of restoration success/failure-based data that allows an increase in the probability of successive subsequent restoration efforts.

**Assessment Projects – Estuarine
Sedimentation
Inflows into the Estuarine Habitats of
Caloosahatchee
Budget Request: \$100,000
Project Partners: FGCU
Project Status: Year 2 of 3**

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The Charlotte Harbor Watershed INITIATIVE

South Florida Water Management District
Fiscal Year 2003-2004

Contents

Introduction – The District.....2

Introduction –the Charlotte Harbor Watershed.....3

Capital Projects – Surface Water Restoration.....7

Water Resource Development Projects.....13

The Charlotte Harbor Watershed

Fiscal Year 2003 – 2004

Introduction – The District

Water is Florida's most important natural resource and is central to our quality of life. The mission of the South Florida Water Management District (District) is to manage and protect water resources of the region by balancing and improving water quality, flood control, natural systems and water supply.

The South Florida Water Management District is the oldest District, starting in 1949 when the Florida Legislature created the Central and Southern Flood Control District, the predecessor to the South Florida Water Management District. In 1972, with the Florida Water Resources Act (Chapter 373), the state created five water management districts, with expanded responsibilities for regional water resource management and environmental protection.

Today, we operate and maintain this massive project, which includes 1,800 miles of canals and levees, 25 major pumping stations and about 200 larger and 2,000 smaller water control structures.

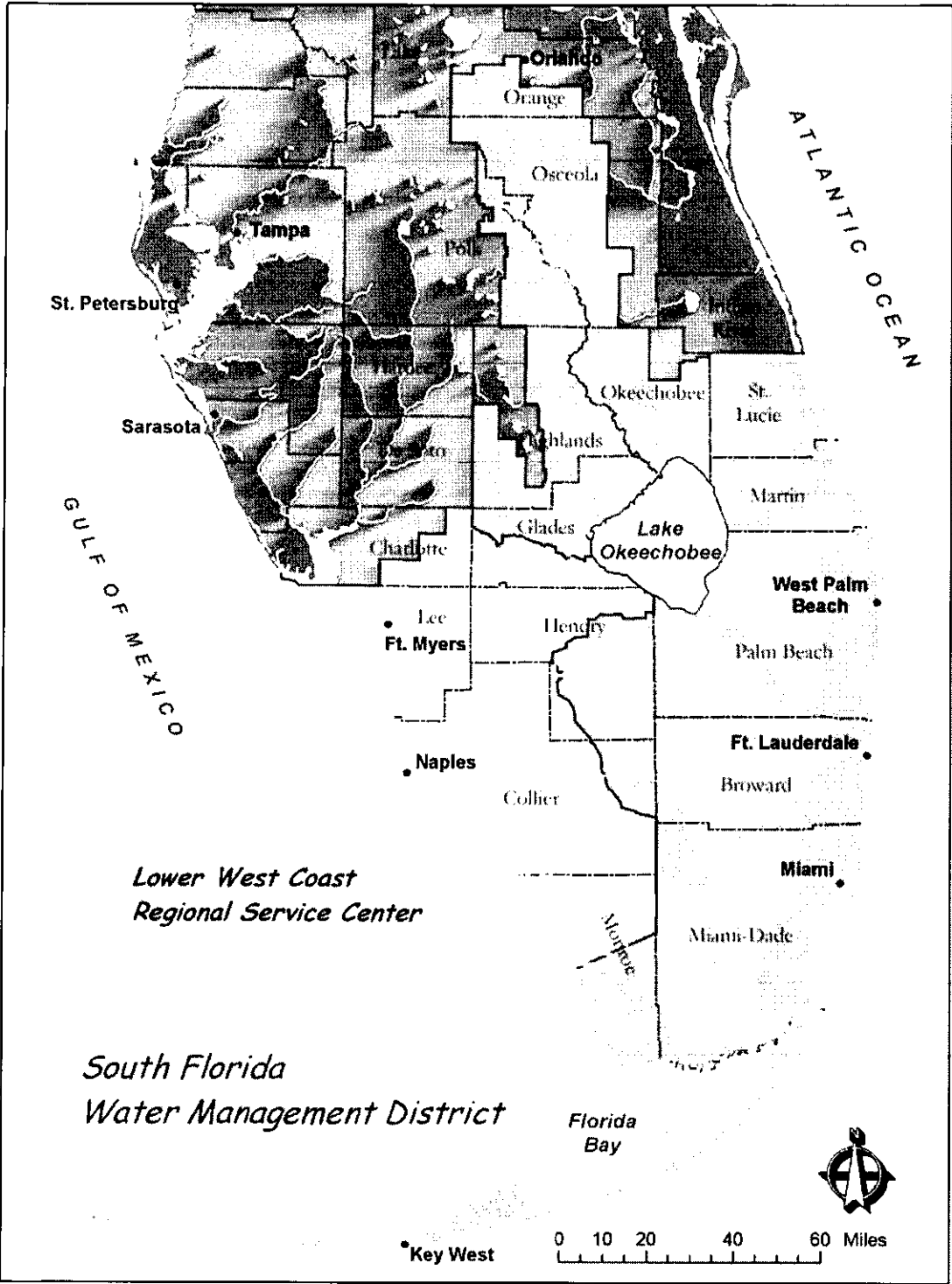
The District spans 16 counties with a total population of about six million residents. This geographic region covers 17,930 square miles and includes vast areas of agricultural lands, water conservation areas, and areas of enormous urban growth and development.

The District also contains some very significant natural systems. Lake Okeechobee is the "liquid heart" of South Florida. It is a large, shallow lake located in south central Florida with a surface area of 730 square miles and is the second-largest freshwater lake in the continental United States. The Kissimmee River, which historically meandered approximately 103 miles from Lake Kissimmee to Lake Okeechobee but was channelized between 1962 and 1971, is now being restored to reverse the loss of ecosystem function. And the world's most famous wetland, "The River of Grass", The Everglades, home to 56 federally-listed threatened or endangered

species including the Florida panther, the American crocodile and the wood stork.

By working with our Federal, state and private partners we can achieve our vision to be the world's premier water resource agency and create an ecosystem that can be enjoyed by everyone.





Introduction – The Charlotte Harbor Watershed

Charlotte Harbor is America's 17th-largest and Florida's second largest open water estuary. It is also one of Florida's major environmental features in which the State of Florida has invested significant financial resources in the last three decades. It has a broad barrier island chain, large parts of which are in public ownership; its mangrove shoreline is largely intact and in public management. It is the site of three National Wildlife Refuges, and four aquatic preserves. It is bordered by three counties (Lee, Charlotte, and Sarasota), each of which is in full compliance with Florida's Growth Management Act.

The Harbor, however, needs significant and sustained investment in water resource restoration. Divided between two districts, the Southwest and South Water Management Districts, the Harbor has long been recognized as needing investment in reestablishing its hydrologic regime. This was first identified in the Governor and Cabinet's Charlotte Harbor Resource Planning and Management Plan (1982), the Southwest Florida Water Management District's SWIM Plan (1992), and the National Estuary Program's Comprehensive Conservation Management Plan (2000). The South Florida Water Management District has a SWIM Plan pending for the part of the Harbor within the jurisdiction of Lee County.

Charlotte Harbor and its adjoining lands and waters constitute a comparatively large, valued ecosystem in Southwest Florida. The Harbor is estuarine in nature and characterized by:

- A semi-enclosed body of water, open to the Gulf of Mexico;
- Freshwater from three major rivers and several smaller streams mixing with marine water of the Gulf;
- Dilution of sea water ranging from zero to 100 percent, depending on season, location, and depth in the Harbor; and
- Semi-tropical plants and animals.

Charlotte Harbor Proper is dominated by rivers that flow into the coastal areas.

Unlike other estuaries in Southwest Florida that are most influenced by the Gulf of Mexico, Charlotte Harbor's special characteristics are created by large rivers, such as the Caloosahatchee. Large fluctuations of river flows between wet and dry seasons strongly affect the salinity and water characteristics in Charlotte Harbor.

Geographically, the watershed stretches from the headwaters of the Peace River in Polk County to the southern end of Estero Bay in Lee County, a distance of more than 100 miles.



Historical Overview

Humans have a long history of changing the hydrology of Southwest Florida. On the Caloosahatchee River, the Calusa Indians, who lived in the region from 500 to 1750 A.D., were active traders who used the waterway network from Charlotte Harbor up the Caloosahatchee. Research suggests that they may have created a series of canals near Ortona, making the Calusa the first humans to create a link between the Caloosahatchee and Lake Okeechobee.

Modern man-made changes to the region's hydrology have been occurring since the late 1800s. In 1881 the State of Florida sold four million acres to businessman Hamilton Disston for \$1 million. In 1882, Disston began straightening and channelizing the Caloosahatchee River. Between 1905 and 1927 six major canals and channelized rivers, including the Caloosahatchee, were connected to Lake Okeechobee to provide drainage. Drainage of South Florida was furthered by the General Drainage Act of 1913 to establish special drainage districts. More than 100 drainage districts were eventually created, some of which still exist.

From 1840 until 1900 the Southwest Florida Region included only two counties,

Hillsborough and Monroe. These counties governed the west coast of Florida from present-day citrus County south to the Florida Keys. The current political boundaries consider "Southwest Florida" to include Charlotte, Lee, Collier, Glades and Hendry Counties. In 1930, the U.S. Census counted the population of Southwest Florida with 40,580 people. By 1994 the permanent population exceeded 1,000,000, not including seasonal residents. The seasonal population increases the total approximately 22 percent.

The land boom of the 1950's and 60's resulted in the platting of thousands of acres of rangeland and forests. Most of the quarter acre plats would not meet today's standards. Most are served by septic tanks. Many are the result of canal dredge and fill. Response against these land changes in southwest Florida resulted in state's first Mangrove Removal and Trimming Rule and local environmental rules.

In 1987, the state Surface Water Improvement and Management Act (SWIM) passed. This program directed the water management districts to prioritize waterbodies, develop plans for their management, and fund restoration projects in these special watersheds. The Southwest Florida Water Management District designated Charlotte Harbor watershed as a SWIM waterbody, one of 29 watersheds in Florida.

Citizens Involvement

Citizen involvement includes formal public involvement opportunities and grassroots citizens' initiatives.

The major formal public involvement process addressing Charlotte Harbor and its watersheds is the Charlotte Harbor National Estuary Program (CHNEP) Citizens Advisory Committee (CAC). Through the CAC, citizens have the opportunity to raise concerns regarding policies affecting the watersheds. Citizens also have the opportunity to identify research, restoration, and education needs.

Other formal public involvement efforts are associated with local government efforts, many of which provide match for the Charlotte Harbor initiative. Lee County's Conservation 2020 program includes the

Conservation Lands and Stewardship Advisory Committee (CLASAC). Charlotte County develops its policies, in part, through the Charlotte Assembly process.

A host of grassroots citizens' initiatives have developed to insure that water resources are protected in southwest Florida. These groups possess a high level of credibility in the area. They include the Southwest Florida Watershed Council (SWFWC), the Water Enhancement and Restoration Council (WERC), The Caloosahatchee River Citizen Association (CRCA), and Friends of the Charlotte Harbor Aquatic Preserves.

Key Efforts

- Restore Spoil Islands in the Caloosahatchee River and Estuary
- Restore native vegetative mosaic in the Charlotte Harbor State Buffer Preserve through removal of exotic vegetation
- Environmental Clean-up and improved drainage in Powell Creek.
- Wetland Restoration at Sanibel Gardens
- Capital Improvements to Burnt Store Road
- Restoration of Shell Fish in Charlotte Harbor
- Submerged Aquatic Vegetation Restoration
- Re-establishing Mangroves along Disturbed Shorelines
- Fisheries Enhancement and Assessment: Lower Charlotte Harbor
- Charlotte Harbor National Estuary Program cost match
- Benthic Community-Based Calibration of Water Quality Parameters in the Caloosahatchee River/Estuary

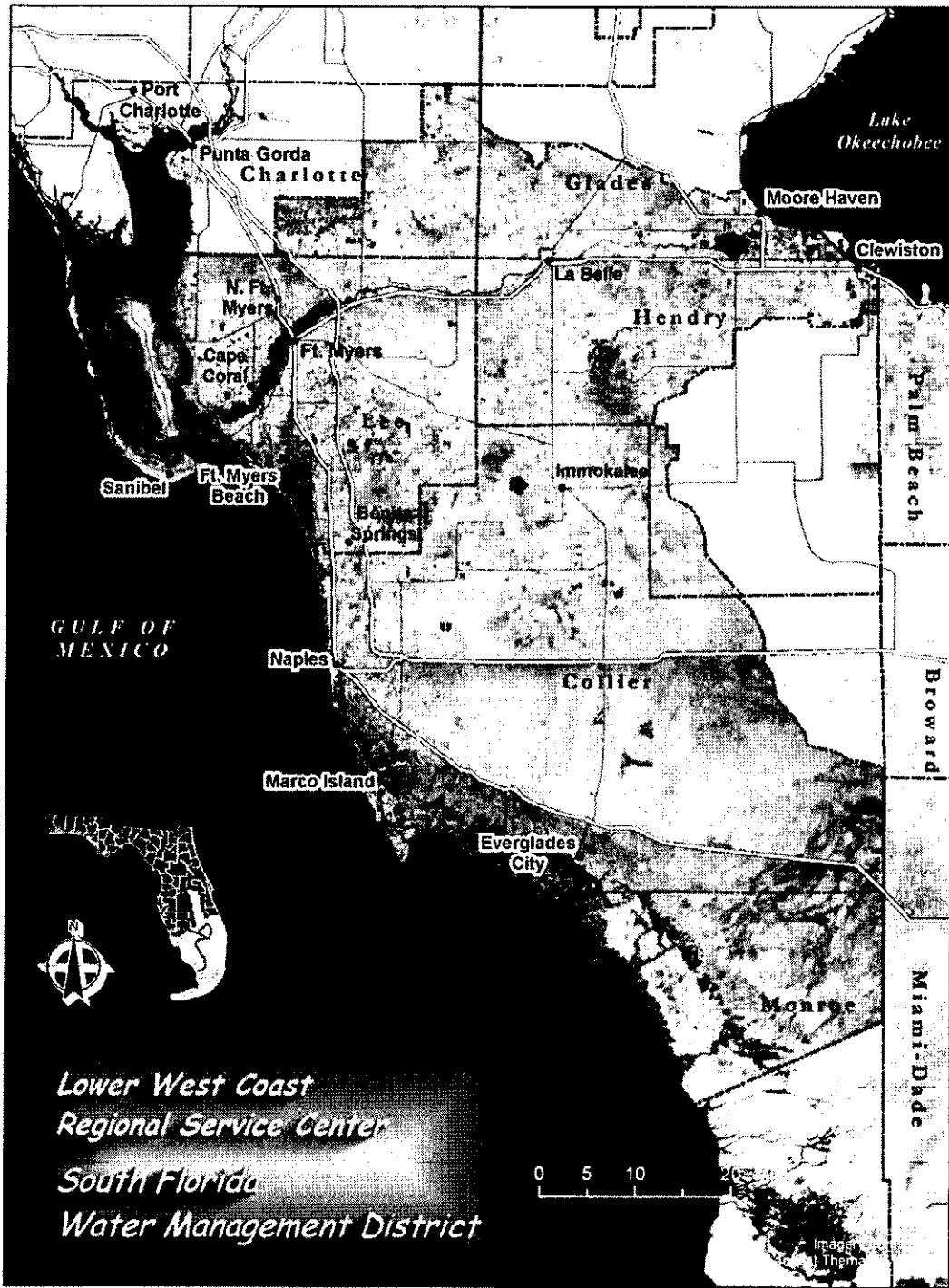


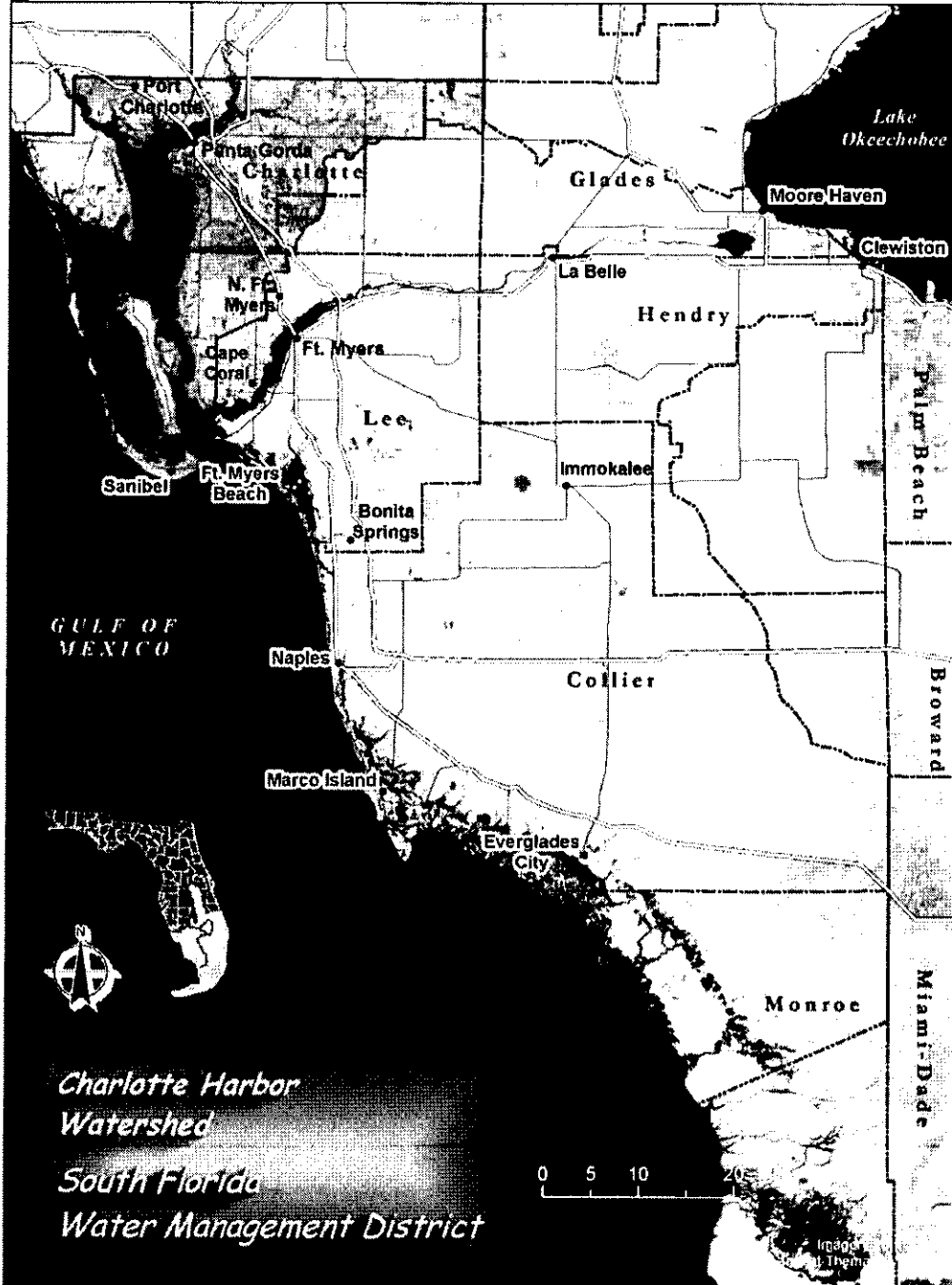
Charlotte Harbor Partners
Charlotte Harbor National Estuary Program
Lee County
Captiva Erosion Prevention District
City of Sanibel

Florida Department of Environmental Protection
Florida Sea Grant
Florida Gulf Coast University
NOVA Southeastern University
Sanibel Captiva Conservation Foundation
Florida Marine Research Institute
Charlotte Harbor State Aquatic Buffer Preserve
Florida Forever

Totals of This Basin

Project costs (2003-2005): \$26,020,500
Funding request (2003-2004): \$4,860,000
Funding Requests (2003-2005) \$9,410,000
Project match (1998-2002): \$16,610,500





Capital Projects – Surface Water Restoration

Caloosahatchee Spoil Area Restoration

Priority Ranking:

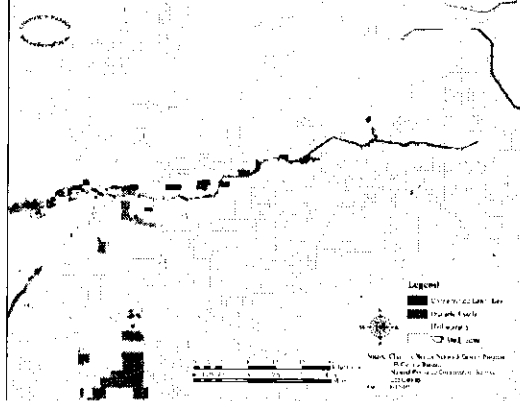
2003-04 Budget Request: \$500,000

Total Project Cost: \$500,000

Project Partner: Lee County and Florida Forever

Project status: year 1 of 1

When the Caloosahatchee was channelized, much of the spoil from the project was piled at locations along the banks. This work not only changed the hydrology of the areas, but allowed a location for exotic plant invasion. Brazilian pepper (*Schinus terebinthifolius*) is the worst among them. The map below shows the spoil areas in red.



Some of these areas are under public ownership, including recent additions under Lee County's Conservation 2020 Program and near I-75. This area is shown on the second map on the north side of the river, intersecting with the blue, publicly owned area.



Approximately 300 acres of the 1167-acre acquisition is covered with spoil from the dredging.

Lee County is pursuing a partnership with Florida Forever which includes a management plan. The draft management plan calls for removal of the exotic infestation and prescribed burning at a cost of \$650,000 for the entire property. Removal of the spoil would assist the county in restoring the riverine vegetative community that occurred before the dredging. Coupling the County cost of exotic removal with an estimated \$500,000 will provide for restoration of the hydrology and purchase of native plants to re-establish what was lost.

Habitat Restoration – Removal of exotics and reestablishment of native vegetative mosaic in the Charlotte Harbor State Buffer Preserve

2002-03 Budget Request: \$500,000

Total Project Cost: \$1,280,000

Project Partner: Charlotte Harbor Aquatic and State Buffer Preserve, Charlotte Harbor National Estuary Program

Project Status: Ongoing

The Charlotte Harbor Aquatic and State Buffer Preserves manages ~45,000 acres of State owned public lands which act as a buffer for 164,806 acres of Aquatic Preserves, including Pine Island Sound Aquatic Preserve, Charlotte Harbor Aquatic Preserve, Cape Haze Aquatic Preserve, and Matlacha Pass Aquatic Preserve. In addition to providing a buffer for the Aquatic Preserves, these lands encompass a matrix of increasingly rare habitats for a host of State and Federally listed endangered and threatened species such as the piping plover, wood stork, bald eagle, gopher tortoise, eastern indigo snake, golden leather fern, and beautiful pawpaw. The Buffer Preserve is also one of the last regional holdouts for some rapidly disappearing species. For example, 68% of the salt marshes and salt flats have already been lost from the Charlotte Harbor

Watershed. Exotic pest plants such as Melaleuca, Brazilian pepper, Australian pine, earleaf Acacia, and aquatic soda apple are threatening these habitats and invasion of these exotic species has led to the single greatest loss of fish and wildlife habitat at the Charlotte Harbor State Buffer Preserve.

Currently, the Charlotte Harbor State Buffer Preserve has an exotic removal program budget of approximately \$70,000 yearly. The requested funding will enable the treatment of over 600 acres of plants within the Cape Coral area of the buffer preserve that have not yet been eradicated. Treatment methods used by the Buffer Preserve include: mechanical treatment, cut stump and treat with herbicide, foliar herbicide, and biological control. This project will include costs for the initial treatment, maintenance, and retreatment of 600 acres of Melaleuca and 275 acres of Brazilian pepper.

Removal of exotic species will improve the environmental integrity of the Charlotte Harbor area; preserve, restore, and enhance seagrass beds, coastal wetlands, and functionally related uplands; and improve water quality.

Powell Creek Improved Drainage and Environmental Cleanup

2003-04 Budget Request: \$250,000

Total Project Cost: \$282,000

Project Partner: Lee County, Florida Department of Environmental Protection

Project Status: year 1 of 1

Powell Creek is located in North Fort Myers and empties into the Caloosahatchee River. As a result of road drainage and improvements of Bayshore Road, the creek has become shallow with areas that have historically been 4 –5 feet deep are now less than 3 inches at low tide. The creek bed sediments can be characterized as fine material that has settled out in the lower portion of the creek. This has created a "false bottom" up to 4" thick in areas. In the northern part of the creek there is much harder and more sandy material due to settling out of the heavier material upstream. The sediments contain significantly high levels of heavy metals, particularly arsenic in the lower portions of the creek.

This requested funding is for the environmental clean-up of Powell Creek and improved drainage.

Gator Slough Flood Protection

2003-04 Budget Request: \$300,000

Total Project Cost: \$1,500,000

Project Partner: Lee County, City of Cape Coral

Project Status: year 1 of 5

In 1991 a study of this watershed was completed with recommendations to improve the conveyance and management of the water from upper reaches of this watershed to the outfall. Phase I of this project was started in 1997. The first phase captures excess runoff in the Gator Slough system and prevents its runoff into Matlacha Pass preserve area. Diversion is accomplished by diverting the water to the City of Cape Coral's freshwater canal system. This fresh water increases the supply of water for the City's dual water irrigation system and thus reduces the loss of water and the impact on the estuary's ecosystem. The project increases the storage capacity of the canal system, while the use of dual water irrigation system reduces the draw down of ground water for residential irrigation uses.

The Lee County Gator Slough Watershed Study recommended the removal of the blockage and cap rock west of U.S. 41; removal of the vegetation obstructing the existing canal and weir system; and repair of the zigzag weir to allow the flow of fresh water through a control structure into the canal system for storage and eventual use in the City of Cape Coral irrigation system. The Gator Slough watershed encompasses approximately 55 square miles. The watershed runs from Matlacha Pass in Lee County, northeasterly, to the vicinity of Tuckers Grade in the Cecil Webb Wildlife Management Area in Charlotte County. To reduce the large peak pulse of stormwater flow to the Matlacha Pass by diverting flows into the City of Cape Coral Canal system and reserving these flows for supplemental use in the City of Cape Coral's Dual Distribution system. With the initiation of the Charlotte Harbor National Estuary Program, additional concern has been expressed that the large volume of runoff entering Matlacha Pass is having detrimental effects on the vegetative

and aquatic life at or near to the Gator Slough discharge point. This concern, coupled with the ongoing emphasis on region-wide water conservation, indicates that methods to either divert or store excess flows should be considered. Capturing the excessive flow in the Gator Slough system and preventing this excess runoff from adversely impacting the Matlacha Pass preserve area, will also provide a tangible benefit to the City of Cape Coral.



Wetland Restoration at Sanibel Gardens Preserve

2003-04 Budget Request: \$400,000

Total Project Cost: 1,000,000

Project Partners: City of Sanibel, U.S. Fish and Wildlife Service, Sanibel-Captiva Conservation Foundation, National Fish and Wildlife Foundation

Project Status: Ongoing

The City of Sanibel seeks matching funds to assist in the restoration of 305 acres of Sanibel Island's unique interior freshwater wetlands at the Sanibel Gardens Preserve. This project is the culmination of 12 years of land acquisition efforts by the City and will be conducted in a partnership with the U.S. Fish and Wildlife Service and the not-for-profit Sanibel-Captiva Conservation Foundation. It involves the removal of invasive exotic tree species, the removal of fill roads in wetlands and the restoration of the historic oxbows of the Sanibel River. To date, the city has spent \$300,000 toward this effort along with an additional \$300,000 obtained through challenge grants.

All exotic vegetation will be removed from the Sanibel Gardens Preserve including Brazilian pepper and Australian pine. As some stands of these exotic trees are in dense monocultures and some are interspersed with desirable native species such as buttonwood and mangrove, a

combination of mechanical and manual removal techniques will be utilized as appropriate in each location. Such methods include but are not limited to root rake, feller-buncher, hydro-ax, chippers and grinders. Vegetative debris will be either chipped, trucked off site, burned in piles, or left in place in small quantities as cover for wildlife.

With the exception of retaining perimeter access/fire line roads for maintenance, public access and safety, all fill roads in the project area will be bulldozed back into the ditches from which the fill originated to restore wetland grades. As is sometimes the case when trying to fill back in a hole, there may not be sufficient fill within the existing roads to completely match the adjacent grade in all areas. In these locations, and at intervals throughout the project, the former road alignments will be graded irregularly to form shallow ponds, seasonal connecting flow-ways and "islands" to provide a diversity of wetland elevations and fish and wildlife habitat. Some of the ponds located within these former roadways will be excavated to a level sufficient to provide adequate standing water for fish populations even in dry conditions. At a bottom elevation of -2.0' to -4.0' NGVD, such "fish refugia" will remain viable and available to re-populate the adjacent wetlands with fish both as forage food for wading birds and for mosquito control purposes even after drought conditions (for example, Spring 1999 brought water levels down to below sea level along the Sanibel River corridor).

Several sections of the Sanibel River channel historically meandered through the wetlands within these subdivisions in curving oxbows. Aerial photographs (see attachment) of Sanibel Island clearly show this former river course. These curves were blocked and cut-off by road construction and the river dredged to form an artificially straight canal. The road fill at the intersections with these historic oxbows will be completely removed from the restoration site so as to re-create and restore water flows to the former meandering river channels. In a few locations some fill will be left as islands within the river to provide potential roosting and nesting sites for wading and/or shorebirds

As is the case with other similar already complete wetland restoration projects on the island, it is anticipated that suitable seed sources exist adjacent to the project which will enable recruitment of sufficient native wetland species to become re-established in the restoration areas without the need for plantings. However, if funding is available, site recovery will be jump-started with low density plantings of appropriate native wetland species to provide an immediate diversity of seed sources. Such plantings would include the endemic flora of the interior wetlands such as smooth cordgrass, leather fern, spike rush, bulrush, water hyssop, widgeon grass, spider lily, pond apple, red mangrove and Carolina willow.

Capital Improvements to Burnt Store Road

2003-04 Budget Request: \$200,000

Total Project Cost: 400,000

Project Partner: Lee County

Project Status: year 1 of 1

The northwest region of Lee County consists of four principle watersheds: Yucca Pen, Durden Creek, Greenwell Branch and Longview Run. These watersheds drain into Charlotte Harbor bay of the Gulf of Mexico. Yucca Pen Creek and Durden Creek have a significant part of their upstream drainage area in Charlotte County.

Burnt Store Road which runs north-south has a number of major crossings of these streams. There is limited development within these watersheds except mining, especially in areas west of Burnt Store Road. Further, residential developments are anticipated in the watershed areas east of Burnt Store Road in coming years. There are no formal surface water drainage systems in the area east of Burnt Store Road on these watersheds; conveyance is primarily by sheet flow and via shallow streams until water reaches the Burnt Store Road.

Lee County intends to develop a surface water management plan for the northwest region including an overall assessment of existing conditions. This plan will involve assessment of drainage basin boundaries and their better delineation as needed and development of hydrologic/hydraulic models of the watersheds.

The surface water management plan will include (1) identification of issues of concern (2) existing level of service deficiencies for flooding (3) evaluation and sizing of all proposed control structures along Burnt Store Road to convey 25-year flood for the projected built-out capacity.

Highlands Weir Hydroperiod Restoration Project

2003-04 Budget Request: \$350,000

Total Project Cost: 3,950,000

Project Partners: City of Sanibel, Sanibel-Captiva Conservation Foundation

Project Status: year 1 of 1

The Highlands Weir Project is designed to restore the historic hydroperiod to degraded wetlands along the Sanibel River on Sanibel Island. The Sanibel River is the major waterbody in the approximately @1600 acre rare barrier island freshwater wetlands on Sanibel Island. The east basin of the river is maintained at elevation +2.7' NGVD by a fixed crest weir located at Beach Road. This weir crest is significantly lower than the historic hydroperiod (estimated at +3.2' - +4.0' NGVD, but was set at this level to prevent flooding of low-lying private property in the basin. Considerable conservation lands at the west end of this basin between the Highlands Subdivision and Tarpon Bay Road has been recently purchased for preservation by both the City via its Environmentally Sensitive Lands Conservation Program and the Sanibel-Captiva Conservation Foundation (SCCF). Protected lands in this area of the east basin total over 350 acres but they are still subject to the artificially lower hydroperiod maintained at the Beach Road weir. This project involves designing and constructing an additional weir at conservation lands owned by the City in the Highlands Subdivision, thereby restoring the historic hydroperiod and greatly improving the habitat values and function of the protected wetlands upstream. By placing the weir in this location, private properties downstream will still have the benefit of lower water levels for flood control, while the protected wetlands upstream will benefit as well by being restored to their previous hydroperiod.

The Sanibel River has been declared a degraded waterbody by the Florida

Department of Environmental Protection due to persistent high levels of nutrient pollution. Another benefit of the project is to provide greater retention in the watershed to allow the wetlands to act as a filter marsh and improve water quality prior to discharge into San Carlos Bay (Class II, Outstanding Florida Waters). The conservation lands upstream of the project area have recently been completely cleared of all invasive exotics, including dominant stands of Brazilian pepper and Australian pine. With the restored hydroperiod, these exotics will be much easier to control on the conservation lands.

This project will be a joint effort between the City of Sanibel, the Sanibel-Captiva Conservation Foundation and the granting agency. The City and SCCF has recently completed a \$3.6 million land acquisition for this project.

Sanibel-Captiva Road Culvert Connection Project

2003-04 Budget request: \$350,000

Total Project Cost: \$380,000

Project Partners: City of Sanibel, Lee County and the Captiva Erosion Prevention District

Project Status: year 1 of 1

This important environmental restoration project is designed to improve tidal flow and water quality in Clam Bayou and Dinkins Bayou at the west end of Sanibel Island by connecting them with a culvert under Sanibel-Captiva Road. Road construction since the 1920's on Sanibel closed off this historic connection, which was once the main channel of Blind Pass. Clam Bayou, an extraordinarily productive mangrove lined estuary is now completely blocked off from tidal flows except when rare and ephemeral tidal pass connections to the Gulf of Mexico occur during and just after major storm events. This has left Clam Bayou in an impounded condition, with fish kills and very serious mangrove die-offs occurring when major rainfall volumes are trapped in the basin. Oyster bars and submerged marine seagrass beds in the bayou are extremely stressed by degraded conditions. Over 116 acres of red mangrove forest were killed during a 2001 water impoundment event.

Dinkins Bayou is still connected to Pine Island Sound at Blind Pass but is also degraded in that it is suffering from low tidal circulation and poor water quality due to the closure of that pass. Both bayous stand to benefit significantly from a properly designed culvert connection to restore the historic tidal flows through the system and prevent fish kills and mangrove die-offs in Clam Bayou.

This project is already in its feasibility study phase with the City of Sanibel, Lee County and the Captiva Erosion Prevention District jointly funding a \$30,000 engineering study. If this study recommends a culvert connection, as it is anticipated to, the design, permitting and implementation phases can begin as soon as grant funds are identified.

A flowing tidal connection between Clam Bayou and Dinkins Bayou would restore an historic tidal creek and improve water quality in both water bodies. With a permanent tidal connection, rainfall cannot impound itself in Clam Bayou, and mangrove die-offs and fish kills can be prevented. Both waterbodies currently support large numbers of listed and protected species including the endangered wood stork and the American crocodile. The improved tidal flows that would result from this restoration project would improve marine habitat for literally hundreds of species of fish and coastal wildlife.

Hydrologic Restoration of the Dewitt Preserve, Sanibel.

2003-04 Budget Request: \$300,000

Total Project Cost: \$350,000

Project Partners: City of Sanibel, Sanibel-Captiva Conservation Foundation

Project Status: year 1 of 1

Proposed project includes clearing and restoring hydrology to 133 acres of the Dewitt Preserve along the Sanibel River Corridor. The Preserve lies at the headwaters of the Sanibel River and is adjacent to over 400 acres of State and City conservation lands already cleared of invasive exotics in 1998.

Currently the parcel is approximately 70-90% covered by Brazilian pepper and Australian pine. Most of the pines are concentrated at the north side along the upland ridge while the rest exist on spoil

piles created by ditching in the 1940's for mosquito control.

The bulk of the exotics will be removed by mechanical means. Remaining exotics will be chemically treated and left standing. Soil piles will be removed from wetlands and returned to natural surrounding grade.

Assessment Projects – Estuarine Restoration

Restoration of Shell Fish in the Charlotte Harbor

2003-04 Budget Request: \$150,000

Total Project Cost: \$790,000

Project Partner: Florida Gulf Coast University Florida Gulf Coast University

Project Status: Year 1 of 5

Records from Southwest Florida suggest that oyster growth and distribution has decreased drastically since the 1960s. Restoration of oyster reefs in this watershed will indirectly restore the water quality of 75,180 hectares in Caloosahatchee estuary alone by the enhanced filtration rate of restored and enhanced oyster reefs. With the support from the South Florida Water Management District and the Charlotte Harbor National Estuary Program, we have already identified areas in the Caloosahatchee River and in San Carlos Bay that are conducive to the production of healthy oyster reefs. In collaboration with the Lee County School District, Florida Sea Grant and the City of Cape Coral, we will educate and involve the general public as well as high school and undergraduate students in a community-based restoration of oyster reefs in the lower Charlotte Harbor estuary. We intend to utilize community volunteers to create, maintain, restore and enhance oyster-shell reefs in order to establish healthy living-oyster reefs.

Currently, Florida Gulf Coast University has a budget of \$40,000 to restore pilot oyster reefs in the Caloosahatchee River. This project attempts, through public education and involvement, to restore and/or enhance oyster reefs, thereby improving habitat availability and water quality within the Caloosahatchee River estuary. Reef-restoration efforts will include "oyster gardening" by local citizens.

Submerged Aquatic Vegetation (SAV) Restoration

2003-04 Budget Requested: \$150,000

Total Project Cost: \$750,000

Project Partner: Sanibel Captiva Conservation Foundation

Project Status: Year 1 of 5

Beds of submerged aquatic vegetation (SAV), such as seagrass, are important to the ecology of shallow estuarine and marine environments. These beds provide habitat for many benthic and pelagic organisms, function as nurseries for juveniles and other early life stages, stabilize sediments, improve water quality and can form the basis of a detrital food web. Because of their importance, estuarine restoration initiatives often focus on SAV. SAV are commonly monitored to gauge the health of estuarine systems and their environmental requirements can form the basis for water quality goals.

A number of natural and human-induced activities have interfered with the ability of SAVs to sustain a normal, healthy condition in the lower portions of the Caloosahatchee River and Estuary. It has been estimated that seagrass coverage in the lower estuary and San Carlos Bay has been reduced nearly 30 % since the 1940's. Storms, dredging, boating, salinity alterations, reduced water clarity, excess nutrient loading and dock construction are just some of the many factors that have interfered with the normal growth process.

A large-scale restoration initiative to help replace the SAV is a significant way in which we can more quickly get this natural and dynamic ecosystem back on track as a highly productive, naturally sustainable estuarine ecosystem. The restoration efforts will examine each of the species of SAV (e.g., tape grass, turtle grass, manatee grass, shoal grass, etc.) and align the known life history requirements of these species with the environmental conditions currently found in the estuary and river. Trial restorations will be conducted in areas experiencing a range of environmental conditions. Sites will range from those with a predicted high potential for restoration to those with a predicted low potential. Monitoring of plant survival, growth rates, and productivity coupled with water quality analysis, measurement of light availability, and quantification of epiphyte load and abundance of drift algae will identify the factors that control the success of SAV in the Caloosahatchee. Thus, the project will

develop a model that will guide and increase the success of future restoration efforts.



Re-establishing Mangroves along Disturbed Shorelines

2003-04 Budget Requested: \$150,000

Total Project Costs: \$750,000

Project Partner: Sanibel Captiva Conservation Foundation, NOVA Southeastern University

Project Status: Year 1 of 5

In many coastal areas, development has occurred, leaving behind a shoreline that is fully capable of being restored to its original productive mangrove shoreline. Methods recently been developed that insure success in planting mangroves from seedlings along a variety of disturbed coastal areas. Using these techniques, the objective is to re-establish mangroves along disturbed shorelines. Previous experience with these techniques indicates that annually about 2-4 miles of shoreline can be successfully replanted from native stock of seedlings. Over the course of this 5 year initiative, it is anticipated that 10-16 miles of shoreline will be re-vegetated. Annually, the methods and site-specific conditions of restoration will be carefully evaluated and examined to modify subsequent restoration efforts. An annual evaluation of the success and failure of the restoration efforts will be made so that future modification to the protocols will benefit from the previous experience.

There will be several benefits derived from this project: 1) over 10 miles of disrupted shoreline will be restored, 2) the coastal ecosystem will increase in its ability to sustain local fisheries and relocated recourses, 3) progress will be made in more fully refining mangrove

restoration techniques, and ultimately 4) the local community will be able to experience and directly observe the overall effects of shoreline mangrove restoration- leading to a more ecologically minded populace that will, hopefully, conduct future developments in a manner that is mindful of the potential impacts that mangrove destruction can have.



Fisheries Enhancement and Assessment: Lower Charlotte Harbor

2003-04 Budget Request: \$500,000

Total Project Cost: \$2,050,000

Project Partner: Florida Marine Research Institute, Florida Sea Grant, Sanibel Captiva Conservation Foundation

Project Status:

Fisheries enhancement year 2 of 5

Fisheries monitoring – year 1 of 4

The fisheries resources in Southern Charlotte Harbor and Caloosahatchee Estuary are poorly understood. Currently, Florida Marine Research Institute has a program to monitor fisheries in Upper Charlotte Harbor through their Independent Fisheries Monitoring (FIM), but there is no similar program in the lower region of the harbor. The FIM Project is long term and is designed to estimate relative abundance of fish and to provide status and trends of fish populations. This project also provides

information on fish community composition and estuarine habitat use.

Florida Sea Grant and Sanibel Captiva Conservation Foundation, through financial support from local businesses, government, and non-profit organization (\$50,000) has started a fisheries enhancement program in Southern Charlotte Harbor, raising red fish, sea trout, and snook. Financial support will allow for the continuation of this program and the collection of information regarding its success.

This Fisheries Assessment and Enhancement Program for Lower Charlotte Harbor project will provide the Florida Marine Fisheries Commission and other resource management agencies with information necessary for implementing effective fisheries management measures.



Benthic Community-Based Calibration of Water Quality Parameters in the Caloosahatchee River/Estuary

2003-04 Budget Request: \$200,000

Total Project Cost: 1,000,000

Project Partner: Sanibel-Captiva Conservation Foundation

Project Status: Year 1 of 5 years

Water quality is an often-measured surrogate as an indicator for environmental condition or fitness. It is normal to establish an array of water quality stations, sample them at regular intervals and report on their status and trends. Moreover, water quality parameters have become an end unto themselves. Missing, however, from this process is the relationship that water quality has with the associated community of organisms that depend upon water quality for their sustenance. This is the situation that currently exists for the Caloosahatchee River/Estuary. We have an abundance of water quality data with little understanding of what those data mean in terms of the ecosystem as a whole.

This study proposes to establish a series of water quality stations, similar to those stations previously established by the SFWMD and other organizations such as Lee County Environmental Laboratory and the Florida Department of Environmental Protection. The variables to be measured will include those typically measured as part of a water quality study and will include: temperature, DO, salinity, conductivity, turbidity, color, pH, and nutrients as well as other important anions (e.g., Cr, Fe, etc.). Concomitant with sampling for water quality (at both surface and bottom), sampling will also be conducted for benthic community residents (typically macrobenthic invertebrates) using replicate bottom samples (petite Ponar grab). Dependent, biotic variables recorded will include: species, number of individuals, species richness, species diversity, and evenness. Sampling for all variables (dependent, biotic variables and independent abiotic variables including flow and weather conditions) will be conducted monthly at each of at least 10 stations chosen to represent the broadest array of habitat within the system that also have historically useful information.

Analyses will include descriptive statistics of all variables as well as an analysis of status and trends of each variable over time. Important to our objective here, however, will be an intense examination of the associative relationship among and between all independent and dependent variables. This will be done chiefly through Canonical Correspondence Analysis (CCA) and non-linear Multi-dimensional Scaling (MDS). These robust analyses can be conducted without assuming that the data are parametric (i.e., drawn from a normally distributed population) and allow the investigator to discern patterns of association among the degree of change in the variables.

The outcome of such a study will allow us to determine the degree of relationship that occurs between the water quality of the area and the *in situ* benthic organisms that depend upon it for sustenance. The degree of relationship and interaction among measured variables will allow future studies to reduce their efforts and direct them more specifically toward those independent and dependent variables that show the highest

degree of predictability. Thus continuing the surrogate measures of water quality may be supported or rejected by this study. It is more likely, however, that this study will provide the basis for establishing long-term measures of the biotic community that meaningful from the perspective of ecosystem management.

overwhelm existing funding levels. A state partnership equal to Federal commitments, and augmenting local funding, will substantially assist the CHNEP in implementing the CCMP.

Charlotte Harbor National Estuary Program state match

2003-04 Budget Request: \$510,000

Total Project Cost: \$1,355,000

Project Partner: Charlotte Harbor National Estuary Program

Project Status: Beginning Plan Implementation

The funding will provide state match to the Clean Water Act Section 320 funds that are given to the Charlotte Harbor National Estuary Program (CHNEP) by the Federal government. Furthermore, the match will fund a variety of research, restoration, and education projects.

The CHNEP was nominated by the governor, championed by Congressman Porter Goss, and approved by Congress in 1995. The Charlotte Harbor study area is 4400 square miles located in southwest Florida and the Peace River basin. CHNEP is composed of 7 cities, 7 counties, 2 water management districts, 2 regional planning councils, state agencies, and the Environmental Protection Agency. Partnerships extend to resource management agencies, private organizations, businesses, and citizens.

Last year, EPA approved the CHNEP's Comprehensive Conservation and Management Plan (CCMP). Signatories to the plan include representatives from the cities, counties, water management districts, regional planning councils, EPA, as well as the Department of Community Affairs, Department of Environmental Protection, and the Florida Fish and Wildlife Conservation Commission. Concurrently with the adoption of the plan, Congress increased funding to the CHNEP from \$210,000 to \$510,000. This increase will help to implement the plan. However, research, restoration, and public involvement needs identified in the plan