Chapter 8: Florida Forever Work Plan, 2005 Annual Update

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SECTION 8-1: INTRODUCTION

OVERVIEW

As required by Section 373.199, F.S., the South Florida Water Management District (SFWMD or District) has completed the annual update of the Florida Forever Work Plan (FFWP). The purpose of the 2005 Florida Forever Work Plan is to present projects eligible for funding under the Florida Forever Act (Section 259.105, F.S.) and to report on progress and changes since the January 1, 2004 submission.

The District's Florida Forever Work Plan document is arranged in sections providing detail on each of the following regions that comprise the study area:

- Kissimmee River Region
- Lake Okeechobee Region
- Lower West Coast Region
- Upper East Coast Region
- Everglades Agricultural Area (EAA) Region
- Everglades, Florida Bay and Keys Region
- Water Preserve Areas Region
- North Palm Beach County Region
- Miami-Dade County Region

To address the work plan informational requirements outlined in the statutes, the regional sections are organized to provide the following information as appropriate: (1) Physical Conditions; (2) Existing Conditions; (3) Water Quality (Future Without Plan Condition); (4) Physical Facilities and Operations (Future Without Plan Condition); (5) Water Quality Problems and Opportunities; (6) Land Use; and (7) brief regional listing of eligible projects. The remaining sections, integrate both the Comprehensive Everglades Restoration Plan (CERP) and Save Our Rivers (SOR) programs (**Sections 8-10 and 8-11**); outline the Florida Forever Goals and Performance Measures (**Section 8-12**); present the list of eligible projects (**Section 8-13**); and summarize land acquisition and management activities occurring during the reporting cycle (**Section 8-14**). Detailed information on eligible projects may be obtained from the *Consolidated Project Report Database*, see Appendix 1-3 of this volume.

The 2005 SFWMD Florida Forever Work Plan identifies a total of 60 eligible projects, including CERP projects, SOR projects, and water quality and supply initiatives, plans and studies.

The majority of Florida Forever funds made available to the District will be used to acquire lands. **Table 8-1** presents a five-year forecast (FY2005–FY2009) of projected real estate expenditures for eligible projects. The estimated total real estate expenditures for eligible projects in the five-year period is $1,194,376.822, of which Florida Forever funding totaling $36 million is projected to be expended in FY2005.

Table 8-1. Five-year Florida Forever Water Management District Work Plan estimated expenditures.

SFMWD Florida Forever Work Plan
Fiscal Years 2005–2009

Project Title	2005	2005–2009
Comprehensive Everglades Restoration Plan Projects		
Upper East Coast Region		
Indian River Lagoon Project		
Lake Okeechobee Watershed Region		
Lake Okeechobee Watershed		
Everglades Agricultural Area		
Everglades Agricultural Area Storage Reseroir, Part 2		
Everglades, Florida Bay, Florida Keys Region		
Everglades National Park Seepage Management		
Florida Keys Tidal Restoration		
WCA-3 Decompartmentalization, Part 1		
C-111 Spreader Canal		
Water Preserve Areas Region		
Site 1 Impoundment		
Acme Basin B		
Broward County WPA		
Strazzulla Wetlands		
Broward County Secondary Canals		
WPA Conveyance		
Palm Beach County Agriculture Reserve Reservoir, Part 1		
North Palm Beach County Region		
North Palm Beach County Project, Part 1		
LNWR Internal Canal Structures		
Lower West Coast Region		
C-43 Reservoir		
Big Cypress/L-28 Interceptor		
Caloosahatchee Backpumping		
Southern Golden Gate Estates		
Miami-Dade County Region		
Bird Drive Recharge Area		
Biscayne Bay Coastal Wetlands		
Waste Water Reuse Pilot		
	$0	**$1,145,721,822**
Water Body Restoration Projects		
Kissimmee River Region & SOR Projects		
Kissimmee River Restoration	$33,000,000	$33,255,000
SOR Projects	$3,000,000	$15,400,000
Restoration Totals	**$36,000,000**	**$48,655,000**
FLORIDA FOREVER TOTALS	**$36,000,000**	**$1,194,376,822**

The annual contribution of Florida Forever funds, while significant, will not be the only source of funds used to implement the projects. Additional funding will be provided through special state appropriations, Conservation and Recreation Lands (CARL) funds, local government-owned lands and/or lands purchased using local government funds. District *ad valorem* funds will support both real estate and non-real estate funding obligations.

LEGISLATIVE REVIEW

Florida Forever Program

The Florida Forever program was created in 1999, authorizing the issuance of bonds in an amount not to exceed $3 billion for acquisitions of land and water areas. The revenue is to be used for the purposes of restoration, conservation, recreation, water resource development, historical preservation and capital improvements to such land and water areas. This program is intended to accomplish environmental restoration, enhance public access and recreational enjoyment, promote long-term management goals and facilitate water resource development. In addition, the legislation sets forth the criteria for the water management districts to evaluate and recommend projects and financial assistance funding programs to local governments. The provision also provides rulemaking authority to the Florida Department of Environmental Protection (FDEP) and the water management districts for implementation of the Florida Forever Act.

The Florida Forever Act

The Florida Forever Act was created in Section 259.105, F.S. The act provides that bond proceeds are to be distributed annually as follows:

- 35 percent ($105 million) to the FDEP for land acquisition and capital expenditures in order to implement the priority lists submitted by the water management districts. A minimum of 50 percent of these funds shall be used for the land acquisitions.
- 35 percent ($105 million) to the FDEP for land acquisition and capital expenditures pursuant to this section. Of these proceeds, a priority is to be given to acquisitions that achieve a combination of conservation goals that include protecting Florida's water resources and natural groundwater recharge. Capital expenditures are not to exceed 10 percent of these funds.
- 22 percent ($72 million) to the Florida Department of Community Affairs, to provide grants to local governments through the Florida Communities Trust. From these funds, 8 percent are to be transferred annually to the Land Acquisition Trust Fund for grants awarded under the Florida Recreation Development Assistance Program in Section 375.075, F.S.
- 1.5 percent ($4.5 million) to each of the following: FDEP for the purchase of inholdings and additions to state parks under the jurisdiction of the Division of Recreation and Parks; the Florida Department of Agriculture and Consumer Services (FDACS); Division of Forestry (DOF) to fund acquisitions and inholdings and additions pursuant to this section, along with reforestation plans or sustainable forestry management; the Florida Fish and Wildlife Conservation Commission (FWC) to fund acquisitions and

> inholdings and additions to land to further the conservation of fish and wildlife; the Florida Greenways and Trails Program to acquire greenways and trails, including railroad rights-of-way and the Florida National Scenic Trail.

All lands acquired pursuant to this section are to be used for "multiple-use" purposes. Multiple use includes outdoor recreational activities pursuant to Section 253.034, F.S., and Section 259.032(9)(b), F.S., water resource development projects and sustainable forestry management. Water resource or water supply projects may be allowed only if the following specified conditions are met: minimum flows and levels (MFLs) have been established for those waters, which may incur significant harm to water resources, the project complies with permitting requirements, and the project is consistent with the regional water supply plan. The entity which vests title in the lands may designate the lands as single use.

Funding under the two 35 percent provisions mentioned above is contingent upon the project contributing to the achievement of certain specified goals. Out of the first 35 percent ($105 million) funding provision, the secretary of FDEP is to ensure that each water management district receives the following percentage of funds: 35 percent ($36.75 million) to the SFWMD; 25 percent to the Southwest Florida Water Management District; 25 percent to the St. Johns River Water Management District; 7.5 percent to the Suwannee River Water Management District; and 7.5 percent to the Northwest Florida Water Management District. An increased priority will be given to such projects that have secured a cost-sharing agreement allocating for the cleanup of point and nonpoint sources of pollution.

According to Section 259.105(3) of the Florida Forever Act, the total allocation will be reduced by the costs of issuing and funding reserve accounts and other expenses associated with bonds. The balance of the bonds are to be deposited into the Florida Forever Trust Fund. Based on historical patterns associated with the Preservation 2000 (P-2000) Program, costs are estimated to be 10 percent.

Under the second 35 percent funding provision mentioned above, the Acquisition Restoration Council (ARC) accepted applications for eligible project proposals beginning July 1, 2000. Project applications are to contain a minimum of two numeric performance measures that relate directly to overall goals and proof that landowners within the acquisition area have been notified of their inclusion in the project. ARC was allowed to use existing rules adopted by the Board of Trustees of the Internal Improvement Trust Fund (TIITF), until amendments to those rules are developed to competitively evaluate, select, and rank projects for Florida Forever funds pursuant to Section 259.105(3)(b). In developing or amending the rules, the council is to give weight to the criteria included in Section 259.105(10). The TIITF are to review the recommendations and adopt rules necessary for the administration of the process. ARC is to review that year's approved project lists and by the first board meeting in May, the council is to submit the lists to the TIITF. ARC is also required to submit to the TIITF, with its project list, a report containing certain specified information regarding each project listed.

The TIITF or water management district may authorize the granting of a lease, easement, or license for the use of certain lands. Particular uses are to be reviewed by the appropriate board and shall be compatible with resource values and management objectives for the land.

The Florida Forever Act allows the TIITF to allow lands identified or acquired under the program to be managed by a private entity in accordance with a contractual arrangement with the acquiring agency. Funding for these contracts may only originate from the documentary stamp

tax revenues deposited into the CARL Trust Fund and the Water Management District Lands Trust Fund.

Save Our Everglades Trust Fund

The Save Our Everglades (SOE) Trust Fund is managed by FDEP pursuant to Section 373.472, F.S. Funds in the trust fund, which serves as a repository for state, local, and federal project contributions, are to be expended to finance the implementation of the comprehensive plan as defined in Section 373.470(2)(a), F.S. For each of the nine consecutive years beginning with FY2001–2002, $100 million of state funds are to be deposited into the trust fund ($25 million of which is committed from the Florida Forever program). The CERP annual report, submitted jointly by the District and the FDEP, describes the funding, expenditures, and implementation status of the comprehensive plan. (Refer to Chapter 2 of this volume for the CERP Annual Report.)

According to the Everglades Restoration Investment Act (Section 373.470(5)(b), F.S.), for each of the two consecutive years beginning with FY2000–2001, FDEP is to deposit into the SOE Trust Fund $25 million of the funds it allocates to the District for the purpose of funding Florida Forever projects (Section 259.105(11), F.S.).

The secretary of the FDEP is to release monies within thirty days after receipt of a resolution adopted by the District's governing board that identifies and justifies pre-acquisition costs necessary for the purchase of any lands listed in the District's five-year work plan. All funds not used for the purposes stated in the resolution are to be returned to FDEP. Similarly, the secretary of the FDEP is to release acquisition monies to the District after receipt of a resolution adopted by the governing board.

Florida Forever Water Management District Work Plan

The requirements for developing the Florida Forever Water Management District Work Plan are contained in Section 373.199, F.S. This provision states that in order to further the goals of the Florida Forever Act, the water management districts are to create a five-year plan identifying projects that meet certain criteria.

In developing their project lists, each water management district is to integrate its surface water improvement and management (SWIM) plans, Save Our Rivers (SOR) land acquisition lists, stormwater management projects, proposed water resource development projects, proposed water body restoration projects, and other properties or activities that would assist in meeting the goals of Florida Forever.

Where applicable, the districts' lists are to include specific information for each project (Section 373.199(4), (5), F.S.), including: a description of the water body system; an identification of all governmental agencies having jurisdiction over the water body; a description of the land uses within the project area's drainage basin; a description of strategies for restoring the water body; a listing and synopsis of studies; a description of measures needed to maintain the water body once it has been restored; a schedule for restoration; an estimate of the funding needed to carry out the project; numeric performance measures; a discussion of permitting and regulatory issues; an identification of the proposed public access for projects with land acquisition components; an identification of lands requiring a full fee simple interest; and an identification of lands necessary to protect or recharge groundwater. The lists must also indicate

the relative significance of each project, the schedule of activities, the sums of monies earmarked, and, as much as possible, rankings over a five-year planning period.

The initial five-year plan was submitted on June 1, 2001 to the president of the Senate, the speaker of the house of representatives and the secretary of the FDEP. The initial five-year work plan and any subsequent modifications are to be adopted by each water management district after a public hearing, in accordance with Section 373.139(3), F.S. Each district is to provide at least fourteen days advance notice of the hearing date, and is to separately notify of the date each county commission within which a proposed work plan project, project modification, or addition is located.

In the first plan update, due January 1, 2002 and each year thereafter, each district is to submit a report of acquisitions completed during the year, together with modifications or additions to its five-year work plan. The plans are to also include the status of funding, staffing, and resource management for every project funded under the Florida P-2000 Act, the Florida Forever Act, and the Water Management Lands Trust Fund (Sections 259.101, 259.105, and 373.59, F.S.), for which the district is responsible. Also included in the report is a description of land management activity for each project owned by the district. The secretary is to submit this report along with the ARC project list as required under Section 259.105, F.S.

Florida Forever Performance Measures

The water management districts were mandated with jointly providing a report to the secretary of the FDEP by December 15, 2000, establishing goals and performance measures to be used to analyze activities under Section 259.105(3)(a), F.S. In accordance with Section 373.1995, F.S., the secretary forwarded the report for approval to the board of trustees of the Internal Improvement Trust Fund (TIITF), the president of the senate and the speaker of the house prior to the beginning of the 2001 regular legislative session. The legislature had the opportunity to reject, modify, or take no action regarding the goals and performance measures established by the report. If no action was taken, the goals and performance measures reflected in the report were to be implemented. On December 1, 2000, the districts jointly submitted to the secretary their Florida Forever Goals and Performance Measures, developed in collaboration with the Florida Forever Advisory Council (FFAC).

The 1999 legislature created the FFAC. The council is composed of seven citizens appointed by the governor and two ad hoc members of the legislature. Pursuant to Section 259.0345(7), F.S., the FFAC submitted a report which was similar to the requirements of the water management districts' report, but was limited in respect to the funding provided under Section 259.105(3)(b), F.S., which comprises the 35 percent of each bond issue provided to the FDEP for its primary acquisition program.

In the report, the FFAC grouped the 19 statutory goals into seven objectives and created one new objective: Increase the amount of open space available in urban areas. For each objective, several performance measures were created. The objectives and performance measures were reviewed and discussed by the Senate Natural Resources Committee, which took no action to revise or reject the FFAC's recommendations.

Although the recommended objectives are very similar to the goals set out in Section 259.105(4), F.S., the recommended performance measures differ substantially from the statutory performance measures. Pursuant to Section 259.0345(7), F.S., if the legislature fails to take action regarding the FFAC's recommendations, they shall be implemented. In the event that takes place,

there would be confusion as to which goals/objectives and performance measures would govern the majority of the program. Accordingly, the FFAC's recommendations are implemented in Senate Bill (SB) 1468 of the 2001 legislature, which also repeals the existing goals and performance measures. It should be noted that the FFAC's recommendations, if not altered by the legislature, become effective only to guide the FDEP's primary acquisition program. However, if enacted in the Florida Statutes – as was the case – the goals and performance measures apply to both the FDEP and the water management districts. The goals and performance measures are included in **Section 8-12** of this chapter**.**

SECTION 8-2: REGIONAL OVERVEIW

The SFWMD encompasses approximately 18,000 square miles from Orlando to the Florida Reef Tract. The Kissimmee River, Lake Okeechobee, and the Everglades are the dominant watersheds that connect a mosaic of wetlands, uplands, coastal areas, and marine areas. The regions comprise all or part of the following 16 counties: Monroe, Miami-Dade, Broward, Collier, Palm Beach, Hendry, Martin, St. Lucie, Glades, Lee, Charlotte, Highlands, Okeechobee, Osceola, Orange, and Polk.

The Central and Southern Florida Project (C&SF Project), authorized by Congress in 1948, is a multipurpose project that provides flood control, water supply for municipal, industrial and agricultural uses, prevention of saltwater intrusion, water supply for the Everglades National Park (ENP), and protection of fish and wildlife resources throughout the regions. The primary system includes about 1,800 miles of levees and canals, nearly 200 large water control structures, and 16 major pump stations. Planning and other activities in the SFWMD are divided among four planning areas – the Kissimmee Basin, the Upper East Coast (UEC), the Lower West Coast (LWC), and the Lower East Coast (LEC) – reflected in **Figure 8-1**.

CERP and Kissimmee River projects further segment the planning areas into the nine regions (**Figure 8-2**) used as the framework for this Florida Forever Work Plan. **Sections 8-3** through **8-9** of this chapter provide details on each of the regions that comprise this large study area:

- Kissimmee River Region
- Lake Okeechobee Region
- Lower West Coast Region
- Upper East Coast Region
- Everglades Agricultural Area (EAA) Region
- Everglades, Florida Bay and Keys Region
- Water Preserve Areas Region
- North Palm Beach County Region
- Miami-Dade County Region

PLANNING AREAS

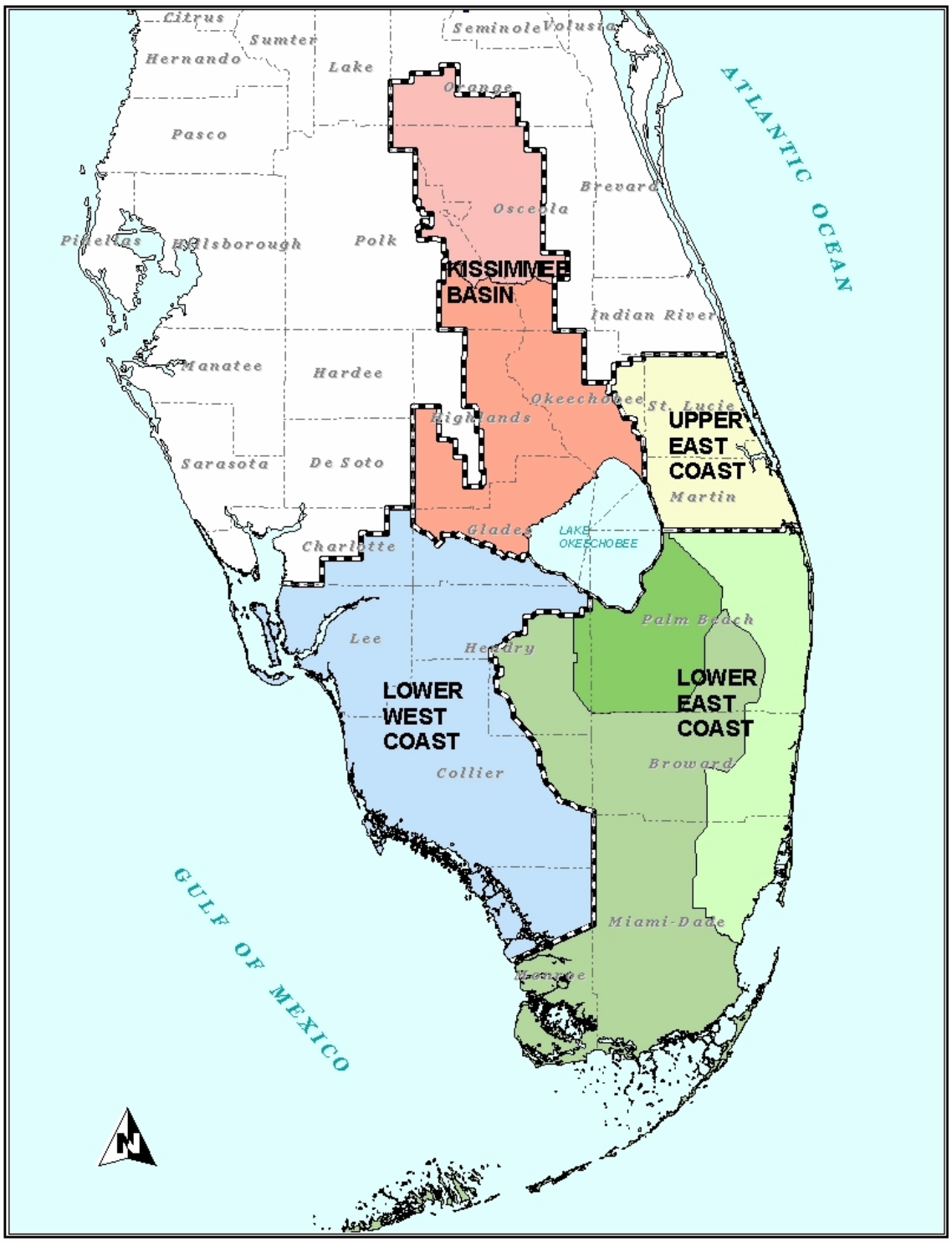

Figure 8-1. Map of the four planning areas within the SFWMD.

FLORIDA FOREVER WORK PLAN REGIONS

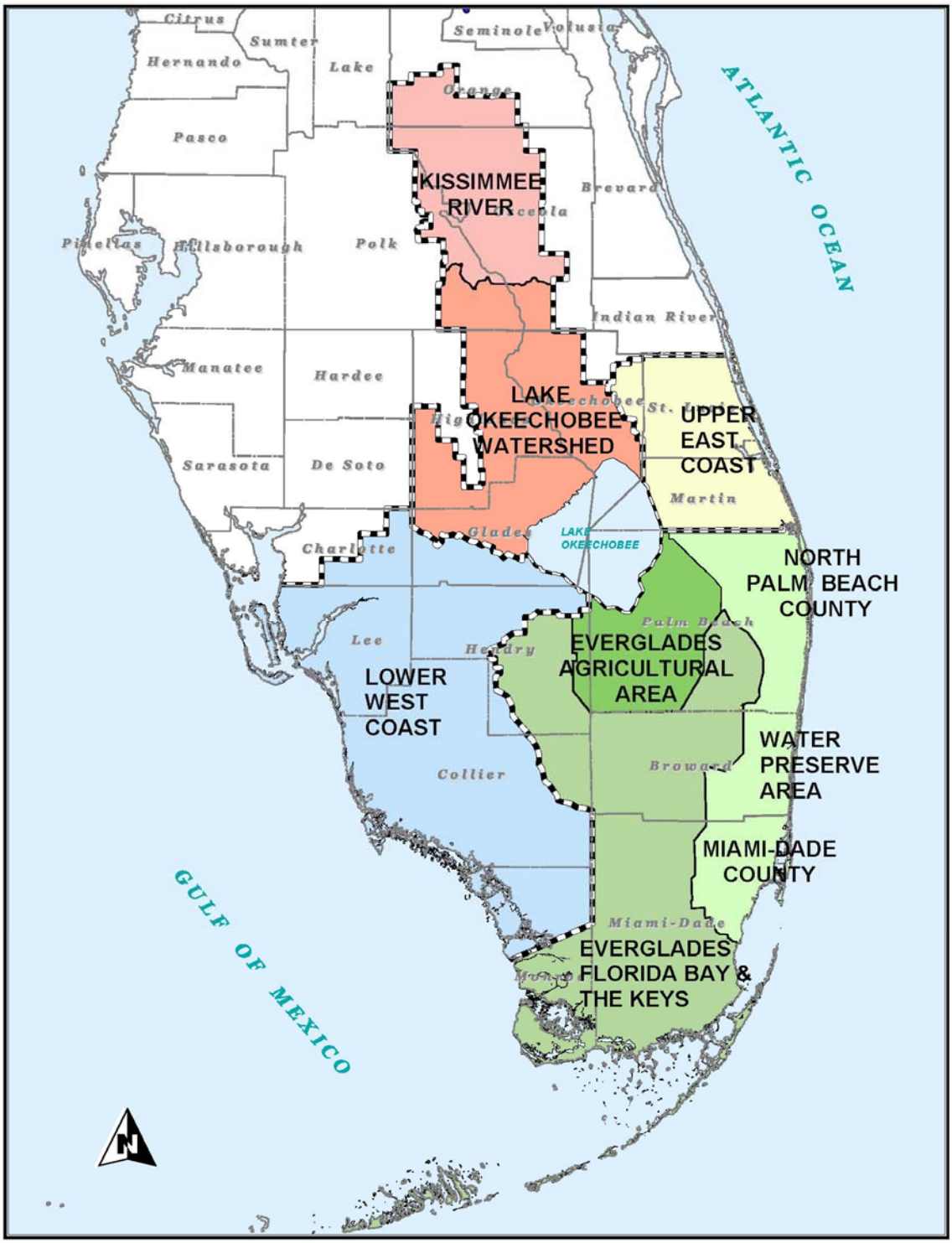

Figure 8-2. Map of CERP and Kissimmee River Regions.

Land Uses

The existing use of land within the District's boundaries varies widely from agricultural to high-density multifamily and industrial urban uses. A large portion of South Florida remains natural, although much of it is disturbed land. The dominant natural features are the federally protected ENP and Big Cypress National Preserve (BCNP) at the southernmost tip of the peninsula, Lake Okeechobee and the state-protected Water Conservation Areas (WCAs) in the westernmost reaches of the Lower East Coast counties. Generally, urban development is concentrated along the LEC from Palm Beach County to Miami-Dade County, in the Central Florida/Orlando area of the Kissimmee Basin, and on the Lower West Coast from Fort Myers to Naples.

Most of the interior of the District is dedicated to agricultural use, including sugarcane (the dominant crop) and vegetable farms in the EAA of western Palm Beach County and Hendry County; the Agricultural Reserve Area of Palm Beach County; and the south Miami-Dade agricultural area, where vegetable crops dominate, especially tropical varieties. There are citrus groves in every county except Monroe, but citrus is most concentrated in St. Lucie and Martin counties in the UEC area; and Hendry, Highlands, Collier and Glades counties in the Kissimmee Basin and LWC areas. Cattle and dairy farms predominate in Glades, Highlands and Okeechobee counties.

In the northern Kissimmee Basin around Orlando, tourism and its attending service-oriented land uses (hotels, motels, convenience stores and souvenir shops) make up a significant portion of the landscape. Agriculture, however, continues to play an important role in the region, with over two million acres being farmed, half of which is pastureland. The area surrounding Lake Okeechobee is largely rural, with agriculture the prevailing land use. There is also extensive pastureland both west and north of the lake. There are over 580,000 acres of irrigated farmland in the EAA; farm products produced there include sugarcane (the predominant crop), rice, row crops and sod. Directly south of the EAA lie the WCAs, which cover 1,372 square miles and consist mainly of sawgrass marshes and tree islands. The 1948 C&SF Project created the WCAs for the conservation of water supplies for the LEC.

The UEC comprises St. Lucie and Martin and eastern Okeechobee counties, where the landscape is dominated by agricultural use. The St. Lucie Estuary (SLE) and Indian River Lagoon (IRL), significant natural resources, are also contained within this area. Urban land use, which makes up 17 percent of the UEC, is mainly concentrated along the seaboard coastal and lagoon shorelines.

The LWC counties of Collier and Lee are the fastest-growing counties in the state, principally due to the immigration of retirees. The LWC is becoming increasingly urbanized, with development spreading eastward from the coastal areas into historically agricultural and natural lands. Agriculture remains, however, a major industry, particularly citrus.

The LEC extends approximately 100 miles through the coastal portions of Palm Beach, Broward, and Miami-Dade counties. The most densely populated area in the state, the LEC, is home to one-third of the state's population, more than five million people. The area is primarily an urban megalopolis, but it also contains substantial agricultural acreage, particularly in southwestern Miami-Dade County (90,000 acres) and western Palm Beach County (29,000 acres). Rapid population growth and land development practices have resulted in notable western urban sprawl; the predominant land use is single-family residential. The once significant rural population in the western areas of the counties, especially in Miami-Dade and Broward, has

practically disappeared, resulting in a largely urbanized population. Palm Beach County is not far behind.

The Florida Keys are made up of over 1,700 islands that encompass approximately 100 square miles and include the largest reef system in the United States. While a majority of the region is designated as conservation land, due to the land falling within Everglades National Park, Big Cypress National Park or the National Key Deer Refuge, land use is primarily either residential or geared towards supporting the region's main industry, tourism. The area's fragile natural resources and vulnerability caused the State of Florida to designate the Florida Keys as an Area of Critical State Concern in 1975, in order to protect such resources from degradation by development.

Future without Plan Condition – Physical Facilities and Operations – the Central and Southern Florida Flood Control Project (Project Modifications)

The C&SF Project was authorized by the Flood Control Act of 1948, and modified by subsequent acts as a plan for improvement of flood control, drainage and other purposes over an 18,000-square-mile area of Central and South Florida. A number of efforts are currently under way by the USACE to modify the project for environmental improvement. The sections that follow list these and other projects.

Water Quality Problems and Opportunities – Regional Overview

Many of the regulatory and environmental restoration programs that are assumed to be in place in 2050 will result in a net improvement in water quality in South Florida. In addition to those assumptions, water quality improvement actions required by the Federal Clean Water Act (Public Law 92-500) are expected to result in improvements in regional water quality necessary to comply with state, tribal, and local water quality standards. These water quality improvement actions are implemented by the U.S. Environmental Protection Agency (USEPA), the FDEP, the SFWMD, the Seminole Indian Tribe and the Miccosukee Tribe of Indians of Florida, and local governments. Examples of these programs include Municipal Separate Storm Sewer Systems (MS4) and other National Pollutant Discharge Elimination System (NPDES), point and nonpoint source pollution reduction permitting requirements, Total Maximum Daily Loads (TMDLs) established under Section 303(d) of the Clean Water Act (Public Law 92-500), and Pollutant Load Reduction Goals (PLRGs) established pursuant to the State of Florida's SWIM Plan for designated priority water bodies (Section 373.451-459, F.S.).

From a regional perspective, the most comprehensive of these programs is the TMDL program implemented by the FDEP and the Seminole and Miccosukee tribes. Under Section 303(d) of the Clean Water Act, states and tribes are required to identify water bodies within their jurisdictions not meeting water quality standards, and rank those water bodies in terms of the severity of the pollution and designated and actual uses of the water bodies. The 303(d)-listed water bodies are to be reported to the USEPA in accordance with Section 305(b) of the Clean Water Act. TMDLs are to be developed for 303(d)-listed water bodies consistent with the priority ranking, and are to be established "at a level necessary to implement the applicable water quality standards with seasonal variations and a margin of safety which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality."

In its 2000 report to the USEPA, the FDEP identified impaired water bodies in the regions in accordance with the requirements of Section 303(d) of the Federal Clean Water Act. The FDEP has developed a strategy for assessing watersheds (basins) and developing TMDLs and remediation plans for pollutants causing impairment of 303(d)-listed water bodies (FDEP, 1996a and FDEP, 1996b). It should be noted that excessive nutrient loads were typically identified as the most common pollutant-causing impairment. The FDEP's statewide strategy for implementing TMDLs involves five-year cycles for basin assessment, monitoring, data analysis and TMDL development, development of basin management plans and implementation of basin management plans. Several key water bodies in South Florida will receive priority for TMDL development, including Lake Okeechobee and the IRL.

Development and implementation of TMDLs is an essential step for achieving overall ecosystem restoration in South Florida. Water quality restoration targets are necessary for detailed design of Restudy recommended plan components to achieve water quality restoration performance objectives. Further implementation of basin management plans developed under the TMDL program is necessary to achieve ecological restoration in watersheds "downstream" of recommended plan components.

The triennial review of state and tribal water quality standards performed under Section 303(c) of the Clean Water Act is another essential step for achieving ecosystem restoration in South Florida. States and tribes are required to periodically review their water quality standards to ensure that standards are adequate to protect designated uses of waters. Within the regions, there are no specific numeric water quality criteria for many pollutants (e.g., nutrients and several pesticides) detected in ongoing water quality monitoring activities. The extent of the contribution of such pollutants to overall "impairment" levels in 303(d)-listed water bodies is unknown. As part of the triennial review process, the FDEP and the Seminole and Miccosukee tribes may propose modifications to existing water quality criteria and propose additional water quality criteria (as appropriate) to protect water resources. Modified and additional water quality criteria should be integrated with future detailed planning and design activities to assure that restoration plan components are operated consistent with water quality restoration targets.

The SFWMD is also developing PLRGs for SWIM-listed water bodies. In South Florida, SWIM-listed water bodies include Lake Okeechobee, the IRL, and Biscayne Bay. PLRGs are similar to TMDLs in that numeric water quality targets are promulgated and remediation programs are developed. TMDLs and PLRGs are essential water quality restoration targets to be integrated into future detailed planning and design activities for restoration plan components during the implementation period.

The following subsections predict water quality changes expected to occur within each of the CERP regions based on current water quality data and descriptions of existing conditions, available trend data, future population growth projections, and the assumed implementation of certain specific regulatory and environmental restoration and water supply projects. Actual improvements in water quality conditions, where projected to occur, depend in large degree upon the successful implementation of the programs and projects included in the future without plan assumptions. For mercury, conditions are projected for the regional system as a whole. Accurately projecting future water quality conditions in the regions is difficult, due to its vast scope, uncertainty in future growth and land use changes, and, in part, to the lack of comprehensive water quality data indicative of statistically reliable trends (FDEP, 1996a).

Water Quality Problems and Opportunities – Mercury

There is much uncertainty about the sources of mercury in South Florida and the Everglades marsh mercury cycling processes that control mercury bioaccumulation. Controlling mercury contamination of the Everglades ecosystem depends on actions that are beyond the scope of CERP. The major external source of mercury for the Everglades ecosystem is atmospheric deposition. Some estimate that a high percentage of the mercury deposited into the Everglades could be contributed from local atmospheric emission sources in the urban area (Dvonch, 1998). Others estimate that most of the mercury deposited on the Everglades originates from outside Florida. Research indicates that mercury deposition rates in portions of North America have greatly increased since the turn of the century (Swain, et al., 1992). Some of this historically accumulated mercury is being recycled by the ecosystem; however, this historical mercury could also be buried beneath the recycling zone by accumulating peat if new sources are shut off.

The effect of this burial process hypothesis has been estimated with a mercury cycling model (Ambrose et al., in press). The model predicts that as little as a 50 percent reduction in atmospheric mercury deposition over the next 50 years (2050) will decrease methylmercury concentrations in Everglades water and fish. Present and future regulatory emission controls may be needed to reduce the atmospheric loading to the system from local sources; however, the significant global atmospheric mercury component is much more difficult to control and will require international agreements.

If control of atmospheric mercury deposition can be affected by decreasing local emission sources in concert with the implementation of the 44,000 acres of stormwater treatment areas (STAs) constructed as part of the Everglades Construction Project (ECP), additional benefits may accrue. However, the necessary complex interactive modeling predictions have not yet been done. The long-term efficiency of the STAs in removing phosphorus and other water quality constituents is presently uncertain, as is the effect of these water quality changes on mercury cycling downstream. Among the key factors that are thought to influence mercury cycling within the Everglades are complex interrelationships involving phosphorus, sulfur, oxygen, carbon and periphyton; peat accretion and sediment redox conditions. There is no scientific consensus as to which of these factors will dominate, and whether the driving factors will be the same throughout all portions of the 4,000-square-mile Everglades ecosystem. Given the 80 percent reduction in total phosphorus (TP) obtained in the Everglades Nutrient Removal Project during the early years of operation, it is possible that a decrease in the methylation of mercury could occur downstream due to the declining nutrient concentrations to the marsh and the reduced stimulation of both producers and decomposers. However, it is unclear what effect changes in sulfur forms will have on mercury methylation, and which influence will dominate.

Restudy Purpose and Scope

The purpose of the Restudy was to develop a Comprehensive Plan for the overall regional C&SF system and the tools necessary to evaluate the Comprehensive Plan as well as separable and incremental portions of the project. This study represents the first thorough, systemwide update since the project's original inception. The Comprehensive Plan includes such features as are necessary to provide for the regional water-related needs of the region; including flood control, the enhancement of water supplies, and other objectives served by the C&SF Project. This feasibility study included hydrologic modeling, environmental modeling, water quality analyses, and water supply studies that refined the information developed in the reconnaissance study. The feasibility study was conducted to identify a Comprehensive Plan for the C&SF

Project and an adaptive implementation and operational strategy based on monitoring, evaluation and modeling.

Other Studies

There are a number of ongoing studies being conducted by the USACE and other agencies that may contribute to restoration of the South Florida ecosystem. Some of the major efforts are discussed in this section.

The USACE is currently conducting a feasibility study of Biscayne Bay in order to investigate effects on water circulation, biological communities and water quality of dredging and filling, spoil islands and freshwater inputs in northern Biscayne Bay from existing federal canals. The study would propose solutions to alleviate adverse factors affecting the bay and help to develop guidelines for future management of Biscayne Bay's natural resources. The nonfederal sponsor is Miami-Dade County.

The South Florida Ecosystem Restoration Task Force observed that the restoration effort needed to be founded on scientific information and mandated that it take an ecosystem approach. In support of this effort, the Science Subgroup completed a report in 1996 entitled South Florida Ecosystem Restoration Scientific Information Needs (Science Subgroup, 1996), which provides information in support of the ecosystem approach. It was the first step in the development of an ecosystem-based South Florida Comprehensive Science Plan that includes monitoring and modeling. The Science Coordination Team (formerly the Science Subgroup) is in the process of developing a series of white papers on key science issues in South Florida. Various agencies, including elements of the U.S. Department of the Interior (USDOI) and the SFWMD are developing several science plans to supply the information needs for ecosystem restoration.

The science plan developed by the Florida Bay Interagency Working Group, initiated by ENP in January 1993, focused upon the research, monitoring and modeling objectives that must be addressed to guide the restoration of Florida Bay. It represents a synthesis of research plans prepared over past years by several federal and state agencies.

The SFWMD has undertaken the development of regional and subregional level water supply plans to provide for better management of South Florida's water resources. The Lower West Coast Water Supply Plan was completed in April 2000 (SFWMD, 2000). The Lower East Coast Regional Water Supply Plan, which addresses water-related needs and concerns of southeastern Florida through the year 2020, was completed in May 2000 (SFWMD, 2000). The updated Upper East Coast Water Supply Plan (SFWMD, 2004), which evaluates future 2025 water demands and supplies for the Upper East Coast of Florida, was completed in 2004.

Permits and Authorizations

The timely processing and approval of permits and other regulatory authorizations is critical to completing design and construction on schedule and being able to operate a project once construction has been completed. To ensure that all required authorizations are processed and approved in a coordinated and timely manner, the USACE and SFWMD project managers will include staff as necessary from their respective regulatory/permitting organizations and a representative from the FDEP on CERP implementation teams.

The USACE and SFWMD project managers will maintain close communication and coordination to identify and address any required permit or water quality certification

applications and negotiations, as well as any conditions included in these authorizations. Where appropriate, final conditions on a permit or authorization will be approved by both the USACE and SFWMD project managers prior to issuance of a draft permit or certification.

SECTION 8-3: KISSIMMEE REGION

PHYSICAL CONDITIONS – KISSIMMEE REGION

The Kissimmee Region is 3,013 square miles in size and extends from Orlando southward to Lake Okeechobee (**Figure 8-3**).

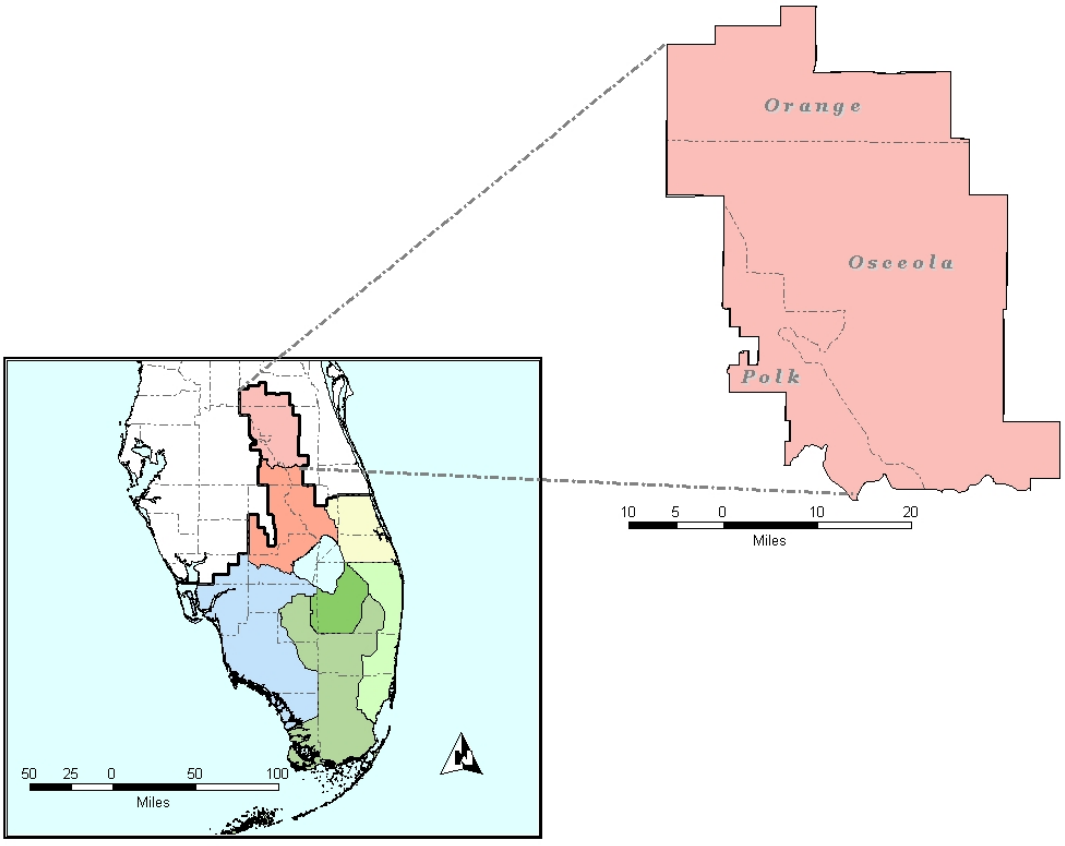

Figure 8-3. Kissimmee Region.

The Kissimmee Watershed follows the area's topography and is the largest watershed providing surface water to Lake Okeechobee (**Figure 8-3**). The name "Kissimmee" is derived from a Calusa Indian word that means "long water." The Kissimmee Watershed includes portions of Orange, Osceola, Polk, Highlands and Okeechobee counties. It is divided into three parts:

1. The Upper Basin, which covers 1,633 square miles, includes Lake Kissimmee and the East and West Chain of Lakes areas in Orange and Osceola counties.
2. The Lower Basin covers 758 square miles and includes the tributary watershed of the Kissimmee River, between the outlet of Lake Kissimmee and Lake Okeechobee.

3. The Lake Istokpoga Basin covers 622 square miles and provides tributary inflow to the Kissimmee River and Lake Okeechobee.

The watershed is located between the city of Orlando and Lake Okeechobee (**Figure 8-4**). The watershed is about 105 miles long and has a maximum width of 35 miles.

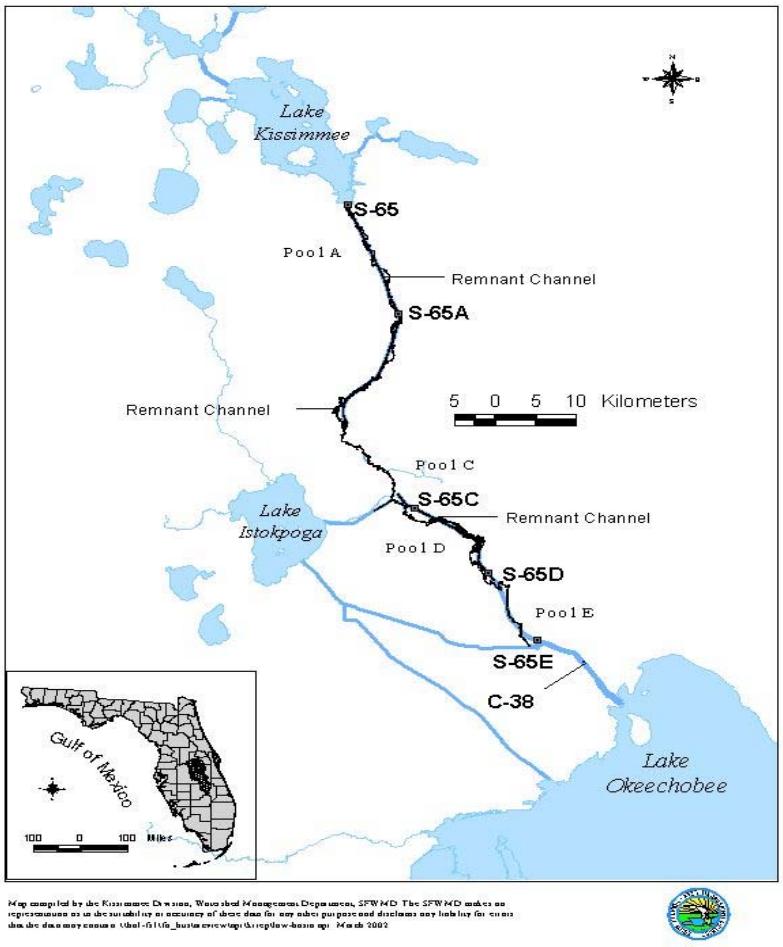

Figure 8-4. Kissimmee River location map.

Lakes are a significant feature of the Upper Basin. Major water bodies in the Upper Basin include Alligator Lake, Lake Gentry, Lake Cypress, Lake Myrtle, Lake Hart, East Lake Tohopekaliga, Lake Tohopekaliga, Lake Hatchineha, Lake Marian, Lake Weohyakapka, and Lake Kissimmee. Many of the lakes' water levels are managed by a water control structure and canals that convey water from one lake to another, thus forming a "chain of lakes." All of the major lakes in this basin are shallow, with mean depths varying from six to 13 feet.

Project works in the basin for flood control and navigation were constructed by the USACE as part of the C&SF Project. Upper Basin works consist of channels and structures that control water flows through 18 natural lakes into Lake Kissimmee. The Lower Basin includes the

channelized Kissimmee River (C-38) as a 56-mile canal extending from Lake Kissimmee to Lake Okeechobee and a series of four water control structures along C-38.

Approximately 50 tributaries provide inflow into the Kissimmee River in the Lower Basin. Relatively constricted central channels characterize these tributaries, with pasturelands usually flanking the channel. Most channels are covered with vegetation. The 622-square-mile Lake Istokpoga Basin also provides tributary inflow to the Kissimmee River.

EXISTING CONDITIONS – KISSIMMEE REGION WATER MANAGEMENT

The system of water control works now in place in the Kissimmee Watershed has been modified from the general C&SF Project plan outlined in the 1948 report to Congress and authorized for construction in 1954. The modifications are associated with the first phase of construction for the Kissimmee River Restoration Project (KRRP), which was completed in February 2001. These modifications were authorized by Congress in the Water Resources Development Act of 1992. The original project was designed to provide flood damage prevention for 30 percent of the standard project flood. This equates to protection against a five-year flood event. Project modifications associated with the KRRP maintain these same levels of flood protection. Water levels within the basin are controlled by a complex system of canals and control structures that are managed by the SFWMD in accordance with regulations prescribed by the secretary of the Army.

Channels connect the major lakes of the Upper Basin. Most of the channels were excavated by private interests in the 1900s and subsequently enlarged to varying degrees by the congressionally authorized C&SF Project plan. Additional operation and maintenance dredging and canal widening are associated with the KRRP. The first phase of this work was completed in August 2002. The remainder will be completed in 2006.

Nine control structures regulate water levels and flows in the lake system. For more details on the C&SF Project, refer to the USACE Kissimmee River, Florida, Headwaters Revitalization Project – Integrated Project Modification Report and Supplement to the Final Environmental Impact Statement (1996). Operational criteria for both basins can be found in the Master Water Control Manual for the Kissimmee River–Lake Istokpoga Basin (1994). These operational criteria have been modified for KRRP to include an interim regulation schedule for the S-65 structure. This interim schedule was put in place in June 2001, and will remain in effect until a new regulation schedule is put into place for the KRRP. Details regarding regulation schedules for S-65 can be found in the USACE Kissimmee River, Florida, Headwaters Revitalization Project – Integrated Project Modification Report and Supplement to the Final Environmental Impact Statement (1996). From time to time, operations may temporarily deviate from the water control plan. These temporary deviations may be conducted for various purposes, such as control of nuisance aquatic vegetation, lake drawdowns, or construction.

Prior to the C&SF Project, lake outlets within the Upper Basin had been dredged for drainage and navigation, but were uncontrolled. Dredged outlets did not provide adequate flood control and the Upper Basin did not have enough outlet or conveyance capacity to remove flood waters within a reasonable time frame to avoid flood impacts. To provide adequate outlet capacity from the Upper Basin, approximately 15 miles of canal were required immediately downstream of Lake Kissimmee. The length is a function of canal size, the size of the Lake Kissimmee outlet structure size (S-65), and the very flat terrain immediately downstream of the lake.

An earlier project, the Herbert Hoover Dike around Lake Okeechobee, modified the original lower end of the Kissimmee River with a borrow canal immediately upstream of Lake Okeechobee. This 8-mile section of canal, known as Government Cut, was modified and enlarged during construction of the C-38, and is inside the Lake Okeechobee containment levee. Government Cut diverted flow from a downstream portion of the Kissimmee River, creating an isolated remnant of the river known as Paradise Run. Paradise Run, which retains most of its original topography; however, diversion of natural flows has lowered water levels and former wetland areas have been converted to grazing and pastureland.

Between the outlet channel at the upper end of the Kissimmee River (C-38) and Government Cut at the lower end, was a section of river and floodplain known as the central reach. This stretch was approximately 33 miles in length and also provided flood control. During the design phase of the C&SF Project, some consideration was given to nonstructural approaches (e.g., levee the uplands from the floodplain); however, channelization was determined to be the most cost-effective solution. Combined with Government Cut, the new canal (C-38) provided complete channelization of the entire 56-mile river-floodplain system from Lake Kissimmee to Lake Okeechobee.

The natural fall of the land from Lake Kissimmee to Lake Okeechobee is about 36 feet. Construction of the C-38 canal included construction of six water control structures (S-65, S-65A, S-65B, S-65C, S-65D, S-65E). These structures were distributed from north to south and formed a series of five independent water bodies called pools (Pools A, B, C, D and E). The northernmost structure, S-65, is located at the southern terminus of Lake Kissimmee. The southernmost structure is located just north of Lake Okeechobee. The pools are located between the structures and are referenced using the letter associated with the downstream structure. For example, the sub-basin between structures 65 and 65A is called the Pool A basin. “Pool” refers to the fact that the water control structures “pool” or impound the water behind it in a reservoir fashion.

The structures along the C-38 canal function as dams and were located to step the canal water level down in increments of about 6 feet. In doing so, the natural slope of the river was removed and flat pools (impoundments) resembling stair-steps were created. The water level in each pool was generally held constant with little fluctuation or slope. This management lowered water in the northern reach of each pool and maintained flooded marsh in the southern or lower section of each pool. The resulting water surface area was approximately 7,600 acres.

The C-38 was excavated to a depth of approximately 30 feet. The bottom width varies from 90 feet near Lake Kissimmee to 300 feet just above the S-65D structure. The canal’s length, width and water level vary in each pool. The head, or difference in water level above and below each structure, varies from structure to structure with rate of discharge but is typically 6 feet.

During the construction of the C-38 canal, a temporary easement was used to obtain areas adjacent to the canal for deposition of dredged material. The material was hydraulically deposited in linear alignments covering some 8,000 acres. The result was spoil piles averaging 15 feet above pre-project topography. The material consisted of hydraulically sifted subsoil sands and clays with limited organic fraction and high percolation rates. The material became part of the property upon which it was deposited. A number of landowners subsequently used the material to fill low areas on their property. At two locations in Okeechobee County, the spoil was used to build flood-free, fly-in residential subdivisions. Where material was left undisturbed, xeric vegetation emerged on the deposits. The spoil material in the vicinity of backfilling activities associated with the KRRP will be used to backfill the C-38 canal. Lands within the five-year floodplain were acquired in fee. This included acquisition of the spoil material.

The CS&F Project works improved navigation opportunities originally provided in the Congressional Act of 1902. Each water control structure along C-38 includes a 30-foot by 90-foot navigation lock, which can accommodate boats with drafts up to 5.5 feet. The canal provides continuous navigation; however, interpool navigation is limited to daylight hours of lock operations.

Prior to the completion of the first phase of the KRRP, there were approximately 68 miles of river oxbows, often referred to as remnant river channels, between Lake Kissimmee and Lake Okeechobee. These remnant river channels were isolated from one another when the C-38 canal was dredged through the historic Kissimmee River/Floodplain system. Remnant channels had widely varying water depths and received little to no inflows except from tributaries or through culverts associated with the S-65B, S-65C and S-65D tieback levees.

This system has been modified by the first phase of construction of the KRRP. This construction was completed in February 2001 and was located in portions of Pools B and C. The first phase of the project backfilled approximately 7 miles of C-38 canal from just north of the S-65B structure, south to the Istokpoga Canal. One and one-quarter miles of new river channel were dredged to reconnect 14 miles of the historic river that had been bisected by the construction of the C-38 canal, providing for 15 miles of contiguous river channel. The S-65B structure was demolished, creating an interconnected river/floodplain system in portions of the former Pool B and Pool C area. Since completion of the first phase of the KRRP, restored river channel has received near continuous flows. These flows are due in part to the interim operational schedule for the S-65 structure. Detailed information regarding the history and current status of KRRP can be found in Chapter 11 of the 2005 SFER – Volume I.

FUTURE WITHOUT PLAN CONDITION – WATER QUALITY – KISSIMMEE REGION

Several planned and ongoing environmental restoration projects are expected to be completed, which would beneficially affect water quality in the Kissimmee Watershed. Of particular importance is the KRRP (including the Headwaters Revitalization and Modified Level II Backfilling projects). The KRRP is expected to result in the restoration of 7,200 acres of former wetlands in the vicinity of the Kissimmee Chain of Lakes (USACE, 1996) as well as 40 square miles of river/floodplain habitat south of Lake Kissimmee (USACE, 1991).

FUTURE WITHOUT PLAN CONDITION – PHYSICAL FACILITIES AND OPERATIONS – KISSIMMEE RIVER RESTORATION

In the future without plan condition, portions of the KRRP will be in place and functioning. The restoration project, authorized by the Water Resources Development Act of 1992, will create a more natural physical environment in the Lower Basin. The major components of the project include the following:

- Reestablishment of inflows from Lake Kissimmee that will be similar to historical discharge characteristics (headwaters component)
- Acquisition of 105,095 acres of land in the Kissimmee Chain of Lakes and river valley
- Continuous backfilling of 22 miles of canal
- Removal of two water control structures

- Re-carving of 9 miles of new river channel

The Kissimmee Watershed contributes approximately 34 percent of the water input to Lake Okeechobee. The supply of water to Lake Okeechobee is anticipated to be reduced by 1.6 percent as a result of the implementation of this project.

As a component of the KRRP, changes to the Upper Chain of Lakes regulation schedules in conjunction with associated canal and water control structure modifications will provide the ability to simulate the historic seasonal flow from Lake Kissimmee to the Kissimmee River, and provide greater fluctuations of water levels in the lakes. The project will result in the expansion of the lakes' littoral zones by up to 7,200 acres, and improved habitat to fish and wildlife on lakes Kissimmee, Hatchineha, Cypress, Tiger, and Jackson. The project will also increase long-term spatial and temporal variability of seasonal water level fluctuations.

The KRRP includes two key hydrologic conditions (criteria) that must be reestablished to restore the Kissimmee River/floodplain ecosystem. These conditions are the reestablishment of continuous flow with duration and variability characteristics comparable to pre-channelization records and the reestablishment of stage hydrographs that result in floodplain inundation frequencies comparable to pre-channelization hydroperiods, including seasonal and long-term variability characteristics (see Chapter 11 of the 2005 SFER – Volume I for more details regarding hydrologic restoration).

WATER QUALITY PROBLEMS AND OPPORTUNITIES – KISSIMMEE REGION

In its 1998 303(d) list, the FDEP identified 25 water bodies or segments of water bodies within the Kissimmee Watershed where water quality was not adequate to sustain designated uses. Several of the 303(d)-listed water bodies are actually reaches of the Kissimmee River. Most of the watershed is classified as Class III ("fishable–swimmable") waters; several water bodies within the watershed are designated Outstanding Florida Waters by the State of Florida. Pollutants and/or water quality criteria identified as contributing to impairment of designated use include: low levels of dissolved oxygen (DO), excessive nutrients, coliform bacteria, high biochemical oxygen demand, several trace metals including mercury (based on fish-consumption advisories), turbidity and un-ionized ammonia.

Kissimmee River restoration projects are expected to reduce net pollution loading to the Kissimmee River and in downstream Lake Okeechobee through the restoration of wetlands. This reduction will occur via two mechanisms. First, some sources of pollutants will be eliminated through the conversion of existing agricultural lands to wetlands. Second, restored wetlands will also have a pollutant assimilation function. Taken together, decreases in sources combined with increases in assimilative capacity will contribute to improved water quality in downstream water bodies (tributaries and oxbows). Additional ongoing land acquisition activities by the SFWMD will supplement ongoing environmental restoration projects (SFWMD, 1997a).

The extent of urbanization in the vicinity of the cities of Orlando and Kissimmee, north of the Kissimmee Chain of Lakes is expected to increase. While new developments must comply with water quality treatment requirements for stormwater runoff, the net load of pollutants, particularly those typically associated with urban stormwater runoff contributed to the watershed north of the Kissimmee Chain of Lakes is expected to increase. Urbanization and attendant pollution loads in the region south of Lake Kissimmee are not expected to significantly increase.

Water Use in the Kissimmee Watershed

Water use is divided into urban and agriculture (**Table 8-2**). Agriculture is the largest existing and largest projected water user within the basin.

Table 8-2. Kissimmee Watershed water demands (mgy).

Land Use	1995	2020	Percent Change
Urban	38,319	68,248	78%
Agricultural	74,089	107,567	45%
Total Water Demand	112,408	175,815	56%

* Demands from 1998 District-wide Water Supply Assessment.

Agency Jurisdictions

Federal Jurisdiction on the Kissimmee Watershed involves the regulatory responsibilities of the USACE, the USEPA and the United States Fish and Wildlife Service (USFWS). The USACE is responsible for prescribing the operational criteria and the regulation schedules for the C&SF Project. Their primary regulatory functions include operation and maintenance of the levees and major outlet works, dredge and fill activities, maintaining navigable waters, cleanup of pollution spills, and the protection of endangered species.

The USEPA is responsible at the federal level for protection of the environmental resources of the Kissimmee Watershed. State agencies involved with the management and regulation of the Kissimmee River Basin include the FDEP and the Florida Fish and Wildlife Conservation Commission (FWC). Their jurisdictions include the protection of water quality, wetland resources, fisheries, and wildlife resources.

At the regional level, the SFWMD and two regional planning councils have jurisdiction within the Kissimmee River Basin planning area. The SFWMD's authority is to manage and protect the water resources in a 16-county region. Regional Planning Council jurisdictions are assigned by county. The Central Florida Regional Planning Council has jurisdiction within Okeechobee and Highlands counties. The East Central Florida Regional Planning Council has jurisdiction within Polk and Osceola counties. Regional Planning Councils have responsibilities to develop regional comprehensive policy plans for protection of water resources within the planning area, provide technical assistance to local governments, and to evaluate the impacts anticipated from development on regional resources.

The local governments listed below have the authority to control land use in the Kissimmee Watershed through their comprehensive plans and land development regulations. Sectors that exist at the local government level include planning, building, zoning and regulatory departments; water and sewer utilities; city and police departments; and soil, water and conservation districts. Local governments in the Kissimmee Watershed include: Highlands, Okeechobee, Osceola, Polk and Orange counties.

Point and Nonpoint Sources of Pollution in the Watershed

Point sources of pollution are defined as discharges to surface and ground waters where discrete measures of water flow and water quality may be taken. In the Kissimmee Watershed,

domestic wastewater treatment and industrial waste facility discharges are considered point sources, as shown in **Table 8-3**. Domestic wastewater and industrial waste facilities in the planning area are regulated by the FDEP.

Table 8-3. Permits in the Kissimmee Watershed.

Permit Type	Permit Agency	Total Sources	Permit Activity
Point Sources			
Industrial Wastewater	FDEP	95	Industrial Treatment Systems
Domestic Wastewater	FDEP	130	Private and Municipal Wastewater Facilities
Petroleum Contaminate Sites	FDEP	841	Gas Stations and Storage Tanks
Nonpoint Sources			
Dairies	FDEP	15	Dairy Farms BMPs
Works of the District Permits	SFWMD	442	Agricultural, Industrial, Commercial, NPS BMPs
Surface Water Management Permits	SFWMD	2,183	Stormwater Management Systems
Waste Disposal Sites	FDEP	47	Landfills

Nonpoint source pollution is usually associated with land use activities that do not have a single discrete discharge point. These pollution sources are usually delineated into rural and urban. Rural nonpoint sources include stormwater runoff and are associated with agricultural activities. Urban nonpoint sources are also primarily conveyed by storm water and contain pollutants associated with urban land use.

Management Strategies for Restoration and Protection of the Water Body to Class III or Better Surface Water Quality Status

Most of the watershed is classified as Class III (fishable, swimmable) waters and several water bodies within the watershed are designated Outstanding Florida Waters by the State of Florida.

LAND USE – KISSIMMEE REGION

Orlando, at the headwaters of the Kissimmee Watershed, is the primary economic and transportation center in the area. Once the center of the state's orange production, the local economy of Orlando and the surrounding area now focuses on tourism. Kissimmee, located in Osceola County, is 8 miles east of Disney World and 17 miles south of Orlando, and is influenced largely by tourism activities in the Orlando area. The other major incorporated area of Osceola County, the city of St. Cloud, is primarily a retirement community.

Land uses/coverages in the Upper Basin around the perimeters of lakes Kissimmee, Hatchineha, Cypress, Rosalie, Tiger and Jackson are primarily pasture, some agriculture and a large amount of wetlands. Marinas, fish camps, and various public facilities such as boat launching sites and picnic areas are located around the lakes. Development is more intense upstream of Cypress Lake, particularly in the Lake Tohopekaliga–East Lake Tohopekaliga

(Toho) chain. Lake Kissimmee State Park is on the extreme northwestern periphery of Lake Kissimmee and the Three Lakes Wildlife Management Area and Prairie Lakes Preserve border the southeastern half of Lake Kissimmee. The 45,000-acre Kissimmee Prairie State Reserve is directly east of Avon Park in Pool B. Small residential and commercial areas are also scattered around most of the lakes.

Agriculture continues to play an important role in the region. In the Lower Basin, most of the area between Lake Kissimmee and Lake Okeechobee is in fewer than fifty large, private land holdings and several hundred subdivided property holdings. Agriculture remains the primary land use activity within the Lower Basin, dominated by extensive beef cattle production and dairy activities.

The Avon Park Air Force Bombing Range is located within the Highlands County portion of the Lower Basin. This 107,000-acre federal facility is used both as a training facility for Armed Forces personnel and as a management area for wetlands adjacent to the Kissimmee River.

Lower Basin lands have undergone substantial change over the last fifty years. Most notable is the conversion of unimproved pastureland to improved pasture at an accelerated pace during the period 1958 to 1972. In the Upper Basin, most of the development susceptible to flood damage is urban, where damage is primarily a function of the depths of flooding inside structures or the stage of flooding. Single-family residential land use is the primary type of development affected by flooding in the Upper Basin. Major affected areas are located around the towns of Kissimmee and St. Cloud, which cover only 6 percent of the damage susceptible flood-prone area, but account for almost half of the basin's standard project flood damage. Other affected areas include Lake Hart, Lake Mary Jane, Pells Cove, Hidden Lake, Lake Hatchineha, Lake Alligator, Lake Rosalie and the area west of the southern part of Lake Kissimmee.

In the Kissimmee River Basin, mobile homes located around Pool E are the primary areas that would be affected by flooding. Although this land use would account for most of the damages from a standard project flood and 100-year event, it is not susceptible to damage during smaller floods. Other damages occur due to the duration of flooding on pastureland. Although agricultural use is the primary land use in the Kissimmee River Basin, flood damages are relatively minor for this activity due to the short duration of flooding, a result of the existing project works.

LAND USE IN THE KISSIMMEE BASIN

The existing land use in the Kissimmee Basin is generally more urban in the north than in the south, as shown in **Table 8-4**. Continued urbanization is anticipated in the north; while in the south agricultural acreage is projected to increase.

Table 8-4. Acreage and percentage of land use by county area.

Land Use	Orange	Osceola	Polk	Highlands	Okeechobee	Glades	Kissimmee Watershed
Agriculture	31,513 (17%)	218,656 (35%)	44,243 (16%)	259,362 (53%)	189,625 (52%)	139,470 (47%)	882,869 (40%)
Urban	60,243 (32%)	52,212 (8%)	51,449 (19%)	42,194 (9%)	21,928 (6%)	2,760 (1%)	230,788 (10%)
Wetlands	36,338 (20%)	164,355 (27%)	59,571 (22%)	76,821 (16%)	66,800 (18%)	59,678 (20%)	463,563 (21%)
Forest	30,264 (16%)	74,857 (12%)	65,136 (24%)	41,586 (9%)	32,591 (9%)	68,578 (23%)	313,012 (14%)
Rangeland	2005 (1%)	26,012 (4%)	25,270 (9%)	33,489 (7%)	48,284 (13%)	20,223 (7%)	155,283 (7%)
Barren	3,419 (2%)	2,842 (1%)	1,420 (1%)	3,733 (0%)	3,588 (1%)	2,471 (1%)	17,473 (1%)
Water	21,796 (12%)	81,082 (13%)	23,885 (9%)	30,022 (6%)	4,299 (1%)	1,492 (1%)	162,576 (7%)
Total	185,578 (100%)	620,016 (100%)	270,974 (100%)	487,207 (100%)	367,115 (100%)	294,672 (100%)	2,225,562 (100%)

*Area based on SFWMD Florida Land Use GIS database, 1995.

Agricultural activities in Orange, Osceola, Polk, Highlands, Glades and Okeechobee counties were included in this planning area. More than 2.8 million acres in these counties are farmed, with more than half of this land devoted to pastureland. Over 320,000 acres in the six counties comprising the Kissimmee Basin are irrigated, requiring a dependable water supply. The counties of Osceola, Polk, Highlands and Okeechobee are among the top counties in Florida for cattle production, both livestock and dairy. In 2004, Okeechobee County led the state with 162,000 cows and cattle, both beef and dairy. Highlands County ranked fourth among the state's counties with 101,000 cows and cattle in 2004. (UFBEBR, 2004).

Water Management Planning Initiatives

Water management planning efforts in the Kissimmee Basin include a variety of interrelated studies and activities, in both the public and private sectors. Each plan or study addresses unique water management issues while maintaining close relationships with water supply planning, as shown in **Table 8-5**. The related efforts with the most significant influence on the implementation of the Kissimmee Basin Water Supply Plan include the establishment of MFLs to several lakes in the Kissimmee Watershed. Other ongoing efforts that will help to preserve the water body include the establishment of TMDLs on the river and several lakes in the Kissimmee Watershed, and eventually the establishment of a water reservation for this watershed.

Table 8-5. Kissimmee Basin-related water management planning efforts.

Study	Scope/Primary Goal	Time Frames
Kissimmee Basin Water Supply Plan Development and Coordination	Adequate and reliable water supply	Update 2005
Kissimmee River Restoration Evaluation	Environmental restoration of Kissimmee River floodplain, improved surface water quality.	2017
Kissimmee Basin Minimum Flows and Levels (MFLs) Development	Prevent significant harm to the water resources and ecology of surface water resources in the Kissimmee Watershed	2004–2006
Kissimmee Chain of Lakes Long-Term Management Plan	Develop recommendations and associated performance measures to improve the health of the Upper Kissimmee Chain of Lakes ecosystem.	2006

Kissimmee River Restoration Project (KRRP)

In 1948, Congress authorized the USACE to initiate construction of the C&SF Project. This was in reaction to the drought of 1944-1945 and a major hurricane in 1947 that caused extensive flooding in the Kissimmee Watershed and illustrated the inadequacy of the basin's existing water control system. In 1954, Congress specifically authorized the Kissimmee River portion of the project, which was planned and designed from 1954 to 1960. Between 1962 and 1971, the Kissimmee River was channelized and transformed into a series of impounded reservoirs (Pools A-E). Inflow from the upper basin was regulated by six water control structures (S-65s). Water control structures and canals were built in the upper lakes region to allow regulation of water flow within and between the lakes.

The objectives of the C&SF Project were to provide flood protection to the Kissimmee Upper Basin, convert floodplain wetlands to usable agricultural lands and reduce flooding impacts associated with major storm events. Upon completion, the project was successful at meeting its objectives. However, it was realized that the draining of the floodplain wetlands had significantly impacted fish, bird and other wildlife resources in the region. As early as 1971, environmental conservation organizations called for restoration of the Kissimmee River. Over 20 years (1971-1991) of restoration-related efforts and consistent support from the state's governors, legislature, and congressional delegations culminated with the 1992 Water Resources Development Act (Public Law 102-580), which authorized the ecosystem restoration of the Kissimmee River, and construction of the Kissimmee River Headwaters Revitalization Project.

The goal of the restoration project is to restore the ecological integrity of the Kissimmee Watershed through the reestablishment of 40 square miles of river/floodplain habitat and 43 continuous miles of meandering river channel. The KRRP consists of both structural and nonstructural modifications, and acquisition of 105,095 acres of land. The total cost of the project, including the Headwaters Revitalization Project, is estimated to be approximately $578 million (2004 dollars).

OVERVIEW OF RESTORATION PROJECT STATUS

Planning, engineering, design and construction have been initiated. A test backfilling project was initiated in 1994 and completed in September 1994. The restoration project is divided into the following five elements (**Figure 8-5**):

1. Restoration Evaluation
2. Headwaters Revitalization
3. Phase I Backfilling
4. Phase II/III Backfilling Projects
5. Phase IV Backfilling Projects

Phase I Backfilling was completed in February 2001. All construction is scheduled to be completed in 2012. The Restoration Evaluation Program, which will continue through 2017, is designed to evaluate the success of the project in meeting the established restoration goals, to provide for continuous, scientifically informed fine-tuning of the construction and adaptive management of the recovering and restored ecosystem. Detailed information regarding the Restoration Evaluation Program can be found in Chapter 11 of the 2005 SFER – Volume I.

PROJECT SCHEDULE

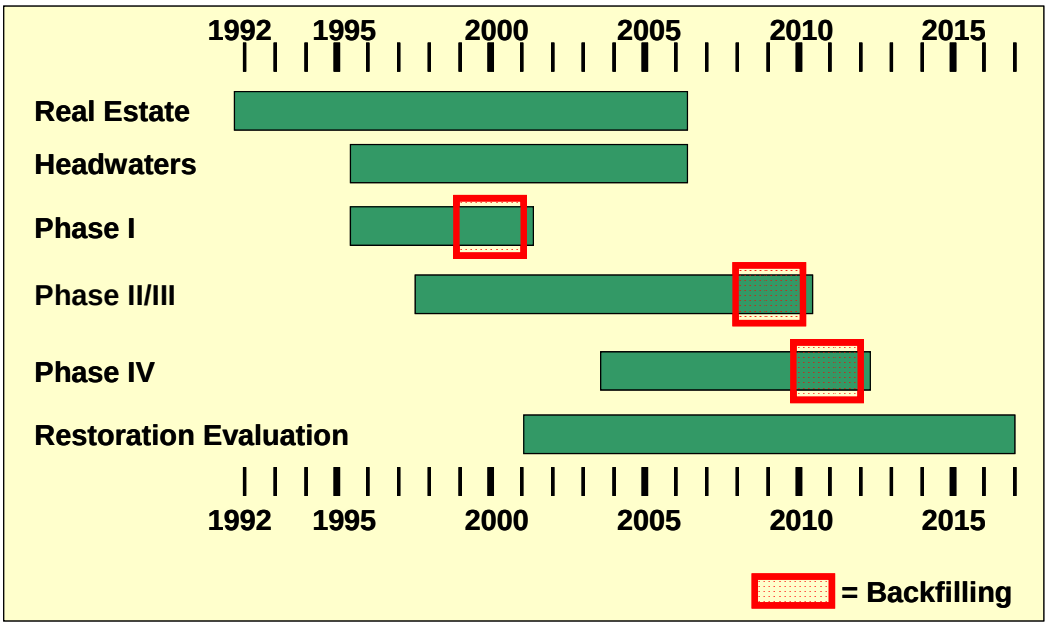

Figure 8-5. Kissimmee River Restoration Project schedule.

The project allows for construction of flood mitigation projects in lieu of land acquisition. Several flood mitigation projects have been approved for residential communities within the Kissimmee River floodplain and adjacent to lakes Kissimmee, Cypress, and Hatchineha. One such project for the Kissimmee River Shores community was completed in July 2003. Another is currently under construction for the Hidden Acres Estates community.

Avon Park southern boundary fence was completed July 2003.

A 300-foot span bridge across U.S. 98 in Pool D with ten box culverts was completed in January 2004. S84 Spillway addition is scheduled to be completed March 2005.

Resources are also committed to further describe, document, and model the baseline surficial aquifer conditions in the Lower Basin. This work involves installation of shallow groundwater wells and implementation of an integrated surface and groundwater hydrologic model.

LAND ACQUISITION FOR KISSIMMEE RIVER RESTORATION

The SFWMD has been purchasing lands for the Kissimmee Restoration Project since the mid-1980s. Lands have been purchased in the Kissimmee Chain of Lakes in order to facilitate the implementation of the new regulation schedules in the lakes. Raising the lake regulation schedules will allow the SFWMD to store more water in the lakes, making it available for release to the Kissimmee River. The additional water is necessary in order to provide a year-round flow when the river is restored. Lands have been purchased in the Lower Basin as a requirement for the restoration of the floodplain and reestablishment of the remnant river segments.

The USACE set the defining criteria for fee versus easement acquisition at the inception of the project. That criterion is a function of the topographic elevation of the land parcel. In the Lower Basin, properties measuring at or below the five-year flood line can be acquired in fee and properties measuring between the five- and 100-year flood line can be acquired as a flowage easement. In the Upper Basin, properties between the 52.5- and 54-foot elevation can be acquired in fee. **Table 8-6** shows approximate land acquisition needs and approximate acquisition status for the Kissimmee Restoration Project.

Table 8-6. Kissimmee River restoration approximate real estate acquisition information.

Area	Acreage Needed	Acreage Obtained	Remaining Acreage	Percent Acquired
Upper Basin	36,763	34,981	1,782	95%
Lower Basin	68,332	52,023	16,309	76%
Total	105,095	87,004	18,091	83%
Percent of Total	N/A	83%	17%	N/A

There are no lands that have been acquired for the KRRP as a function of the need to protect or recharge groundwater.

GOALS AND PERFORMANCE MEASURES

The KRRP was designed to restore ecological integrity to the Kissimmee River.

Focus Areas: Flood Protection and Natural Systems

PERFORMANCE INDICATORS

FLOOD PROTECTION

Objective: Promote nonstructural approaches to achieve flood protection and protect and restore the natural features and functions of the floodplain.

Measures: Percentage of total project acres in Kissimmee Watershed floodplain mitigated or acquired.

Actual FY2003	Actual FY2004	Target FY2005	Target FY2006
70%	83%	96%	100%

Note: FY2005 total includes all project lands except for Chandler Slough, which is scheduled to be acquired in 2006.

Percentage of total project acres around lakes Tiger, Cypress, Hatchineha and Kissimmee acquired in order to implement Headwaters Revitalization.

Actual FY2003	Actual FY2004	Target FY2005
85%	90%	100%

NATURAL SYSTEMS

Objective: Restore the integrity and function of water resources and related natural systems to a naturally functioning condition. See Chapter 11 of the 2005 SFER – Volume I for a comprehensive update on the status of biological and abiotic resources of the Kissimmee River, including initial responses to Phase I backfilling and the interim operation schedule for the S-65 structure.

Expenditures:	Actual FY 2002	Actual FY 2003	Adopted FY2004	Proposed FY2005
	$38.4M	$11.7M	$49.0M	$48.2M

Significant Changes in Expenditures: None.

FY2005 KEY KRRP ACTION STEPS

- Land acquisition
- Mitigation in lieu of land acquisition
- Evaluation Program (KRREP)

Conclusions

The KRRP is a monumental project in many ways. It is the largest river restoration project ever attempted. It is the result of cooperative efforts between many state, federal and local organizations that have worked together for over three decades to make this project happen. This ambitious project represents the culmination of more than 25 years of research, design, and public activism. The comprehensive scientific approach towards the evaluation of the restoration program is atypical of river restoration efforts. Restoration benefits are expected to begin immediately and continue in perpetuity.

ELIGIBLE FFWP PROJECTS FOR THE KISSIMMEE REGION

- Kissimmee Water Supply Plan Development and Coordination
- Kissimmee River Restoration Evaluation
- Kissimmee Basin Minimum Flows and Levels (MFLs)
- Kissimmee Chain of Lakes Long-Term Management Plan
- Kissimmee River Restoration Project

SECTION 8-4: LAKE OKEECHOBEE WATERSHED REGION

PHYSICAL CONDITIONS – LAKE OKEECHOBEE WATERSHED REGION

The Lake Okeechobee Watershed Region resides in the lower portion of the Kissimmee Basin Planning Region (**Figure 8-6**) and the Lake Okeechobee Watershed (**Figure 8-7**) encompasses the entire region.

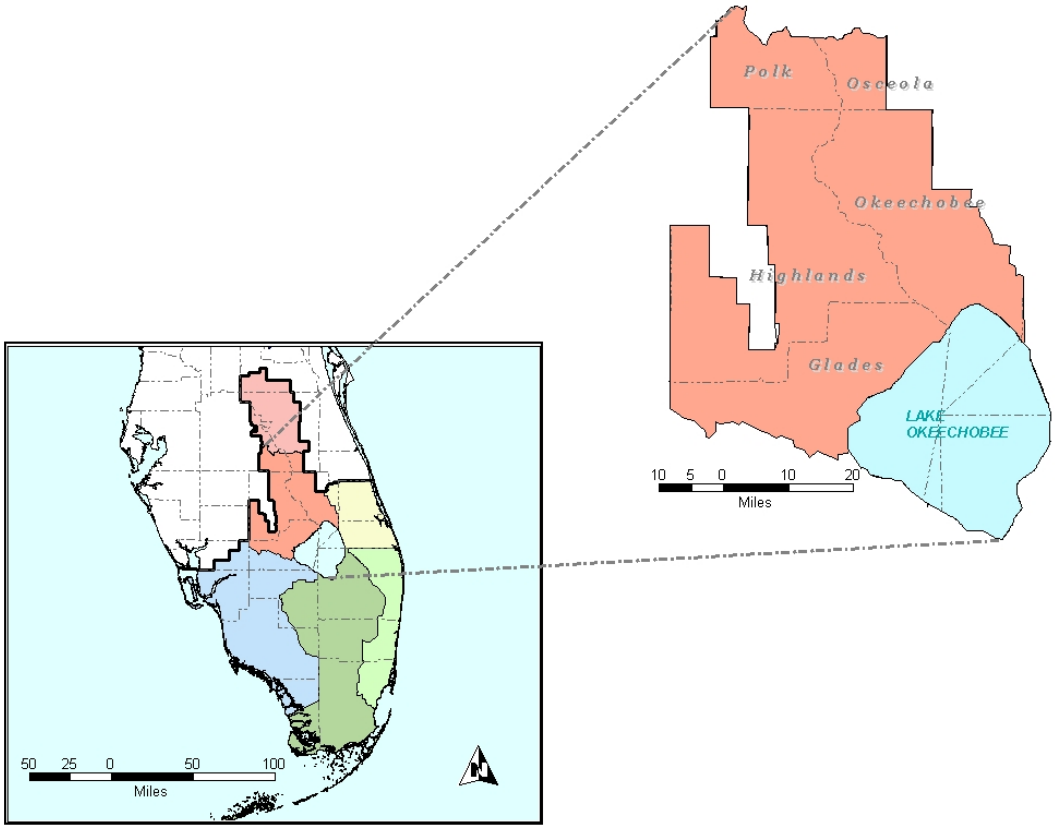

Figure 8-6. Lake Okeechobee Watershed Region.

Lake Okeechobee lies 30 miles west of the Atlantic coast and 60 miles east of the Gulf of Mexico in the central part of the peninsula. Lake Okeechobee is a broad shallow lake occurring as a bedrock depression. The lake has a surface area of approximately 730 square miles, and is the largest lake in Florida and the Southeast United States.

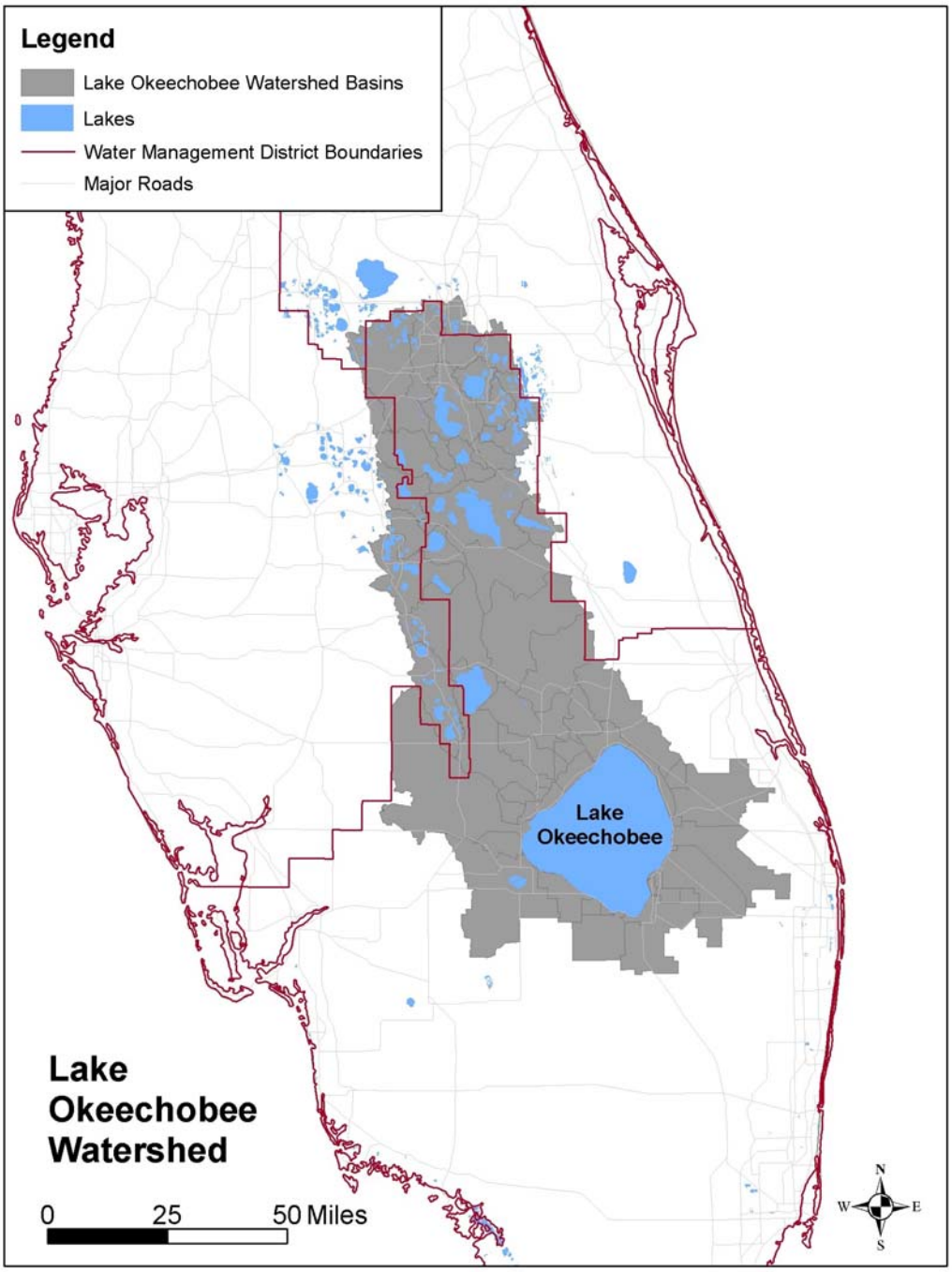

Figure 8-7. Lake Okeechobee Watershed.

Lake Okeechobee's largest outlets include the St. Lucie Canal eastward to the Atlantic Ocean and the Caloosahatchee Canal and River to the Gulf of Mexico. The four major agricultural canals – the West Palm Beach, Hillsboro, North New River, and Miami canals – have a smaller capacity, but are used to release excess water to the WCAs south of the lake when storage and discharge capacity are available. When water must be released from the lake for flood protection to the three WCAs, excess water can be passed up to the capacity of the pumping stations and

agricultural canals, and the regulatory schedules of the WCAs, with the remainder going to the Atlantic Ocean and Gulf of Mexico.

The waters of Lake Okeechobee are impounded by a system of encircling levees, which form a multipurpose facility for navigation, water supply, flood control and recreation. Pumping stations and control structures in the levee along Lake Okeechobee are designed to move water either into or out of the lake as needed.

Surface water inflows include the Kissimmee River, Lake Istokpoga, Fisheating Creek and Taylor Creek that flow into the lake from the north and west. Outflows include the Caloosahatchee River that flows out of the lake to the west; the St. Lucie and West Palm Beach canals that flow out of the lake to the east; and the Hillsboro, North New River and Miami canals that flow out of Lake Okeechobee to the south.

EXISTING CONDITIONS – LAKE OKEECHOBEE WATER MANAGEMENT

Historically, water levels in Lake Okeechobee were probably much higher than they are today (Brooks, 1974), perhaps as high as 20 feet NGVD. Prior to large-scale development and construction of the Herbert Hoover Dike, the lake had no channeled outflows and water overflowed the lake as sheetflow to the south and east. This resulted in a much larger and broader littoral zone and marsh ecosystem to the north and west than the existing one. Today, as the primary reservoir of the C&SF Project, Lake Okeechobee is capable of storing 3.75 million acre-feet of water at an average depth of 9 feet. Water levels in the lake are managed according to a regulation schedule developed by the SFWMD and the USACE. The Caloosahatchee and St. Lucie canals are the primary outlets for release of floodwaters when the lake is above regulation stages.

A series of structures are situated around the lake, to provide flood protection and drainage control, and to facilitate navigation. The USACE operates these primary structures and navigation locks and is responsible for maintenance of the schedule. The SFWMD operates and maintains the secondary water control structures and pump stations.

Historically, Lake Okeechobee's regulation schedule was developed primarily to meet flood control, water supply, and navigation objectives – the primary purposes for construction of the C&SF Project. The environmental concerns for the lake's littoral zone and wildlife habitat and the downstream estuaries have generally been compromised in order to meet the water supply needs of South Florida.

The current Water Supply and Environment (WSE) regulation schedule for the lake, adopted by the USACE in July 2000, uses climate forecasting and information regarding regional hydrologic conditions to determine the volumes of water to release from the lake under flood control circumstances, with the goal of improving performance for the lake and downstream systems.

Water Quality

Lake Okeechobee is a naturally eutrophic water body that has become hypereutrophic, due primarily to nutrient inputs from the Kissimmee River and Taylor Creek basins. Large quantities of nutrients are discharged from Lake Tohopekaliga to Lake Kissimmee and other downstream

receiving waters. Water quality improves from Lake Kissimmee to near Lake Okeechobee, where the Kissimmee River channel flows mostly through natural rangeland; however, pollutant loadings increase as cattle and dairies grow more numerous near the lake. Because the lake's phosphorus is internally recycled and a vast reservoir of the nutrient is stored in wetland and canal sediments, phosphorus within the lake may not reach acceptable levels for many decades after external loads are substantially reduced.

The 1997 and 2002 SWIM Plan updates recommended the implementation of programs and projects to improve the lake and watershed water quality situation. Even with the implementation of these programs and projects, nutrient loads to Lake Okeechobee have not decreased significantly, although there have been declines in concentrations. The highest inflow phosphorus concentrations continue to be found in the S-154 and S-191 basins where dairies and other high phosphorus sources are abundant. Phosphorus loading is far in excess of the amount considered for a healthy Lake Okeechobee ecosystem.

The Federal Clean Water Act (Title 33, Chapter 26, Subchapter III, Section 1313(d)) requires that states develop TMDLs for each water-quality-limited segment reported. A TMDL reflects the total pollutant loading, from all contributing sources, that a water segment can receive without exceeding its capacity to assimilate the pollutant loads and still meet applicable water quality standards. The phosphorus TMDL established for Lake Okeechobee is 140 metric tons, including rainfall (based on a five-year rolling average), to achieve an in-lake target phosphorus concentration of 40 parts per billion in the open water zone of the lake (FDEP, 2000). The restoration target was determined using computer models developed based on past research performed by the SFWMD. This target aims to restore a healthy lake system, restore the designated uses of Lake Okeechobee, and allow the lake to meet applicable water quality standards.

The enactment of the Lake Okeechobee Protection Act (LOPA) (Section 373.4595, F.S.) in 2000 also advanced restoration efforts. This act provides an umbrella that captures many Lake Okeechobee restoration efforts. It significantly enhances the mandates restoring and protecting the lake using a phased, watershed-based approach to reduce phosphorus loading to the lake and downstream receiving waters. Fulfilling this act requires a great deal of cooperation among government agencies and the public. To facilitate the execution of the LOPA, an interagency committee was formed with individuals from the FDEP, the FDACS, the University of Florida Institute of Food and Agricultural Sciences (UF-IFAS), the USDA Natural Resources Conservation Service (NRCS) and the SFWMD. The agencies have been planning and implementing numerous management activities in the watershed to reduce phosphorus loading to the lake. These include: the construction of surface water storage reservoirs and stormwater treatment areas; the restoration of isolated wetlands; the development and implementation of BMPs to control nonpoint sources of pollution; the continuation of research and monitoring to ensure projects are designed and implemented to optimize success and the removal of phosphorus-rich sediment from tributaries to Lake Okeechobee. In addition, the plan proposes the construction of urban and regional stormwater treatment areas in conjunction with the CERP Lake Okeechobee Watershed Project. More current information regarding the current status of LOPA activities, including research and studies, can be found in Chapters 10 and 3, of the *2005 South Florida Environmental Report, Volumes 1* and *II,* respectively (2005 SFER).

FUTURE WITHOUT PLAN CONDITION – WATER QUALITY – LAKE OKEECHOBEE

Over 60 watershed and in-lake cleanup projects are currently under way to incrementally reduce inputs of nutrients to Lake Okeechobee. However, to sustain water quality improvements brought about by in-lake cleanup projects, pollutant source reduction programs, via agricultural land acquisition, and implementation of BMPs in the lake watershed must be implemented concurrently. The FDEP TMDL pollutant load target (FDEP, 2001) is expected to result in additional pollutant load-reduction activities in watersheds flowing to Lake Okeechobee, as well as the Lake Okeechobee Protection Program target load of 140 metric tons by 2015.

FUTURE WITHOUT PLAN CONDITION – ENVIRONMENTAL RESOURCES

Lake Okeechobee is now smaller than under natural conditions, and water levels are lower than historic levels. The littoral zone occupies about 25 percent of the lake's surface along the southern and western shores in a region that was once under water. As a result of Herbert Hoover Dike, the littoral zone is uncoupled from land that once supported a much larger marsh to the west. That land now supports various agricultural activities and some residential development. Despite lower water levels from a historical perspective, flooding in the littoral zone in past years has resulted in serious impacts. Because the dike prevents the gradual outward expansion of marsh habitat that normally may have occurred, additional water (> 15 feet NGVD) in the lake results in deeper flooding of the littoral zone. Likewise, under extreme low water level conditions (< 11 feet NGVD) nearly the entire littoral zone is dry and unavailable as habitat for fish and other wildlife. This occurs because a relatively sharp depth gradient occurs at the interface between this region of the lake and the adjacent pelagic (open water) zone.

When the water level in Lake Okeechobee increases above a seasonally variable maximum (the lake stage that triggers discharge decisions on any given date based on a USACE regulation schedule), discharges can occur through canals connected to estuaries on the east and west coast of Florida. As a result of past discharges, the estuarine ecosystems have experienced unnaturally large inputs of fresh water following periods of high rainfall in the Lake Okeechobee watershed, and estuarine fish, shellfish, plants and other biota have been impacted.

The following management efforts have been directed at the issues associated with littoral zone flooding, drying, and high freshwater discharges to the estuaries:

- The WSE regulation schedule that uses climate forecasting to allow proactive discharges of water from the lake during periods of high rainfall to minimize damage to the littoral zone and the estuaries and conservation of water in the lake when dry conditions are predicted.
- Minimum water level criteria for the lake were developed as required by state law.
- A managed drawdown of the lake was carried out in the spring of 2000 to provide a period of lake levels below 13 feet so that submerged plant beds could recover from damaging high water levels that occurred in between 1994 and 1999. Total Submerged Aquatic Vegetation (SAV) coverage increased significantly following the recession.

- A temporary deviation to the WSE regulation schedule was conducted in the spring of 2004 to alleviate high stages. Total SAV coverage again increased significantly as a result of lower lake stages.

Management goals and objectives developed for Lake Okeechobee include provisions for protecting and enhancing the environmental resources of the lake itself, and for enhancing the functional role of the lake in the regional ecosystem, including the St. Lucie and Caloosahatchee estuaries, the Kissimmee River, and the Florida Everglades. A multifaceted approach is used to provide the most scientifically rigorous and relevant information to decision makers and it involves several fundamental and interrelated components. In addition, the Lake Okeechobee Protection Program requires exotic plant control in the lake and the watershed, as well as ecological assessment, research, and predictive model development (see Chapter 10 of the 2005 SFER – Volume I).

FUTURE WITHOUT PLAN CONDITION – PHYSICAL FACILITIES AND OPERATIONS – LAKE OKEECHOBEE REGULATION SCHEDULE

Lake Okeechobee has undergone numerous changes since the initial construction of the Herbert Hoover Dike. Today, Lake Okeechobee's water level is managed using regulation schedules to provide a range of desired benefits including flood protection, water supply and environmental protection. Adaptive protocols describe the process for implementing the opportunities for operational flexibility that exist in the WSE schedule (SFWMD, 2002).

The WSE schedule improves multi-objective performance and serves to better balance competing lake management objectives. High lake stages and regulatory discharges to the St. Lucie Estuary are reduced under WSE. A key feature of the WSE schedule is the lower operational zone that allows the flexibility to deliver water to the Everglades during lower lake stages. WSE, however, is not a schedule for water supply deliveries. The WSE regulation schedule:

- Initiates discharges at lower lake stages under special conditions to WCAs and estuaries.
- Makes pulse releases to estuaries for extended periods of time when large inflows are expected.
- Does not require discharges when drier conditions are expected (benefits water supply).
- Provides more flexibility in release decisions by using climate and hydrologic forecasting; decision trees; and outflow rules that provide ranges rather than fixed rates.

FUTURE WITHOUT PLAN CONDITION – PHYSICAL FACILITIES AND OPERATIONS – CRITICAL RESTORATION PROJECTS

Lake Okeechobee Water Retention/Phosphorus Removal

The project consists of design and construction of stormwater treatment areas on Taylor Creek (190 acres) and Nubbin Slough (780 acres), and the construction of a stormwater detention

area. The purpose of the project is to capture and attenuate peak flows from portions of the watershed and to improve water quality. The total project cost is estimated at $25 million. The USACE and the SFWMD entered into a project cooperation agreement on January 7, 2000 for implementation of the project on a 50-50 basis. Construction of the stormwater detention area was completed in 2003. Construction of the Taylor Creek/Nubbin Slough stormwater treatment areas was initiated in June 2004 and will be complete in June 2005 and March 2006, respectively.

More information regarding this project can be found at:
www.sfwmd.gov/org/wrp/wrp_okee/projects/h20 retention_premoval.html.

WATER QUALITY PROBLEMS AND OPPORTUNITIES – LAKE OKEECHOBEE

Lake Okeechobee is a Class I (potable water supply) and Class III (protection of habitat for fish and wildlife) water body, according to Florida Administrative Code (F.A.C.) rule. Class I water bodies generally have the most stringent surface water quality and pollution control criteria in Florida. However, water quality data for Lake Okeechobee indicate that the lake is in a eutrophic condition, primarily due to excessive nutrient loads from agricultural sources both north and south of the lake.

The main tributary to Lake Okeechobee is the Kissimmee River. As stated above, several water bodies within the Kissimmee River Watershed, including segments of the river itself, are impaired to various levels. Degradation of water quality in the Kissimmee River Watershed contributes to downstream degradation in Lake Okeechobee. Lower reaches of the Kissimmee River contribute high levels of nutrient loading to Lake Okeechobee.

Another important tributary to the lake is the Taylor Creek/Nubbin Slough Basin, which also contributes high levels of nutrient loading. Although the basin contributes only 4 percent of the total volume of inflows to Lake Okeechobee, it accounts for approximately 29 percent of the total phosphorus inflow loads.

Water quality in Lake Okeechobee is expected to slowly improve between 2004 and 2050. Field and laboratory studies of phosphorus stored in lake sediments indicate that sediment bound phosphorus is a dominant pollutant affecting lake water quality (Reddy et al., 1995). Currently, the average cumulative phosphorus load to the lake exceeds the P TMDL target by approximately 400 tons per year (SFWMD, 2003). Phosphorus loads to the lake eventually become sequestered in lake sediments. The surface layer of sediments and its associated phosphorus is frequently re-suspended by wind-aided mixing (Havens, 1997), and this tends to maintain a high phosphorus concentration in the water column, even if sources of phosphorus in the contributing watershed are controlled consistent with regulatory and watershed management programs. Although short-term water quality conditions in Lake Okeechobee are not expected to improve, in-place pollutant reduction programs in the lower Kissimmee River and Taylor Creek/Nubbin Slough basins are expected to result in long-term reduction in Lake Okeechobee water column nutrient concentrations. This will occur as phosphorus-rich sediments are slowly buried by sediments with reduced levels of phosphorus when external loads are lower.

Urban development in the Lake Okeechobee Watershed and nonpoint source pollution loading associated with urban stormwater runoff is not expected to increase significantly by 2050. Non-agricultural BMPs being implemented under the direction of the FDEP include sediment traps, grassed swales, and reduced P fertilizer in residential communities to improve water quality (see Chapter 10 of 2005 SFER – Volume I).

LAND USE – LAKE OKEECHOBEE REGION

Lake Okeechobee has traditionally been a key source of water supply for irrigated crops around the lake in the EAA, the Caloosahatchee River Basin, and Martin and St. Lucie counties (Upper East Coast). Continued access to this source of water is considered vital to sustaining agriculture in the surrounding regions.

Agriculture

The area is rural in character, with most lands dedicated to agriculture. Sugarcane is the predominant crop in the south, row crops and sugarcane in the east, and pastureland with dairy production in the north. Urban areas (generally few and modest in population) service the agriculture sector, as well as the tourists who come to the lake to fish, hunt, and enjoy other recreational pursuits.

Urban

A significant use of land outside the agricultural context is for urban development. Six incorporated communities are situated around the lake, ranging in population from approximately 1,700 to 15,000.

The Brighton Seminole Indian Reservation occupies a large area of land west of the lake in Glades County. The southern end of this reservation is near the Herbert Hoover Dike just north of Lakeport.

Major transportation corridors around the perimeter of Lake Okeechobee include several highways and railroads. County Road 78 parallels the lake along its western and northern shores from Moore Haven to Okeechobee. From Okeechobee, State Highway 98/441 follows the northern and eastern portion of the lake to Pahokee. County Road 715 then follows the Herbert Hoover Dike from Pahokee to Belle Glade, where State Highway 27 follows the southern lake area back to Moore Haven and County Road 78. In many cases, these highways are within one mile of the Herbert Hoover Dike, and are often within 50 feet.

Railroad corridors in the Lake Okeechobee area include the Florida East Coast Railroad and the South Central Florida Railroad. The East Coast Railway is located along the eastern part of the lake where it comes very near to the Herbert Hoover Dike. The South Central Florida Railroad travels along the southern end of the lake, where it comes within one mile of the dike.

ELIGIBLE FFWP PROJECTS FOR THE LAKE OKEECHOBEE WATERSHED REGION

- CERP - Lake Okeechobee Watershed Project
- Okeechobee County
- Lake Istokpoga

SECTION 8-5: LOWER WEST COAST REGION

PHYSICAL CONDITIONS – LOWER WEST COAST REGION

The Lower West Coast Region covers 5,129 square miles in Lee, Hendry, Glades, and Collier counties, and a portion of Charlotte and mainland Monroe counties (**Figure 8-8**). This area is generally bounded by Charlotte County to the north, Lake Okeechobee and the EAA to the east, the Big Cypress National Preserve (BCNP) to the south, and the Gulf of Mexico to the west. The area is characterized by the sandy flatlands region of Lee County, which gives way to sandy though more rolling terrain in Hendry County, and the coastal marshes and mangrove swamps of Collier County. The surface drainage of the region is primarily achieved by natural sloughs and man-made canals to the Caloosahatchee River, Estero Bay, Naples Bay, Rookery Bay, and the Faka Union Bay.

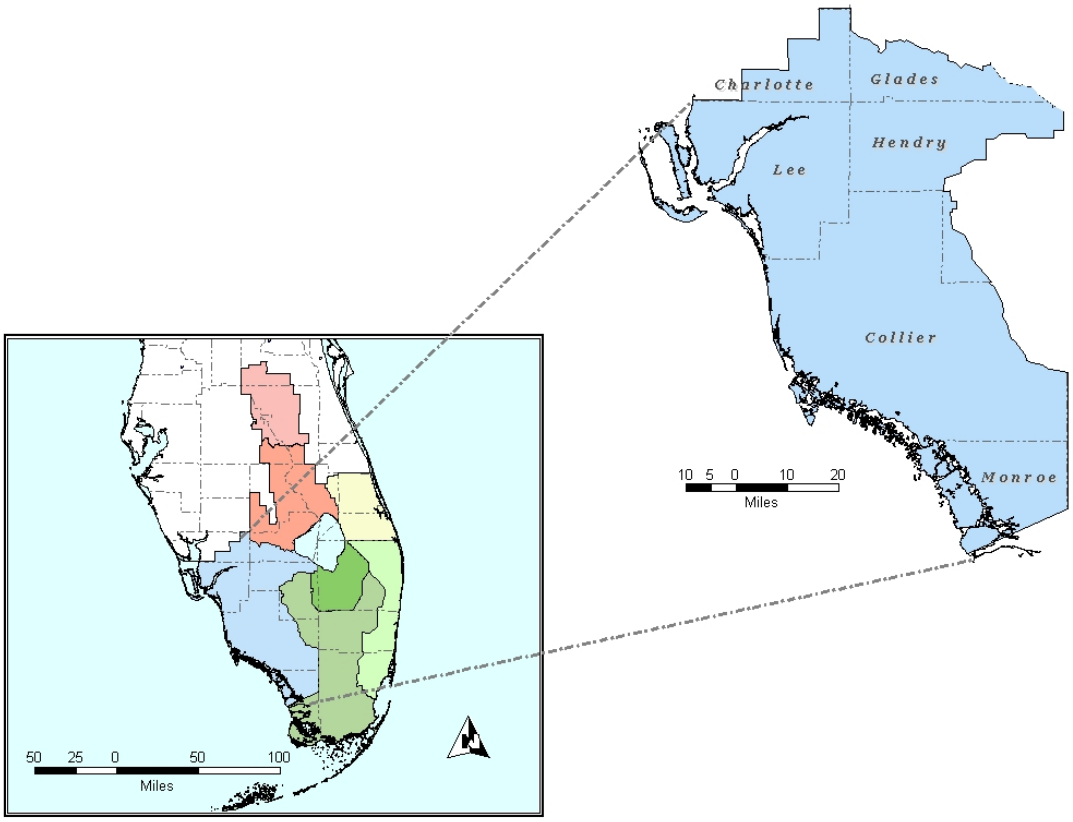

Figure 8-8. Lower West Coast Region.

The Caloosahatchee River Basin includes an area of 860 square miles in parts of Lee, Glades, Charlotte, and Hendry counties. From a hurricane gate on the southwest shore of Lake Okeechobee at Moore Haven, the Caloosahatchee Canal drains westerly for about 5 miles through a very flat terrain into Lake Hicpochee. From there the canal joins the upper reach of the Caloosahatchee River. On its way to the Gulf of Mexico, the river is controlled by navigation locks at Ortona (15 miles downstream from Moore Haven) and at Olga, near Fort Myers.

Downstream from Ortona Lock, many tributaries join the river along its course to the gulf. The Caloosahatchee River serves as a portion of the cross-state Okeechobee Waterway, which extends from Stuart on the east coast via the St. Lucie Canal, through Lake Okeechobee and the Caloosahatchee River to Fort Myers on the Gulf of Mexico. The river has been straightened by channelization through most of its 65-mile course from the Moore Haven Lock to Fort Myers.

The J. N. "Ding" Darling National Wildlife Refuge (NWR) Complex includes Pine Island NWR, Island Bay NWR, Matlacha Pass NWR, and Caloosahatchee NWR, all located on the lower west coast. The health of the estuarine ecosystem they embody is directly tied to the water quality and quantity, and timing of flows from the Caloosahatchee Watershed and the watersheds that drain into the Caloosahatchee River (i.e., Kissimmee River and Lake Okeechobee watersheds).

South of the Caloosahatchee River Basin, a tributary network of the Estero River and Imperial River drain to Estero Bay. The rapidly urbanizing area of southern Lee County is primarily drained through the Estero and Imperial Rivers. In 1995 there was significant flooding in the area. Potential for severe flooding has been somewhat reduced through implementation of the South Lee County Watershed Plan, and improvement of the conveyance capacity of the Imperial River. However, the characteristics of runoff – quantity, quality, and timing – have been affected by an urbanized landscape.

South of the Estero Bay watershed, an approximately 1,200-square-mile area of western Collier County is rapidly urbanizing from a variegated landscape of wetlands and agricultural uplands. This watershed also contains several pristine natural areas such as the Fakahatchee Strand, Corkscrew Swamp, Lake Trafford Picayune Strand, Belle-Meade, Florida Panther National Wildlife Refuge, and a vast expanse of coastal wetlands covering Rookery Bay and the Ten Thousand Islands National Wildlife Refuge. The overall drainage of the urbanizing area is presently achieved by a network of man-made canals. Most of the natural areas have been acquired under public ownership.

Big Cypress Swamp spans 1,205 square miles from southwest of Lake Okeechobee to the Ten Thousand Islands in the Gulf of Mexico. The 570,000-acre BCNP was established by Public Law 93-440 in 1974 to protect natural and recreational values of the Big Cypress Watershed and to allow for continued traditional uses such as hunting, fishing, and oil and gas production. It was also established to provide an ecological buffer zone and protect the ENP water supply. In 1988, Congress passed the BCNP Addition Act (Additions), which added 228 square miles to the preserve.

EXISTING CONDITIONS – LOWER WEST COAST REGION WATER MANAGEMENT

Inflows from Lake Okeechobee and runoff from within its own basin supply the Caloosahatchee River. The freshwater portion of the river (C-43 canal) extends westward from Moore Haven, on Lake Okeechobee, through LaBelle, to the Franklin Lock and Dam (S-79). The C-43 canal is part of the Lake Okeechobee Waterway, providing navigation between the east and west coasts of Florida. West of S-79, the river mixes freely with estuarine water as it empties into the Gulf of Mexico (SFWMD, 1995; SFWMD, 1997). C-43 is 45 miles long, averages 20 to 30 feet deep, and ranges from 150 to 450 feet wide. The Ortona Lock and Dam (S-78), located approximately 27 miles upstream of S-79, separates the freshwater portion of the river into the East and West Caloosahatchee basins. Roughly 40 percent of the drainage area is in the east

basin, and the remaining 60 percent is in the west basin. The total drainage area to the river between S-77 and S-79 is about 880 square miles (CDM, 1991).

That portion of the LWC which is in the Caloosahatchee Watershed is part of the Lake Okeechobee Service Area. The Lake Okeechobee Service Area sub-basins lie at critical intermediary points in the water management system of South Florida. The needs of the Okeechobee sub-basin for flood protection and drainage services affect inflows to the Caloosahatchee Estuary. Excessive discharges of fresh water to the Caloosahatchee Estuary are caused by regulatory releases from Lake Okeechobee and runoff from each local watershed (SFWMD, 1997).

The Lake Okeechobee regulation schedule determines the timing and quantity of water that is released from the lake into the Caloosahatchee River. The specific duration and temporal pattern of release is a function of lake water surface elevation, season, and long- and short-term weather forecasts. When lake surface elevation is within an acceptable range, pulsed releases that mimic rainfall events can be made to prevent the lake level from rising. At higher lake levels, continuous releases of water are made until the lake level falls within an acceptable range. The specific level of continuous release depends on the lake level; the higher the level the higher the release. Maximum water releases to the Caloosahatchee may be up to 9,300 cubic feet per second (cfs).

Continuous discharges to the Caloosahatchee and St. Lucie estuaries have caused documented negative effects on estuarine ecology (Chamberlain et al., 1995; Haunert and Startzman, 1985; Chamberlain and Hayward, 1996). Research has shown that prolonged releases, even at modest rates, transform the estuarine systems into freshwater habitats within three to four weeks. The dramatic and rapid changes in salinity and associated siltation caused by the release of suspended solids can produce long-term negative effects on these estuaries. High, continuous releases generate even more problems due to greater potential for environmental disruption and associated public concern. Even with a thorough understanding of these major environmental concerns, flood control remains a major purpose of the man-made structures; and regulatory discharges are sometimes necessary because of the high risk of loss of life and property associated with high lake stages and hurricane-generated waves and tides.

The rapid urbanization of western Collier County has had adverse impact on the surface and groundwater flow patterns and the natural environment. Residential and agricultural developments in the fringe of wetlands have disrupted the historic flow-ways. Flash flooding has been a regular occurrence in many areas. A 169-mile network of primary canals with 44 water control structures is presently operated and maintained as Works of the District by the Big Cypress Basin (BCB) unit of the SFWMD. The secondary and tertiary drainage systems are maintained by Collier County. Since the early eighties, Big Cypress Basin has undertaken an aggressive capital improvement program to enhance the conveyance capacities of the canal network and reduce over-drainage.

The Big Cypress Swamp is a recognized physiographic province in southwestern Florida. The region is essentially a rain-driven hydrologic unit that, for the most part, is not dependent on adjacent land for water flow. It is a source of recharge for the shallow aquifers of South Florida and is important to the integrity of the water resources in the western part of Everglades National Park (ENP). The water regimen of the area largely determines the patterns in which temperate and tropical vegetative communities and their related wildlife species occur. During the wet season (summer and fall), when heavy rains lead to widespread surface inundation, the almost imperceptible slope of the land creates an overland sheetflow. During the dry season (winter and spring), natural surface water flows are confined to the lower elevations of strands, swamps and sloughs. Congress recognized the hydrological features of the swamp and established the BCNP,

which has since been mapped by the USFWS as part of the national wetlands inventory. The majority of BCNP lands are classified as wetlands; exceptions are scattered hardwood hammocks, some pinelands, and artificially filled areas.

PROBLEMS RELATED TO WATER MANAGEMENT

During the annual November to April dry season, little water is released into the Caloosahatchee River from the Lake Okeechobee, resulting in low flows and low water levels in the upper Caloosahatchee. Several problems may develop as a consequence. Low flow may lead to development of an occasional severe algal bloom in the river above Franklin Lock (S-79) and Dam. The City of Fort Myers and Lee County both have municipal water intakes in this area. Short-term high rates of discharge from Lake Okeechobee are used by the USACE to break up the blooms whenever requested by the District (USACE, 1991). During the extreme driest months (April-May) river flow may drop to near zero. When this occurs, navigation lockages through the W. P. Franklin Lock (S-79) allow a saltwater wedge to move upstream. If salt intrusion is too severe, the SFWMD requests that the USACE flush out the salt water with a short-term high rate of discharge from Lake Okeechobee. During a declared water shortage period, the SFWMD requests the USACE to go to reduced hours of lockages (USACE, 1991). In September 2001, an MFL for the Caloosahatchee River and Estuary went into effect, requiring that certain salinity criteria be met downstream of S-79 at the Ft. Myers Yacht Basin. When water is available, low-level environmental releases (300 cfs at S-79) can be made from the lake to maintain a low salinity zone in the upper Caloosahatchee Estuary.

In South Lee County and BCB, the continual over-drainage by the canals has led to large-scale drawdown of the groundwater aquifers and impaired salinity distribution in the estuaries of Estero Bay, Naples Bay, Rookery Bay, and Faka Union Bay.

FUTURE WITHOUT PLAN CONDITION – PHYSICAL FACILITIES AND OPERATIONS – CRITICAL RESTORATION PROJECTS

Lake Trafford Restoration

Lake Trafford is located in north Collier County and is the largest lake south of Lake Okeechobee, with a surface area of approximately 1,500 acres. It is the headwaters of the Corkscrew Swamp Sanctuary to the southwest, the Corkscrew Regional Ecosystem Watershed (CREW) to the west, and the Florida Panther National Wildlife Refuge to the south. Lake Trafford has poor water quality, extensive muck accumulations, loss of native submergent plant communities, and numerous fish kills. The project involves removal of approximately 8.5 million cubic yards of loose, flocculent organic sediments that blanket the bottom of the lake and transport of these sediments to a sediment disposal site through a temporary pipeline. A project cooperation agreement was entered into by the SFWMD and the USACE on January 7, 2000. Implementation of the project began in September 2004. More information regarding this project is available at http://www.evergladesplan.org.

Southern CREW / Imperial River Flowway

This project is located in southern Lee County bordering the western boundary of the CREW. The environmentally sensitive area east of Bonita Springs has been altered by the construction of roads, house pads, agricultural berms and ditches. These alterations have resulted in restriction of

historical sheetflow, unnatural water impoundment and flooding, increased pollutant loading to the Imperial River and Estero River, and disruption of natural wetland functions. The project involves acquisition of approximately 4,670 acres and restoration of historic sheetflow by removal of canal and road berms, home pads, and ditches. The project also involves replacement of the Imperial Bonita Estates Bridge and modifications to the Kehl Canal Weir.

The project is divided into three phases. Phase I consists of construction of the Kehl Canal Weir Modification. Phase II consists of land acquisition and restoration of historic flows over Sections 25, 26, 35, 36, and the SE ¼ of Section 24, Township 47S, and Range 26E, totaling 2,720 acres. Phase III consists of land acquisition and restoration of historic flows over Sections 32, 33 and 34, Township 47S, Range 26E, and the flow-way starting at Section 32 downstream to Matheson Street, totaling 2,040 acres. The estimated project cost is $26.1 million, of which $12.1 million will be cost-shared under a Project Cooperative Agreement with the USACE, and the remaining $14 million for land acquisition will be cost-shared under a separate agreement with the United States Department of the Interior (USDOI). Additional information is available at: http://www.evergladesplan.org/.

Western Tamiami Trail Culverts

The project is located on the Tamiami Trail (U.S. 41) in Collier County between State Road 92 and 50 Mile Bend (a distance of 43 miles). In 1928, the Tamiami Trail was completed between Miami and Naples. To obtain fill material for the roadbed, a borrow canal was excavated on the northern side of the road alignment. The effect of the Tamiami Trail and adjacent borrow canal has been to intercept existing north-south flow-ways to the BCNP and channel flows through a few bridges/culverts. The purpose of this project is to increase the number of north-south flow-ways by adding culverts at locations that will restore natural hydropatterns. The installation of approximately 80 culverts under Tamiami Trail and Loop Road will improve sheetflow of surface water within Ten Thousand Islands National Wildlife Refuge (NWF), BCNP and ENP. A project cooperation agreement was entered into by the SFWMD and the USACE. The implementation of the project is being phased due to cost overrun by the other critical restoration projects. The District will move forward with Phase I of the project, which starts at SR-29 and goes west to CR-92. Construction of this project began in September 2004 with completion in the spring of 2006. Additional information is available at http://www.evergladesplan.org/.

FUTURE WITHOUT PLAN CONDITION – WATER QUALITY – LOWER WEST COAST REGION

The new Lake Okeechobee regulation schedules (WSE) will have minimal impact on water quality conditions in the Caloosahatchee River/Estuary. In general, water quality conditions throughout the basin in the future without plan condition are expected to be similar to current water quality conditions.

The District has identified the S-190 structure (a gated culvert at the confluence of the North and West feeder canals) as a water control structure discharging into the Everglades Protection Area that requires an assessment of pollution loads and the development of a water quality improvement strategy. This strategy must be in accordance with the non-ECP structures requirement of the Everglades Forever Act (EFA). SFWMD water quality data (SFWMD, 1998a) indicate that agricultural areas upstream of the Seminole Reservation contribute significant nutrient loads (particularly phosphorus) into the canal system that drains into the north and west feeder canals and ultimately across the northeast corner of BCNP. Water quality improvements

required under the EFA are scheduled to be completed by December 31, 2006, to assure that all water quality standards are met in the Everglades Protection Area.

WATER QUALITY PROBLEMS AND OPPORTUNITIES – LOWER WEST COAST REGION

The FDEP listed 14 water body segments in the Caloosahatchee River Basin and in downstream coastal waters on its 1998 303(d) list. Water quality parameters of concern included excessive nutrients, coliform bacteria, biochemical oxygen demand (BOD), and depressed levels of dissolved oxygen (DO). The Caloosahatchee River Basin is a Group 3 basin in FDEP's watershed management cycle and is currently being reassessed. The draft list for Caloosahatchee Basin (dated December 2002) now includes 30 water body segments potentially impaired for chlorophyll, DO, lead, mercury, fecal and total coliform, iron, copper, or biology.

As with the BCB discussed below, the number of monitoring locations in coastal waters of the region used to prepare the 303(d) list are inadequate to accurately characterize the extent of water quality degradation in coastal areas. The Charlotte Harbor Basin, which includes downstream waters of San Carlos Bay and Pine Island Sound, is a Group 2 basin; however, its verified list also remains draft. The draft Basin Status Report found insufficient data in many water body segments for determining impairment based on nutrients. Extensive urban development (Fort Myers and vicinity, Cape Coral) at the mouth of the Caloosahatchee River contributes significant point and nonpoint source pollution loads into coastal canals and downstream into the Caloosahatchee Estuary.

In 2050, water quality conditions in the upper (eastern) and central portions of the watershed are expected to be unchanged compared to existing conditions. Water quality in downstream coastal areas is expected to decline as a result of increased population growth and urban and agricultural development. Water quality impacts from increased agricultural development are anticipated to be most readily observed in downstream areas of the watershed. The projected increase in population growth in urban areas of the Caloosahatchee River Basin is expected to exacerbate existing water quality problems in coastal waters, particularly those associated with wastewater discharges. Offsetting the water quality impacts of coastal development and inland agricultural development is the implementation of a different regulatory schedule for Lake Okeechobee. The new schedule is expected to improve water quality conditions in the Caloosahatchee River and estuary by reducing the frequency and volume of large quantities of nutrient/sediment-laden Lake Okeechobee flood regulation waters.

The BCB (the watershed of BCNP) includes agricultural areas west of the EAA, the Seminole Indian Tribe's Big Cypress Reservation, most of the Miccosukee Tribe of Indians' reservation lands, and developed areas of the west coast, including Naples and Marco Island. Twelve water body segments within the BCB were included on the FDEP 2002 303(d) list. Pollutants and constituents of concern include excessive nutrients (as indicated by chlorophyll-*a*), coliform bacteria, BOD, low levels of DO, iron, cadmium, and mercury (based on fish consumption advisories).

The L-28 interceptor canal, on the east side of the BCB and within a Group 5 Basin, was listed in the 1998 303(d) list as use-impaired based on elevated nutrient levels and low levels of DO. It should be further noted that due to the scarcity of ambient monitoring sites in coastal waters of the basin, actual water quality problems are likely to be more severe in coastal waters than as described in the FDEP 303(d) list, as a result of development pressure and point and nonpoint source pollution loading in developing areas.

Poor water quality and excessive drainage into the BCNP via the existing canal system constitute the most significant water quality impacts facing the BCNP, both now and in the future. It should be noted that the canals contributing pollutants into BCNP are not part of the C&SF Project. Existing pollution loads entering the BCNP from northwestern areas of the watershed (Big Cypress Seminole Indian Reservation, C-139 basin, and C-139 annex agricultural areas) are expected to be reduced by 2050 through the implementation of planned and ongoing water quality improvement projects.

LAND USE – LOWER WEST COAST REGION

Caloosahatchee River

The Caloosahatchee River Region has 161,862 acres of urban land – largely fixed single-family units (77,208 acres), and an almost equal number of acres in some stage of construction. There are 374,924 acres of agriculture with predominantly improved and unimproved pastures (160,783 acres), citrus groves (104,105 acres), and sugarcane (84,067 acres). Various types of rangeland make up 51,847 acres of land use. The category of barren land has 10,249 acres. This includes spoil and borrow areas (6,651 acres) and rural land in transition (3,418 acres). Transportation, communication, and utilities comprise 16,092 acres. (SFWMD, 2003)

Rangeland and agriculture dominate land use in the basin, particularly the upper portion. The freshwater portion of the Caloosahatchee River Region is mostly agricultural. The only urban areas are the cities of LaBelle, Alva and Moore Haven (CDM, 1991). Land use adjacent to the Caloosahatchee River Estuary is largely residential and urban with the city of Cape Coral on its northern bank and the highly urbanized city of Fort Myers on its south bank. Both of these communities have experienced rapid growth, with even more growth anticipated in the near future.

AGRICULTURE

Glades and Lee counties are included in this region. Over one-half million acres are farmed in the Caloosahatchee River Basin, and approximately three-fourths of that area is pastureland. Large farms averaging 700 acres characterize the region, with relatively low productivity per acre. Hendry County is one of the top six counties in Florida for beef cattle production, with Glades County ranking eighth (UFBEBR, 2002). Citrus production in the Caloosahatchee River Basin covers more than 20,000 acres (FASS, 2002), much of which is likely categorized as unique farmland based upon its location, growing season, and high value citrus crops.

Almost 4,000 people are employed in agricultural production and services, and the payroll totals approximately $75 million. Agricultural products in this region have a total market value of more than $174 million (UFBEBR, 2002).

More than 47,000 acres of farmland are irrigated in the Caloosahatchee River Basin (USGS, 2002). Reliable water supply is a major concern in this region, which has traditionally relied upon water deliveries through the Caloosahatchee River from Lake Okeechobee. Irrigation demands can be expected to increase as additional land is used for citrus production.

Big Cypress National Preserve

Roadways in South Florida often obtain necessary road fill from excavation of a parallel canal, resulting in both an elevated obstruction to natural drainage patterns and rerouting of flow

in open canals. Such drainage alterations in the BCNP include the Tamiami Trail (U.S. 41), Interstate 75 (Alligator Alley), County Route 839 (Turner River Road), County Route 841 (Birdon Road), County Route 94 (Loop Road), and numerous smaller roads. State Road 29, a north-south road, parallels the western boundary just outside of the BCNP, although its borrow canal is just within the boundary of the BCNP. Extending northward from the Tamiami Trail along the eastern boundary of the BCNP, the L-28 Levee forms the boundary between the Everglades and Big Cypress drainage. Although the levee is located immediately outside of the BCNP boundary, it is significant to the hydrology of the BCNP. The L-28 interceptor canal cuts through the extreme northeastern corner of the BCNP, rapidly draining the agriculturally active lands north of the BCNP.

Oil and gas are currently produced from two active fields in the BCNP. A portion of the Bear Island field lies within the Okaloacoochee Slough in the northwestern corner of the BCNP. The Raccoon Point field is located in the northeastern corner of the original BCNP and north of the Jetport site.

The Miami-Dade-Collier Transition and Training Airport, popularly known as the Jetport, occupies a 32-square-mile site just north of the Tamiami Trail and adjacent to the eastern boundary of the BCNP. Although originally intended as an international airport, it is currently used only for limited training activities. Construction required 3 million cubic yards of fill excavated from 7 pits, ranging from 30 to 40 feet deep and covering 65 acres of surface area just west and south of the Jetport runways. Since all structures must be elevated above the seasonal high water levels, fill material must be excavated from borrow pits. Numerous such pits exist within the BCNP, ranging in size and depth based on the extent of the development.

Off-road vehicle usage in the BCNP is regulated by the National Park Service and is permitted by the enabling legislation to the extent that it does not significantly harm the environment. Areas open to use are designated and permits are required, with a maximum of 2,000 permits to be issued per year. The BCNP is currently transitioning to a designated trail system wherein off-road vehicle use will be permitted only on designated trails. In areas where the trails are in place, users are restricted to them. In areas where trails are not yet in place, access may still be limited, and access will be from designated points only. Approximately 50 miles of a planned 400 miles of trails are currently designated.

Some 38,700 acres, totaling 6 percent of the BCNP's original boundary, are nonfederal lands. These nonfederal lands consist of 12,236 acres of school board lands, including one section in each township set aside for schools; 23,488 acres of Jetport Authority lands; 1,514 acres of county roads; and 1,271 acres of private lands. Nonfederal lands within the Additions have not yet been completely defined.

Agriculture within the original boundary of the BCNP is minimal. Farming is known to be more extensive within the Additions, but until the lands are formally transferred to the federal government, these agriculturally impacted areas will not be completely defined.

Five active "life" leases cover grazing rights on approximately 29,000 acres in the northwestern corner of the original preserve. All leases are located north of Alligator Alley. The leases can only be renewed by the permittee or spouse and are not transferable. These are gradually being phased out as lessees curtail operations or leases are relinquished.

Public Law 93-440 provides that members of the Miccosukee Tribe of Indians of Florida and members of the Seminole Indian Tribe of Florida shall be permitted, subject to reasonable regulations established by the secretary, to continue their usual and customary use and occupancy

of federal or federally acquired lands and waters within the BCNP, including hunting, fishing, trapping on a subsistence basis, and traditional tribal ceremonies.

URBAN AREAS

Naples, Marco Island and Everglades City comprise the three largest urban areas within the Big Cypress Region. All three cities are on the west coast, and Naples is among the fastest-growing urban areas in the United States. It has developed into a significant retirement destination with extensive residential and business center construction. Water supply demands to meet this fast-growing and developing urban area are rapidly increasing.

Fakahatchee Strand State Preserve

The Fakahatchee Strand, located just west of the BCNP, is included in the area designated by the State of Florida as an Area of Critical State Concern. It is the recipient of the flow of the Okaloacoochee Slough, which cuts across the extreme northwestern corner of the BCNP and crosses under State Road 29 into the strand.

Southern Golden Gate Estates

West of the Fakahatchee Strand State Preserve and south of Interstate 75 is the Southern Golden Gate Estates. The area was planned as a large residential subdivision and construction began in the 1960s. The building of roads and several drainage canals in this 94-square-mile area has affected the area's environmental quality by over-draining the watershed, sending harmful freshwater discharges to the estuaries, increasing frequency of forest fires, and reducing aquifer storage (SFWMD, 1996). An aggressive hydrologic restoration plan involving plugging of four primary canals, pump stations, spreader channels, and road removal is being implemented under the CERP.

Water Conservation Areas

The BCNP is bounded on the east by WCA-3A. Water is impounded in the Conservation Area and released to ENP and BCNP on predetermined schedules. The L-28 Levee forms the boundary between WCA-3A and the BCNP. The WCAs are managed by the FWC, under contract to the SFWMD.

Everglades National Park

The southern and portions of the eastern boundary of the BCNP abut ENP. The BCNP's southern boundary forms a "stair-step" pattern that distinguishes the wetland environment of the BCNP and the estuarine environment of the ENP. The Stair-Step area receives flows from the BCNP en route to the estuarine environment of the ENP.

American Indian Reservations

Two American Indian reservations abut the BCNP. The Seminole Indian Tribe of Florida is along the eastern part of the BCNP's northern boundary, and the Miccosukee Tribe of Indians of Florida is along the eastern boundary of the BCNP.

AGRICULTURE

A persistent southward progression of agricultural development presents an external threat to the water quality and quantity of the Okaloacoochee Slough and Mullet Slough drainages. Expanding agricultural development is now located along the BCNP's northern boundary.

Hendry and Collier counties are included in this region. More than 730,000 acres are farmed in the Big Cypress Region, and almost half of that area is pastureland. The region is characterized by moderate to large farms producing more than $680 per acre per year in market value. Hendry County ranks sixth in the state for cattle production with approximately 85,000 head of cows and cattle in 2004. Approximately 72,000 acres of sugarcane were harvested in 2002. Hendry County, with 93,155 acres, ranks second in citrus acreage in Florida behind Polk County; Hendry County leads the state in number of citrus trees with over 14 million trees. Hendry County ranks third in citrus production behind Polk and Highlands counties. Big Cypress region citrus production and acreage peaked in 2000 and have declined slightly since then. Hendry and Collier counties rank second and third in the state (behind Miami-Dade County) in market value of agricultural products sold in 2002 (UFBEBR, 2004).

ELIGIBLE FFWP PROJECTS FOR THE LOWER WEST COAST REGION

- CERP - C-43 Basin Storage Reservoir
- CERP - Caloosahatchee Backpumping with STA
- CERP - Picayune Strand Restoration (formerly known as Southern Golden Gates Estates)
- CERP - Big Cypress/L-28 Interceptor Modifications
- Charlotte Harbor Watershed Initiatives
- Caloosahatchee River Watershed Initiatives
- The Western Basins
- Estero Bay Watershed
- Naples Bay Initiative
- Four Corners

SECTION 8-6: UPPER EAST COAST REGION

PHYSICAL CONDITIONS – UPPER EAST COAST REGION

The Upper East Coast Region covers 1,139 square miles and includes most of Martin and St. Lucie counties and eastern Okeechobee County (**Figure 8-9**). The Atlantic Ocean borders Martin and St. Lucie counties to the east, and Lake Okeechobee shares a substantial portion of the Martin County line to the west. Urban development is primarily located along the coastal areas while the central and western portions are used primarily for agriculture; the main products being citrus, truck crops, sugarcane, and beef and dairy products.

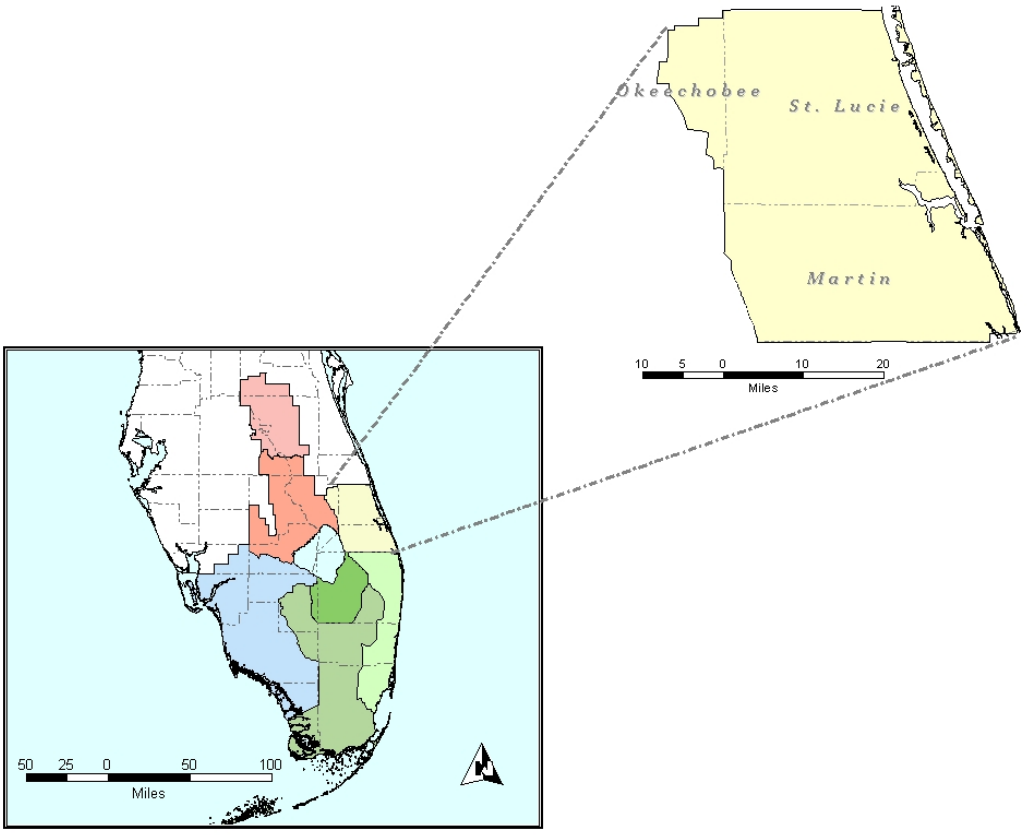

Figure 8-9. Upper East Coast Region.

The land in the UEC is generally flat, ranging in elevation from 15 to 60 feet NGVD in the western portion, with an average elevation of 28 feet. The coastal area ranges from sea level to 25 feet. The coastal sand hills adjacent to the Atlantic Intracoastal Waterway are higher than most parts of the county, reaching a maximum elevation of 60 feet. This feature is known as the Atlantic Coastal Ridge.

Natural drainage in the UEC has been significantly altered by the construction of canals, drainage ditches and numerous water control structures that direct stormwater discharge to the east coast. The area contains the C&SF Project canals C-23, C-24 and C-25 drainage basins, and the drainage area served by C-44 (St. Lucie Canal).

The St. Lucie Canal is Lake Okeechobee's eastern outlet, extending 25.5 miles from Port Mayaca to the city of Stuart, where it terminates at the South Fork of the St. Lucie River. The St. Lucie River Basin is part of a much larger southeastern Florida basin that drains over 8,000 square miles. The St. Lucie River, composed of the North and South forks, lies in Martin and St. Lucie counties in the northeastern portion of the basin. The South Fork is a relatively short stretch of river. The North Fork, designated as an aquatic preserve by the State of Florida, begins south of Fort Pierce and flows past the city of Port St. Lucie to the St. Lucie River Estuary.

The St. Lucie Estuary is part of a larger estuarine system known as the Indian River Lagoon (IRL), which has been designated an estuary of national significance. The lagoon is a component of the USEPA-sponsored National Estuary program, and is also designated a state priority water body for protection and restoration under the state's SWIM Act. The SWIM Plan identifies excessive freshwater runoff from the St. Lucie Estuary Watershed as a problem within the St. Lucie Estuary.

Much of the St. Lucie River has been channelized and many drainage canals empty into the river, particularly the St. Lucie Canal, C-23 and C-24. The St. Lucie Canal, the largest overflow canal for Lake Okeechobee, is a navigation channel 8 feet deep and 100 feet wide connecting the Atlantic Intracoastal Waterway in Stuart with Lake Okeechobee at Port Mayaca.

EXISTING CONDITIONS – UPPER EAST COAST WATER MANAGEMENT

The St. Lucie Estuary is located on the southeast coast of Florida, encompassing portions of both Martin and St. Lucie counties within the watershed. The two forks of the St. Lucie Estuary, the North Fork and South Fork, flow together near the Roosevelt Bridge at the city of Stuart, and then flow eastward 6 miles to the IRL and Atlantic Ocean at the St. Lucie Inlet. Tidal influences in the North Fork reach 15 miles north of Stuart in Five-Mile Creek, and to a water control structure on Ten Mile Creek just west of the Florida Turnpike at Gordy Road. Tidal influences in the South Fork extend about 8 miles south of Stuart to the St. Lucie Lock and Dam on the St. Lucie Canal. Tidal influence also extends into the extremes of the nearby Old South Fork tributary (Morris, 1987).

The estuary is divided into three major areas: the inner estuary, composed of the North and South forks; the mid-estuary, from the juncture of the North and South forks to Hell's Gate; and the outer estuary, extending from Hell's Gate to the St. Lucie Inlet. The main body of the North Fork is about 4 miles long, with a surface area of 4.5 square miles and a total volume of 998.5 x 10^6 cubic feet at mean sea level. The South Fork is approximately half the size of the North Fork with a surface area of about 1.9 square miles and a volume of 468.7 x 10^6 cubic feet. The mid-estuary extends 5 miles from the Roosevelt Bridge to Hell's Gate and has an area and volume similar to the North Fork (4.7 square miles and 972.7 x 10^6 cubic feet) (Haunert and Startzman, 1985).

Surface sediment composition within the estuary has been mapped by the SFWMD (Haunert, 1988). Sediment composition within the St. Lucie Estuary is influenced by hydrodynamics and is somewhat correlated to depth. Sand substrates with little organic content are found along the

shallow shorelines of the estuary and in the St. Lucie Canal. This reflects the impacts of wave turbulence and rapid currents. Substrates comprised of mud and moderate quantities of sand are present in areas that are more typically low-energy environments but subjected to occasional high-energy events. Mud substrates are found in low-energy areas, such as dredged areas and the deeper portions of the estuary. These mud sediments often contain high concentrations of organic materials.

While the estuary encompasses about 8 square miles, the watershed covers an area of almost 775 square miles. The watershed is divided into eight basins, five major basins and three minor ones. Three of these major basins, the C-23, C-24 and C-44, represent basins now linked to the estuary by components of the C&SF Project. In addition to drainage from within the C-44 basin, the C-44 canal (St. Lucie Canal) also conveys flood control discharges from Lake Okeechobee to the St. Lucie Estuary. The other two major basins, the North Fork and Tidal basins, include numerous connections to the St. Lucie Estuary.

Agricultural drainage and residential development have extensively modified the watershed of the entire St. Lucie Estuary. One major effect of these man-made alterations in the landscape and water management practices is increased drainage, manifested by a lowered groundwater table and dramatic changes in the way stormwater runoff is introduced to the estuary. Typically, when a watershed such as the St. Lucie Estuary Watershed is highly drained, all three runoff factors (quality, quantity and timing) are negatively affected. From a yearly cycle perspective, the quantity of water drained to the estuary is increased, the water quality is degraded, and the seasonal distribution of runoff is altered such that dry season flows are of lesser magnitude and frequency, and wet season flows are of greater magnitude and frequency. The vast majority of runoff occurs within the first three days after a rainfall event, rather than over an extended period of time. Water quality is especially degraded by increased amounts of nutrients and suspended solids. The increased nutrients in the St. Lucie Estuary have increased primary productivity within the system to the point where unhealthy levels of DO in the inner estuary occur on a regular basis.

The dramatic increase in sediment load has contributed significantly to the buildup of muck throughout the system. The sandy sediment loads, similar to those that accumulate in the Palm City area, are from primarily high-discharge events. However, the increased organics coming from high levels of chlorophyll-*a* and floating aquatics introduced from the canals, combined with highly organic fine suspended sediments, flocculate out at the freshwater-saltwater interface, leading to the formation of muck. As a result, the benthic environment of the estuary is a favorable habitat for mostly pollution-tolerant organisms. In addition, the rapid introduction of fresh water causes salinity fluctuations that are not conducive to developing or maintaining a healthy estuarine plant and animal community. The overall result of these changes is the loss of important habitats.

The St. Lucie Estuary has received increased inflows over the last 100 years because of these modifications to the watershed. Extreme salinity fluctuations and ever-increasing inflows have contributed to major changes in the structure of the communities within the estuary, such as seagrass and oyster losses. Phillips (1961) described the marine plants in the St. Lucie Estuary. At the time, mangroves were abundant in the North and South forks and seagrasses, although stressed, were still found in many areas of the estuary. Today, the presence of seagrasses is severely limited and ephemeral. Oyster populations in the estuary are virtually nonexistent due to the continual exposure to low salinities and lack of suitable substrate (clean hard objects) for larval recolonization (Haunert and Startzman, 1980 and 1985).

Regulatory discharges from the C-44 canal have been documented to adversely impact the St. Lucie Estuary by depressing the salinity range far below normal, and by transporting large quantities of suspended materials into the estuary. Sedimentation problems in relation to C-44 canal discharges were recognized as early as the 1950s (Gunter and Hall, 1963). While current monthly average flows from the watershed to the St. Lucie Estuary seldom exceed 2,500 cfs, regulatory releases from the C-44 canal alone have produced flows in excess of 7,000 cfs. The quantity of suspended solid material passing S-80 reached a peak of 8,000 tons per day when daily discharges reached nearly 7,000 cfs in 1983. Much of this material passes through the estuary and into the IRL or Atlantic Ocean (Haunert, 1988). It was recognized then that these discharges transported sand and very fine, organic-rich, suspended material to the estuary.

Surface Water Resources

Prior to development, most of the UEC Planning Area was characterized by nearly level, poorly drained lands subject to frequent flooding. The natural surface drainage systems included large expanses of sloughs and marshes, such as St. Johns Marsh, Allapattah Slough (also referred to as Allapattah Flats), and Cane Slough. Drainage systems with higher conveyance included the North and South forks of the St. Lucie River, Ten Mile Creek, Five Mile Creek, the Loxahatchee River and Bessey Creek. Minor creeks include Danforth, Fraiser, Hidden River, Willoughby, Krueger, Mapps and Warner. Most of these surface water systems, especially those with poor drainage, have been altered to make the land suitable for development and to provide flood control.

Since the early 1900s, numerous water control facilities have been constructed to make this region suitable for agricultural, industrial and residential use. The St. Lucie Canal (C-44) was constructed between 1916 and 1924 to provide an improved outlet for Lake Okeechobee floodwaters. From 1918 to 1919, the Fort Pierce Farms Drainage District (FPFDD) and the North St. Lucie River Drainage District (NSLRDD) were formed to provide flood control and drainage for citrus production in eastern and northeastern St. Lucie County. The C-25 canal (also known as Belcher Canal) provided a drainage outlet for the FPFDD, as well as limited flood protection for western areas of the basin. The C-24 canal (also known as the Diversion Canal) provided drainage and limited flood protection west of the NSLRDD protection levee. The C-23 canal provided water control in Allapattah Flats during the dry season. However, large areas continued to be under water for months at a time during the wet season.

Although the primary function of the C&SF Project was for flood control and drainage, the drainage network formed by the C&SF Project canals and the secondary canals and ditches has become an important source of irrigation water and frost protection for agriculture. In general, water stored in the canals is replenished by rainfall, groundwater inflow and withdrawals from the Floridan Aquifer System (FAS) when needed.

Prior to the large-scale expansion of citrus production in the 1960s, storage in the drainage network in St. Lucie County was adequate to meet irrigation demands. However, the drainage and development of the large marsh areas in western St. Lucie County have depleted much of the surface water storage. The lowering of water tables also reduced the amount of water in groundwater storage. The reduced surface and groundwater storage, combined with increased acreages of citrus, have resulted in inadequate supplies of surface water to meet demands during droughts. Therefore, an equitable distribution of the available surface water in the C-23, C-24 and C-25 basins is maintained by limiting the invert elevation of irrigation culverts and the intake elevation of pumps to a minimum of 14.0 feet NGVD. Artesian well water from the FAS is used as an irrigation supplement when surface water supplies become limited. Due to the high mineral

content of the Floridan aquifer, this water is generally blended with surface water before it is used as irrigation water.

Surface Water Inflow and Outflow

Within the UEC Planning Area basins, essentially all surface water inflows and outflows are derived from rainfall. The exception to this is the St. Lucie Canal (C-44), which also receives water from Lake Okeechobee. In addition, most of the flows and stages in the region's canals are regulated for water use and flood protection. The amount of stored water is of critical importance to both the natural ecosystems and the developed areas in the UEC Planning Area. Management of surface water storage capacity involves balancing two conflicting conditions. When there is little water in storage, drought conditions may occur during periods of insufficient rainfall. Conversely, when storage is at capacity, flooding may occur due to excessive rainfall, especially during the wet season. Management of surface water systems is one of the main factors affecting movement of water through the regional hydrologic cycle.

Groundwater Resources

A distinctive feature of South Florida's hydrologic system is the aquifer system and its use for water supply. Two vast aquifer systems, the SAS and the FAS, underlie the UEC Planning Area. Groundwater inflows from outside the planning area form an insignificant portion of recharge to the SAS. Rainfall is the main source of recharge, and as a result, long-term utilization of this source must be governed by local and regional recharge rates. The FAS, on the other hand, receives most of its recharge from outside of the UEC Planning Area. This fact must also be incorporated into long-term planning decisions. Within an individual aquifer, hydraulic properties and water quality may vary both vertically and horizontally. Groundwater supply potential varies greatly from one place to another.

FUTURE WITHOUT PLAN CONDITION – PHYSICAL FACILITIES AND OPERATIONS – CRITICAL RESTORATION PROJECTS

Ten Mile Creek Water Preserve Area

The project is located just south of Ten Mile Creek in St. Lucie County. Ten Mile Creek is the largest sub-basin delivering water to the North Fork of the St. Lucie River Estuary (SLE). The SLE discharges into the IRL, which is the most biologically diverse estuary in North America and has been designated an Outstanding Florida Water. The entire lagoon is endangered due to increased runoff from watershed drainage fluctuations. Excess storm water from drainage improvements is causing radical fluctuations of the salinity of the SLE, resulting in elimination of viable habitat suitable for oysters, seagrasses and marine fish spawning.

The project involves acquisition of 920 acres of land and construction of a water preserve area to attenuate flows and improve water-quality discharge to the SLE/IRL. The project features a two-stage detention system consisting of a reservoir and polishing cell. A series of large pumps will deliver water from Ten Mile Creek into the reservoir during high water at a rate of 380 cfs. Water will be stored in the 550-acre reservoir, and then metered out through a 40-cfs spillway into a polishing cell of 104 acres. The deep-water storage cell will allow for storage of up to 5,000 acre-feet. The total estimated project cost is $33.0 million including land design and construction. This project is currently under construction with completion expected late in 2005.

More information is available regarding this critical project at www.saj.usace.army.mil/projects/index.html.

FUTURE WITHOUT PLAN CONDITION – WATER QUALITY – UPPER EAST COAST

Several ongoing watershed management/planning programs in the UEC and IRL areas are expected to be completed, which will beneficially affect water quality conditions in the St. Lucie River and Estuary, IRL and other freshwater water bodies in the area. The SFWMD IRL SWIM team has developed numerous programs and objectives to improve water quality conditions in the area. Many of the water quality remediation activities being implemented by the SWIM Plan focus on reducing agricultural pollutant loads in the IRL Watershed, and urban/suburban pollutant loads in the rapidly developing coastal region surrounding the St. Lucie Estuary and IRL. Implementation of more environmentally sensitive Lake Okeechobee regulation schedules should also reduce pollutant loading to the St. Lucie Estuary/IRL systems. The IRL National Estuary Program, jointly administered by the USEPA and the State of Florida, will also result in water quality improvement activities and a reduction of pollutant loads to the IRL in the future. In summary, as a result of these ongoing watershed management programs, water quality in the UEC is expected to improve in the future.

WATER QUALITY PROBLEMS AND OPPORTUNITIES – UPPER EAST COAST

The UEC Planning Area includes Martin and St. Lucie counties and a small portion of Okeechobee County. The principal water body is the IRL, which includes the St. Lucie River. The UEC is hydrologically connected to the Everglades and Florida Bay ecosystems through the C-44 (St. Lucie) canal. The IRL is a SWIM priority water body. Most of the UEC Watershed consists of Class III waters; however, there are small areas of Class II waters (shellfish propagation or harvesting) within the watershed. Class II waters are generally afforded greater protection than Class III waters. Currently, nine locations in the St. Lucie (C-44) Canal, the North and South forks of the St. Lucie River, and several sub-basins draining to the IRL are listed by the FDEP on the 1998 303(d) list of impaired water bodies. Pollutants/constituents causing impairment include: low levels of DO, excessive nutrients, high levels of total suspended solids, high BOD, coliform bacteria, and mercury (based on fish consumption advisories). There are an additional eight monitoring locations in the southern IRL area included on the 1998 303(d) list. In addition to the above-listed constituents, copper and turbidity were identified to be causing use impairment at some of the monitoring sites.

On October 1, 2002 the FDEP submitted the 2002 update to Florida's 303 (d) list of impaired surface waters. The scope of this 2002 list is limited to specific basins, termed Group 1 Basins, representing approximately one-fifth of the state. The FDEP plans to submit annual amendments to its 303 (d) list as part of the Watershed Management Approach, which rotates through all of Florida's basins over a five-year cycle. The planned annual updates of the 1998 list will provide a transition between the 1998 list and lists developed under the new methodology. Except for the listed Group 1 waters, the 1998 303 (d) list will remain unchanged until the FDEP completes its assessment of waters on the 1998 303 (d) list, and annually adopts by Secretarial Order, basin-specific verified lists for Groups 2 through 5.

The SFWMD portion of the IRL system, South IRL and St. Lucie River, are included in Group 2. Public meetings have been held on the draft verified list of impaired waters for Group 2,

and public comment on the Group 2 list was closed on August 1, 2003. Once the verified list of impaired waters has been adopted by FDEP through a Secretarial Order, the list will be submitted to the USEPA as the state's Section 303 (d) list of impaired waters for the basin. The pollutants/constituents contained in the current draft of the verified list for impaired waters in the IRL and St. Lucie River are consistent with the previously adopted 1998 303 (d) list.

Once these impaired waters have been approved by USEPA, the FDEP staff will begin developing TMDLs for these waters. A TMDL represents the maximum amount of pollutant loading that can be discharged to a water body and have its designated uses be met. The final step in this process will be the development, by watershed stakeholders and FDEP, of a Basin Management Action Plan. The plan will specify the activities, schedule, and funding sources that point and nonpoint source dischargers will undertake to restore the water body.

Overall, water quality conditions in the UEC Area and the IRL are expected to be somewhat improved by 2050, compared to existing conditions. Lake Okeechobee freshwater discharges via the St. Lucie Canal (C-44) alter ambient salinity levels and deliver nutrients and other pollutants contained in Lake Okeechobee water and runoff from localized sources (agricultural and urban) to the estuary. The C-23/C-24/C-25 canal system in St. Lucie County facilitates drainage to sustain agricultural (primarily citrus groves) and urban development in the vicinity of those canals. Implementation of a different regulation schedule for Lake Okeechobee is also expected to improve water quality conditions in the IRL Estuary by reducing the frequency and volume of fresh water delivered to the estuary. It is also expected that agricultural nonpoint source pollution loads delivered to the estuary via secondary and tertiary canals connected to C&SF Project canals will be reduced compared to existing conditions through the implementation of agricultural BMPs and the conversion of some agricultural lands to other uses (e.g., conservation, urban/suburban development). The efforts of the Indian River Lagoon SOR project and St. Lucie County Mosquito Control have significantly improved water quality in the eastern lagoon through the use of mosquito impoundments.

The extent of urbanization in the watershed is expected to increase by 2050. New growth and development in the watershed will be regulated to comply with water quality regulations governing point and nonpoint source discharges; however, the net pollution load contributed to the St. Lucie River and the IRL system from these sources is expected to increase compared to existing conditions. Ongoing and planned pollutant load reduction activities in the UEC Area should help offset additional pollutant loads expected to occur from future urbanization.

LAND USE – UPPER EAST COAST

The record of human existence in the UEC Area spans approximately 8,000 years. The lagoon system provided the Indians and early settlers with food, materials for tools, and their major means of transportation. In the late 1800s, the IRL Region was already established as a major area of commerce (tourism, fisheries, shipping and agriculture). The lagoon was used for safe harbor and transportation of cargo, especially citrus.

At present, the dominant land use in the basin is agriculture (covering 45 percent of the basin). Combined agricultural land use in Martin and St. Lucie counties total 346,448 acres. The present urban land use (17 percent of the basin) is concentrated along the coast and the lagoon shorelines. Urban growth is rapidly extending westward, replacing agricultural land. Future land use patterns indicate that this trend will continue as urbanization intensifies along the coast, especially in the southern counties (Swain and Bolohassen, 1987). Present forested uplands and wetlands compose 11 percent and 18.8 percent of the basin, respectively.

Agriculture – Upper East Coast

Citrus is the dominant agricultural land use in the watershed. There are over 123,000 acres devoted to commercial citrus production in St. Lucie and Martin counties. St. Lucie and Martin counties rank third (behind Polk and Hendry counties) and eighth respectively in citrus acreage. There is also a significant amount of pasture in these two counties. Farms average 493 acres per farm in Martin County and 464 acres per farm in St. Lucie. The market value of all agricultural products sold in the Upper East Coast regions in 2002 was approximately $255,662,000 (UFBEBR, 2004).

ELIGIBLE FFWP PROJECTS FOR THE UPPER EAST COAST REGION

- CERP - Indian River Lagoon–South (IRL-S)
- Indian River Lagoon (IRL) SWIM Plan
- St. Lucie River Issue Team

SECTION 8-7: EVERGLADES AGRICULTURAL AREA REGION

PHYSICAL CONDITIONS – EVERGLADES AGRICULTURAL AREA REGION

The lands located immediately south and southeast of the Lake Okeechobee in the SFWMD are known as the Everglades Agricultural Area (EAA) (**Figure 8-10**). This area of about 700,000 acres consists of rich, fertile agricultural land. A large portion of the EAA is devoted to the production of sugarcane. The average ground elevation is about 12 feet. The occurrence of surface water in the area is now a direct result of the construction of the numerous conveyance and drainage canals. The primary canals consist of the Miami, the North New River, the Hillsboro and the West Palm Beach canals, which traverse the area north to south, and the Bolles and Cross canals, which extend east to west. Water levels and flows are stringently manipulated in the canals to achieve optimum crop growth.

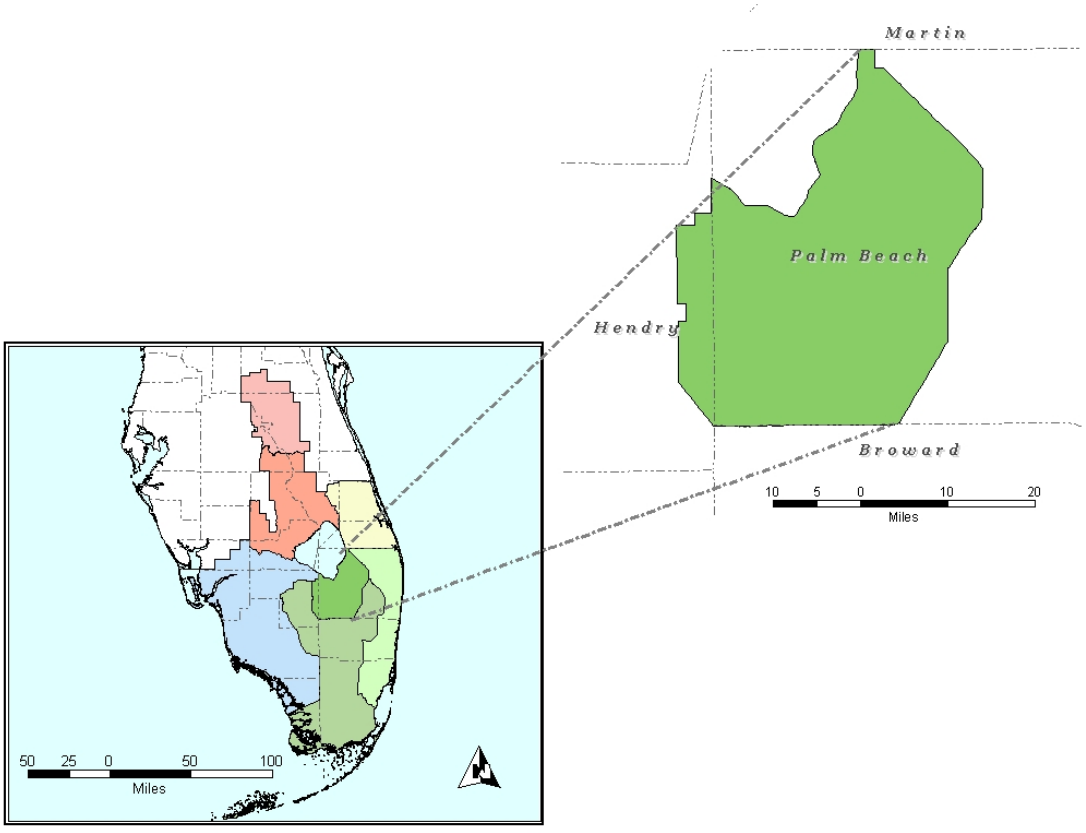

Figure 8-10. Everglades Agricultural Area (EAA) Region.

EXISTING CONDITIONS – EVERGLADES AGRICULTURAL AREA WATER MANAGEMENT

The existing drainage/irrigation system within the EAA is a complicated network of canals, levees, control structures and pumps. The original six major canals, (West Palm Beach, Hillsboro, Miami, North New River, Cross and Bolles canals), built in the 1920s, underwent major improvements during the 1960s and still serve to drain the EAA today. Historically the EAA has depended upon the flood storage capacity of Lake Okeechobee to the north and the Everglades WCAs to the south as means of removing excess drainage water from the EAA. Prior to adoption of the Interim Action Plan in 1979, the northern one-third of the EAA was routinely backpumped directly into Lake Okeechobee through the S-2, S-3 and S-4 pump stations located on the south shore of the lake. The eastern and southern two-thirds of the EAA drained water south to the WCAs via pump stations S-5A, S-6, S-7 and S-8.

Under the current Interim Action Plan, drainage from the S-2 and S-3 basins is now also routed south to the WCAs. Approximately 82 percent of the EAA land area (i.e., S-2, S-3, S-5A, S-6, S-7 and S-8 basins) now pumps excess drainage waters into the STAs and three WCAs via pump stations S-5A, S-6, S-7 and S-8. Five Chapter 298 Drainage Districts historically discharged surface water runoff into Lake Okeechobee; however, as a result of the EFA mandated Everglades Construction Project, a majority of the runoff from these districts is being diverted south to the ECP STAs for treatment prior to discharge to the EPA. As a result, the EAA depends on the flood storage capacity of the STAs and WCAs, and to a lesser extent, on Lake Okeechobee, as a means to remove water from the basin.

The growers remove runoff water from their lands by pumping to the six C&SF Project canals serving the EAA. Growers in general are allowed a maximum removal rate that is determined by a runoff formula and is almost always in excess of the basinwide design rate of three-quarters of an inch of runoff per day (Cooper, 1989). This amount was based on the following three considerations:

1. Not all land in the basin would be in agricultural production at one time.
2. Some of the land would be planted with water-tolerant crops.
3. The canals in the basin have some storage capacity.

Although the capacity of the canal system is not large enough to handle all the water discharged from the EAA at one time, it was assumed that not all of the growers' pump stations would be pumping or pumping to capacity at any given time (Cooper, 1989).

FUTURE WITHOUT PLAN CONDITION – WATER QUALITY – EVERGLADES AGRICULTURAL AREA REGION

Recent monitoring results indicate that phosphorus loads in EAA runoff have declined by 54 percent (three-year average, as reported in the 2005 SFER). The current three-year average concentration of total phosphorus contained in EAA runoff is 71 parts per billion (as reported in Chapter 4 of the *2005 South Florida Environmental Report – Volume I*). Construction of the ECP involves converting approximately 44,000 acres of existing agricultural land and lands of other prior uses into STAs. The construction project is explained in more detail below.

Everglades Forever Act (EFA)

The 1994 Everglades Forever Act's principal water quality treatment strategy for improving water quality in the Everglades Protection Area centers around five requirements: the ECP, EAA Best Management Practices (BMP) Regulatory Program, Everglades research and monitoring program, evaluation of water quality standards, and long-term water quality improvement strategies as part of state compliance permits.

The ECP consists of six large constructed wetland treatment facilities, or STAs, containing approximately 44,000 acres of land previously used for agricultural and other purposes. These areas are designed to treat runoff from the EAA and other sources prior to discharge into the Everglades Protection Area.

Design of the ECP was initiated in 1994 and construction began in 1997. STA-6 Section 1 was completed in October 1997 and flow-through operation was initiated in December 1997. Construction of STA-1 West included a 2,900-acre expansion of the existing Everglades Nutrient Removal Project, and start-up operation of the new area began in March 1999. Start-up operation of STA-2 began in June 1999. STA-5 construction was completed in December 1998. STA-1 East is expected to be in start-up operations by early 2005. STA-3/4 began start-up operations in October 2003 and flow-through operations followed soon thereafter.

The ECP was designed to treat runoff from the EAA and other sources to meet an interim phosphorus concentration target of 50 ppb in discharges to the Everglades Protection Area (Burns and McDonnell, 1994). STA-1 West discharges into the L-7 borrow canal in WCA-1, which is part of the Loxahatchee National Wildlife Refuge. STA-1 East will discharge into the L-40 borrow canal in WCA-1. STA-2 discharges to WCA-2A via the L-6 borrow canal. STA-3/4 uses the existing S-7 and S-8 pump stations as the outflow facilities. STA-5 discharges to the Miami Canal via the STA-5 discharge canal, where the majority of the water moves south to the northwest corner of WCA-3A. STA-5 discharges are delivered to the Rotenberger Wildlife Management Area via a 240-cfs electric pump station (G-410) according to the operating schedule developed by an interagency group recognized in the FDEP permit for STA-5. STA-6 discharges to WCA-3A through the L-4 borrow canal. During the Restudy, the future base condition assumed all of the treatment areas were completed and operational with the exception of STA-6 Section 2. STA-6 Section 2 was not included in hydrologic regional modeling for the Restudy since the conceptual design for the STA did not include this element (Burns and McDonnell, 1994). STA-6 Section 2 is currently scheduled to be completed by December 31, 2006.

Another component of the ECP targeted for completion in 2004 is the diversion of runoff from five special districts (four Chapter 298 districts and the 715 Farms Area established under Florida Statutes). These special districts are located adjacent to Lake Okeechobee north of the EAA. Currently, the districts discharge directly to Lake Okeechobee. According to the EFA, approximately 80 percent of the historic flow volumes and total phosphorus loads are to be diverted away from the lake. The future base condition assumes that the diversion of flows and loads has been completed.

According to the EFA and based upon research, field-tests and expert review, the EAA BMPs are determined to be the most effective and practicable on-farm means of improving water quality to a level that balances water quality improvements and agricultural productivity. The act establishes monitoring programs, permit requirements, research, field-testing and evaluation programs designed to improve water quality prior to discharge into conveyance canals in the EAA. The act provides a tax incentive for phosphorus load reductions of 25 percent or more. As a

consequence, during the Restudy, the future base condition assumed a 25 percent phosphorus load reduction due to BMPs.

In addition to the ECP and BMPs, the EFA directed that an Everglades Research and Modeling program be established to seek means of optimizing the design and operation of the STAs. This program was required to include research to reduce outflow concentrations and identify other treatment and management methods and regulatory programs that are superior to STAs in achieving the intent and purposes of the EFA. The research and monitoring program was also directed toward development of a phosphorus criterion in the Everglades Protection Area by the FDEP and evaluation of existing state water quality standards applicable to the Everglades area. In 2003, the State of Florida's Environmental Regulation Commission adopted a water quality standard for phosphorus within the EPA that includes a numeric criterion for TP in the EPA, moderating provisions for permits authorizing discharges to the EPA, and a method for determining achievement of the criterion. Research to determine means of optimizing the performance of the STAs is ongoing. Additional information on STA optimization can be found in Chapter 4 of the *2005 South Florida Environmental Report – Volume I*).

The EFA establishes a long-term water quality goal for water delivered to the EPA to achieve state water quality standards by December 31, 2006. It further requires the following (reference Section 373.4592, F.S.)

> (10) LONG-TERM COMPLIANCE PERMITS. By December 31, 2006, the department and the district shall take such action as may be necessary to implement the pre-2006 projects and strategies of the Long-Term Plan so that water delivered to the Everglades Protection Area achieves in all parts of the Everglades Protection Area state water quality standards, including the phosphorus criterion and moderating provisions.
>
> (a) By December 31, 2003, the district shall submit to the department an application for permit modification to incorporate proposed changes to the Everglades Construction Project and other district works delivering water to the Everglades Protection Area as needed to implement the pre-2006 projects and strategies of the Long-Term Plan in all permits issued by the department, including the permits issued pursuant to subsection (9). These changes shall be designed to achieve state water quality standards, including the phosphorus criterion and moderating provisions. During the implementation of the initial phase of the Long-Term Plan, permits issued by the department shall be based on BAPRT, and shall include technology-based effluent limitations consistent with the Long-Term Plan, as provided in subparagraph (4)(e)3.
>
> (b) If the Everglades Construction Project or other discharges to the Everglades Protection Area are in compliance with state water quality standards, including the phosphorus criterion, the permit application shall include:
>
> 1. A plan for maintaining compliance with the phosphorus criterion in the Everglades Protection Area.
>
> 2. A plan for maintaining compliance in the Everglades Protection Area with state water quality standards other than the phosphorus criterion.

As an important step toward development of the Long-Term Compliance Permit application required under the EFA, the District conducted Basin-Specific Feasibility Studies, which integrated information from research, regulation, and planning in order to meet the final water

quality objectives for the EPA. The Basin-Specific Feasibility Studies identified and evaluated alternative solutions for seven basins included in the ECP and for six basins covered by the Everglades Stormwater Program.

Technical representatives from the District, the FDEP, the United States Department of the Interior, the EAA Environmental Protection District, and other stakeholders used the results of the Basin-Specific Feasibility Studies to formulate a consensus approach for achieving the long-term water quality goals of the Everglades Forever Act. Their recommended approach, referred to as the Long-Term Plan, is set forth in the Conceptual Plan for Achieving Long-Term Water Quality Goals (Burns & McDonnell, 2003a).

During the 2003 legislative session, the 1994 EFA was amended to include reference to the Long-Term Plan as the appropriate strategy for achieving the long-term water quality goals for the EPA. The amended EFA includes the following direction:

- Implementation of the Long-Term Plan shall be integrated and consistent with the implementation of the projects and activities in the congressionally authorized components of the CERP so that unnecessary and duplicative costs will be avoided.
- Nothing regarding integration of Long-Term Plan components with CERP projects shall modify any existing cost share or responsibility provided for projects included in the Water Resources Development Act of 1996 or in the Water Resources Development Act of 2000.

The Long-Term Plan was revised to incorporate direction received from the legislature in the amended EFA as well as to address comments received from the public and interagency reviewers. The Long-Term Plan for Achieving Water Quality Goals (Burns & McDonnell 2003b) was submitted to the FDEP in December 2003 as part of the long-term permit application required by the Everglades Forever Act. FDEP's review of the long-term permit application is currently under way. The Long-Term Plan including related links, documents, presentations and photos can be found at http://www.sfwmd.gov/org/erd/longtermplan/index.shtml.

The Basin-Specific Feasibility Studies which formed the basis for the Long-Term Plan are documented in the October 2002 Evaluation of Alternatives for the ECP Basins, prepared for the District by Burns & McDonnell and the October 2002 Basin-Specific Feasibility Studies, Everglades Stormwater Program Basins prepared for the District by Brown & Caldwell. The Basin-Specific Feasibility Studies are also discussed in Chapter 8A of the 2003 and 2004 Everglades Consolidated Reports. Documents, presentations, data and other related information on the Basin-Specific Feasibility Studies can be found at http://www.sfwmd.gov/org/erd/bsfboard/bsfsboard.htm.

The majority of Everglades tributary basins contain proposed CERP projects. There is potential for significant cost savings by integrating some of the Long-Term Plan components with CERP projects. Many CERP projects are currently in the early planning and design phases; therefore, uncertainty exists in how CERP projects would influence flows and water quality, as well as their implementation schedules. Close coordination is needed between members of the CERP project delivery teams and staff implementing the Long-Term Plan components to ensure that project goals are met on schedule.

Additional information on the Long-Term Plan and implementation activities for FY2004 can also be found in Chapter 8 of the 2005 SFER – Volume I.

WATER QUALITY PROBLEMS AND OPPORTUNITIES – EVERGLADES AGRICULTURAL AREA

According to the FDEP 1998 303(d) list of use-impaired water bodies, there are 10 canal segments within the EAA not meeting designated uses for Class III waters. For the most part, these include canal segments affected by operation of the primary pump stations and canals discharging water from the EAA to downstream areas (e.g., S-7 and S-8 pump stations, North New River, Hillsboro and West Palm Beach canals). In addition to excessive nutrient loads, low DO levels and high levels of mercury (based on fish consumption advisories), coliform bacteria, total suspended solids, turbidity and unionized ammonia contributed to use impairment in Class III waters within the EAA. It should be noted that within the EAA, there are many agricultural canals or ditches in agricultural water management systems controlled by water control structures permitted by the SFWMD. Such water bodies are classified as Class IV waters (agricultural water supply) pursuant to Rule 62-302.600(3)(a), F.A.C. Generally, the water quality criteria for Class IV waters are less stringent than those for Class III waters. None of the 303(d)-listed segments within the EAA are in Class IV waters.

Water quality conditions within the EAA are expected to improve by 2050. It is important to note that the existing conditions for the EAA demonstrate significant water quality improvements compared with recent past conditions. Recent water quality improvements in the area have occurred as a result of the implementation of the EAA regulatory program (F.A.C. Rule 40E-63) beginning in 1993, and the operation of the STAs. The regulatory program requires BMPs and monitoring to achieve a 25 percent reduction in phosphorus loading from the EAA to the Everglades Protection Area. Recent monitoring results indicate that phosphorus loads in area runoff have declined by 54 percent (SFWMD, 2005) due to the BMPs. The current three-year average concentration of total phosphorus contained in EAA runoff is 71 parts per billion (SFWMD, 2005). Over 1,700 metric tons of phosphorus that otherwise would have entered the Everglades have been removed by the EAA BMPs and STAs. BMPs are also expected to have resulted in a net reduction of other pollutants contained in agricultural runoff, although the extent of load reduction for other pollutants has not been fully quantified since the implementation of the program; nor is it a specific objective of that program.

LAND USE – EVERGLADES AGRICULTURAL AREA

Agriculture

The EAA contains parts of Palm Beach and Hendry counties. Most of Hendry County lies within the Big Cypress of the Lower West Coast Region, discussed in **Section 8-5** of this chapter. Palm Beach County is not entirely within the EAA, but it is assumed that the majority of agricultural production is within the EAA because the remaining portion of the county is primarily urbanized.

More than 535,000 acres are farmed in Palm Beach County, and sugarcane was harvested from about 345,000 acres. Sugarcane cash receipts accounted for 82 percent of Florida's cash receipts from field crops. In addition to sugarcane, Palm Beach County ranks twentieth among Florida counties in citrus acreage; citrus in Palm Beach County finds itself squeezed between expanding urban areas to the east and expanding environmental land uses to the west in the County. This region is characterized by midsize farms averaging 483 acres each with high productivity of $3,348 per acre. Total market value of agricultural products produced in Palm Beach County is over $759 million (UFBEBR, 2004).

The EAA is highly dependent upon the system of canals running through the region to provide necessary drainage of excess water during the wet season, as well as supplemental water supplies for irrigation during the dry season. The EAA has traditionally relied upon Lake Okeechobee for its water supply, and looked to the WCAs to the south to receive their excess drainage.

Continued agricultural production in the EAA has become increasingly controversial. Some of the factors that may affect EAA agriculture include water quality concerns and soil subsidence. The water quality concerns, particularly phosphorus loading, are being addressed through implementation of BMPs, construction of STAs, the growing use of organic farming practices, and rice cultivation in rotation with sugarcane production.

Although sugarcane cultivation in the EAA has come under some sharp criticism in recent years, sugarcane is recognized as the most appropriate crop for this region. Sugarcane requires less phosphorus fertilizer than other crops grown in the EAA (Sanchez, 1990), and sugarcane has been found to remove 1.79 times more phosphorus than was applied as fertilizer (Coale et al., 1993). Florida sugarcane only requires small amounts of pesticides due to disease resistant and tolerant cultivars, and cultivation instead of herbicides for weed control. Sugarcane also tolerates greater variability in water table levels, allowing for more flexible water management strategies (Glaz, 1995).

Soil subsidence has become a potential threat to long-term crop production in the EAA. The average historic rate of subsidence of 1 inch per year has slowed to 0.56 inches per year since 1978 (Shih et al., 1997). They attributed the lower rate to several factors including higher water tables and an increased proportion of land planted to sugarcane. Surveys conducted by Shih et al. (1997) in 1997 found an average of 1.62 feet to 4.36 feet of soil remaining over 11 transects. Prevention of continued soil subsidence will depend on maintaining high groundwater levels to prevent further oxidation of the soil profile. This, in turn, will require development of more water-tolerant sugarcane varieties and/or increased rice cultivation. This research is currently under way and showing promising results (Glaz, 1997).

Land use within the C-139 basin of eastern Hendry County is predominantly agricultural. The land use in the basin is 62 percent agricultural, 4 percent urban and 34 percent native land cover. This rural area is primarily pastureland for cattle grazing, with increasing amounts of land being converted to citrus groves, sugarcane and vegetable farms. Agricultural land uses include vegetable farms, citrus groves, improved pasture, and unimproved pasture (Mock Roos, 1993).

Conservation Lands

ROTENBERGER AND HOLEY LAND WILDLIFE MANAGEMENT AREAS

The Holey Land Tract (35,026 acres) is managed by the FWC as a state wildlife management area. The SFWMD has been managing the hydroperiod since completion of a perimeter levee and pump station in 1990. The Rotenberger Tract (23,970 acres) is also managed by the FWC as state wildlife management area. The Brown's Farm Tract (4,460 acres) was incorporated into STA-2 and is therefore no longer managed as a state wildlife management area.

LAKE HARBOR WATERFOWL MANAGEMENT AREA

Lake Harbor Waterfowl Management Area is operated by FWC for management of waterfowl. The land is under rice production for both harvest and wildlife habitat.

Urban

The remaining 5 percent of the EAA includes the communities of Pahokee, Belle Glade, South Bay and Clewiston, along with several sugar mills, roads, canals, and water control features.

ELIGIBLE FFWP PROJECTS FOR THE EVERGLADES AGRICULTURAL AREA REGION

- CERP - Everglades Agricultural Storage Reservoir – Part 1
- CERP - Everglades Agricultural Storage Reservoir – Part 2

SECTION 8-8: EVERGLADES, FLORIDA BAY AND KEYS REGIONS

PHYSICAL CONDITIONS – EVERGLADES, FLORIDA BAY AND KEYS REGIONS

The WCAs are an integral component of the Everglades and freshwater supplies for South Florida (**Figure 8-11**). Located south and east of the EAA, they comprise an area of about 1,350 square miles, including 1,337 square miles of the original Everglades, which averaged some 40 miles in width and extended approximately 100 miles southward from Lake Okeechobee to the sea.

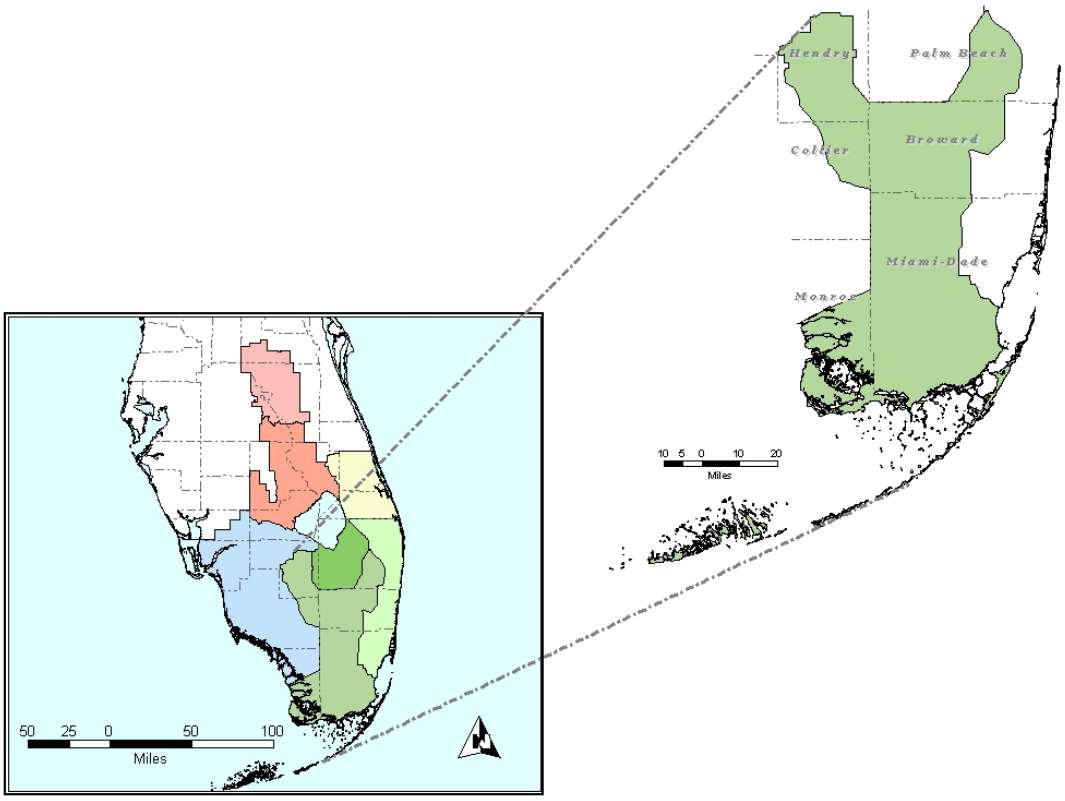

Figure 8-11. Everglades, Florida Bay and Keys Regions.

The WCAs provide a detention reservoir for excess water from the agricultural area and parts of the LEC Planning Area, and for flood discharge from Lake Okeechobee. The WCAs also provide levees needed to prevent Everglades floodwaters from inundating the LEC while providing water supply for LEC agricultural lands and Everglades National Park; improve water supply for east coast communities by recharging the Biscayne Aquifer (the sole source of drinking water for southern Palm Beach, Broward, Miami-Dade and Monroe counties); retard saltwater intrusion in coastal wellfields; and benefit fish and wildlife in the Everglades.

WCA-1 is designated as the Arthur R. Marshall Loxahatchee National Wildlife Refuge (Refuge), managed by the USFWS. WCA-2 and WCA-3 are public hunting and fishing areas comprising the Everglades Wildlife Management Area maintained by the FWC, formerly the FGFWFC. The Seminole Indian Tribe of Florida and the Miccosukee Tribe of Indians of Florida each have reserved rights within WCA-3.

Florida Bay and the Ten Thousand Islands comprise 1,500 square miles of ENP. The bay is shallow, with an average depth of less than 3 feet. To the north is the Florida mainland and to the south lie the Florida Keys. Sheetflow across marl prairies of the southern Everglades and 20 creek systems fed by Taylor Slough and the C-111 canal provide direct inflow of fresh surface water and groundwater recharge. Surface water from Shark River Slough, the sub-region's largest drainage feature, flows into Whitewater Bay, and also may provide essential groundwater recharge for central and western Florida Bay. Exchange with Florida Bay occurs as this lower salinity water mass flows around Cape Sable into the western sub-region of the bay.

The Florida Keys is a limestone island archipelago extending southwest over 200 miles from the southern tip of the Florida mainland to the Dry Tortugas, 63 miles west of Key West. The Keys are bounded on the north and west by the relatively shallow waters of Biscayne Bay, Barnes and Blackwater sounds, Florida Bay, and the Gulf of Mexico. Hawk Channel lies to the south, between the mainland Keys and an extensive reef tract 5 miles offshore. The Straits of Florida lie beyond the reef, separating the Keys from Cuba and the Bahamas.

The Florida Keys comprise over 1,700 islands covering 103 square miles. They are broad, with little relief, have a shoreline length of 1,865 miles, and are inhabited from Soldier Key to Key West. Key Largo and Big Pine Key are the largest islands. The Keys are frequently divided into the following three regions:

1. The Upper Keys (north of Upper Matecumbe Key)
2. The Middle Keys (from Upper Matecumbe Key to the Seven Mile Bridge)
3. The Lower Keys (from Little Duck Key to Key West)

The Florida Keys National Marine Sanctuary encompasses 3,668 square miles of submerged lands and waters between the southern tip of Key Biscayne and the Dry Tortugas Bank. North of Key Largo the sanctuary includes Barnes and Card sounds, and to the east and south the oceanic boundary is the 300-foot isobath. The Florida Keys National Marine Sanctuary also contains part of Florida Bay and the entire Florida Reef Tract, the largest reef system in the continental United States. The Florida Keys National Marine Sanctuary contains components of five distinct physiographic regions: Florida Bay, the Southwest Continental Shelf, the Florida Reef Tract, the Florida Keys and the Straits of Florida. The regions are environmentally and lithologically unique, and together they form the framework for the sanctuary's diverse terrestrial and aquatic habitats.

Water Conservation Area 1 (WCA-1)

WCA-1, part of the Arthur R. Marshall Loxahatchee Wildlife Refuge (the Refuge) is about 21 miles long from north to south and totals 221 square miles. Prior to construction of the Everglades Construction Project and Stormwater Treatment Areas, the northern boundary of WCA-1 was the West Palm Beach Canal. The STA-1 Inflow Basin now lies at the extreme northern boundary of WCA-1 and on the south the Hillsboro Canal separates WCA-1 from WCA-2. Ground elevations slope about 5 feet in 10 miles, both to the north and to the south from the west center of the area, varying from over 16 feet in the northwest to less than 12 feet in the south. The area, which is enclosed by about 58 miles of levee (13 miles of which are common to WCA-2), provides storage for excess rainfall, excess runoff from agricultural drainage areas of the West Palm Beach Canal (230 square miles) and the Hillsboro Canal (146 square miles), and

excess water from Lake Okeechobee. Inflow to WCA-1 currently comes from rainfall and runoff from the EAA through canals and structures at the northern, northeastern, and northwestern ends. Release of water for dry-season use is controlled by structures in the West Palm Beach Canal, the Hillsboro Canal, and in the north-south levee, which forms the eastern boundary of the area. When stages exceed the regulation schedule, excess water in WCA-1 is discharged to WCA-2.

Water Conservation Area 2 (WCA-2)

WCA-2 is composed of two areas, 2A and 2B. It measures about 25 miles from north to south, and covers an area of 210 square miles. It is separated from the other WCAs by the Hillsboro Canal on the north, and the North New River Canal on the south. Ground elevations slope southward about 2 to 3 feet in 10 miles, ranging from over 13 feet NGVD in the northwest to less than 7 feet NGVD in the south. The area is enclosed by about 61 miles of levee, of which 13 miles are common to WCA-1 and 15 miles to WCA-3. An interior levee across the southern portion of the area reduces water losses due to seepage into an extremely pervious aquifer at the southern end of the pool and prevents overtopping of the southern exterior levee by hurricane waves.

The upper pool, WCA-2A, provides a 173 square mile reservoir for storage of excess water from WCA-1, and a 125 square mile agricultural drainage area of the North New River Canal. Storage in WCA-2A provides water supply to the east coast urban areas of Broward County. Water enters the area from WCA-1 and the Hillsboro Canal on the northeast side, and from several structures in the L-6 levee which discharge treated water from STA-2 on the northwest side. Water in excess of that required for efficient operation of WCA-2A is discharged to WCA-3 via structures into C-14, the North New River Canal, and WCA-2B.

WCA-2B has ground elevations ranging from 9.5 feet NGVD in the northern portions down to 7.0 feet NGVD in the southern portions of the area. The area experiences a high seepage rate, which does not allow for long-term storage of water, and as a result water is not normally released from the area.

Water Conservation Area 3 (WCA-3)

WCA-3 is also divided into two parts, 3A and 3B. It is about 40 miles long from north to south and covers 915 square miles, making it the largest of the conservation areas. Ground elevations, which slope southeasterly 1 to 3 feet in 10 miles, range from over 13 feet NGVD in the northwest to 6 feet NGVD in the southeast. The Miami Canal traverses the area from northwest to southeast, and the North New River Canal separates it from WCA-2. The area is enclosed by 111 miles of levee, of which 15 miles are common to WCA-2. An interior levee system across the southeastern corner of the area reduces seepage into an extremely pervious aquifer.

The upper pool, WCA-3A, provides a 752 square mile area for storage of excess water from WCA-2A; rainfall excess from 750 square miles in Collier and Hendry counties and from 71 square miles of the former Davie agricultural area lying east of pump station S-9 in Broward County; and excess water from a 208-square-mile agricultural drainage area of the Miami Canal and other adjacent areas to the north. Water enters WCA-3A from various sources on the northern and eastern sides. The storage is used to meet the principal water supply needs of adjacent areas, including urban water supply and salinity control requirements for Miami-Dade and Monroe County, irrigation requirements and water supply for ENP.

EXISTING CONDITIONS – WATER CONSERVATION AREAS WATER MANAGEMENT

Surrounded by 56 miles of levees and canals, WCA-1 is the only conservation area completely encircled by canals. A network of pump stations, levees and water control structures, controls water levels. The water management facilities are hydrologically connected with Lake Okeechobee, the EAA, the STAs, WCA-2, WCA-3 and the Atlantic Ocean. Rainfall represents a major source of water inflow into WCA-1. Pump Station S-5A, located at the northern tip of the STA-1 Inflow Basin near 20-Mile Bend, currently moves from the West Palm Beach Canal into the STA-1 Inflow Basin and then into STA-1W for treatment prior to discharge to the Refuge. Upon commencement of flow-through operations, STA-1E will also discharge treated water from various sources to the Refuge. Pump Station S-6, located on the Refuge's western border, historically discharged to the Refuge, but currently pumps water from the Hillsboro Canal into STA-2 Inflow Canal for treatment in STA-2 prior to discharge to WCA-2A.

Two small pumps operated by the Acme Improvement District are located in the L-40 Levee on the northeastern boundary of the Refuge. These pumps drain primarily residential/urban lands (Village of Wellington) and can move water in and out of the Refuge. Acme represents only a minor fraction of the Refuge's water budget. Four water control structures (S-10A, S-10C, S-10D and S-10E) exist along WCA-1 on the southern levee of L-39 (Hillsboro Canal). The S-10 structures allow water to flow southward out of the Hillsboro Canal and WCA-1 into WCA-2A if so desired. The Hillsboro Canal (L-39), located in the extreme southeast corner of the Refuge, drains WCA-1 to the east through S-39, which provides water supply to urban areas and discharges drainage waters to tide water. To the north, the S-5A structure can be used to move water north out of the Refuge into the L-8 canal. There are four other small privately operated structures in the L-40 levees; one of these is operated by the USFWS. These structures constitute less than 1 percent of the Refuge's annual water budget. Water management operations for WCA-1 are governed by a water regulation schedule adopted in 1994.

Major developments in the WCAs have been the construction of canals, levees, water control structures and roads. WCAs-2 and 3 are almost completely enclosed by a levee and canal system that is approximately 150 miles in length. The only portion of the area not completely enclosed by the levee system is WCA-3A, where a 7-mile section of the western border remains hydrologically connected to the BCNP. Four canals and their associated levees pass through the WCAs: the Miami Canal, L-35B canal, L-67A canal and L-67C canal.

Prior to construction of the STAs, many water control structures were constructed to move water throughout the WCAs. Now that the STAs have been constructed, runoff from the EAA and other sources is first routed through the STAs for treatment prior to discharge to the WCAs through S-6, S-7, and S-8. Future projects will address runoff that currently discharges through the S-9 and S-140 pump stations. Water is moved from WCA-2A to WCA-3A via the S-11 structures and through WCA-3A via the Miami Canal and a series of bridged openings under Alligator Alley (I-75). Water is released from WCA-3A through the S-12 and S-333 structures and the Pompano and North New River canals. The canals, levees and water control structures were constructed and are currently operated by the USACE and the SFWMD. The WCAs were constructed primarily to provide flood protection to adjacent agricultural and urban areas, and to serve as a source of fresh water for the heavily populated LEC. Secondary considerations were the need to manage the areas to benefit fish and wildlife and to provide public recreation.

In 1994, the State of Florida enacted the EFA and mandated the SFWMD to construct the ECP. The ECP consists of six large constructed wetland treatment facilities, or STAs, containing approximately 44,000 acres of land previously primarily used for agricultural purposes. These

areas are designed to treat runoff from the EAA and other sources prior to discharge into the Everglades Protection Area. As of the end of 2004, all six of the STAs described in the 1994 EFA were complete. The District is currently planning the construction of additional STAs in the EAA.

The ECP was originally designed to treat runoff from the EAA and other sources to meet an interim phosphorus concentration target of 50 ppb in discharges to the Everglades Protection Area (Burns and McDonnell, 1994). STA-1 West discharges into the L-7 borrow canal in WCA-1, part of the Refuge. STA-1 East will discharge into the L-40 borrow canal in WCA-1. STA-2 discharges to WCA-2A via the L-6 borrow canal. STA-3/4 uses the existing S-7 and S-8 pump stations as the outflow facilities. STA-5 discharges to the Miami Canal via the STA-5 discharge canal, where the majority of the water moves south to the northwest corner of WCA-3A. STA-5 discharges are also delivered to the Rotenberger Wildlife Management Area via a 240-cfs electric pump station (G-410) according to the operating schedule developed by an interagency group recognized in the FDEP permit for STA-5. STA-6 discharges to WCA-3A through the L-4 borrow canal. STA-6 Section 2 is scheduled to be completed by December 31, 2006. In 2003, the 1994 EFA was amended to include reference to the Long-Term Plan for Achieving Water Quality Goals in the Everglades Protection Area (Long-Term Plan) as the optimal strategy for achieving compliance with water quality standards including the phosphorus criterion in the Everglades. The District is currently implementing the Long-Term Plan. See Volume I, Chapter 8 of the 2005 SFER for an update on the status of implementation of the Long-Term Plan.

Water regulation schedules represent water level targets that govern the operations to store and release water from the WCAs. The water regulation schedule for WCA-2A was originally set too high to support Everglades habitat, and has been the subject of extensive research and experimentation. The original 1961 schedule called for water levels to fluctuate from 12 to 14.5 feet. The schedule was revised even higher in 1970 to a range of 13 to 14.5 feet with only a 30-day period at the lower end. Observed changes in the ecology of WCA-2A caused scientists in the early 1970s to initiate efforts to lower the water schedule and provide for annual drying of the interior marsh. Extended high water killed significant stands of trees, eroded islands, and caused other undesirable vegetation changes in the area (Dineen, 1972, 1974; Worth, 1988). In 1980, the schedule was revised to an interim plan of 9.5 to 12.5 feet, an extreme drawdown that was in place for eight years. Extensive research during this time led to an interim schedule of 11 to 13 feet, which was adopted in 1989.

The regulation schedule for WCA-3A is perhaps the most complicated and difficult schedule to describe or implement. The schedule ranges from 9.5 to 10.5 feet, but includes a series of five zones to modify discharges to ENP when water levels are above or below the optimum target. The size of WCA-3A and the number of inflow and discharge points preclude intensive management of water levels in the area. Discharges at the southern end of the area flow directly into ENP. These discharges were modified three times in the past decade to alleviate problems resulting from too little discharge in the early years, and heavy flood discharges during the dry season, which impacted nesting wading birds and other wildlife during the 1970s and early 1980s.

The original schedule was set shortly after ENP and the SFWMD's predecessor agency was created. In 1970, Congress adopted an ENP-backed plan to establish a minimum monthly volume of water to be delivered to ENP. This resulted in significant flood damages from dry-season floodwaters, which were discharged from WCA-3A when the water schedule was exceeded. In 1983, Congress authorized an Experimental Program of Water Deliveries to ENP, which allowed an experiment with water releases based on rainfall and evaporation over the Everglades. This rainfall-based plan distributes water over a broader area than the original operating schedule whenever possible.

Currently, the Holey Land Wildlife Management Area's water regulation schedule is based upon the initial operating plan agreed to by the SFWMD and the FWC on June 28, 1990. This schedule dictates that water stages in Holey Land Wildlife Management Area vary between a low of 11.5 feet mean sea level (msl) on May 16 to a high of 13.5 feet on November 1. When direct rainfall is unable to provide enough water to meet the schedule, water is pumped onto the area from the Miami Canal at the G-200 Pump Station in the northwest corner of the area. Other water enters the area from the G-201 Pump Station, which returns water to the Holey Land from the exterior seepage canal. Outflow is through three sets of culverts along the Holey Land's south boundary. In accordance with the 1990 Operational Agreement, after cattail coverage exceeded 2,000 acres, flashboards were placed in the outflow culverts and were set at 13.5 feet in order to retain water in the area as long as possible to reduce the need for pumping untreated water from the Miami Canal. Detailed topographic data on Holey Land Wildlife Management Area, collected after restoration began, found that average ground elevation was approximately 0.5 feet lower than previously thought, and a verbal agreement was made between the SFWMD and the FWC in July 1993 to change the operational schedule to one that lies between 11 and 13 feet. The current operation schedule lies between 10 and 12 feet.

Additional research conducted by FWF and the SFWMD staffs indicated that high water levels in Holey Land Wildlife Management Area contributed to the explosive growth of cattails in the area after restoration began, and that water levels above 12.5 feet drove deer from the marsh onto surrounding levees. In response to this information, on January 20, 1995, the FWC proposed that the water schedule be again lowered, to 10.5-12.0 feet, a level that has since been used as a guideline by the SFWMD. A similar (10.75-12.0 feet) schedule was proposed by the FWC on June 11, 1997, and discussions are currently under way to finalize an agreement recognizing this proposed level. The water management plan is designed to simulate a natural hydroperiod for the purpose of restoring and preserving natural Everglades habitat.

The Rotenberger Wildlife Management Area is located in the north end of the Everglades ecosystem, in an area that has historically been dominated by nearly monospecific plains of dense sawgrass. Since drainage efforts began in the late 1800s, 74 percent of these sawgrass plains have been converted to agriculture. The Rotenberger Wildlife Management Area represents nearly 18 percent of the remainder of this important component of the Everglades. Because of development and drainage of surrounding areas, the hydropattern in the Rotenberger Wildlife Management Area has shortened, causing a shift away from its historically sawgrass-dominated community. The distribution, timing, and depths (hydropattern) of water in the Rotenberger Wildlife Management Area are being reevaluated as new pumps and other features come online. Future efforts will focus on management to restore wetland structure.

While the current hydropattern in the Rotenberger Wildlife Management Area does mimic the natural rise and fall associated with the wet and dry seasons, it does not receive enough rainfall to reach historic water levels during the wet season and dries much more quickly than normal due to the culverts mentioned above. The 1983 agreement between the FWC, SFWMD and FDEP calls for the restoration of 0-1 feet water levels in the area. As part of the ECP, these levels have been used as initial goals of hydropattern restoration within the Rotenberger Wildlife Management Area. In accordance with the Everglades Forever Act Permit No. 0131842, the water scheduled is operated between 12.30 and 13.5 feet. Achievement of this goal will be a two-stage process. First, all drainage culverts will be closed and the effects of this upon the hydropattern will be assessed. This information will be used to devise an operational schedule for the area, which will become effective upon completion of STA-5, and installation of the pumps allowing inflow into the Rotenberger Wildlife Management Area.

EXISTING CONDITIONS – EVERGLADES NATIONAL PARK AND FLORIDA BAY WATER MANAGEMENT

The Everglades National Park Drainage Basin is described in Cooper and Roy, 1991. The Everglades National Park Drainage Basin has an area of 1,684.5 square miles and is located in western Miami-Dade County (886.5 square miles), northwestern Monroe County (773.9 square miles) and southwestern Collier County (24.1 square miles) (Cooper and Roy, 1991). The basin includes all of ENP, the ENP expansion area, the remainder of the eastern Everglades, and portions of the southern Glades Wildlife Environmental Area.

Internal Project Structures

The drainage basin for ENP consists primarily of undeveloped land. Areas of the park (located east of the L-67 extension) were acquired as part of the ENP 1989 Expansion Act. All of this land is managed for environmental purposes. C&SF Project structures are generally located outside of ENP and installed primarily for environmental purposes for the park or to separate drainage between the park and the area to the east of the L-31N and L-31. There are six project structures within ENP as listed below:

- L-67 Extension
- Buttonwood Canal plug
- S-175
- S-332
- S-346
- S-347

The L-67 Extension was installed to separate what was the eastern boundary of ENP before the expansion authorized by the 1989 Expansion Act (Western Shark River Slough) from what were the privately owned lands east, which included the northeastern portions of Shark Slough. The canal excavated to provide the fill required to construct the L-67 Extension Levee serves as a getaway channel allowing water to move predominately south from the S-12 structures rather than south and east (Cooper and Roy, 1991). Approximately the lower third of the L-67 extension canal has been backfilled to increase the spread of water. The Buttonwood Canal plug was installed at the mouth of the Buttonwood Canal on Florida Bay to prevent further intrusion of salt water and improve conditions upstream of the canal. The S-175 and S-332 are used to deliver water to Taylor Slough, while S-346 and S-347 are used to control flow in the L-67 extension.

External Project Inflows

Managed inflows to ENP are from the eastern farmland and from the north as an outlet of WCA-3A and 3B. The managed flows delivered from WCA-3A through the S-12 structures, S-333 and from WCA-3B through G-69. Other inflow points include the L-31W borrow canal through S-332 and S-175 and from the C-111 between S-18C to S-197 as overland flow though the degraded canal berm into the panhandle of ENP.

Project Structures Controlling Inflow

Project structures controlling flow to the ENP basin include: S-12A, S-12B, S-12C, S-12D, G-69, S-175, S-18C, S-197, S-332, S-333 and S-334. There are two internal structures controlling flow (S-346 and S-347), which control flow in Buttonwood Canal. There are three project structures, which are located in the basin but are not currently operated: the S-12E, S-12F and S-14. The S-12A, S-12B, S-12C and S-12D are identical gated spillways located in the L-29

between L-28 and L-67. They connect WCA-3A to the ENP basin. The first connection between WCA-3A and the south Miami-Dade canals occurred in 1978 with the completion of structures S-333 and S-334 in the L-29 canal. These structures were installed to provide additional dry season water deliveries to L-31N. Structure G-69 connects WCA-3B to the ENP basin via the L-29 canal. Project works are largely peripheral to the ENP basin and have as their primary function providing a supply of water to the basin.

EXISTING CONDITIONS – FLORIDA KEYS WATER MANAGEMENT

There is no overall surface water management canal infrastructure in the Florida Keys. The C&SF Project canal system has very little influence on the Florida Keys, except in the estuarine areas of Florida Bay, where it controls the amount and timing of freshwater releases into the estuaries.

FUTURE WITHOUT PLAN CONDITION – WATER QUALITY – NATURAL AREAS

The natural areas of the study area include the Rotenberger and Holey Land Wildlife Management Areas, WCA-1, WCA-2, and WCA-3, BCNP and ENP. The Rotenberger and Holey Land Wildlife Management Areas are adjacent to the EAA and are contained within the same hydrologic basin. The ECP, which is part of the future without plan condition, is designed to reduce phosphorus loading and achieve hydrologic restoration objectives for the natural areas by redirecting EAA runoff through STAs and improving conveyance facilities to create preferred hydropatterns.

A fundamental underlying assumption for the Restudy was the full implementation of the State of Florida's Everglades Program contained in the 1994 Everglades Forever Act (EFA), Section 373.4592, F.S., by December 31, 2006. The 1994 EFA included a requirement to complete construction of the STAs as described in the conceptual design for the ECP (Burns and McDonnell, 1994), setting of a numeric phosphorus criterion for the Everglades Protection Area, by December 31, 2003, and compliance with that criterion by December 31, 2006. In 2003, the EFA was amended to include a requirement to construct enhancements to the STAs described in the 1994 conceptual design document. These enhancements as well as the other projects contained in the Long-Term Plan for Achieving Water Quality Goals (Long-Term Plan) are intended to achieve compliance with the phosphorus criterion in the Everglades Protection Area by December 31, 2006. Additional information on the Long-Term Plan can be found in Chapter 8 of the 2005 SFER – Volume I.

In July 2003, the State of Florida's Environmental Regulation Commission adopted a water quality standard for phosphorus within the Everglades Protection Area that includes a numeric criterion, moderating provisions, and a method for determining achievement of the phosphorus criterion. Additional information on the adopted phosphorus standard can be found in Chapter 2C of the 2005 SFER - Volume I.

In addition to the ECP and water quality treatment facilities developed as a result of the non-ECP requirements of the EFA, the currently authorized C-111 Canal Project and the Modified Water Deliveries to Everglades National Park Project are assumed to be implemented in 2050. Implementation of the Modified Water Deliveries to Everglades National Park Project was on hold until February, 2003 due to litigation involving the USACE's authority to implement the selected plan for the 8.5 Square Mile Area.

FUTURE WITHOUT PLAN CONDITION – WATER QUALITY – FLORIDA BAY

An assumption of the future without plan condition is that both the Modified Water Deliveries to ENP and C-111 canal projects are completed. Portions of the C-111 Canal Project have already been implemented, according to the 1994 GRR, while other portions were implemented as temporary facilities due to the jeopardy of the Cape Sable Seaside Sparrow. The implemented/temporary facilities are listed below:

- Removal of the C-111 spoil (dredged material) mounds in the marsh on the southern leg of the C-111 canal (1997) to promote overland flow out of the canal into the marshes in the northeastern part of Florida Bay
- The S-332B pump station with 325 cfs directed to the West detention area and 250 cfs directed to the North detention area – the West detention area covers 160 acres and the North detention area covers 240 acres.
- The S-332C pump station and 300-acre detention area
- The S-332D pump station and 800-acre detention area
- Replacement of the single span bridge over Taylor Slough in the ENP with two longer span bridges and two box culverts

Furthermore, agricultural nonpoint pollution sources in the C-111 basin are currently being investigated as required by the non-ECP structure requirements of the EFA and the C-111/Modified Water Deliveries projects implementation process.

FUTURE WITHOUT PLAN CONDITION – WATER QUALITY – FLORIDA KEYS

The major ongoing water quality improvement program in the Florida Keys, which is anticipated to result in improved water quality conditions in the future, is the Water Quality Protection Program of the Florida Keys National Marine Sanctuary Program. The USEPA and the FDEP are jointly responsible for implementing water quality improvement activities throughout the Florida Keys Region as part of the Water Quality Protection Program. Implementation of these activities will result in improved water quality conditions in the Florida Keys in the future.

FUTURE WITHOUT PLAN CONDITION – PHYSICAL FACILITIES AND OPERATIONS – WATER CONSERVATION AREAS AND EVERGLADES NATIONAL PARK RAINFALL-BASED RAINFALL WATER DELIVERY PLANS

In the future without plan condition, the rainfall delivery plan, as defined in the LEC Regional Water Supply Plan is based on antecedent rainfall and natural system hydropatterns for WCA-2A and WCA-3A and ENP, with quantities to approximate BMP replacement water quantities.

FUTURE WITHOUT PLAN CONDITION – PHYSICAL FACILITIES AND OPERATIONS – EMERGENCY INTERIM PLAN

The Emergency Interim Plan for Florida Bay (Chapter 373.4593, F.S.) was passed by the Florida legislature in May of 1994. Its purpose was to:

> Provide for the release of water into Taylor Slough and Florida Bay by up to 800 cfs, in order to optimize the quantity, timing, distribution, and quality of fresh water, and promote sheetflow into Taylor Slough.

Section 2(e) called for acquisition of the western three sections of the agricultural area known as the Frog Pond in Miami-Dade County. The SFWMD took title to all eight sections of the Frog Pond in February 1995. This effectively became Phase 1 of the Emergency Interim Plan, as the acquisition of this land eliminated land use conflicts between ENP and farming occurring in the Frog Pond. Elimination of these conflicts prevented the unnatural reduction in canal stages that had previously taken place each year in the fall to facilitate those farming activities. In addition, it allows greater flexibility in implementation of a rainfall driven plan for water levels in L-31W.

Phase 2 of the Emergency Interim Plan was designed to provide additional pumping capability into the L-31W canal, which formed the western boundary of the Frog Pond. Pump station S-332D (C-111 Project and Experimental Program of Water Deliveries to ENP) was built for this need and increased pumpage to 500 cfs.

WATER QUALITY PROBLEMS AND OPPORTUNITIES – NATURAL AREAS

Eighteen water body segments within WCA-1, WCA-2 and WCA-3 were listed as use-impaired on the FDEP 1998 303(d) list. Pollutants/water quality parameters contributing to use-impaired conditions include: excessive nutrient loads, low levels of DO, high levels of mercury (based on fish consumption advisories), un-ionized ammonia, coliform bacteria, total suspended solids (TSS) and certain trace metals. There are also four water body segments in ENP on the 303(d) list. Those water body segments include: ENP Shark Slough, ENP L67 Culvert at U.S. 41, Taylor Slough, and the Tamiami Canal. Problem constituents in ENP waters include low levels of DO and high levels of nutrients, mercury (based on fish consumption advisories), iron, and other trace metals. Many of the water body segments in the WCAs and ENP may eventually be removed from subsequent 303(d) lists because the Everglades Forever Act includes schedules and strategies for achieving compliance with water quality standards, consistent with the requirements of the Clean Water Act.

Water quality conditions and in downstream ENP are expected to be significantly improved in 2050 compared to pre-ECP conditions.

In the southern Everglades, implementation of the C-111 and Modified Water Deliveries Projects may also involve developing water quality treatment features necessary to assure that regulatory requirements are met. Minimally, implementation of the C-111 Project involves acquisition of the Frog Pond agricultural area adjacent to the C-111/L-31W levee/borrow canal system, which will result in a net reduction of pollution loading (nutrients, pesticides) into ENP via the existing canal system from nonpoint source agricultural runoff.

WATER QUALITY PROBLEMS AND OPPORTUNITIES – FLORIDA BAY

Barnes Sound is the only segment of Florida Bay included on the FDEP 1998 303(d) list. Excessive nutrients, chlorides and low levels of DO were identified as constituents of concern in ambient water quality monitoring. Other areas of Florida Bay also experience periodic water quality problems. Salinity is the primary water quality parameter of concern in the bay. Bay waters are periodically hypersaline or too low in salinity, depending upon the frequency of hurricanes and other significant storm events and flood release discharges from C&SF Project features. Advective conditions in the bay have also contributed to extensive algal blooms. Water

temperature levels are also periodically elevated above prescribed temperature limitations. Sea trout collected from Florida Bay also exhibit elevated mercury levels.

Water quality conditions in northeastern Florida Bay should improve by 2050. Full implementation of the Biscayne Bay SWIM Plan elements should also benefit water quality conditions in Florida Bay. When fully completed, it is anticipated that the C-111 Project will improve water quality conditions in the vicinity of Taylor Slough through the implementation of structural and operational modifications necessary to achieve preferred hydrologic conditions. Compared to existing conditions, the net load of agricultural nonpoint source pollution entering the C-111 canal and south into Florida Bay should be reduced in 2050. The Modified Water Deliveries to ENP Project is also expected to result in water quality improvements in Florida Bay through the delivery of increased volumes of fresh water to the bay via Northeast Shark River Slough.

WATER QUALITY PROBLEMS AND OPPORTUNITIES – FLORIDA KEYS

The Florida Keys as a whole were identified as having use-impaired water quality on the FDEP 1998 303(d) list; however, water quality problems are generally restricted to canals, marina basins and nearshore waters as opposed to adjacent open waters. The principal pollutants of concern are excessive nutrient loading and fecal coliform bacteria from inadequate wastewater treatment and disposal facilities; although low DO levels are also common in canals of the Florida Keys.

Due to recently imposed growth management regulations and limitations on expanded urban development, the population of the Keys should not greatly increase by 2050. In addition, the Florida Keys National Marine Sanctuary Plan (National Oceanic and Atmospheric Administration, 1996) contains a Water Quality Protection Program developed by the USEPA (USEPA, 1996) in cooperation with the Administration and the FDEP. The Water Quality Protection Program Document, approved in 1996, contains a set of initial recommendations for corrective actions, monitoring, research and education/outreach. These recommendations have been included in a Water Quality Action Plan focusing on wastewater, stormwater, marinas and live-aboard vessels, landfills, hazardous materials, mosquito spraying, canals, and research and monitoring. If the recommended wastewater and stormwater corrective actions are implemented, water quality conditions in the Florida Keys Region are expected to improve by 2050.

The USEPA, other federal, state, and local agencies and citizen stakeholders have identified wastewater infrastructure as the single most important investment to improve nearshore and canal water quality. The cost of wastewater improvements necessary to improve nearshore and canal water quality in the Florida Keys has been estimated at between $184 to $418 million, depending on the percentage reduction in wastewater nutrient loadings to be achieved and which treatment system or systems are ultimately selected. Stormwater management improvements in the Florida Keys area are also needed. The cost of stormwater management and treatment necessary to reduce pollutant loadings in the Florida Keys is estimated at $370 to $680 million, depending on the percentage reduction in stormwater pollutant loadings targeted to be achieved and which areas are selected to be retrofitted. Water quality improvements in Florida Keys canals and nearshore areas are expected to result from improved wastewater collection, treatment and disposal implemented through the Monroe County Wastewater Master Plan and through implementation of the Monroe County Stormwater Master Plan, both of which are major components of the Water Quality Protection Program.

LAND USE – WATER CONSERVATION AREAS

The WCAs are located in western and southwestern Palm Beach, western Broward and northwestern Miami-Dade counties, Florida. They consist of WCA-1, 2 and 3 and encompass approximately 878,000 acres. For management purposes, the area has been subdivided into several units: WCA-1, WCA-2A, WCA-2B, WCA-3A and WCA-3B. The WCAs are bordered on the east by the Sawgrass Expressway, U.S. Highway 27, and Krome Avenue; on the south by U.S. Highway 41; on the west by Levee 28 (L-28) and the Miccosukee Tribe of Indians of Florida Federal Reservation; and to the north by L-4, L-5 and L-6.

The WCAs are located near several state and federal land and water resources. Lake Okeechobee is 25 miles north. State and federal lands that border the WCAs include the Holey Land Wildlife Management Area, Rotenberger Wildlife Management Area, Miccosukee Tribe of Indians of Florida Federal Indian Reservation, Big Cypress Indian Reservation (Seminoles), BCNP and ENP. The Big Cypress Area of Critical State Concern is adjacent the southwest boundary of WCA-3A. As part of the C&SF Project, land and flowage easements were obtained for the construction of the three WCAs. Construction of the required levees and canals began in 1949 and the WCAs became functional in 1962. The USACE designed, constructed, and currently participates in the management of the WCAs and the water resource.

The SFWMD serves as the local management agent under the direction of the USACE. WCA-1 became part of the Arthur R. Marshall Loxahatchee National Wildlife Refuge in 1961, and is managed by the USFWS. WCA-2 and 3 were designated as the Everglades Wildlife Management Area in 1952, and are operated by the FWC under the terms of a cooperative management agreement with SFWMD (formerly Central and Southern Florida Flood Control District). The agreement became effective on March 1, 1952 with an initial term of 25 years and three automatically successive terms of 15 years each. The SFWMD holds fee title to 27 percent of the WCAs, and has flowage easements over the remainder. The TIITF owns 55 percent of the WCAs. Other public agencies own 4 percent, with private landowners owning the remaining 14 percent of the area. The identity of the private landowners and the location of the inholdings are, for the most part, unknown; Palm Beach, Broward and Miami-Dade counties have little or no land records for lands in the Everglades Water Management Area.

In 1982, an agreement between the TIITF, the FWC, the SFWMD and the Miccosukee Tribe of Indians was prepared to clarify the documentation and respective rights and responsibilities of the state and the Miccosukee Tribe in the 189,000 acres of reservation lands within WCA-3.

The SFWMD has used SOR funds since 1982 to purchase land in the Everglades Water Management Area. Section 373.59, F.S., created the SOR program, and established the Water Management Lands Trust Fund that contains monies designated for the purchase of environmentally sensitive riverine lands. Funds for SOR are provided by a portion of documentary stamp tax on properties purchased in Florida. SOR legislation calls for the management and maintenance of lands acquired with SOR funds in an “environmentally acceptable manner, and to the extent practicable, in such a way as to restore and protect their natural state and condition.” The legislation encourages the use of SOR lands for public outdoor recreational activities compatible with the primary goal of environmental protection and enhancement.

Governor Bob Graham initiated the Save Our Everglades program on August 9, 1983. This program was designed to improve environmental conditions in the Everglades system. Two of the seven program initiatives directly affected the management of the Everglades Water Management Area. Initiative 4 required the FWC to manage the Everglades Water Management Area deer herd at a level that could survive moderate flooding conditions. Initiative 5 incorporated hydrological improvements in the conversion of State Road (SR) 84 to Interstate 75 (Alligator Alley). The five

remaining program initiatives provided secondary benefits to the Everglades Water Management Area by providing for land acquisition and hydrological improvements that enhanced water quality and delivery to the area.

The three major roadways that affect the WCAs are U.S. Highway 27, which separates WCA-2 from WCA-3, U.S. Highway 41 (Tamiami Trail), which borders WCA-3 to the south, and Interstate 75, which bisects WCA-3. The roadways, in combination with the existing levee and water delivery systems, have altered the natural hydroperiod of the area and disrupted sheetflow throughout the Everglades Water Management Area. In the past, there has been substantial environmental damage to the WCAs due to severe flooding and drought caused by these alterations.

The Holey Land Wildlife Management Area is a tract of Everglades marsh comprising 35,350 acres, located in the southwest corner of Palm Beach County. It is located immediately north of WCA-3, on the east side of the Miami Canal. It is 17 miles south of Lake Okeechobee and 43 miles north of ENP. A large portion of the property came to the TIITF through statehood as part of the Federal Swamp and Overflowed Lands Act of 1850. Some of the property may have been acquired under the Environmentally Endangered Lands acquisition fund in the early 1970s. The remainder of the property was purchased in order to facilitate restoration of the hydroperiod for the area, possibly through the Save Our Everglades (SOE) Program. Lease #2343, dated July 30, 1968 and issued by the TIITF, leased the area to the FWC for fish and wildlife management purposes. Since that time, the FWC, formerly the FGFWFC, has managed the area for public hunting, fishing and recreational use. From 1968 until 1975, the area was apparently included as part of the Everglades Wildlife Management Area. In 1975, the FWC established the area as the Holey Land Wildlife Management Area. Uses prior to 1968 are unknown.

Man-made structures include levees associated with the Miami Canal and the L-5 canal. A series of canals and borrow pits enclose the area's northern and eastern boundaries. Boat ramps are located at the northwest (G-200) and southwest (G-201) pump stations. There are three water gauges (Holey G, Holey 1, and Holey 2) within the marsh, with another located in the eastern boundary levee (G-203D). These structures are operated by the SFWMD in accordance with a management agreement with the FWC. The SFWMD also maintains public roads associated with the Miami Canal and L-5 levees. The road along the crest of the northern and eastern boundary levee is closed to the public because it is too narrow to accommodate two-way public vehicular use. Florida Power and Light maintains high-tension power lines and support pads on the southern boundary of the Water Management Area, and a small electrical transmission line along the Miami Canal levee. A series of 54 artificial islands were constructed in the south- and east-central portions of the area in 1974 and 1975.

The Rotenberger Wildlife Management Area is an area of Everglades marsh comprising 27,810 acres located in the southwest corner of Palm Beach County. The Rotenberger Wildlife Management Area is located immediately north of WCA-3 on the west side of the Miami Canal. It is 17 miles south of Lake Okeechobee and 43 miles north of ENP. Holey Land Wildlife Management Area is immediately along the east boundary of the Rotenberger Wildlife Management Area. The area was named for Ray Rotenberger, who constructed a small camp and airfield in the area during the late 1950s or early 1960s. Approximately 6,300 acres of the original Environmentally Endangered Lands project were purchased by the state on February 17, 1975. Since that time all but about 3,500 acres have been acquired. Although biologists were performing surveys and checking harvests in the Rotenberger area as early as 1970, and it may have been part of the Sawgrass Hunt Area at this time, the area was not included in the FWC wildlife management area system until August 26, 1975. The Rotenberger Wildlife Management Area has been operated under lease # 3581 dated November 13, 1979 from the TIITF since that time, with six major lease amendments. This lease also includes some lands on the east side of the

Miami Canal that are managed as part of the Holey Land Wildlife Management Area and some 14,000 acres south of the L-4 canal in Broward County that are operated as part of the Everglades and Francis S. Taylor Wildlife Management Area (known as the Seminole Indian Lands).

Man-made structures include levees associated with the Miami Canal, Manley Ditch, L-4 canal, the Florida Power and Light Powerline, the Guerry Sugarcane Farm (834 acres), and the abandoned Cousin's Ranch (940 acres) and Holper (100 acres) Properties. A small camp and airstrip were built by Ray Rotenberger, and there are several cabins and other structures associated with that camp. There used to be a cabin on Wall's Head, but it was abandoned and fell apart some years ago. Another cabin on Cousin's Ranch near the Miami Canal (Wildlife Officer's Camp) has also been abandoned, but is still standing. Several sets of culverts drain from Rotenberger Wildlife Management Area into the Miami Canal and L-4 canal, and there are a series of culverts underneath the Powerline Road. There are two SFWMD water gauges in Rotenberger Wildlife Management Area (Rotenberger North and South). Sometime in the late 1950s or early 1960s an exploratory oil well was drilled near the south-central boundary. Using shell rock and material dredged from the wetlands a 2-acre support pad and access road to the L-4 North and Powerline levees was constructed, but this site was soon abandoned.

LAND USE – EVERGLADES NATIONAL PARK AND FLORIDA BAY

As the region has grown its land use patterns have dramatically changed. In South Florida the character of the land has acted as one of the constraints dictating early settlement patterns. Topography, soils, and aquifer maps illustrate the vulnerability of South Florida to inundation. On the east coast, the Atlantic Coastal Ridge and associated pine rocklands, due to its higher elevation and more stable soils, were the first to develop. As the coastal ridge developed and available lands were depleted (particularly over the last few decades), other less suitable lands were developed in the sprawl pattern characteristic of current day South Florida.

Everglades National Park encompasses 2,353 square miles of wetlands, uplands and submerged lands at the southern end of the Florida peninsula. The topography is extremely low and flat, with most of the area below 4 feet NGVD. The highest elevations are found in the northeastern section of the park and are from 6 to 7 feet NGVD. The saline wetlands, including mangrove and buttonwood forests, salt marshes and coastal prairie that fringe the coastline are subject to the influence of salinity from tidal action.

Everglades National Park, authorized by Congress in 1934 and established in 1947, was established to protect the unique tropical biological resources of the southern Everglades ecosystem. It was the first national park to be established to preserve purely biological (versus geological) resources. The park's authorizing legislation mandated that it be managed as:

> …wilderness, [where] no development… or plan for the entertainment of visitors shall be undertaken which will interfere with the preservation intact of the unique flora and fauna and the essential primitive natural condition now prevailing in this area.

This mandate to preserve wilderness is one of the strongest in the legislative history of the National Park System.

Recognized by the international community, as well as the national and state governments, ENP is important, as a natural, recreational and cultural resource. At the international level, the park is a World Heritage Site, an International Biosphere Reserve and a Wetland of International Significance. In 1978, Congress designated much of the park, (86 percent) as Wilderness under the Wilderness Act of 1964. In 1997, this area was re-designated the Marjory Stoneman Douglas Wilderness. Hell's Bay Canoe Trail and the Wilderness Waterway are designated National Trails. The State of Florida has designated the park an Outstanding Florida Water.

The park preserves a unique landscape where the temperate zone meets the subtropics, blending the wildlife and vegetation of both. The landscape includes sawgrass sloughs, tropical hardwood hammocks, offshore coral reefs, mangrove forests, lakes, ponds and bays, providing habitat for dozens of threatened and endangered species of plants and animals. It is the largest designated wilderness, at 1,296,500 acres, east of the Rocky Mountains. It protects the largest continuous stand of sawgrass prairie in North America, the most significant breeding grounds for tropical wading birds in North America, over 230,100 acres of mangrove forest (the largest in the western hemisphere), a nationally significant estuarine complex in Florida Bay and significant ethnographic resources, revealing 2,000 years of human occupation.

Agriculture

Little or no agricultural production takes place in these regions, which includes ENP, Florida Bay, the Ten Thousand Islands and Whitewater Bay. However, water management decisions made for these regions may affect other regional farmland and should, therefore, be considered carefully.

LAND USE – FLORIDA KEYS

In 1975, Florida designated Monroe County an Area of Critical State Concern under the authority of Chapter 380, F.S. This legislation was designed to preserve and protect the county's unique natural resources, which were being degraded by large development projects. It gave the State Department of Community Affairs the responsibility of overseeing all development activities within the designated area. The legislation required both the drafting of a comprehensive plan and development regulations designed to set the county's growth-management standards, over which the state has final review and approval.

Significant features of the plan include the "down-zoning" of large natural areas (excluding Key West, Key Colony Beach and Layton), and the establishment of the Monroe County Land Authority, which is responsible for purchasing these down-zoned areas. The plan was also designed to preserve the contiguous areas of habitat as biologically functional units, specifying that required open-space areas may not be altered. It also contained the rudiments of the concept of "concurrency," which requires that a project cannot be completed without the public infrastructure necessary to support it.

Monroe County and its sister municipalities are currently revising their comprehensive plans under Chapter 163, F.S. In general, Chapter 163 legislates more specific standards, significantly expands the concept of concurrency, and allows the local government to set a "level of service" for hurricane evacuation that cannot be exceeded as a result of new development. However, because the county is an Area of Critical State Concern, the county must still meet the standards of Chapter 380, F.S.

The inhabited Keys make up only five percent of Monroe County's total land area (65,500 of 1.2 million acres). The county also contains over 99,000 acres of the Everglades, but this area is almost entirely within ENP and BCNP. The majority of the county, consequently, is classified as "conservation land."

Within the county, the unincorporated area is distinguished from the four incorporated areas of Key West, Key Colony Beach, Layton and Islamorada. Within the unincorporated area, land use is also apportioned differently between the Upper, Middle and Lower Keys. The types of land use can be defined as residential, commercial, industrial or public facilities and buildings; historical buildings and districts; military facilities; and recreation, conservation and vacant land.

Residential Land

The portion of land used for residential purposes ranges from 12 percent in the Lower Keys to 58 percent in Key Colony Beach. The small percentage of residential use in the Lower Keys is due to the high proportion of conservation land, primarily in the National Key Deer Refuge. The relatively high proportion of residential development in Key Colony Beach reflects the city's reliance on Marathon for commercial and other use categories. Within the unincorporated area, the majority of residential development (78 percent) consists of single-family units. The unincorporated area also has the majority of the county's mobile homes, although the total area is relatively small. The cities of Key West and Key Colony Beach have substantial duplex development. In the city of Key West, the single-family/duplex zoning category accounts for 62 percent of all residential area. Key Colony Beach has similar percentages.

Commercial Land

The proportion of commercial land in each area is similar, although there are significant differences between the Upper, Middle and Lower Keys. In general, commercially zoned land accounts for about 4 percent of land-use acreage within the Keys. The Middle Keys contain significantly higher proportions because of the large amount of commercial land in Marathon. The lower levels in the Lower Keys reflect the large amount of refuge conservation land.

Industrial Land

The cities of Key West, Key Colony Beach, and Layton contain no significant industrial development, and rely on the adjacent unincorporated areas for their industrial needs. Two industries, rock mining and marine repair and salvage define industrial use in the Keys. The majority of rock mining operations are in Stock Island and Marathon. Other small-scale industrial businesses are located in Stock Island, Big Pine Key, Marathon, and Key Largo.

Public Facilities and Buildings

As much as 8 percent of Key West is allocated to public buildings and facilities (excluding recreational uses), while the unincorporated area, Key Colony Beach and Layton provide 1 percent or less.

Historic Buildings and Districts

Within the cities of Key Colony Beach and Layton, and in the unincorporated areas of the Keys, virtually no acreage is allocated for historical lands. There are, however, historic structures and buildings outside Key West, including those on Pigeon Key and the Carysfort Light off North Key Largo, both of which are listed in the National Register of Historic Places. The city of Key West also considers large areas of "old town" historic and, as a result, requires additional permits before allowing development. In addition, the city has established a Historic Architectural Review Commission to ensure that the traditional character and appearance of the area is maintained.

Military Facilities

Military facilities are located exclusively in Key West and the Lower Keys. About 25 percent of Key West's land is used for military purposes. In the Lower Keys there are three military facilities that make up 5 percent of all land in the unincorporated area.

Recreational Facilities

The City of Key West provides 7 seven percent of its land area for recreational purposes, while the Lower and Upper Keys provide less than 2 percent each. The Middle Keys provide 11 percent, Key Colony Beach 9 percent, and Layton none. These numbers may be somewhat misleading, however, as they are derived primarily from a list of publicly and privately owned lands that provide recreational activities. Many private owners of resort areas provide recreational facilities geared toward water activities that include swimming pools and/or tennis courts.

Conservation Land

Conservation land makes up 34 percent of all unincorporated land use within the Keys. The largest proportion is in the Lower Keys, and is associated with the National Key Deer and Great White Heron refuges (28 percent). In the Upper Keys (51 percent), conservation land is located primarily in North Key Largo. The cities of Layton and Key Colony Beach have no conservation land. Within the city of Key West, conservation land is undeveloped and categorized as open water, freshwater islands, tidal wetlands, mangrove and hammock. Some of the land is in private ownership and, therefore, could be subject to future development. However, Monroe County Land Authority has been acquiring substantial areas around the "Salt Ponds" area of Key West. A total of 550 acres remains undeveloped in Key West.

Vacant Land

About 210,000 acres of land are potentially available for development, representing just over 34 percent of the Keys' total land area. In the unincorporated area of the county, vacant land is the largest land-use category. Ten percent of the county's vacant land is divided into nearly 15,000 vacant lots. These lots represent the only reasonably buildable property remaining in the Keys, and make up a substantial proportion of the total potential single-family development area.

Florida Reef Tract

The Florida Reef Tract is an arcuate band of living coral reefs paralleling the Keys. The reefs are located on a narrow shelf that drops off into the Straits of Florida. The shelf slopes seaward at a 0.06-degree angle into Hawk Channel, which is several miles wide and averages 50 feet deep. From Hawk Channel, the shelf slopes upward to a shallower area containing numerous patch reefs. The outer edge is marked by a series of bank reefs and sand banks that are subject to open tidal exchange with the Atlantic Ocean. The warm, clear, naturally low-nutrient waters in this region are conducive to reef development.

ELIGIBLE FFWP PROJECTS FOR THE EVERGLADES, FLORIDA BAY AND KEYS REGIONS

- CERP- WCA-3 Decompartmentalization and Sheetflow Enhancement Project – Part 1
- CERP- C-111 Spreader Canal
- CERP- Florida Keys Tidal Restoration Project.
- CERP- Flow to NW and Central WCA-3A
- CERP- Everglades National Park Seepage Management
- Florida Bay Restoration Initiative

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SECTION 8-9: WATER PRESERVE AREAS, MIAMI-DADE COUNTY AND NORTH PALM BEACH COUNTY REGIONS

PHYSICAL CONDITIONS – WATER PRESERVE AREAS, MIAMI-DADE COUNTY AND NORTH PALM BEACH COUNTY REGIONS

These regions consist of the coastal ridge section in Palm Beach, Broward, and Miami-Dade counties and a strip of sandy land that lies east of part of the WCAs (**Figure 8-12**). The area is made up of the WPAs, Miami-Dade County and North Palm Beach County regions. The ground surface of the flatlands in the west ranges from about 25 feet NGVD in the upper part of the region to about 5 feet NGVD in lower Miami-Dade County. The Atlantic Coastal Ridge is comprised of broad, low dunes and ridges with elevations ranging from 10 to 25 feet NGVD. This ridge area ranges from 2-4 miles in width at its northern edge to its southern edge in Miami. South of Miami the ridge becomes less pronounced but significantly wider.

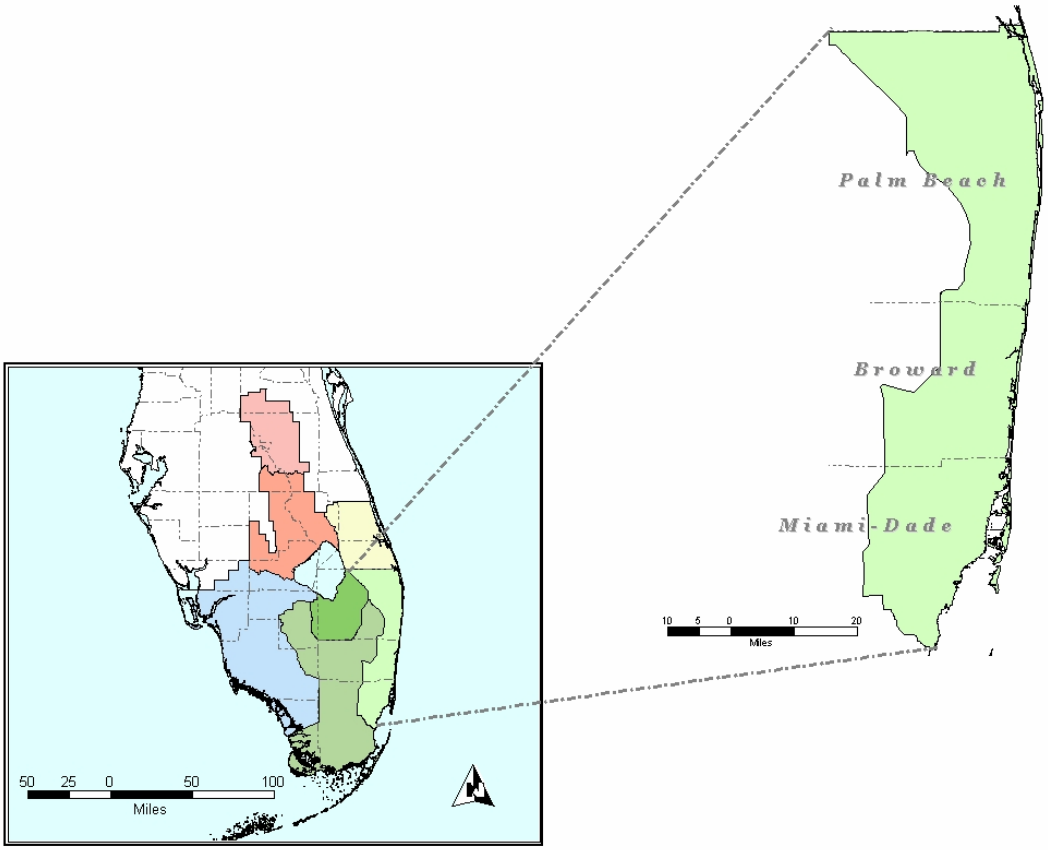

Figure 8-12. Water Preserve Areas, Miami-Dade County and North Palm Beach County Regions.

These regions are the most densely populated part of the state. The largest population centers are near the coast and include the cities of Miami, Hollywood, Fort Lauderdale, and West Palm Beach. Water levels in coastal canals are controlled near the coastal shoreline to prevent over-drainage and to prevent saltwater intrusion. Low water levels in these canals may enable salt

water to migrate into the groundwater, wellfields, and natural freshwater systems upon which the urban areas depend for a potable water supply.

This area is characterized by sandy flatlands to the west, the sandy coastal ridge and the coastal marsh and mangrove swamp areas along the Atlantic seaboard. The northern portion, generally north of Miami-Dade County, marks the shore of a higher Pleistocene sea and occurs as one or more relict beach ridges. The southern portion appears to be marine-deposited sands or marine limestone.

Extensive development has resulted in nearly complete urbanization of the coastal region from West Palm Beach southward through Miami, and physiographical characteristics of the region have been greatly overshadowed. South of Miami, in Miami-Dade County, this coastal area widens as the Everglades bends to the west to include urban areas and agricultural areas that extend almost to the southern coast. Miami-Dade County's agricultural industry covers more than 83,000 acres southwest of the coastal metropolitan area. Vegetables, tropical fruits, and nursery plants are grown in this area.

Biscayne Bay is a shallow tidal sound located near the extreme southeastern part of Florida. Biscayne Bay, its tributaries and Card Sound are designated by the State of Florida as aquatic preserves, while Card and Barnes Sounds are part of the Florida Keys National Marine Sanctuary. A significant portion of the central and southern portions of Biscayne Bay comprises Biscayne National Park.

The original extent of Biscayne Bay approximated 300 square miles, but it has since undergone major modifications, particularly in its northern portions, as a result of development. The bay extends about 55 miles in a south-southwesterly direction from Dumfoundling Bay on the north to Barnes Sound on the south. It varies in width from less than 1 mile in the vicinity of the Atlantic Intracoastal Waterway passage to Dumfoundling Bay, to about 10 miles between the mainland and the Safety Valve Shoals to the east.

While there has been extensive dredging and filling within northern Biscayne Bay, the area still supports a productive and healthy seagrass bed and a few tracts of natural shoreline also remain. Northern Biscayne Bay's headwaters are now considered to include dredged areas known as Maule Lake and Dumfoundling Bay, near the northern boundary of Miami-Dade County.

Central and, in particular, southern Biscayne Bay have been impacted less by development than northern Biscayne Bay. For instance, mangrove-lined coastal wetlands extend from Matheson Hammock Park south along the entire shoreline of Biscayne National Park, Card and Barnes Sounds, a distance of 30 miles. These coastal wetlands are the largest tract of undeveloped wetlands remaining in South Florida outside of ENP, BCNP and the WCAs.

Biscayne National Park, in southern Biscayne Bay, was established in 1980 to protect and preserve this nationally significant marine ecosystem consisting of mangrove shorelines, a shallow bay, undeveloped islands, and living coral reefs. The park is 180,000 acres and 95 percent water. The shoreline of southern Biscayne Bay is lined with a forest of mangroves and the bay bottom is covered with dense seagrass beds. The park has been designated a sanctuary for the Florida spiny lobster. Biscayne Bay and Biscayne National Park support a multitude of marine wildlife, such as lobster, shrimp, fish, sea turtles and manatees. The coral reefs within the Biscayne National Park support a diverse community of marine plant and wildlife.

Depending upon the flood stages reached, all of the C&SF Project canals in Miami-Dade County can carry floodwaters to Biscayne Bay. However, much of the time, discharges from project canals represent primarily runoff or seepage from within the flood protected area of the county. These flows originate in the extensive networks of secondary drainage canals and storm sewers that discharge into the project canals. Supplementing the complex system of project canals and secondary drainage systems are many hundreds of other stormwater drainage canals and

storm sewer outfalls within Miami-Dade County that discharge fresh water directly into Biscayne Bay.

EXISTING CONDITIONS – WATER PRESERVE AREAS, MIAMI-DADE COUNTY AND NORTH PALM BEACH COUNTY

These regions function as a multipurpose canal system with several objectives including flood control, urban and agricultural water supply, protection and enhancement of wetland and estuarine systems, prevention of saltwater intrusion, and recreation. The LEC system is capable of moving vast quantities of water during the wet season, as well as supplying water (if available) during the dry season or as needed. Important freshwater canals are, from north to south: C-44, C-18, C-17, C-51, Hillsboro Canal, North New River Canal, South New River Canal (C-11), C-9, C-8, C-7, Miami Canal (C-6), C-4, C-100, C-100c, C-1, C-102, C-103, C-109, C-110, C-111 and the South Miami-Dade Conveyance System. Providing adequate drainage and flood control to the South Miami-Dade County agricultural area is a serious challenge because the farmland is directly adjacent to ENP. Agricultural land provides a buffer between urbanization and ENP. Farmland is recognized as the preferred neighbor to natural areas because of its minimal impervious areas, open green space, and low population density.

The major estuaries in the area are Lake Worth Lagoon in Palm Beach County, West Lake in Broward County and Biscayne Bay in Miami-Dade County. Lake Worth Lagoon was predominantly a freshwater system as recent as 100 years ago but was converted into a marine system with construction of permanent inlets to the ocean. West Lake is 1,400 acres of coastal wetland and mangroves in Hollywood along the Intracoastal Waterway. Biscayne Bay is a subtropical lagoon about 40 miles long that extends the length of Miami-Dade County.

Prior to urban development, freshwater discharge to Biscayne Bay consisted of flows through natural drainage-ways, overland flow, and groundwater discharge from the Biscayne aquifer. However, the flow has changed from short bursts of rainy season flow through low drainage-ways to regulated releases through drainage canals and decreased periods of groundwater discharge (SFWMD, 1995). The construction of the canal system lowered the regional water table and subsequently reduced the amount of groundwater flow into Biscayne Bay. Groundwater discharge into Biscayne Bay is believed to occur through both seepage and flow through subsurface leakage channels. A zone of seepage occurs around the perimeter of Biscayne Bay where the water table elevation is higher than sea level. Subsurface flow occurs through natural leakage channels in the rock formations. Prior to the construction of drainage canals, springs flowed along the shore and emanated from the bottom of the bay. However, present-day rates of groundwater discharge into the Bay are insufficient to produce such flowing springs (SFWMD, 1995).

Surface water flows into Biscayne Bay and Lake Worth Lagoon are primarily controlled by the system of canals, levees and control structures built as part of the C&SF Project. Biscayne Bay receives freshwater surface flows from 17 surface water basins through 12 major coastal structures (SFWMD, 1995). Lake Worth Lagoon's freshwater input is principally from the C-51 canal. The mechanism of surface water flow into Biscayne Bay and Lake Worth Lagoon are short intense pulses of fresh water discharged at discrete locations. This flow has replaced the historic sheetflow through the wetlands adjacent to Biscayne Bay that existed before development of the canal system. Dry-season flows into these water bodies are much lower than pre-drainage levels because most of the discharge into Biscayne Bay is from stormwater releases from the canals. The canal discharge can bring sediments, heavy metals, pesticides, fertilizers, herbicides, nutrients and low salinity plumes, which can all adversely affect the biota (SFWMD, 1995).

FUTURE WITHOUT PLAN CONDITION – WATER QUALITY – WATER PRESERVE AREAS, MIAMI-DADE COUNTY AND NORTH PALM BEACH COUNTY

The SWIM Act (Chapter 373.451-373.459, F.S.), which was passed by the Florida Legislature in 1987 and amended in 1991 and 2003, mandated the preparation and implementation of a SWIM plan for Biscayne Bay. The SFWMD prepared and adopted the initial SWIM Plan for Biscayne Bay in 1988 and modified the plan in 1989 and 1995. This plan provides solutions and proposed projects that are consistent with the directives and intent of this legislation to prevent further decline in the quality of the Biscayne Bay resource. The Plan includes numerous water quality improvement-related strategies and projects to reduce pollutant loading in Biscayne Bay and its tributaries. Many of the projects that have been or are in the process of being implemented are anticipated to beneficially affect the future water quality conditions of Biscayne Bay.

The Biscayne Bay Partnership Initiative was created by the 1999 Florida Legislature to survey the status of Biscayne Bay's resources and their management, and to produce a final report of findings and recommendations which was presented to the Florida legislature in early 2001. One of those recommendations resulted in the creation of the Biscayne Bay Regional Restoration Coordination Team (BBRRCT), which is a part of the Working Group of the South Florida Ecosystem Restoration Task Force. This team identifies priority issues relating to Biscayne Bay as well as goals and performance measures related to those priority issues and recommends the implementation of specific projects that address those issues and fulfill the recommendations of the Biscayne Bay Partnership Initiative. All work done by the coordination team is consistent with the Biscayne Bay Aquatic Preserve Act. As with the Biscayne Bay SWIM Plan, many of the projects identified by the team are anticipated to beneficially affect the water quality conditions of Biscayne Bay and its tributaries.

In addition to the efforts in Biscayne Bay, the Lake Worth Lagoon Management Plan will also result in water quality improvement projects being implemented in the LEC area. Although implementation of these water quality improvement activities will result in beneficial effects to the LEC water bodies, the currently funded activities are not anticipated to be enough to improve the net future condition of the water bodies in this region due to the dramatic additional urban development and associated additional pollutant loads projected to occur in this region.

FUTURE WITHOUT PLAN CONDITION – PHYSICAL FACILITIES AND OPERATIONS – PROJECTS

C-51 Canal

The current Design Memorandum, completed in February 1998 and submitted for review and approval, contains the same National Economic Development plan as the June 1992 Detailed Design Memorandum, but references an "authorized" plan, which includes the replacement of the 2.5-square-mile detention area with STA-1E from the ECP. The "authorized" plan is also a product of the Technical Mediated Plan, which has been agreed to by the United States Department of Justice, USDOI, United States Army, the State of Florida, and the SFWMD. The Everglades Forever Act is based, in part, on the Technical Mediated Plan. The current "authorized" plan was authorized by the Water Resources and Development Act of 1996. The act included language for the Western C-51 Project that additional work, as described in the ECP, shall be accomplished at full federal cost.

The authorized plan is recommended in the C-51 Design Memorandum and has many of the same physical features proposed in the 1992 Detailed Design Memorandum. The project will

provide 10-year flood protection for the western basin of C-51. The major physical difference between the 1992 Detailed Design Memorandum National Economic Development plan and the authorized plan is the replacement of the 1,600-acre detention area with the 5,350-acre "locally preferred" STA-1 East. The most significant modification will be the reduction of discharges to Lake Worth, with C-51 West basin runoff directed instead to WCA-1, part of the Refuge. Runoff from the C-51 West basin will pass through STA-1 East for water quality improvement prior to its discharge to WCA-1. In addition to the flood damage reduction benefits provided by the 1992 plan, the authorized plan would provide water quality improvement, reduction of damaging freshwater discharges to Lake Worth, and increased water supply for the Everglades and other users.

Miami-Dade County Lake Belt Area

This component assumes that the conditions caused by the currently permitted mining exist and that the effects of any future mining are fully mitigated by the mining industry.

C-111 Project

Plan 6A, recommended in the USACE General Reevaluation Report (dated May 1994), will create the operational capability and flexibility necessary to provide restoration of the ecological integrity of Taylor Slough and the eastern panhandle areas of the Everglades, and maintain flood protection to the agricultural interests adjacent to C-111.

In the future without plan condition, C-111 Plan 6A will protect the natural value of a portion of ENP, and will maintain flood damage prevention within the C-111 basin east of L-31N and C-111. The project, which consists of both structural and nonstructural modifications to the existing project works within the C-111 basin, will restore the hydrology in 128 square miles of Taylor Slough and its headwaters in the Rocky Glades. In addition, the hydroperiod and depths in 1,027 square miles of Shark River Slough are beneficially impacted by the higher stages in the Rocky Glades, resulting in a net increase in water volume within Shark River Slough. The project will provide adequate operational flexibility to incorporate management strategies that will evolve as a result of continued monitoring and studies.

Modified Water Deliveries to Everglades National Park

The Modified Water Deliveries to Everglades National Park Project was on hold until February 2003, pending the resolution of litigation involving the USACE's authority to implement the selected plan for the 8.5 Square Mile Area.

The Modified Water Deliveries to Everglades National Park Project was authorized by the Everglades National Park Protection and Expansion Act (Public Law 10229). The purpose of the project is to provide for structural modifications to the C&SF Project to enable the restoration of more natural water flows to Shark River Slough in ENP. The project is being implemented by the USACE in conjunction with the acquisition of about 107,600 acres of land by the USDOI. Land acquisition for the levee, canal, and pump station for the flood mitigation system in the 8.5 Square Mile Area is under way.

In the future without plan condition, the Modified Water Deliveries Project will provide more natural flows to Shark River Slough in ENP. Water flows will be spread across a broader section of Shark River Slough to include the east Everglades between L-67 extension and L-31N.

To restore the natural hydrology of the park, the existing C&SF Project will be modified by the addition of new water control structures and culverts to reestablish the historic distribution of water from WCA-3A into WCA-3B and finally into ENP. New water control structures are planned in the L-67 A and C levees that now physically separate WCA-3A and WCA-3B. Outlets

from WCA-3B (S- 355A and B) have already been constructed to discharge into the existing L-29 canal that currently conveys water under Eastern Tamiami Trail Highway (U.S. Highway 41) through a series of culverts into Northeast Shark River Slough. To further promote the sheetflow of water into the park, a new 3,000-foot bridge will replace portions of the eastern Tamiami Trail highway and culverts to improve water flow from the L-29 canal into Northeast Shark River Slough. An existing levee and canal (L-67 extension) dividing the newly acquired ENP Expansion Lands (Northeast Shark Slough) from the west half of ENP will also be removed. Additional flood protection has been provided to the Miccosukee Indian Tribe Tigertail Camp on eastern Tamiami Trail to avoid periodic flooding that would otherwise be caused by the project. Similar protective measures are planned for the Seminole Indian Tribe Osceola Camp, also on eastern Tamiami Trail.

In order to prevent adverse flood impacts to the 8.5 Square Mile Area, the authorized project includes the construction of a seepage levee and canal through the western third of the area and a pump station (S-357) to remove excess seepage water. USDOI will acquire the lands west of the newly constructed protective levee. These project features are designed to maintain the existing level of flood protection in the remaining residential area after the Modified Water Deliveries to Everglades National Park project returns water levels in Northeast Shark Slough to higher levels. A second pump station (S-356) has been constructed to pump excess seepage water from the L-31N borrow canal into the L-29 borrow canal. This water will then flow through culverts under U.S. Highway 41 (Tamiami Trail) into Northeast Shark River Slough. The structural modifications were designed to provide for maximum operational flexibility so that as more is learned through the continued iterative testing program, the operation of the project can be adjusted accordingly.

East Cape and Homestead Canals

The East Cape and Homestead canals, located within ENP, were constructed by local interests in the early 1900s to assist in the drainage of the Everglades prior to authorization of the park in 1936. After the ENP was established, the canals were plugged to prevent over-drainage of upstream freshwater systems and saltwater intrusion during high tides in the dry season. The passage of Hurricane Andrew resulted in extensive damage to both plugs. The plugs were repaired in 1997.

Lower East Coast Regional Water Supply Plan

The Lower East Coast Regional Water Supply Plan (LEC Plan) was adopted by the SFWMD governing board in May 2000. It provides a blueprint to meet South Florida's water resource needs through the year 2020, when South Florida's population is projected to increase from five to seven million residents.

The analyses conducted during the LEC planning process demonstrated the need for increased storage capabilities throughout the system to help meet the increasing agricultural, environmental and urban demands through 2020. The LEC Plan identified water resources and water supply development projects, both structural and nonstructural, to help meet the growing needs of the region. The LEC Plan also recommended major changes to the District's consumptive use permitting rules.

Northeastern Broward Secondary Canal Recharge Network

This component includes pump stations and structures that would maintain higher levels in secondary canals in eastern Broward County between the Hillsboro and the North New River canals during the dry season. The control of seasonally higher canal elevations along the coast could help recharge the aquifers being used by local public water supply wellfields, and further

reduce saline encroachment into the coastal freshwater aquifers. The selected canals are located where recharge from the canals would help to maintain the freshwater interface front and protect the production capability of wellfields to the east.

Miami-Dade County Utility Aquifer Storage and Recovery

This component includes Aquifer Storage and Recovery (ASR) wells and related facilities that would be installed associated with wellfields of the Miami-Dade Water and Sewer Authority Department. These facilities would be operated to store water in the Floridan aquifer in the wet season and recover this water in the dry season.

Selected Elements of L-8 Project

The goal of the selected elements of the L-8 project is to redirect runoff from the southern L-8 basin away from WCA-1 and the C-51 canal to the West Palm Beach Water Catchment Area and the Loxahatchee Slough via the M canal and the C-18 canal. Subsequently, this water may be used to meet urban water supply demands for West Palm Beach, to meet environmental water demands of the West Palm Beach Catchment Area and Loxahatchee Slough, and may provide recharge for the Jupiter and Seacoast Utilities Authority wellfields. In addition, this project would be expected to reduce the incident and volume of harmful freshwater releases into Lake Worth Lagoon via the C-51 canal. The project includes an improved structural connection from the West Palm Beach Water Catchment Area to the Loxahatchee Slough ASR wells at the West Palm Beach Water Catchment Area or the Indian Trails Improvement District impoundment and a coastal recharge delivery system.

Minimum Flows and Levels

This component involves operational adjustments associated with the establishment of minimum flows and levels (MFLs) for the Biscayne Aquifer and the Everglades. Minimum levels for the Biscayne Aquifer involves maintaining water levels in coastal canals to prevent saltwater intrusion. MFLs for the Everglades focuses on preventing hydric soils (peat and marl) from extreme drawdown (groundwater levels exceeding more than 1 foot below ground surface) during drought and causing significant harm. Additionally, MFLs for Biscayne Bay are to identify the point at which future withdrawals will cause significant harm to the bay.

FUTURE WITHOUT PLAN CONDITION – PHYSICAL FACILITIES AND OPERATIONS – CRITICAL RESTORATION PROJECTS

C-4 Water Control Structure

This project involves construction of a gated control structure (S-380) in the C-4 canal at the congruence with the Dade-Broward Levee. This project is now completed and fully operational. A large volume of seepage was being lost from WCA-3B to the coast because the water management system could not raise surface and groundwater levels high enough to prevent seepage. The construction of a gated control structure with five 72-inch diameter culverts with remotely operated slide gates was necessary to increase aquifer recharge and surface and subsurface storage of water to reduce seepage, as well as enhance habitat for plants and animals. The total cost was $1.3 million, according to the project cooperation agreement entered into by the SFWMD and the USACE on January 7, 2000. More information is available regarding this critical project at www.saj.usace.army.mil/projects/index.html.

Western C-11 Water Quality Improvement

The purpose of this project is to improve the quality and timing of stormwater discharges from the Western C-11 basin to the Everglades Protection Area. The S-9 pump station currently pumps urban and agricultural stormwater runoff from the Western C-11 basin directly into WCA-3A. This project will be completed in two phases. Phase 1 involves installation of four new seepage return pumps adjacent to the S-9 pump station. These seepage return pumps include two 75-cfs electric pumps and two 175-cfs diesel pumps. Phase 1 was completed in September 2002 and fully operational as of April 2003. Phase 2 will involve construction of a new divide structure in the C-11 canal, approximately 0.5 miles east of U.S. Highway 27. The divide structure will be a bladder-type concrete spillway with a discharge capacity of 2,880 cfs. The construction contract was awarded in September 2003, with completion of construction targeted for January 2005. During non-flood conditions, the new structure is intended to separate seepage from stormwater runoff, allowing return of relatively clean seepage waters to WCA-3A using the new seepage return pumps. Additional information may be obtained from the Website: www.saj.usace.army.mil/projects/index.html.

WATER QUALITY PROBLEMS AND OPPORTUNITIES

According to the FDEP 1998 303(d) list, 42 water body segments (both fresh and marine water bodies) within these regions are use-impaired. Pollutants/water quality constituents causing impairment include low levels of DO, high levels of mercury (based on fish consumption advisories) and other trace metals, and high levels of coliform bacteria, TSS, BOD and un-ionized ammonia.

Four of the main C&SF Project canals delivering flows from Lake Okeechobee and the WCAs (the West Palm Beach, Hillsboro, New River and Miami canals) traverse the LEC. In addition to conveying Lake Okeechobee and WCA flows, the C&SF Project canals and a network of connecting secondary and tertiary canals provide drainage in the LEC, which conveys stormwater runoff and attendant pollution loads to estuarine waters. Management of stormwater runoff and flooding via the existing canal system has been implicated as the chief cause of water quality degradation in the region, particularly in the northern portion of Biscayne Bay.

Improving water quality in these regions to meet water quality standards in all impaired water bodies will likely be difficult, considering the extent of urban development, minimal or nonexistent water quality treatment for nonpoint source runoff, and other direct (point source) and indirect discharges adversely affecting water quality. Water quality conditions are expected to worsen in central and southern Palm Beach, Broward and Miami-Dade counties by 2050 compared to current conditions. The FDEP's 1996 Section 305(b) report to the USEPA describing water quality conditions in the regions indicates that most of the region exhibits "fair" or "good" water quality. The report goes on to state that most pollution in the region comes from storm water, although bacteriological contamination from wastewater discharges and septic tanks is also a significant problem, particularly in the Miami River, downstream in Biscayne Bay, and urban areas west of the Intracoastal Waterway in Broward County and north of the New River. Water quality conditions in receiving water bodies in 2050 are expected to be further degraded, due to the developed condition of the watershed and the continued accumulation of pollutants in sediments in receiving water bodies.

Nearly all of this heavily urbanized watershed drains to estuarine waters. Net pollution loads, especially from nonpoint sources, to receiving waters are expected to increase as a result of projected population increases. The expected increase in net pollution loads may not be directly proportional to population growth. New growth and urban/suburban development must comply with water quality treatment requirements for nonpoint source runoff, whereas much of the existing development does not include facilities for treatment of nonpoint pollution sources.

Nevertheless, the projected addition of approximately 2.7 million people to the region is expected to cause water quality conditions to be further degraded, especially in those basins which are already stressed by existing pollution loads.

In Palm Beach County, the Lake Worth Lagoon Estuary is the receiving water body for most of that urban watershed. There are eight use-impaired water bodies in Palm Beach County on the FDEP 1998 303(d) list. Listed water body segments include coastal canals and freshwater areas further inland. Water quality conditions are expected to improve (in terms of estuarine salinity targets) as a result of the C-51 (STA-1 East) Project, which will divert freshwater discharges to Lake Worth Lagoon to a treatment area prior to discharge to WCA-1. However, net nonpoint source pollution loads to Lake Worth Lagoon may increase commensurate with increases in population and development.

Although there are no extensive estuarine water bodies in Broward County, remaining mangroves in southern Broward County canals and along the Intracoastal Waterway provide similar habitat. There are 21 303(d)-listed use-impaired water body segments in Broward County. These water body segments are primarily coastal canals providing drainage. Due to the extent of existing urban development in the watersheds of those canals, it is not likely that there will be a significant increase in future nonpoint source pollution loads into these water bodies. However, it is also unlikely that basinwide stormwater BMPs, e.g., retention/detention facilities and filtration, can be implemented effectively in heavily urbanized watersheds due to the lack of available land for such facilities. Future basin planning efforts during TMDL development and implementation may result in more effective controls of other direct (point source) and indirect discharges of pollutants (e.g., car washes and other industrial facilities). At best, the long-term prognosis for improving all use-impaired water bodies in coastal areas of Broward County is uncertain.

In Miami-Dade County, 13 water body segments were identified as use-impaired on the FDEP's 1998 303(d) list. Most are coastal canals providing drainage of runoff to Biscayne Bay. Biscayne Bay is the largest estuarine water body in these regions, and is the receiving water body for most of the developed area of Miami-Dade County. Most of Biscayne National Park is located within the central and southern portion of the Biscayne Bay Estuary. As with some of the Broward County canals, controlling nonpoint sources of runoff in heavily urbanized areas in Miami will be difficult, due to the lack of available land for basinwide BMPs. Some incremental improvement of nonpoint source pollution loads may be realized through the basin management plans to be developed by the FDEP. Point sources and other direct discharges of pollutants to Biscayne Bay and tributary canals should be significantly improved if basin management plans are fully implemented. However, overall, it is not expected that water quality in coastal canals draining to Biscayne Bay will be improved to the point that all surface water quality standards will be achieved. Furthermore, the water quality benefits achieved in the short term as a result of the current Biscayne Bay SWIM Plan and Biscayne Bay Partnership Initiative Implementation projects may be offset in the long term by the increases in nonpoint source pollution loads associated with projected population increases.

LAND USE – WATER PRESERVE AREAS, MIAMI-DADE COUNTY AND NORTH PALM BEACH COUNTY

Agriculture

Broward and Miami-Dade counties are included in this area. Although Palm Beach County is also a part of this area physiographically, agriculture issues for Palm Beach County were addressed within the Everglades Agriculture Area Region (see **Section 8-7**). In 2002, there were 6,656 acres of avocados in Miami-Dade County; acreages of other tropical fruits totaled 388 acres of limes, 809 acres of lemons, and 1,286 acres of mangoes. (See

http://www.nass.usda.gov/fl/citrus/tfat02.pdf.) Foliage production remains a major industry in Miami-Dade County. As of 2002, there were 10,550 acres of nursery, greenhouse, floriculture, Aquatic plants, mushrooms, flower seeds, vegetable seeds, and sod harvested in Miami-Dade County (UFBEBR, 2004). Approximately half of the acreage farmed in the three-region area is irrigated (UFBEBR, 1995). This region is highly dependent on the system of canals, levees and other structures for flood control in the wet season and water supply in the dry season. Providing adequate drainage and flood control to south Miami-Dade County agricultural area is a serious challenge because the farmland is directly adjacent to ENP. Evidence suggests that efforts to provide flood control to agriculture have resulted in over-drying the eastern portions of ENP adversely affecting Park ecology. Agricultural land does, however, provide a buffer between urbanization and ENP. Farmland is recognized as the preferred neighbor to natural areas because of its minimal impervious areas, open green space, and low population density.

Urban

This LEC Area supports the densest population in the State of Florida. Population in the LEC Planning Area is projected to increase by 35 percent, from 4,518,401 in 1995 to 6,825,600 (UFBEBR, 2002) in 2020. Land use is primarily related to urban activities and the infrastructure, such as transportation and utilities, needed to support this large number of people. Urban demands are forecast to increase by 39 percent by 2020. If, however, the LEC experiences a one-in-10-year drought during the planning period, then the projected urban and agricultural demand will increase by about 43 percent.

South Miami-Dade County is defined as the area south of SW 184th St. (Eureka Drive). U.S. Highway 1 bisects the area. West of U.S. 1, land uses are primarily estate and low-density residential uses within the Urban Development Boundary. Other higher density residential uses, business/office and industrial uses are found in Homestead and Florida City. The Redlands and other agricultural areas are west across the Urban Development Boundary and make up most of the approximately 55,000 acres of agricultural lands that remain in south Miami-Dade County. The Urban Expansion Area designation identifies agricultural lands in south Miami-Dade County as the next place for development.

Miami-Dade and Broward counties have the most pronounced sprawl patterns. The South Florida Regional Planning Council (SFRPC) describes the change:

> Essentially rural areas in the western extremes of Broward and Miami-Dade counties have given way to sprawling suburban residential development and shopping centers. Indeed, these have been an important component of the economic growth that has taken place in the region. During the process, the once significant rural population has virtually disappeared, resulting in the emergence of a distinctly urban character to the region. Miami-Dade County was already 94 percent urban in 1950, and 77 percent of Broward County's population lived in urban areas. By 1980, both counties were 99 percent urban. Only in Monroe County did a significant portion of the population still live outside of urban areas in 1990 (27 percent), consistent with the special characteristics of that county's political geography (SFRPC, 1996).

Palm Beach County is experiencing a similar change. The Treasure Coast Regional Planning Council (TCRPC) reports that while the coastal area of Palm Beach County, from Riveria Beach to Boca Raton is heavily urbanized, much of the recent population growth has occurred in the western unincorporated areas (TCRPC, 1996). This sprawling urbanization tended to push agricultural land uses off of prime farmlands into the less suitable wetlands fringing the coastal ridge. As the development continues to expand, it is expected that it will consume the remaining agricultural lands (both historic and recent) and eventually make its way into the remaining

unprotected wetlands of the counties. The SFRPC explains that the region, in response to the pressure of continued population growth, is likely to yield to the pressure to continue to urbanize.

Additional urban-related land uses include the Florida Power and Light nuclear power plant at Turkey Point, landfills, rock mining, the former Homestead Air Force Base site, and a number of marinas scattered throughout Biscayne Bay and Lake Worth Lagoon.

Increased Pressure on Open Land

As development continues, the availability of developable land decreases, putting pressure on the unprotected wetlands and agricultural lands. There is a fear that agricultural lands will come under increased pressure as lands are converted into subdivisions or set aside for environmental protection. South Miami-Dade County typifies this trend. As people continue to move into the county pushing the north and central regions to capacity, the remaining undeveloped areas in south Miami-Dade County become the easiest option for future growth. The 80,000 acres of agricultural lands in the Redland Region and other parts of unincorporated Miami-Dade County are increasingly under development pressure. In the 1995 Evaluation and Appraisal Report, Miami-Dade included a recommendation that a Farmland Retention Study be conducted, noting that:

> By [the Evaluation and Appraisal Report for 2000] the currently planned Urban Development Boundary will be substantially built out and the County will be facing the prospect of having to plan for the urbanization of an additional 20 square miles of land, if we continue the past trend of low-density development.

There are several other efforts to slow these land conversion and development trends including the following: Eastward Ho!, Brownfields and the South Miami-Dade U.S. 1 Corridor Project.

ELIGIBLE FFWP PROJECTS FOR THE NORTH PALM BEACH COUNTY, MAIMI-DADE AND WPA REGIONS

- CERP - North Palm Beach County Project – Part 1
- CERP - Loxahatchee National Wildlife Refuge Internal Canal Structures
- CERP - Acme Basin B Discharge
- CERP - Strazzulla Wetlands
- CERP - Palm Beach County Agricultural Reserve Reservoir – Part 1
- CERP - Site 1 Impoundment
- CERP - Broward County WPA
- CERP - Eastern C-4 Structure
- CERP - WPA Conveyance
- CERP - WCA 2B Flows to Everglades National Park
- CERP - WCA 3 Flows to Central Lake Belt Storage Area
- CERP - Broward County Secondary Canal System
- CERP - Lake Belt In-Ground Reservoir Technology Pilot
- CERP - Wastewater Reuse Technology Pilot
- CERP - Biscayne Bay Coastal Wetlands
- CERP - Bird Drive Recharge Area

- Lower East Coast Regional Water Supply Plan
- Biscayne Bay Surface Water Improvement and Management (SWIM) Plan
- Biscayne Bay Regional Restoration Coordination
- Lake Worth Lagoon Initiative
- Loxahatchee River Preservation Initiative

SECTION 8-10: SAVE OUR RIVERS PROJECTS

HISTORY

In 1981, the Florida legislature created the Save Our Rivers (SOR) program for the water management districts to acquire environmentally sensitive land. The legislation produced Section 373.59, F.S., known as the Water Management Lands Trust Fund. The trust fund receives revenues from the documentary stamp tax, which the FDEP administers. The statute enables the water management districts to use the trust fund to acquire fee title or other interest in lands needed to manage, protect and conserve the state's water resources. The act specifies an allocation formula for each district and the process by which to use the fund. P-2000, enacted by the legislature in 1990, also added land acquisition funds to the Save Our Rivers program. P-2000 created the Florida Preservation Trust Fund, which FDEP also administers.

FLORIDA FOREVER

During the 1999 session, the Florida legislature created the Florida Forever program. With the termination of Preservation 2000, the Florida Forever program provides an alternative source of funding for land acquisition and management activities, including recreation.

Acquisitions of lands for SOR projects will be accomplished in concert with other District initiatives under the Florida Forever Work Plan. Although the majority of Florida Forever expenditures will be used to purchase lands for water resource projects, such as reservoirs and stormwater treatment areas, the purchase and management of several SOR projects may be funded through Florida Forever if necessary. In FY2005, the majority of Florida Forever funds will be used to acquire land for the Kissimmee River Restoration Project. **Table 8-7** summarizes the Estimated Five-Year (FY2005–2009) District real estate expenditures for eligible SOR projects. The total estimate of $48,655,000 is projected to be expended in FY2005.

Table 8-7. Estimated five-year SFWMD real estate expenditures for SOR projects.

Project	Cost (FY2005–FY2008)
CREW	$ 4,000,000
Kissimmee River Restoration	$33,255,000
L-31 North	$ 8,400,000
Pal-Mar	$ 3,000,000
TOTAL	$48,655,000

A status of land acquisition and management activities is included in **Section 8-14** of this chapter. The 2003 Save Our Rivers Land Management Annual Report provides an update on the SOR Program and is available through the District's Website at www.sfwmd.gov; select Major Projects; select SOR.

Refer to **Section 8-13** of this chapter for the eligible FFWP projects within the SOR Program.

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SECTION 8-11: COMPREHENSIVE EVERGLADES RESTORATION PLAN (CERP) PROJECTS

The C&SF Project was authorized by Congress in 1948 and modified by subsequent acts to provide flood control, water supply, prevention of saltwater intrusion, and protection of fish and wildlife resources. The design of the project was based on forecasts that significantly underestimated the intensity of land uses and future population growth in Central and South Florida. The demands on the system's flood protection and water supply capabilities are now much greater than initially anticipated. In addition, South Florida's natural systems have been degraded by the intensity of land use and water management practices.

In 1994, a multiagency, multidisciplinary team began to reexamine and determine the feasibility of modifying the C&SF Project to restore the Everglades and the South Florida ecosystem, while providing for the other water-related needs of the region, such as urban and agricultural water supply and flood protection. This process was referred to as the Restudy. In 1999, a comprehensive plan to meet these goals was laid out in the Central and Southern Florida Project Comprehensive Review Study, Final Integrated Feasibility Report and Programmatic Environmental Impact Statement (USACE and SFWMD, 1999). The plan was approved with the signing of the Water Resources Development Act of 2000 (WRDA 2000) (Public Law 106-541). WRDA 2000 recognized the comprehensive plan, now referred to as CERP, as the framework for modifications to the C&SF Project, and requires that implementation be integrated with existing federal and state activities in accordance with WRDA 1996 (Public Law 104-303).

The goals of CERP are to restore the quantity, quality, timing and distribution of water to the Everglades ecosystem. CERP includes over 50 projects that involve either structural or operational changes to modify the C&SF Project to achieve CERP goals. The CERP projects are shown in **Figure 8-13**.

Many projects must be implemented before the hydrologic improvements necessary for ecosystem restoration can begin. The timing and distribution of water by the C&SF Project can be altered only after water storage capacity has been increased, along with any necessary water quality improvements. As each of the components to improve the timing and distribution of water are completed, it is expected that the ecosystem will begin to recover.

It is predicted that native flora and fauna, including threatened and endangered species, will rebound as a result of the restoration of hydrologic conditions. It is also predicted that the frequency of water restrictions for agricultural and urban users will be significantly reduced. The ability to sustain the region's natural resources, economy, and quality of life depends, to a great extent, on the success of the efforts to enhance, protect and better manage the region's water resources.

Refer to the CERP Annual Report, Chapter 2 of this volume, for additional information about the status of these projects. In addition, refer to **Section 8-13** of this chapter for the eligible FFWP projects within the CERP program.

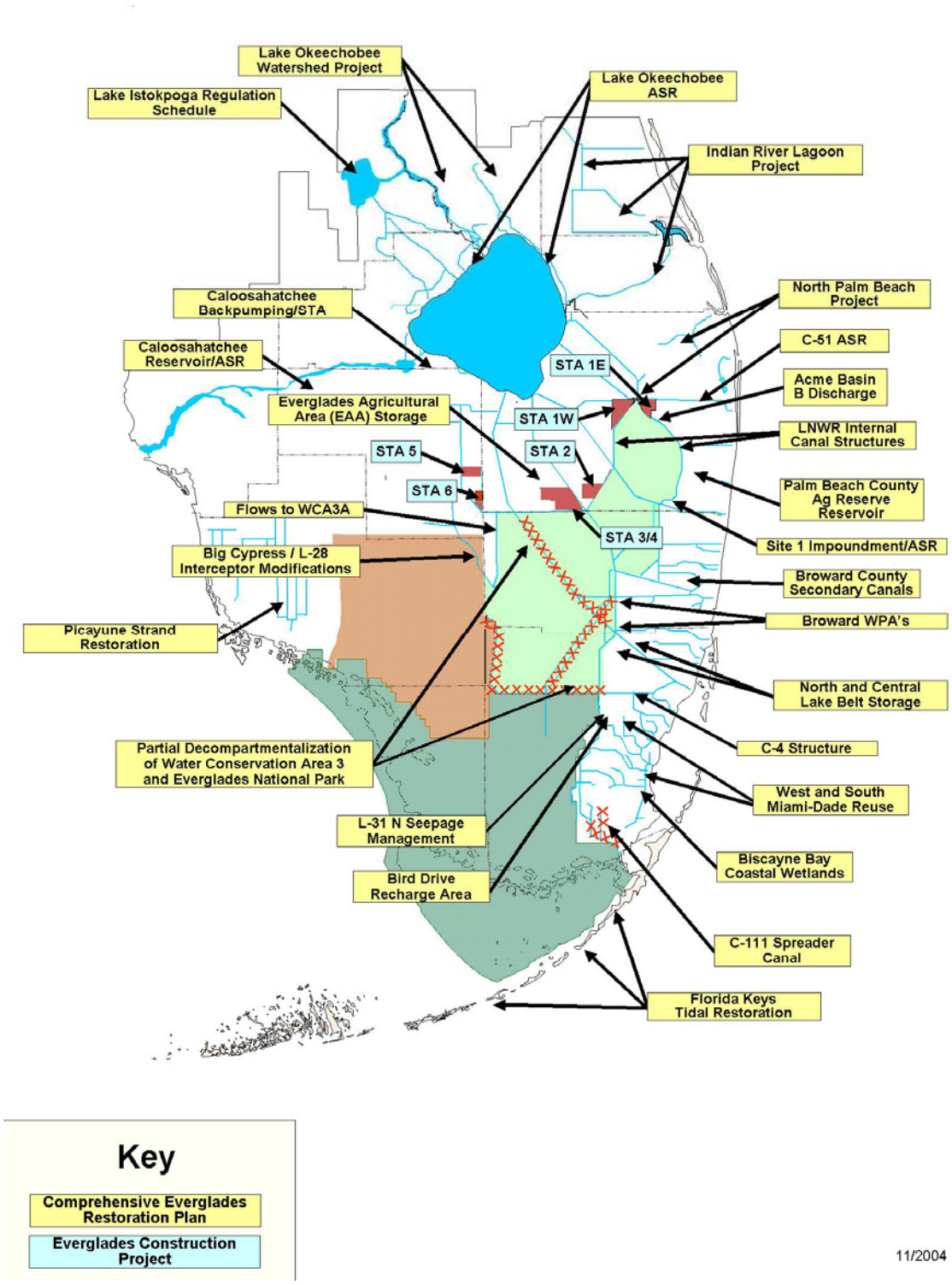

Figure 8-13. Map of the CERP projects.

FUNDING AND MANPOWER RESOURCES

Table 8-8 summarizes estimated District real estate expenditures for FY2005–2009 based on a real estate acquisition strategy developed to support the CERP implementation schedule. Only real estate costs are presented in **Table 8-8,** because during the time frame, the District anticipates the majority of Florida Forever funds will be used to support real estate acquisitions. The estimated total real estate expenditures for CERP projects in the five-year period are $1,145,721,822.

Table 8-8. Estimated five-year SFWMD real estate expenditures for CERP projects.

Project	Cost (FY2005–FY2009)
Acme Basin B	$4,380,170
Big Cypress/L-28 Modifications	$0
Bird Drive Recharge Area	$22,517,972
Biscayne Bay Wetlands	$194,179,987
Broward County Secondary Canals	$0
Broward County WPA	$13,738,230
C-111 Spreader Canal	$31,416,768
C-43 Reservoir	$43,604,390
Caloosahatchee Backpumping	$0
Central Lake Belt Storage	16,910,708
Everglades Agricultural Area Storage Reservoir, Part 2	86,536,000
Everglades National Park Seepage Management	$0
Florida Keys Tidal Restoration	$0
Indian River Lagoon	$289,202,148
Lake Okeechobee Watershed	188,529,727
LNWR Internal Canal Structures	$0
North Lake Belt Storage	$13,179,744
North Palm Beach County Project, Part 1	$211,758,115
Palm Beach County Agriculture Reserve Reservoir, Part 1	$13,763,328
Site 1 Impoundment	$85,000
Southern Golden Gate Estates	$0
Strazzulla Wetlands	$6,857,535
Wastewater Reuse Pilot	$0
WCA 3 Decompartmentalization, Part 1	$100,000
WPA Conveyance	$8,962,000
TOTAL	**$1,145,721,822**

The cost to implement the current schedule falls within the revenues expected under CERP funding legislation adopted by the legislature. This legislation proposes specific amounts from a variety of sources to fund the plan. The USACE funding for implementing the plan will be obtained through the federal budgeting and appropriations process on an annual basis and will be coordinated with what is being made available in Florida. It is anticipated that adequate

manpower resources, both at the USACE and the SFWMD, will be available at planned funding levels.

GOALS AND PERFORMANCE MEASURES

CERP projects satisfy Florida Forever goals and performance measures as outlined in **Section 8-12** of this chapter.

IMPLEMENTATION SCHEDULE

The Comprehensive Plan is conceptual in nature; consequently, any schedule that is developed from that plan will also be conceptual. When the Comprehensive Plan was sent to Congress in 1999, it contained an implementation schedule that was at the time the best professional judgment of the Implementation Plan Team as to how the plan could be implemented. In 2000, the Implementation Plan Team began to revise the schedule to take into account new information regarding the projects, the available funding, and the nature of the SFWMD-USACE working relationship.

The Implementation Plan Team released a revised implementation schedule in July 2001 known as UPDATE 1.0. UPDATE 1.0 can best be thought of as a master sequencing of the projects. Currently, based on direction from the CERP Programmatic Regulations, the Implementation Plan Team is looking at the schedule once again. Changes that are likely to affect the schedule may include, but are not limited to, changes in funding levels, changes in performance targets for some projects and changes in planned locations for some projects. The team will ultimately produce a new Master Implementation Sequencing Plan (MISP), which will lay out a series of five-year periods or bands for CERP implementation. The MISP will list which band each project is expected to be completed within. The plan will be continually monitored to ensure that the proposed dates are both realistic and are being achieved. Additional information regarding the MISP is available at http://www.evergladesplan.org/pm/misp.cfm.

SECTION 8-12: FLORIDA FOREVER GOALS AND PERFORMANCE MEASURES

INTRODUCTION

Included in this section are the Florida Forever Goals and Performance Measures that apply to both the FDEP and water management districts. When the goals and performance measures for the Florida Forever Program were developed in collaboration with the Florida Forever Advisory Council (FFAC), it was envisioned that these criteria would serve as a guide to land acquisition using Florida Forever funds. While the majority of funds expected to be received by the SFWMD will be used to acquire land for CERP or the Kissimmee River Restoration projects, final foot prints are not always available at the time land acquisition occurs. This is especially true for CERP projects, as most are in the early stages of their development and exact locations will not be available for some time. The Florida Forever Goals and Performance Measures thus provide a guide for acquisition managers as they make purchases. As land managers identify tracts for specific projects, they must, at the same time, identify which goals and performance measures the tracts satisfy. To make that process easier, **Table 8-9**, Florida Forever Goals, Performance Measures, and Projects, identifies how each of the projects satisfies one or more Florida Forever Goals and Performance Measures. In this way, as land managers acquire land for specific projects, they can all be sure that land satisfies the requirements of the Florida Forever Program.

The Goals and Performance Measures are outlined as part of Section 259.105 of the Florida Statutes.

Effect of Proposed Changes:

1. Section 259.105(4), F.S., is amended to provide new goals and performance measures for the Florida Forever programs of the FDEP and water management districts. They include:

(Goal) (a) Enhance the coordination and completion of land acquisition projects, as measured by:

1. The number of acres acquired through the state's land acquisition programs that contribute to the completion of Florida Preservation 2000 projects or projects begun before Preservation 2000;
2. The number of acres protected through the use of alternatives to fee simple acquisition; or
3. The number of shared acquisition projects among Florida Forever funding partners and partners with other funding sources, including local governments and the federal government.

(Goal) (b) Increase the protection of Florida's biodiversity at the species, natural community, and landscape levels, as measured by:

1. The number of acres acquired of significant strategic habitat conservation areas;
2. The number of acres acquired of highest priority conservation areas for Florida's rarest species;
3. The number of acres acquired of significant landscapes, landscape linkages, and conservation corridors, giving priority to completing linkages;
4. The number of acres acquired of under-represented native ecosystems;

5. The number of landscape-sized protection areas of at least 50,000 acres that exhibit a mosaic of predominantly intact or restorable natural communities established through new acquisition projects, or augmentations to previous projects; or
6. The percentage increase in the number of occurrences of endangered species, threatened species, or species of special concern on publicly managed conservation areas.

(Goal) (c) Protect, restore, and maintain the quality and natural functions of land, water, and wetland systems of the state, as measured by:

1. The number of acres of publicly owned land identified as needing restoration, acres undergoing restoration, and acres with restoration activities completed;
2. The percentage of water segments that fully meet, partially meet, or do not meet their designated uses as reported in the Department of Environmental Protection's State Water Quality Assessment 305(b) Report;
3. The percentage completion of targeted capital improvements in surface water improvement and management plans created under Section 373.453(2), F.S., regional or master stormwater management system plans, or other adopted restoration plans;
4. The number of acres acquired that protect natural floodplain functions;
5. The number of acres acquired that protect surface waters of the state;
6. The number of acres identified for acquisition to minimize damage from flooding and the percentage of those acres acquired;
7. The number of acres acquired that protect fragile coastal resources;
8. The number of acres of functional wetland systems protected;
9. The percentage of miles of critically eroding beaches contiguous with public lands that are restored or protected from further erosion;
10. The percentage of public lakes and rivers in which invasive, non-native aquatic plants are under maintenance control; or
11. The number of acres of public conservation lands in which upland invasive, exotic plants are under maintenance control.

(Goal) (d) Ensure that sufficient quantities of water are available to meet the current and future needs of natural systems and the citizens of the state, as measured by:

1. The number of acres acquired which provide retention and storage of surface water in naturally occurring storage areas, such as lakes and wetlands, consistent with the maintenance of water resources or water supplies and consistent with district water supply plans;
2. The quantity of water made available through the water resource development component of a district water supply plan for which a water management district is responsible; or
3. The number of acres acquired of groundwater recharge areas critical to springs, sinks, aquifers, other natural systems or water supply.

(Goal) (e) Increase natural resource-based public recreational and educational opportunities, as measured by:

1. The number of acres acquired that are available for natural resource-based public recreation or education;
2. The miles of trails that are available for public recreation, giving priority to those that provide significant connections including those that will assist in completing the Florida National Scenic Trail; or
3. The number of new resource-based recreation facilities, by type, made available on public land.

(Goal) (f) Preserve significant archaeological or historic sites, as measured by:

1. The increase in the number of and percentage of historic and archaeological properties listed in the Florida Master Site File or National Register of Historic Places which are protected or preserved for public use; or
2. The increase in the number and percentage of historic and archaeological properties that are in state ownership.

(Goal) (g) Increase the amount of forestland available for sustainable management of natural resources, as measured by:

1. The number of acres acquired that are available for sustainable forest management;
2. The number of acres of state owned forestland managed for economic return in accordance with current best management practices;
3. The number of acres of forestland acquired that will serve to maintain natural groundwater recharge functions; or
4. The percentage and number of acres identified for restoration actually restored by reforestation.

(Goal) (h) Increase the amount of open space available in urban areas, as measured by:

1. The percentage of local governments that participate in land acquisition programs and acquire open space in urban cores; or
2. The percentage and number of acres of purchases of open space within urban service areas.

Table 8-9. Florida Forever goals, performance measures, and projects.

Goals									Project Name
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	ID	
3		2	2	1,2,3				38	Acme Basin B Discharge (OPE)
3		5	2	1,2,3				10	Big Cypress/L-28 Interceptor Modifications (CCC)
3			2	1,2,3				43	Bird Drive Recharge Area (U)
3		7,2	1	1,2,3				28	Biscayne Bay Coastal Wetlands (FFF/ OPE)
									Biscayne Bay SWIM Plan
3		2	1	1,2,3				49	Broward County WPA Conveyance (BB, XX,P1)
3			1	1,2,3				24	Broward County Secondary Canal System (CC) (P1)
3		2	2	1,2,3				45	Broward County WPA (C-9 & C-11 Impoundments & WCA-3A & 3-B Levee Seepage Management) (O,Q)
3	3	2	1	1,2,3				29	C-111 Spreader Canal (WW) (WW)
3			2,3	1,2,3				4	C-43 Basin Storage Reservoir and ASR Part 1 (DP1)
3			2	1,2,3				5	C-43 Basin Storage Reservoir and ASR Part 2 (DP2)
3		2		1,2,3				6	Caloosahatchee Backpumping with Stormwater Treatment (DDD)
3			2	1,2,3				33	Caloosahatchee River (C-43) Basin ASR Pilot Project (Pilot)
3			2,3	1,2,3				26	Central Lake Belt Storage Area Phase 2 (SP2)
1,3	1,2,3,5	1,2,3,4,5,6,8,10,11	1,3	1,2,3					CREW
3			1,2	1,2,3				23	Diverting WCA Flows to Central Lake Belt Storage Area
3			3	1,2,3				46	East Coast Canal Structures (C-4) (T)
3		2	2,3	1,2,3				8	Everglades Agricultural Area Storage Reservoir Phase I (GP1)
3		2	2,3	1,2,3				9	Everglades Agricultural Area Storage Reservoir Phase II (GP2)
3			2	1,2,3				27	Everglades National Park Seepage Management) (V,FF)
		3							Estero Bay Watershed
		7,9							Florida Bay Restoration Initiative
3	3			1,2,3				31	Florida Keys Tidal Restoration (OPE/FK)
3	3			1,2,3				11	Flow to Northwest and Central WCA -3A (II)(RR)
1,2		2							Henscratch Ranch
3				1,2,3				93	Henderson Creek/Belle Meade Restoration (OPE)
				1,2,3				22	Hillsboro ASR Pilot (MP2)
3		1,2,4,5	1,2	1,2,3				7	Indian River Lagoon South, C-23/C-24/C-25/Northfork and Southfork Storage Reservoirs (UU), and C-44 Basin Storage Reservoir (B)
									Indian River Lagoon SWIM
		3							Kissimmee Basin Minimum Flows and Levels Development
1,2		1,4							Kissimmee River (Lower Basin)
1,2		1,4							Kissimmee River (Upper Basin)
1,2		2,10							Kissimmee River Chain of Lakes Long-Term Management Plan
		2,3							Kissimmee River Water Supply Plan Development & Coordination
1,2		1,4							Kissimmee River Restoration and Evaluation
1,2		1,4							Kissimmee River Restoration Project
3			2	1,2,3				36	L-31 N Seepage Management Pilot Project (Pilot)
3			1,2	1,2,3				35	Lake Belt In-Ground Reservoir Technology - Pilot Project (Pilot)
		3							Lake Istokpoga

Goals									Project Name
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	ID	
3				1,2,3				2	Lake Istokpoga Regulation Schedule (OPE)
3			1,2	1,2,3				32	Lake Okeechobee Aquifer Storage and Recovery Pilot Project (Pilot)
3			2	1,2,3				3	Lake Okeechobee ASR (GG P1, GGP2,GGP3)
3				1,2,3				1	Lake Okeechobee Regulation Schedule
		1							Lake Okeechobee SWIM Plan
3		1,2,4,5	1,2	1,2,3				1	Lake Okeechobee Watershed (A) OPE (LOTSD) (W)
		3,7							Lake Worth Lagoon Initiative
				1,2,3				94	Lakes Park Restoration (OPE)
3	3			1,2,3				14	Loxahatchee National Wildlife Refuge Internal Canal Structures (KK)
		4		2					Loxahatchee Preservation Initiative
		11		1,2,3				95	Melaleuca Eradication Project and other Exotic Plants
3				1,2,3				90	Miccosukee Tribe Water Management Plan (OPE)
3				1,2,3				15	Modified Holeyland Wildlife Management Area Operation Plan (DD)
3				1,2,3				16	Modified Rotenberger Wildlife Management Area Operation Plan (EE)
		3							Naples Bay Initiative
3			2,3	1,2,3				25	North Lake Belt Storage Area (Phase I & II) (XXP2)
3		1,2,4,5	1,3	1,2,3				17	North Palm Beach County Part 1 ((OPE)(PAL-Mar)(KP1,GGG) OPE (LWL) (X,Y)
3			2	1,2,3				18	North Palm Beach County Part 2 (LL,KP2)
			2						Okeechobee County
1,3	3	11							Pal Mar (West Jupiter Wetlands)
3		2	2,3	1,2,3				20,21	Palm Beach County Agricultural Reserve Reservoir and ASR (WP1) (WP2)
3	1			1,2,3				39	Protect and Enhance Existing Wetland Systems along LNWR (Strazzulla Tract) (OPE)
1		8,11		1					Reedy Creek
				1,2,3				92	Restoration of Pineland and Hardwood Hammocks in C-111 Basin
3				1,2,3				96	Seminole Tribe Big Cypress Water Conservation Plan (OPE)
3			1,2	1,2,3				34	Site 1 Impoundment and Aquifer Storage and Recovery (Pilot)
3		2	2,3	1,2,3				40	Site 1 Impoundment and Aquifer Storage and Recovery (MP1)
3			2	1,2,3				98	South Miami-Dade County Reuse (BBB)
									St. Lucie River Issue Team
3		1,4,6	2	1,2,3				30	Picayune Strand Restoration (OPE)
3			2	1,2,3				37	Wastewater Reuse Technology Pilot Project (Pilot)
				1,2,3				48	WCA - 2B Flows to ENP (YY, SP1)
2				1,2,3				47	WCA - 3A & - 3B Flows to CLBSA (ZZ)
3	3			1,2,3				12,13	WCA -3 Decompartmentalization and Sheetflow Enhancement (QQP1, SSP2, SSP1,AA) (QQP 2) WCA Conveyance
			2						WCA Conveyance
3			2	1,2,3				97	West Miami-Dade County Reuse (HHH)
				1,2,3				91	Winsburg Farms Wetland Restoration (OPE)
		2							Western Basin

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SECTION 8-13: CURRENT FLORIDA FOREVER ELIGIBLE PROJECTS

INTRODUCTION

The purpose of the Florida Forever Work Plan is to present projects eligible for funding under the Florida Forever Act (Section 259.105, F.S.). The SFWMD 2005 Florida Forever Work Plan lists and describes 60 projects eligible for Florida Forever funding in the FY2005–2009 period. The list of eligible projects includes CERP projects, SOR projects, and water quality and supply initiatives, plans and studies.

ELIGIBLE COMPREHENSIVE EVERGLADES RESTORATION PLAN PROJECTS

Information for the Comprehensive Everglades Restoration Plan (CERP) projects is included in the Project Management Plan for each project. Current approved versions of all CERP PMPs, as well as in progress drafts are made available at www.evergladesplan.org/. The following list summarizes all eligible CERP projects:

Full-Scale Projects

- Acme Basin B Discharge
- Big Cypress/L-28 Modifications
- Bird Drive Recharge Area
- Biscayne Bay Coastal Wetlands
- Broward County Secondary Canal System
- Broward County Water Preserve Areas (WPA)
- C-43 Basin Storage Reservoir
- C-111 Spreader Canal
- Caloosahatchee Backpump and Stormwater Treatment
- Everglades Agricultural Area Storage Reservoir, Parts 1 and 2
- Everglades National Park Seepage Management
- Florida Keys Tidal Restoration
- Flow to NW and Central WCA-3A
- Indian River Lagoon – South
- Lake Okeechobee Watershed
- Loxahatchee National Wildlife Refuge Internal Canal Structures
- North Palm Beach County, Part 1
- Palm Beach County Agricultural Reserve Reservoir, Part 1
- Site 1 Impoundment
- Picayune Strand Restoration (formerly known as Southern Golden Gates Estates)
- Strazzulla Wetlands
- WCA-3A/3B Decompartmentalization and Sheetflow Enhancement, Part 1
- WCA-2B Flows to Everglades National Park (ENP)

- WPA Conveyance

Pilot Projects

- Lake Okeechobee ASR Pilot
- Lake Belt In-Ground Reservoir Pilot
- Caloosahatchee ASR Pilot
- Hillsboro ASR Pilot
- L-31N Seepage Management Pilot
- Wastewater Reuse Pilot

ELIGIBLE KISSIMMEE REGION PROJECTS

Information on the Kissimmee Region is included in Chapter 3 of this volume. The following list summarizes all eligible projects within the region:

- Kissimmee Basin Water Supply Plan Development and Coordination
- Kissimmee Basin Minimum Flows and Levels (MFLs) Study
- Kissimmee Chain of Lakes Long-Term Management Plan
- Kissimmee River Restoration Evaluation
- Kissimmee River Restoration Project

ELIGIBLE SAVE OUR RIVERS PROJECTS

Descriptions of the eligible Save Our Rivers Projects are provided in **Section 8-10**. Additional information and project maps can be obtained from the Save Our Rivers Land Acquisition & Management Plan, available at www.sfwmd.gov; select Major Projects; select SOR.

- CREW
- C-111/L-31N
- Henscratch Ranch
- Kissimmee River (Lower Basin)
- Kissimmee River (Upper Basin)
- Lake Marion Creek
- Pal-Mar (West Jupiter Wetlands)
- Reedy Creek

OTHER ELIGIBLE WATER RESOURCE PROJECTS

- Biscayne Bay Regional Restoration Coordination
- Biscayne Bay SWIM Plan
- Caloosahatchee River Watershed Initiatives
- Charlotte Harbor Watershed Initiatives
- Estero Bay Watershed
- Florida Bay Initiative
- Four Corners

- Indian River Lagoon (IRL) SWIM Plan
- Lake Istokpoga
- Lake Okeechobee SWIM Plan
- Lake Worth Lagoon Initiative
- Lower East Coast Water Supply Plan
- Loxahatchee Preservation Initiative
- Naples Bay Initiative
- Okeechobee County
- St. Lucie River Issue Team
- Western Basin

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SECTION 8-14: LAND ACQUISITION AND MANAGEMENT

LAND ACQUISITION ACTIVITY REPORT

The SFWMD land acquisition activity for the fiscal year of October 1, 2003 through September 30, 2004 (FY2004), culminated with the purchase of 12,935 acres of land for a total cost of $100.6 million. The acquisitions were funded by the state's Conservation and Recreation Lands (CARL) Program, Florida Forever Program (Save Our Everglades Trust Fund), Save Our Rivers Program (Land Acquisition Trust Fund, Water Management Lands Trust Fund, and P-2000), and other funds provided by the District, federal, state and local governments.

2004 Land Acquisition Highlights

- $73.7 million used to purchase 7,917 acres for CERP Projects
- $539,000 used to acquire 40 acres for the Kissimmee River Restoration Project
- $26.4 million used to purchase 4,978 acres for SOR Projects
- Over $3.55 million of mitigation funding was used to acquire SOR lands
- Local governments contributed $699,270 for acquisition of lands
- Federal government contributed $6.6 million for acquisition of lands
- SFWMD funded $808,868 in land acquisitions
- $66.9 million funded through the state's Florida Forever Program
- $21 million funded through the state's SOR Program

Lands acquired for CERP will be used to provide enhanced water quality, quantity, timing and distribution. The 4,749 acres of land acquired for the Indian River Lagoon–South project will be used for the C-23/C-24 South Reservoir and STA, and the Allapattah Complex. The 135 acres acquired for the Broward County Water Preserve Area (WPA) project will be used for construction of the C-11 Impoundment and the WCA-3A/3B Levee Seepage Management Area. Slightly more than 83 percent of the land required for the Broward County WPA project has been acquired. In addition, 2,730 acres were acquired for the Taylor Creek/Nubbin Slough Storage Treatment Area component of the Lake Okeechobee Watershed project. The District continues its acquisition program in Miami-Dade County, acquiring 50 acres for the Biscayne Bay Coastal Wetlands project and 194 acres for the Bird Drive Recharge Area project.

In December, the District reached the halfway mark in acquiring lands for CERP. The acres acquired in FY2004 increased the total lands available for use by CERP projects to 206,109 acres, representing 53 percent of the estimated land needed for CERP projects.

In addition to acquiring lands, the District surplused 541 acres of the northern portion of the Berry Groves acquisition in exchange for 600 acres of the Paul property to the south. The exchange represents a continuation of land acquisitions for the C-43 Basin Storage Reservoir CERP project. The exchange provided the benefits of realigning and squaring-off the acquisition boundary of the reservoir, reducing construction costs, and avoiding costs associated with relocating utilities in place.

A key acquisition for the SOR program was the 2,286-acre Pal Mar-Hartsel Ranch purchase of lands containing some of the highest quality marshes and wet pine flatwoods in South Florida. In addition, the District acquired a conservation easement of over 124 acres of land owned by Osceola County in the Shingle Creek SOR project.

The land acquisitions gained by the District in FY2004 were possible only through support provided by local, state and federal governments; state and federal agencies; and the general public. The following table, **Table 8-10**, provides additional details regarding the lands acquired, by project and funding source.

Table 8-10. Acquisition activity report (Fiscal Year 2004).

LAND ACQUISITIONS (01-OCT- 2003 THROUGH 30-SEP-2004)														
Project Names	**Parcel**	**Acres**	**Price**	**CARL**	**DISTRICT**	**FEDERAL**	**STATE**	**Local Gov't**	**MITIGATION**	**P- 2000**	**WMLTF/LATF**	**FL Forever**	**SOETF**	**TOTALS**
Broward County WPA (CERP)	0	0	$0											**$0**
C-11 Impoundment	1	113	$19,000,000			$5,900,813.00							$13,099,187	**$19,000,000**
WCA 3A & 3B Seepage Management	7	22	$865,250									$419,250	$446,000	**$865,250**
Bird Drive Recharge Area (CERP)	132	194	$6,770,113		$792,668								$5,977,445	**$6,770,113**
Biscayne Bay Coastal Wetlands (CERP)	6	50	$1,171,625				$84,700						$1,086,925	**$1,171,625**
C-4 Emergency Detention	2	20	$1,260,000			$630,000	$630,000							**$1,260,000**
Central Lake Belt Storage Reservoir - Part I	2	27	$681,300										$681,300	**$681,300**
Corkscrew Regional Ecosystem Watershed (CREW)	0	0	$0											**$0**
Critical CREW	12	75	$955,155	$264,000.00		$83,500				$190,438		$417,217		**$955,155**
Flint Pen Strand	12	75	$259,500						$259,500					**$259,500**
Everglades Agricultural Area	1	10	$40,000							$40,000				**$40,000**
East Coast Buffer/WPAs	0	0	$0											**$0**
Pennsucco Wetlands	2	1,289	$20,339,932						$2,000,000	$18,339,932				**$20,339,932**
Faka Union*	4	1	$16,200		$16,200									**$16,200**
Indian River Lagoon - South (CERP)	0	0	$0											**$0**
Allapattah	2	961	$2,835,304										$2,835,304	**$2,835,304**
C-23/24 South Reservoir	4	1,430	$9,407,662										$9,407,662	**$9,407,662**
C-23/24 STA	9	2,358	$22,604,540										$22,604,540	**$22,604,540**
Kissimmee River Restoration (KRR)	0	0	$0											**$0**
Kissimmee River (KR)	10	40	$539,000							$39,400		$499,600		**$539,000**
L-31N	5	55	$335,000									$335,000		**$335,000**
Lake Okeechobee Watershed (CERP)	0	0	$0											**$0**
Taylor Creek/Nubbin Slough Storage Treatment Area	2	2,730	$8,522,260										$8,522,260	**$8,522,260**
PBC Agricultural Reserve Reservoir - Part 1	2	13	$555,000										$555,000	**$555,000**
Pal Mar- Hartsel Ranch	1,182	2,286	$3,020,250					$699,270		$1,151,888	$1,169,092			**$3,020,250**
Shingle Creek **	3	127	$1,296,400						$1,296,400					**$1,296,400**
Stormwater Treatment Area***	1	82	$0											**$0**
Water Conservation Area	7	980	$98,000							$94,588	$3,412			**$98,000**
Totals	**1408**	**12,935**	**$100,572,491**	**$264,000**	**$808,868**	**$6,614,313**	**$714,700**	**$699,270**	**$3,555,900**	**$19,856,246**	**$1,172,504**	**$1,671,067**	**$65,215,623**	**$100,572,491**

*Includes $11,200 ad valorem from Big Cypress Basin.

**Includes a conservation easement acquired over 124 acres of land owned by Osceola County.

***Donation

LAND STEWARDSHIP ACTIVITY REPORT

Background and History

The SOR program began in 1981 with the legislative enactment of the Water Management Lands Trust Fund, Chapter 373.59, F.S., which enabled the five water management districts to buy lands needed for water management, water supply, and the conservation and protection of water resources, and to make them available for appropriate public use. Since that time the SFWMD and its acquisition partners have purchased 375,463 acres of environmentally sensitive land (not including 800,000 acres in the three water conservation areas). Water resource projects, or those lands associated with CERP consisting largely of impacted agricultural lands, have added another 206,109 acres.

Land Stewardship Program Operational Structure

The Land Stewardship Program is responsible for the planning and management of SOR lands and the implementation and administration of mitigation banks and regional offsite mitigation areas. The program has direct management responsibility for 177,000 acres in 13 projects, including two mitigation banks and several regional mitigation areas. For the 133,000 acres of non-District-managed lands, contracts, agreements or leases have been entered into with other agencies or local governments.

The major goals of the program are to restore the lands to their natural state and condition, manage them in an environmentally acceptable manner, and provide public recreational opportunities that are compatible with natural resources protection. The program is implemented by a professional staff of 27 based in five service centers and at District headquarters in West Palm Beach.

Land Stewardship Program

Program Objectives

- Complete/update management plans for all projects
- Control invasive exotics
- Restore natural fire regime
- Restore native communities
- Employ multiple-use practices
- Open lands for appropriate public use
- Implement two mitigation banks and offsite mitigation per permit conditions

Program Finances

Since its inception in the early 1980s, the Land Stewardship Program has been funded by a variety of sources. District *ad valorem* taxes have not been utilized for management since 1989. The principal source of management funding has been the Water Management Lands Trust Fund, which utilizes a portion of the state's documentary tax revenue to pay for land management activities. The fund reimburses actual expenditures based on quarterly invoices to the FDEP, which administers the fund. Appropriate expenditures are identified in the District's annual budget and approved by the governing board by a resolution to the FDEP. Since 2000, use of these funds has been limited to land management costs or retirement of the District's land acquisition bonds.

Other funding sources include offsite mitigation, lease revenues and grants. Offsite mitigation funds are collected as a result of conditions placed on Environmental Resource Management Permits and approved by the governing board for authorized regional mitigation activities. These funds must be spent strictly in accordance with the permit requirements for land acquisition, restoration and general maintenance of the mitigation lands. This form of mitigation allows the District to direct mitigation dollars where they benefit the South Florida ecosystem. Land Stewardship Program staff obtained several grants to fund specific restoration projects on District lands. Low-intensity cattle leases generate modest lease revenues, but may also require substantial in-kind services from the lessee. Additional in-kind services are provided by state and local governments, as well as numerous recreational groups and individual volunteers.

Management activities for FY2004 occurred on 557,460 acres of land at an estimated total cost of $8.5 million or unit cost of $15/acre.

OPERATION AND MAINTENANCE OF LAND RESOURCES

Chapter 373.59, F.S., the originating legislation of the SOR program, states that lands acquired through this program "shall be managed and maintained in an environmentally acceptable manner and, to the extent practicable, in such a way as to restore and protect their natural state and condition." Major components of the Land Stewardship Program are detailed below.

Hydrologic/Habitat Restoration

A major thrust of the Land Stewardship Program is to protect and restore the flow-ways, watersheds and wetlands, all of which are critical to the water resources of the District. Hydrologic restoration has been accomplished through numerous SOR projects, which include installing earthen ditch plugs to re-hydrate isolated wetlands, constructing at-grade road crossings to restore sheetflow, and constructing levees and water control structures to re-flood former Everglades marsh. Upland restoration efforts include timber thinning and chopping for the planned reintroduction of endangered red-cockaded woodpeckers, pine plantings to return pasture to pine flatwoods, and the creation of hardwood hammock and forested wetlands in the southern Everglades.

Exotic Plant Control

The District is committed to reducing the proliferation of exotic plant infestations and eradicating the problem where possible. Exotic control consists of the proper application of various environmentally acceptable chemical herbicides combined with mechanical techniques performed by staff or private contractors. Cooperators who manage District lands under contract or lease are strongly encouraged to apply a similarly aggressive approach to exotic plant control. Exotic control is consistently the single largest item in the Land Stewardship Program annual budget.

Prescribed Burning

Periodic fire is a natural element of native Florida ecosystems. The District uses prescribed burning to reduce hazardous buildup of vegetative fuel loads, enhance wildlife habitat, and encourage restoration of native plant communities. The District burns its lands to simulate natural fire cycles, which benefits native plant communities. The goal is to conduct at least 50 percent of prescribed burns during the growing season to mimic the natural occurrence of lightning season fires. The fire management program is based on ecological research and proven safety standards and requires trained and experienced staff familiar with the diverse and unique fire management needs of the Florida landscape.

Public Use and Environmental Education

The District encourages use of its lands for appropriate outdoor recreational activities. All SOR lands are available for public use, except in rare instances where there is no legal public access or where contract or lease restrictions prohibit the public. The vast majority are managed as semi-wilderness areas, with very limited vehicular access other than off-road parking. Recreational opportunities include hiking, primitive camping, canoeing, fishing, and horseback riding, with volunteers from various user groups maintaining the trails and wilderness campsites. Cooperative agreements with the FWC enable high-quality, low-impact hunting on nearly 160,000 acres. Acquisition and management partners from several counties have constructed environmental education centers, boardwalks, and interpretive trails – all at no cost to the District – that are used by thousands of school children and adults annually.

Mitigation

Under Chapter 373, F.S., the District is authorized to participate in and encourage the development of private and public mitigation banks and regional offsite mitigation areas. Furthermore, the state's mitigation banking rule, Chapter 62-342, F.A.C., encourages each water management district to establish two mitigation banks. The use of mitigation and mitigation banking offers opportunities to generate revenue that will supplement funding of the District's land acquisition, restoration and management programs.

SFWMD's mitigation bank sites include the Loxahatchee Mitigation Bank in Palm Beach County and the Corkscrew Regional Mitigation Bank in Lee County. The District is developing each bank in a public/private contractual agreement. Private bankers obtain permits, restore the land, reimburse the District for its land acquisition and staff costs, and then generate a revenue stream for future projects. As of late 2004, the Loxahatchee Mitigation Bank is completing its second year of monitoring towards attainment of the success criteria, and in May 2004 the first revenue disbursement, amounting to $205,000, was provided by TetraTech, FW to the SFWMD. This will be utilized to offset previous land acquisition costs associated with the project. In 2004, the Corkscrew Regional Mitigation Bank obtained its mitigation bank permits and filed the conservation easement.

PROJECT SUMMARIES

A brief description of each SOR project, organized by land management region, and maps of the five management regions are provided below. **Tables 8-11** and **8-12** describe land acquisition status and public use opportunities, respectively.

UPPER LAKES LAND MANAGEMENT REGION, ORLANDO SERVICE CENTER

Kissimmee Chain of Lakes (District managed)

- County: Osceola/Polk
- Project size: 36,763 acres
- District ownership: 34,981 acres
- Acquisition partners: None

A management plan for the Kissimmee Chain of Lakes (KCOL) was completed in August 2003. Acquisition of the project was designed to provide the capacity to store and flow water up to the 54-foot NGVD contour line. Resource management goals for the KCOL are to maintain and, where possible, restore natural communities, provide cost-effective resource protection, and provide opportunities for compatible public use. In FY2004, approximately 15,000 acres were treated for exotic plants. Staff also mowed 3,000 acres of semi-improved pasture to reduce nuisance native and exotic plants and to improve the conditions of the altered wet prairie communities on Gardner-Cobb Marsh, Lightsey Units, Catfish Creek, and East Shoreline. Approximately 8,000 acres were burned utilizing prescribed fire.

Lake Marion Creek (District managed)

- County: Polk
- Project size: 17,300 acres
- District ownership: 7,067 acres
- Acquisition partners: Polk County, Southwest Florida Water Management District (SWFWMD), United States Fish and Wildlife Service (USFWS)

Lake Marion Creek, in Polk County, flows from Lake Marion to Lake Hatchineha. Contained within the project are scrub, sand hills, pine flatwoods, and riverine swamp forests. The majority of the property is open for hiking year-round, and camping and biking are available by Special Use License. Lands in this project have been acquired with assistance from Polk County, the SWFWMD, and the USFWS. Primary stewardship activities include prescribed burning, exotic plant control, resource protection, and public use. FWC participates as a cooperative management partner by conducting a hunt program and security patrols. The area is managed as a Type 1 Wildlife Management Area.

In 2003, approximately 300 acres of scrub were purchased with offsite mitigation funds to preserve sand skink habitat, and additional scrub may be added in 2005. In 2004, 1,050 acres were burned, and exotic treatment of 100 acres of lygodium and cogon grass occurred. Scrub jay and sand skink surveys were completed in 2004 by private contractors. SFWMD executed a cooperative agreement with the Nature Conservancy in 2004 to monitor scrub jays. The management plan will be updated in 2005.

SUMICA, formerly known as Lake Walk-in-Water (managed by Polk County)

- County: Polk
- Project size: 4,009 acres
- District ownership: 4,009 acres
- Acquisition partners: Polk County

SUMICA, formerly known as Lake Walk-in-Water, is named after the historic logging town that existed on the site in the 1920s. Current public uses include hiking and primitive camping; future plans include hunting and horseback riding. Polk County participated as a 50 percent acquisition partner under its Environmental Lands Program, and is also lead manager. A five-year management plan was prepared by the county and approved by the SFWMD. In 2003, Polk County provided spot treatment of 2 acres of exotics and burned 800 acres. In 2004, with the assistance of a Florida Recreation Development Assistance Program grant, the county constructed a parking lot on SR 60 to provide public access into the project. Also constructed under this arrangement was an elevated walking trail to access the old elevated railroad tram and observation area. Two special opportunity hog hunts were also conducted in 2004.

Reedy Creek (District managed)

- County: Osceola
- Project size: 30,000 acres
- District ownership: 5,483 acres
- Acquisition partners: None

For management purposes, the Reedy Creek project is divided into Upper and Lower Reedy Creek. The Upper Reedy Creek Management Area includes those lands north of Pleasant Hill Road and is approximately 4,800 acres. The Lower Reedy Creek Management Area encompasses seven miles of creek corridor and totals 5,483 acres under District ownership. Management goals for both areas are to conserve and protect water resources and supplies, protect and restore the land in its natural state and condition, and provide compatible public use opportunities. FWC has identified the area of Lower Reedy Creek as a "Strategic Habitat Conservation Area," a "Biodiversity Hotspot," and a "Priority Wetland for Listed Species." These designations make the area a priority for preservation based on known occurrences of rare or listed species.

The Lake Russell Management Unit in Poinciana is jointly managed by Osceola County Schools as an environmental education facility. A center with classrooms and displays provides interpretation to the scrub, Lake Russell, and the floodplain swamp communities that exist on site. An interpretive hiking trail describes the unique plant communities and wildlife that exist in the scrub habitat of the site.

District staff burned 4,800 acres in 2004 and more than 5,483 acres were treated for control of exotic vegetation. There are two cattle leases and grazing reservations within the Reedy Creek Management Area.

Shingle Creek (District managed)

- County: Orange/Osceola
- Project size: 7,655 acres
- District ownership: 1,457 acres (includes conservation easement of 124 acres)
- Acquisition partners: Mitigation

The District has undertaken several successful restoration projects within Shingle Creek Swamp, which were funded as mitigation to offset wetland impacts associated with construction of the Orlando Beltway. In 2004, 200 acres were prescribe-burned, and the entire 1,457 acres were surveyed and spot-treated for exotic vegetation. The Marriott development in the northwest corner of the project has constructed a parking area and boardwalk/trail that leads to District-owned lands. Construction of a boardwalk to connect the Marriott boardwalk with other District lands is planned for 2004. Also in 2004, SFWMD staff worked on securing two separate public access points that will be available to the public in 2005. Construction of the pedestrian walkway to Hunter's Creek Middle School to the Shingle Creek management area is currently under construction.

Tibet Butler Preserve (managed by Orange County)

- County: Orange
- Project size: 439 acres
- District ownership: 439 acres
- Acquisition partners: None

The Preserve covers 439 acres and approximately 4,000 feet of shoreline along the southwest shore of Lake Tibet Butler in Orange County. Vegetative communities include bay swamp, pine flatwoods, cypress swamp, and smaller areas of xeric oak and freshwater marsh. Orange County Parks and Recreation Department manages Tibet Butler Preserve as an environmental education facility. A large enclosed education center with classrooms was constructed in 1994. It has a full-time staff, which conducts programs for thousands of students each year.

Land managers treat exotic vegetation and maintain the system of hiking trails and boardwalks that lead to the many community types on the property. Exotic control is limited due to the small number present on the site. The property is open for public use.

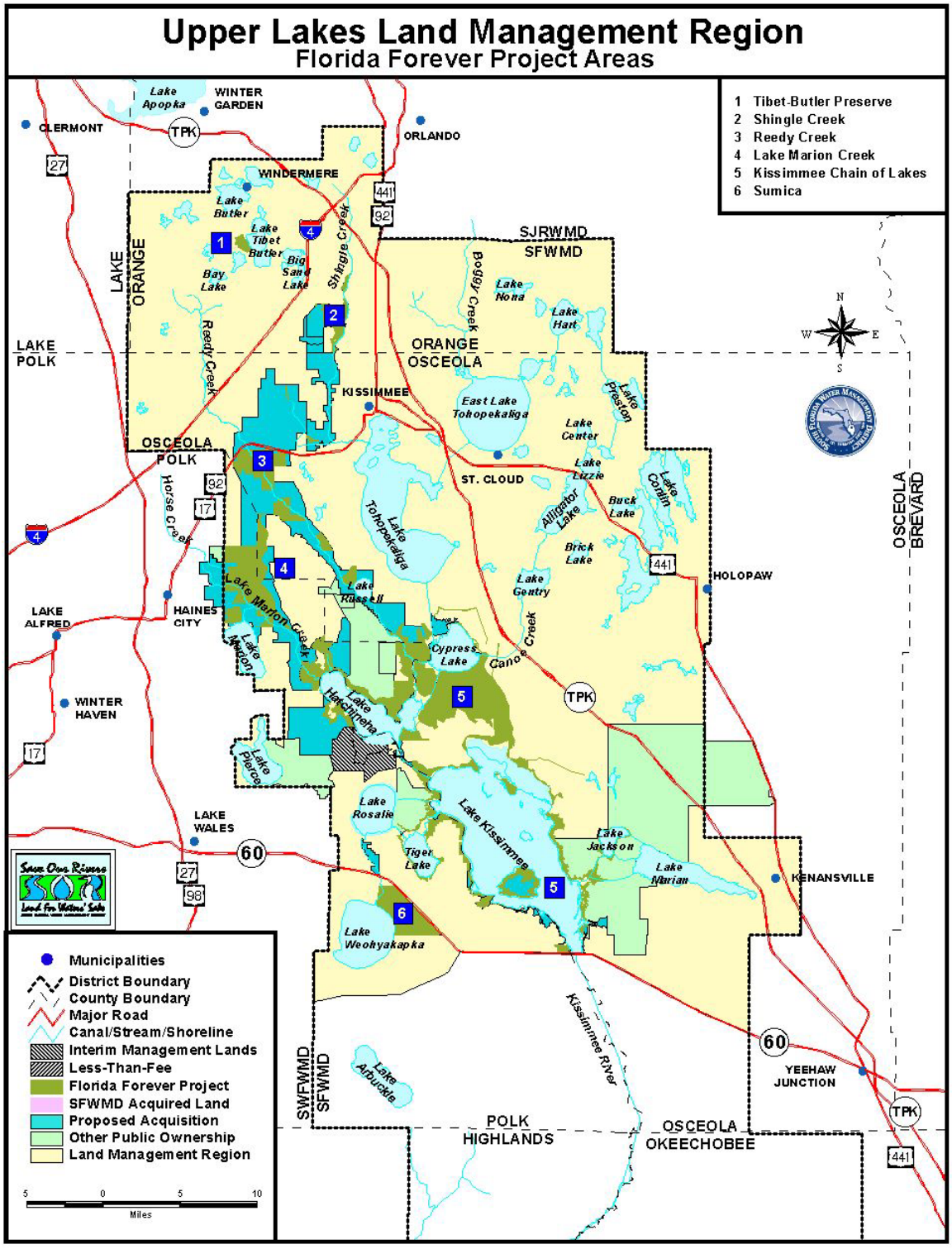

Figure 8-14. Upper Lakes Land Management Region.

KISSIMMEE/OKEECHOBEE LAND MANAGEMENT REGION, OKEECHOBEE SERVICE CENTER

Kissimmee Prairie Ecosystem (managed by FDEP)

- County: Okeechobee
- Project size: 38,282 acres
- District ownership: 38,282 acres
- Acquisition partners: CARL

The project is managed by the FDEP, Division of Recreation and Parks under lease from the District and state, and is known as Kissimmee Prairie Preserve State Park. Recreational uses include hiking, bicycling, camping and horseback riding. A state-approved management plan is in place that addresses prescribed burning, exotic control, and public use. SFWMD obtained a federal grant to restore hydrology to a major slough on the property. During 2004, fifty-nine wild hogs were removed from the river floodplain and river hammock. In this same area exotic treatment of 10 acres of air potato, 10 acres of cogon grass, and 5 acres of Brazilian pepper also occurred.

Kissimmee River (managed by District/FWC)

- County: Osceola/Polk/Highlands/Okeechobee
- Project size: 68,332 acres
- District ownership: 52,023 acres
- Acquisition partners: None

The District shares management responsibility with FWC in Pools A, C, D and E, and in Paradise Run. District-owned marshes along the river are open below the "No Airboating Beyond This Point" signs and are included in FWC's Kissimmee River Public Use Area, which is open to hunting under FWC regulations. The established "no airboat zone" provides an airboat-free zone on an average 200-yard margin along both edges of the river floodplain to accommodate recreational users and wildlife. Recently completed river restoration efforts in Pool C provide excellent opportunities for canoeing, fishing and camping on District-owned lands along the river. Several subunits of the Kissimmee River Management Area, including the Kissimmee Island Cattle Company (KICCO) and Hickory Hammock Wildlife Management Areas, are open for equestrian and bicycle use, and contain portions of the Florida National Scenic Trail. A 1,000-foot-long boardwalk was built in the Bluff Hammock portion of the trail by the Florida Trail Association and the District. Two new campgrounds with pavilions were built; one at Blanket Bay Slough (on the east side of Pool A) and the other at Starvation Slough (on the east side of the old Pool C) both with labor provided by the Florida Sportsmen's Association, and one with help from the Boy Scouts of America. A third campground for equestrian use is under development at Hickory Hammock.

A management plan for Pools C and D was completed in 2002. Approximately 13 miles of the Kissimmee River in Pool C has been restored by backfilling the C-38 canal. Management actions in Pool C can proceed with long-term goals in mind now that backfilling is complete. Management actions in Pool D are interim in nature until backfilling is complete in this area. Management activities in Pools C and D include prescribed burning of both upland and riparian areas. Exotic plant control takes place both above and below the 100-year flood line on these and all District lands. In the time period between October 1, 2003 and September 30, 2004, 800 acres

were prescribed burned and 2,100 acres were treated for control of exotic vegetation. Several cattle leases were renewed within the Kissimmee River Management Area.

Paradise Run (District managed)

- County: Glades
- Project size: 4,265 acres
- District ownership: 3,328 acres
- Acquisition partners: None

The project lies west of Canal-38, between the S-65E structure and Lake Okeechobee. Unlike the other pools of the Kissimmee River, Level II backfilling (river restoration) will not re-flood Paradise Run, since it is controlled by the stage in Lake Okeechobee. Remnant river oxbows are still present, although the surrounding land has been drained and is now improved pasture. Paradise Run is open for public use including hunting, under FWC's Public Use Area concept. There are two cattle leases in Paradise Run. In the past year, 200 acres were treated for exotic plant control. This property is slated for hydrological restoration under the Lake Okeechobee Program.

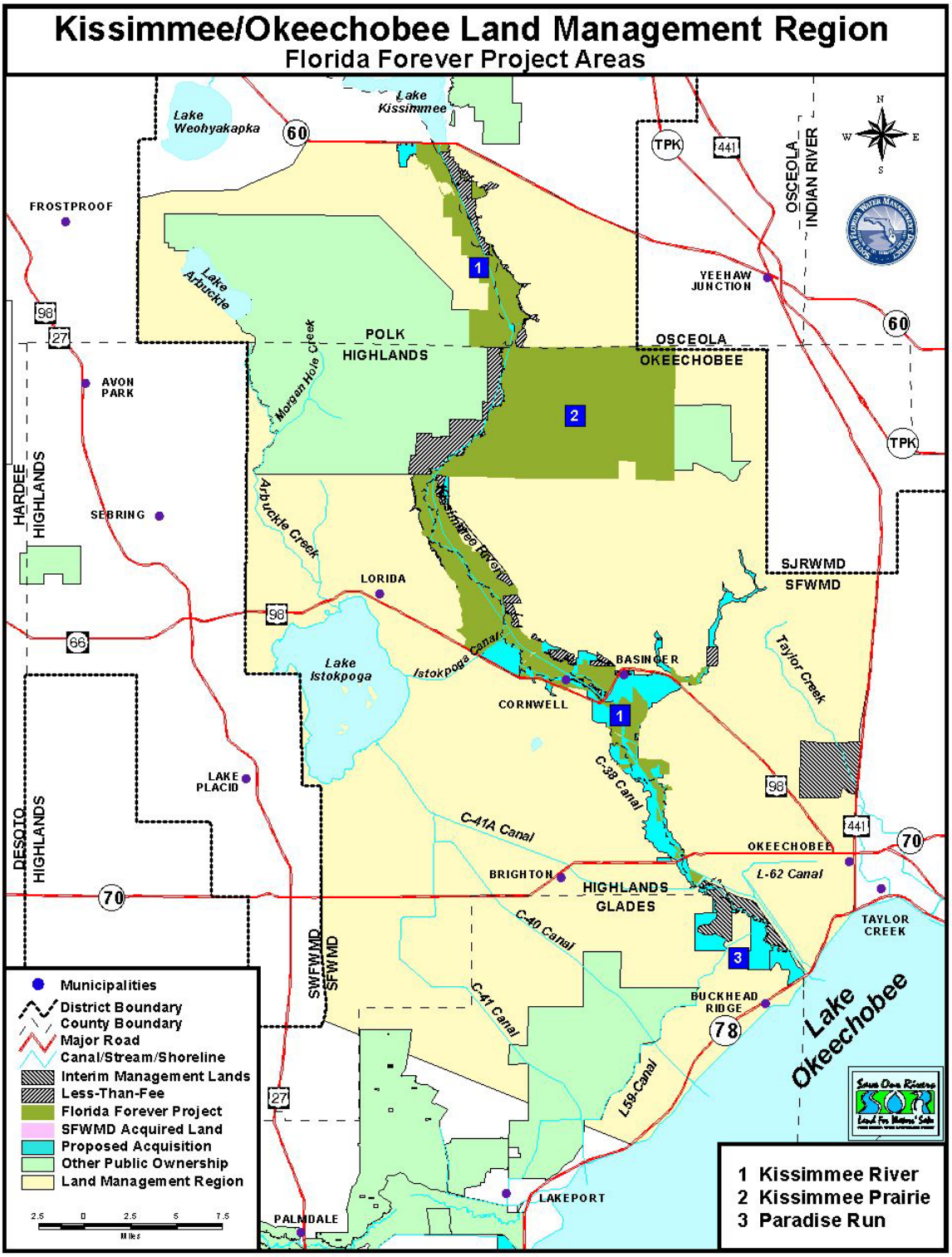

Figure 8-15. Kissimmee/Okeechobee Land Management Region.

EAST COAST LAND MANAGEMENT REGION, WEST PALM BEACH/DUPUIS

Allapattah Flats (District managed)

- County: Martin
- Project size: 22,560 acres
- District ownership: 21,407 acres
- Acquisition partners: Martin County, Federal Government

Allapattah was purchased as part of the Indian River Lagoon Initiative of CERP, with funding assistance from Martin County and the federal government. Public ownership increased in 2004 with the acquisition of 961 acres in the southwest corner of the project. It is proposed that the ditches and swales that were excavated to drain and improve the property for cattle grazing will be plugged and filled, and the ranch's extensive wetlands allowed to re-flood. Restoration will be funded through the Natural Resources Conservation Service's Wetland Reserve Program. The project is expected to result in flood attenuation and water quality improvement.

In 2004, a draft management plan was prepared and presented to the Martin County Commission, a management review team evaluated the plan and on-ground management activities, and an evening workshop was held to take public comment. Final changes are being made to the plan before adoption by the District governing board. Management activities include continued treatment of exotic vegetation. Upland restoration began in Parcel A where 265 acres of pasture were planted with slash pine. Discussions were held with FWC to have them take over as lead managers following completion of restoration activities. In 2005, FWC will take over management of a limited public use program that will include hiking, bicycling, equestrian use, hunting and fishing.

Atlantic Ridge Ecosystem (managed by FDEP)

- County: Martin
- Project size: 13,122 acres
- District ownership: 6,094 acres
- Acquisition partners: CARL

Atlantic Ridge is being managed by FDEP, Division of Recreation and Parks under a joint management lease from the SFWMD and the Division of State Lands. The area will be known as Atlantic Ridge Preserve State Park. A management plan is near completion that outlines the goals and objectives for the park. The plan describes hydrologic restoration and staffing needs, plans for exotic control and prescribed burning, and a public use program. It is proposed that initial public facilities use will include an interpretive kiosk, trailhead and hiking trails, camping, and equestrian trails with an onsite stable and paddocks. Public access to the property is anticipated in mid-2005 through a new residential development off Cove Road. The management lease has been modified to remove the lands along the west bank of the South Fork St. Lucie River from state responsibility and turn them over to Martin County for management.

Cypress Creek/Loxahatchee (managed by District/Palm Beach County)

- County: Palm Beach/Martin
- Project size: 4,347 acres

- District ownership: 3,547 acres
- Acquisition partners: Palm Beach/Martin counties

The project is divided between Martin and Palm Beach counties and forms connections with Pal-Mar and District-owned lands in Jonathan Dickinson State Park. Nearly 3,000 acres are high-quality natural area, containing a mixture of pine flatwoods, cypress swamps, and freshwater marshes. The area is the headwaters to Cypress Creek, a major tributary to the Northwest Fork of the Loxahatchee River. The remainder of the site has been cleared and used for intensive agriculture for many years. In 2003, more than 3,500 acres were purchased; and in 2004, 820 acres of overgrown shrub vegetation were mechanically shredded and an exotics control program completed for the entire site. Prescribed burns are planned, a FWC officer was moved onsite to provide security, and a feral hog control program was begun. Restoration plans are under way to enhance the impacted natural areas and convert the agricultural lands to reservoirs or treatment marshes as a component of CERP.

DuPuis Management Area (managed by District/FWC)

- County: Palm Beach/Martin
- Project size: 21,875 acres
- District ownership: 21,875 acres
- Acquisition partners: None

The DuPuis Management Area is cooperatively managed by the SFWMD and the FWC. The DuPuis five-year management plan includes prescribed burning, exotic plant control, upland shrub control, wildlife management, and forest management. In 2004, 7,360 acres were burned; 2,200 acres were chemically treated for exotic plants; 1,800 acres of overgrown shrub vegetation were mechanically shredded and 30 acres of pine seedlings were planted. In addition, an extensive public use program at DuPuis attracted thousands of visitors to the area and included hunting, fishing, horseback riding, nature watching, hiking and camping. An extensive public use program at DuPuis that attracts thousands of visitors annually offers hunting, fishing, equestrian trails, hiking and camping.

Halpatiokee Park (managed by Martin County)

- County: Martin
- Project size: 347 acres
- District ownership: 347 acres
- Acquisition partners: None

Halpatiokee is the combined 163-acre portion of the Atlantic Ridge Ecosystem project that lies west of the South Fork St. Lucie River and the 184 acres previously acquired by the District as the South Fork SOR project. Martin County manages the natural area in conjunction with Halpatiokee Regional Park. The property consists of pine flatwoods that surround a series of lakes that were originally excavated to provide fill for the construction of Interstate 95. The South Fork property is a mixture of river floodplain, pine flatwoods, and scrub. In 2004, the county had the entire site treated for exotic vegetation with funding from the District. Understory shredding was also performed with District funding to reduce fuel loads and open the property for increased public use. No management plan has yet been prepared.

Indian River Lagoon (managed by St. Lucie County)

- County: St. Lucie/Martin
- Project size: 1,550 acres
- Public ownership: 653 acres
- Acquisition partners: St. Lucie County, CARL, Federal Government

Indian River Lagoon is managed by St. Lucie County under a lease from the SFWMD and the Division of State Lands. The property is incorporated into St. Lucie County's mosquito control program, where mosquitoes are controlled by non-chemical means. This method results in greatly improved water quality and wildlife and fisheries habitat in the lagoon. Mosquito impoundment berms are accessible to the public and provide excellent opportunities for fishing, crabbing, and bird-watching. The Blind Creek property includes ocean beachfront access, including a dune crossover. Approximately 60 acres of exotics along the coastal dune system at Blind Creek were mechanically removed. Also, 4,000 dune plants were installed on the dune for restoration purposes. The Queens Island management plan was completed, public hearings held, and the plan approved at the local level.

Loxahatchee River (managed by Palm Beach County/FDEP)

- County: Palm Beach
- Project size: 1,936 acres
- District ownership: 1,547 acres
- Acquisition partners: Palm Beach County

District-owned lands along the river are managed by the FDEP, Division of Recreation and Parks and Palm Beach County Parks and Recreation Department. FDEP manages the area north of SR 706 (Indiantown Road) as part of Jonathan Dickinson State Park. The county manages the lands south of the road as Riverbend County Park. Both managers have done extensive treatment of exotics. Palm Beach County, in conjunction with the District, is completing hydrologic restoration of its management area in an attempt to restore a major tributary to the Loxahatchee River. The restoration project will enable water to be delivered to the river through a more natural flow-way. FDEP manages its lands under the Jonathan Dickinson State Park plan. The county has a development plan for Riverbend Park. A management plan will be developed as park development progresses.

Loxahatchee Slough (managed by District/Palm Beach County)

- County: Palm Beach
- Project size: 15,200 acres
- District ownership: 1,488 acres
- Acquisition partners: None

The District is currently managing the Sandhill Crane portion of the project – the 1,425-acre tract purchased by the District – but a transfer of ownership is under way that will result in Palm Beach County owning the property and their Department of Environmental Resources Management managing the lands. The County owns more than 10,000 acres in the Loxahatchee Slough Natural Area, which adjoins the Sandhill tract. In 2004, more than 1,000 acres of exotic vegetation were treated, 150 acres were prescribe-burned, and the remaining 400 acres of former flatwoods were planted with 270,000 South Florida slash pine seedlings under a cooperative agreement with the Natural Resources Conservation Service's Wetland Reserve Program. A

timber cruise that was previously conducted on the 400 acres of remaining pine flatwoods revealed that tree densities in this area are excessive and fuel loads are extremely high, which makes prescribed burning nearly impossible. The District contracted for the timber to be marked in preparation for a timber thinning that will reduce the tree stand by approximately 50 percent.

North Fork St. Lucie River (managed by St. Lucie County/FDEP)

- County: St. Lucie
- Project size: 3,800 acres
- District ownership: 474 acres
- Acquisition partners: St. Lucie County, CARL

State, County, and District-owned lands along the North Fork are being managed by St. Lucie County and the FDEP, as part of the North Fork Aquatic Preserve. Both agencies are treating exotics and conducting limited prescribed burns. Burning is extremely difficult due to the surrounding urban development. St. Lucie County constructed and operates the Oxbow Eco-center, an environmental education facility along the river in Port St. Lucie that incorporates indoor displays with outdoor programming that utilizes interpretive trails, towers and boardwalks. Approximately sixteen thousand students and adults participated in classes, workshops and special events. In 2003, the end of an historic oxbow of the North Fork that had been blocked by river channelization was successfully reconnected. Improvements in water quality and the fishery are already apparent. During 2004, 13 acres at Spruce Bluff and 10 acres at the Eco-center were prescribed-burned.

Pal-Mar (managed by FWC/Palm Beach County)

- County: Palm Beach/Martin
- Project size: 36,745 acres
- District ownership: 13,117 acres
- Acquisition partners: CARL, Palm Beach County, Martin County

State and District-owned lands are under management lease to FWC using an approved management plan. Resource inventories are being conducted by FWC and exotic infestations have been mapped. Exotic treatments and prescribed burning are ongoing. The property is open for public use that includes hiking, primitive camping, hunting, fishing, bicycling and horseback riding. FWC is managing the Martin County lands as the John C. and Mariana Jones/Hungryland Wildlife and Environmental Area. A new entrance road, connecting the main east-west canal to Pratt-Whitney Road, was completed in May 2004. In June 2004, a spoil removal project in association with original sale agreements between MacArthur Foundation and the State began. Construction associated with this project will remove most of the exotic vegetation along the spoil berms. In 2003 the state approved purchase of Palm Beach County lands that are north of SR 706 (Indiantown Road) from the county for management by FWC. This land (2,121 acres) will be established as part of the Wildlife Environmental Area by FWC commissioners in September 2004. An additional 320 acres was acquired by the state (S13 T40S R41E) and will also be incorporated into the Wildlife environmental Area. Palm Beach County will continue to manage their lands south of Indiantown Road as the Pal-Mar Natural Area.

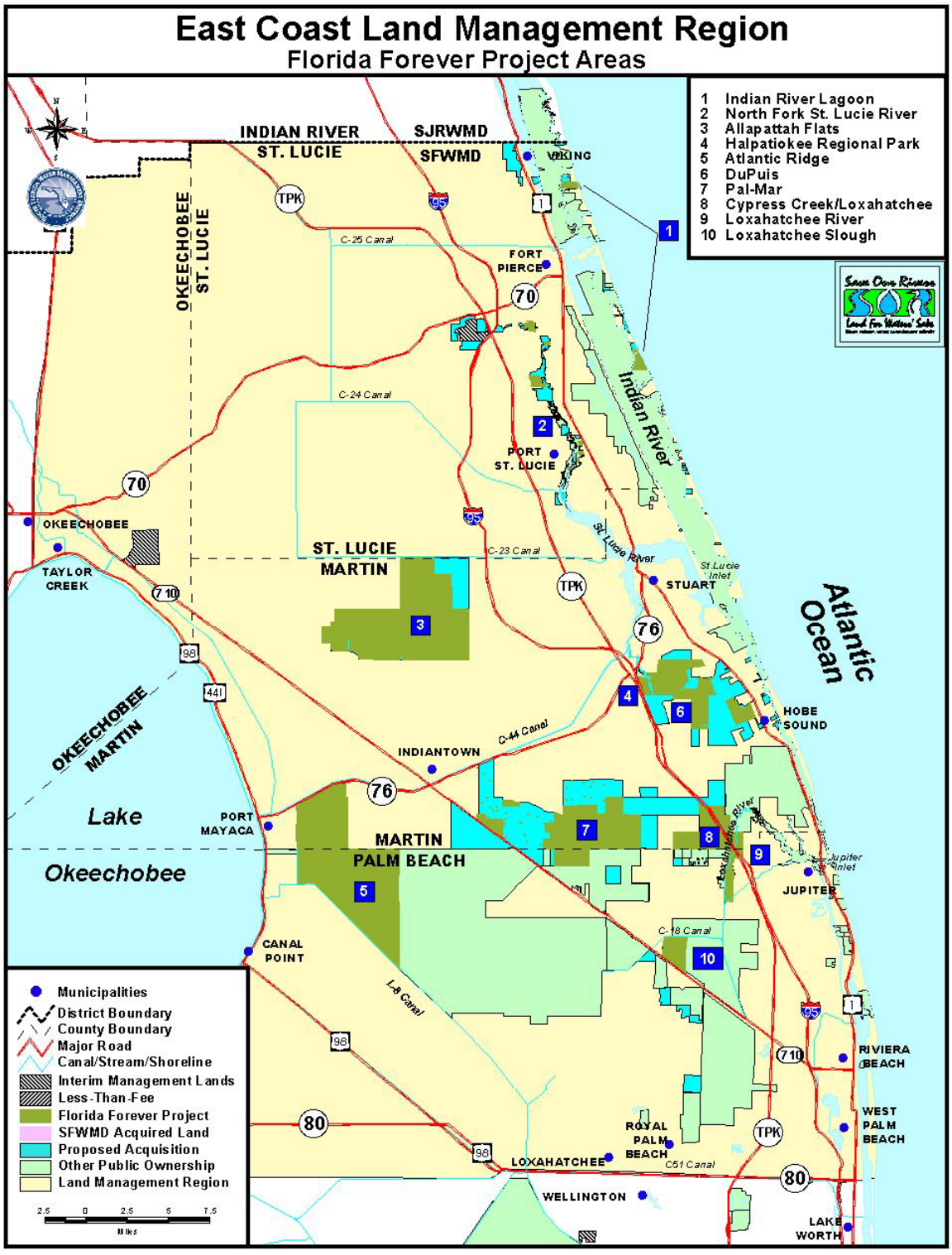

Figure 8-16. East Coast Land Management Region.

EVERGLADES LAND MANAGEMENT REGION, MIAMI SERVICE CENTER / WEST PALM BEACH

Loxahatchee Mitigation Bank (managed by TetraTech FW, Inc.)

- County: Palm Beach
- Project size: 1,256 acres
- District ownership: 1,256 acres
- Acquisition partners: None

The Loxahatchee Mitigation Bank site lies adjacent to the Loxahatchee National Wildlife Refuge. The location of this site will provide habitat connectivity that augments existing Everglades wetland systems. Brazilian pepper and other exotics have degraded the area, adversely impacting native wildlife habitat, including a number of threatened and endangered species. The goal of the bank is to restore habitat values and provide enhancement of a degraded Everglades ecosystem through hydroperiod restoration, exotic vegetation removal, re-vegetation with desired species, and prescribed burning. Through an open and competitive solicitation process Tetra Tech FW was selected to establish the Loxahatchee Mitigation Bank. Permitting and construction have been completed; exotic enhancements are ongoing.

Model Lands (District managed)

- County: Miami-Dade
- Project size: 42,402 acres
- District ownership: 6,840 acres
- Acquisition partners: Miami-Dade County

The Model Lands project will play a vital role in conveyance and treatment of sheetflow from the south Miami-Dade area to the downstream estuaries. It is a combination of fresh and salt-water wetlands, portions of which are heavily infested with exotic vegetation. Although more than 6,000 acres are in public ownership, there is no public use program due to lack of legal access and patchy ownership. A large-scale project is currently under way to identify and post District-owned properties. The major management activities have been treating exotic vegetation and restricting off-road vehicle use that causes long-term ecological impacts. Hydrologic restoration is necessary and is planned under CERP. A management plan for the area is currently under development. In 2003, over 200 acres of exotics were treated for the first time and follow-up was completed on more than 1,000 acres.

Southern Glades (managed by FWC)

- County: Miami-Dade
- Project size: 37,620 acres
- District ownership: 32,499 acres
- Acquisition partners: None

Southern Glades is managed by FWC, under a lease agreement, as the Southern Glades Wildlife and Environmental Area. It is open to hiking, wildlife viewing, fishing, hunting, airboating, bicycling, and horseback riding (seasons and times set forth by FWC). The District is directing mitigation funds for habitat restoration that includes exotic removal and re-vegetation with native species. The large, mature hammock known as Lucky Hammock was planted with supplemental shrubs. Currently, the District is constructing three additional fishing piers to

complement the pier constructed in 2003. In cooperation with FWC, the District has mulched and chemically treated 200 acres of invasive exotic species. Approximately 1,510 acres were managed by prescribed fire. The several-acre pine rockland was burned for the first time as part of the ongoing restoration efforts in the area.

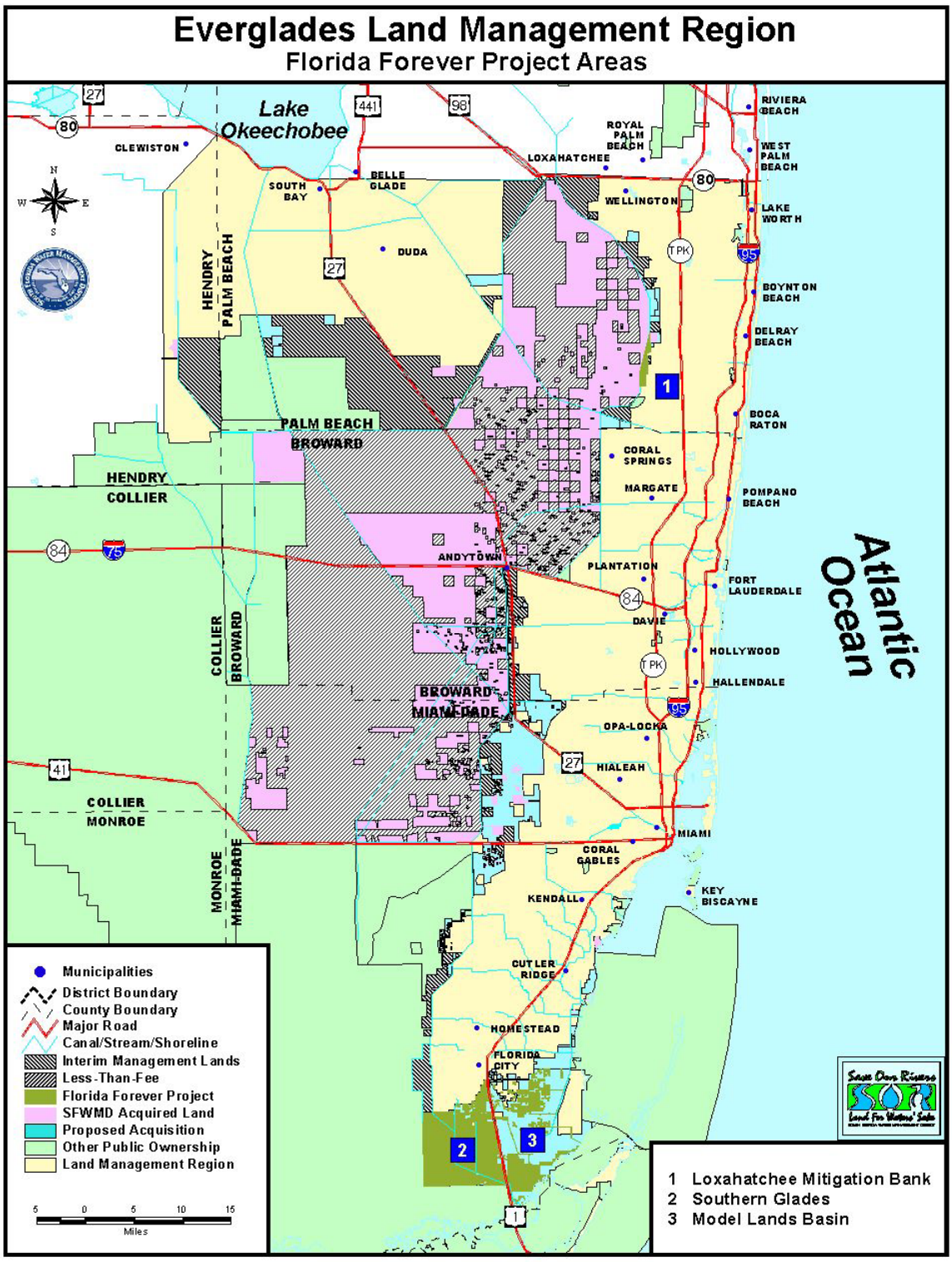

Figure 8-17. Everglades Land Management Region.

WEST COAST LAND MANAGEMENT REGION, FT. MYERS SERVICE CENTER

Corkscrew Regional Mitigation Bank (managed by Mariner Properties Development, Inc.)

- County: Lee
- Project size: 633 acres
- District ownership: 633 acres
- Acquisition partners: None

The Corkscrew Regional Mitigation Bank is located in southern Lee County, along Corkscrew Road (SR 850). It is adjacent to the Imperial Marsh/Stairstep mitigation area, which has been established to offset impacts associated with the Southwest Florida Regional Airport. The goal of the bank is to improve habitat values and restore the historic function of the upland/wetland mosaic through hydroperiod restoration, exotic vegetation removal, and prescribed burning. The Corkscrew bank site contributes to corridor building and the green infrastructure within the regional context. Mariner Properties Development, selected through an open and competitive solicitation process, is establishing Corkscrew Regional Mitigation Bank. Permitting for the bank site and filing of the conservation easement was completed in 2004.

Corkscrew Regional Ecosystem Watershed (CREW) (managed by District/FWC)

- County: Lee, Collier
- Project size: 64,103 acres
- District ownership: 25,644 acres
- Acquisition partners: Lee County, CARL, USFWS

The SFWMD and FWC jointly manage CREW. The public use and environmental education program is directed by the CREW Land and Water Trust. The management plan was updated in 2002 and describes plans for exotic control, prescribed burning, upland restoration opportunities, and public use. Property boundaries are posted and FWC wildlife officers patrol the property. In 2004, 518 acres were prescribe-burned and 7,925 acres of exotics were treated. Restoration work continued on the CREW Management Center (288 acres), E Corkscrew Marsh (80 acres), E Bird Rookery Swamp (70 acres) and the Tree Wizard (10 acres) with mechanical shrub control and exotic plant control. Staff constructed a parking lot and access path to a 1,400-foot boardwalk site that will provide public access to approximately 6,000 acres in Bird Rookery Swamp. Staff also constructed ¼ mile of new hiking trail in Corkscrew Marsh that will link a new 1,100-foot boardwalk with the existing observation platform that is the only other legally accessible point. At that location the CREW Trust and SFWMD have developed an interpretive hiking trail and constructed an observation platform that overlooks Corkscrew Marsh. There is one grazing lease on the CREW Management Area.

Nicodemus Slough (managed by Aim Engineering, Inc.)

- County: Glades
- Project size: 2,231 acres
- District ownership: 2,231 acres
- Acquisition partners: None

Aside from the two mitigation banks, Nicodemus Slough is the only SOR tract under management by a private entity. The District contracts with Aim Engineering, Inc. for management services that include exotic control, prescribed burning, and maintaining the public use facilities. During 2004, 537 acres were roller chopped, 367 acres were mowed, 510 acres were burned, and 17 acres had exotic control. A hydrologic restoration project that was undertaken by the District many years ago has been disappointing and has caused much dissatisfaction with the adjoining property owner. The District has been attempting to reach a suitable agreement with the adjoining landowner in which the property would be sold to them while the District would retain a conservation easement.

Okaloacoochee Slough (managed by Division of Forestry/FWC)

- County: Hendry, Collier
- Project size: 37,210 acres
- District ownership: 34,982 acres
- Acquisition partners: CARL, FWC, DOF

The Division of Forestry (DOF) and FWC purchased additional lands in the project that expand the original District/state purchase. The project is managed as Okaloacoochee Slough State Forest with DOF as the lead manager and FWC responsible for wildlife management under a four-party lease agreement with the Division of State Lands and the District. FWC manages the project as a Type 1 Wildlife Management Area and conducts a public hunt program. An approved management plan is in place.

In 2004, approximately 3,500 acres were prescribe-burned and 5,000 acres of exotic vegetation were surveyed and/or chemically treated. Additionally, 330 acres were drum chopped, with 314 acres of the 330 planted with 190,000 South Florida slash pine.

Six Mile Cypress (managed by Lee County)

- County: Lee
- Project size: 1,741 acres
- District ownership: 842 acres
- Acquisition partners: Lee County

The property is jointly owned by Lee County and the District and has been managed by Lee County Parks and Recreation since acquisition began. The management plan was updated in 2002. The county built and maintains a boardwalk and outdoor classroom facility that is used by 35,000 Lee County students and other citizens each year. Six Mile Cypress likely has the highest rate of public visitation of any SOR project.

Management activities conducted during 2004 include working with SFWMD, FDOT and consultants on design and permitting for two large mitigation projects involving exotic plant removal and replanting with native vegetation, one in the northern and the other in the southern portion of the slough. It is anticipated that these projects will begin in early 2005. Monitoring surveys of selected ponds were also conducted to determine wildlife presence, percent cover by exotic vegetation, and other related parameters. Wildlife cameras were also placed in several locations and checked regularly. Wild hogs, raccoons, and bobcat were recorded by photographs. A combination of patrols by county rangers and posting of regulatory signage was employed to decrease off-road vehicle trespassing in the preserve. Maintenance work on several existing mitigation areas was performed, which included exotic and nuisance plant control. Maintenance exotic plant control work was also done along 2 miles of the west boundary of the preserve from

Daniels Parkway to north of Penzance Road. Prescribed burning is difficult due to the surrounding urban development.

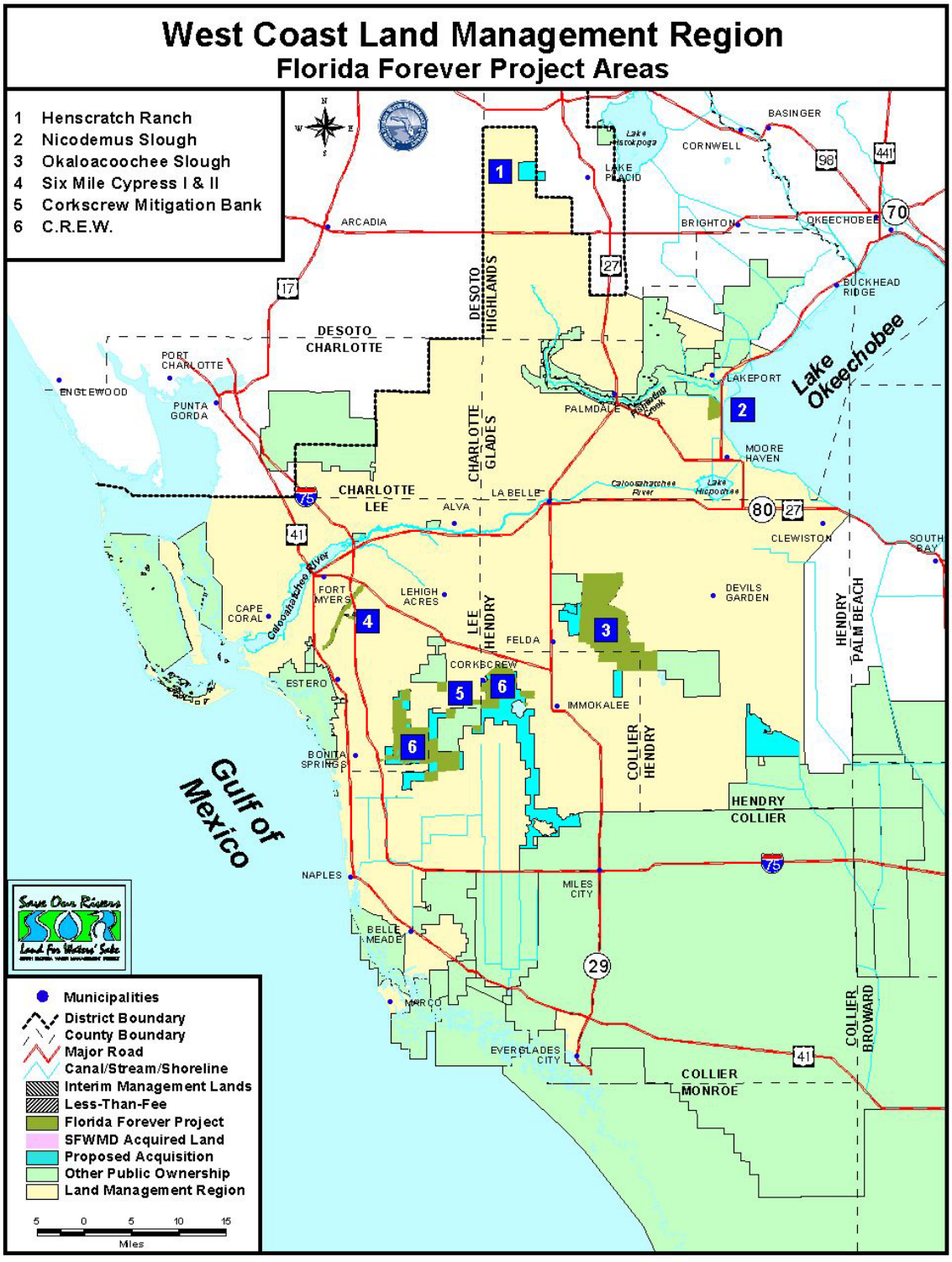

Figure 8-18. West Coast Land Management Region.

Table 8-11. Land Stewardship Program Acquisition Summary – through FY2004.

Project Name	County	Size (Acres)	Acres Acquired	Acquisition Partners
Allapattah Flats	Martin	22,560	21,407	Martin County/Federal
Atlantic Ridge Ecosystem	Martin	13,122	6,094	CARL
Corkscrew Mitigation Bank	Lee	633	633	None
CREW	Lee/Collier	64.103	25,644	CARL/Lee County
Cypress Creek	Martin/Palm Beach County	4,347	3,547	Martin County/ Palm Beach County
DuPuis	PB/Martin	21,875	21,875	None
Halpatiokee Park	Martin	347	347	None
Indian River Lagoon	Martin/St. Lucie	1,550	653	St. Lucie County/ CARL/Federal
Kissimmee Chain of Lakes	Polk/Osceola	36,763	34,981	None
Kissimmee Prairie	Okeechobee	38,282	38,282	CARL
Kissimmee River	Highlands/Okee/Polk/ Osceola	68,332	52,023	None
Lake Marion Creek	Polk	17,300	7,067	Polk County
Loxahatchee Mitigation Bank	Palm Beach	1,256	1,256	None
Loxahatchee River	PB/Martin	1,936	1,547	Palm Beach County
Loxahatchee Slough	Palm Beach	15,200	1,488	None
Model Lands	Miami-Dade	42,402	6,840	Miami-Dade County
Nicodemus Slough	Glades	2,231	2,231	None
N. Fork St. Lucie River	St. Lucie	3,800	474	St. Lucie County/ CARL
Okaloacoochee Slough	Hendry/Collier	37,210	34,982	CARL/DOF/FWC
Pal-Mar	PB/Martin	36,745	13,117	CARL/Martin County/ Palm Beach County
Paradise Run	Glades	4,265	3,328	None
Reedy Creek	Osceola	30,000	5,483	None
Shingle Creek	Orange	7,655	1,457	None
Six Mile Cypress	Lee	1,741	842	Lee County
Southern Glades	Miami-Dade	37,620	32,499	None
SUMICA	Polk	4,009	4,009	Polk County
Tibet-Butler Preserve	Orange	439	439	None
Water Conservation Areas	PB/Brow/Dade	105,047	52,918	None
Totals		**556,731**	**375,463**	

Table 8-12. Public Use Opportunities.

Public Use Opportunities								
Land Management Region	Lead Manager	Public Access	Environ. Education	Hunting	Horseback Riding	Airboating	Camping	Hiking
Upper Lakes Region								
Kissimmee Chain of Lakes	SFWMD	•		•	•	•	•	•
Lake Marion Creek	SFWMD	•		•			•	•
Sumica	Polk County	•						•
Reedy Creek	SFWMD	•	•					•
Shingle Creek	SFWMD	•						•
Tibet Butler Preserve	Orange County	•	•					•
Kissimmee-Okeechobee Region								
Kissimmee Prairie	DEP	•			•		•	•
Kissimmee River	SFWMD	•		•	•	•	•	•
Paradise Run	SFWMD	•		•		•		•
East Coast Region								
Allapattah Flats	SFWMD	none						
Atlantic Ridge	DEP	none						
Cypress Creek	SFWMD	none						
DuPuis	SFWMD	•	•	•	•		•	•
Halpatiokee Park	Martin County						•	•
Indian River Lagoon	St. Lucie County	•						•
Loxahatchee River	DEP	•			•		•	•
Loxahatchee Slough	SFWMD	none						
North Fork St. Lucie River	DEP	•	•					•
Pal-Mar	FWC	•		•			•	
Everglades Region								
Everglades Buffer Strip	SFWMD	•						•
Loxahatchee Mitigation Bank	TetraTech FW	none						
Model Lands	SFWMD	none						
Southern Glades	FWC	•		•	•	•	•	•
West Coast Region								
Corkscrew Regional Mitigation Bank	Mariner Properties	none						
CREW	SFWMD	•	•	•			•	•
Nicodemus Slough	Aim Engineering, Inc.	•		•		•		•
Okaloacoochee Slough	DOF	•		•	•		•	•
Six Mile Cypress	Lee County	•						•

INTERIM PROPERTY MANAGEMENT AND LAND STEWARDSHIP

Background

The Interim Property Management Program is responsible for managing those properties acquired by the District for future CERP and other projects until such time as the land is needed for construction. These lands will ultimately be used as STAs, surface water reservoirs, groundwater recharge areas, and/or buffer lands between the Everglades and other sensitive areas and urban development. These lands are not specifically acquired or designated for environmental enhancement, restoration, or preservation purposes, and generally are not proposed for recreational or other public uses except on a limited basis that is consistent with their future use.

The Interim Property Management program was initially developed in 1997 to manage the STA, WPA/WMA, and East Coast Buffer lands during the interim period while acquisition, planning, design and construction for these projects was taking place. It has since evolved to include other lands acquired by the District for future CERP and other similar construction projects throughout the District. The Land Management Division has developed a multifaceted management approach that:

- protects the natural resource;
- provides onsite management and security for District-owned lands at a minimal cost to the District;
- minimizes District expenses by increasing revenue from non-governmental sources to offset District management, maintenance, and resource protection costs;
- generates additional funding for future acquisition;
- minimizes impacts to the local agricultural economy by keeping viable agricultural lands in active production for as long as possible; and
- minimizes fiscal impacts to the local government by keeping lands on the tax roll until they are actually needed for construction.

Where appropriate, historical uses of properties, such as grazing, sod, vegetable, sugar-cane farming, and nurseries and tree farms are allowed to continue through the use of reservations, leases or similar agreements. Generally, a competitive bid process is used to solicit proposals and award contracts, which include the appropriate cancellation clauses so the land can be quickly made available when it is needed. In some cases, short-term leases (five years or less) are negotiated as part of the acquisition package. Lessees are typically required to actively manage the property, control exotics, provide security for the property, implement applicable best management practices, keep the property and facilities in good repair and condition, obtain all required permits and approvals for their activities, maintain required insurance coverage, pay applicable taxes, etc.

For those lands that are in their natural state and/or where some type of active interim use is inappropriate due to the environmental sensitivity of the land and/or the projected construction timetable for the project for which the land has been acquired, Interim Property Management either manages these lands themselves or contracts with another governmental entity. Interim Property Management conducts an ongoing property management program and oversees exotic control, cleanup, security, and any other activities necessary to maintain the lands in good condition.

During FY2004, the Interim Property Management program was responsible for over 140,000 acres of land, of which 109,261 acres were managed under 74 different leases or management agreements.

The Interim Property Management program is currently staffed by a group of nine professionals with expertise in real estate, engineering, finance, business administration, property management, planning, and regulation. They are responsible for managing these lands through the development of land management plans, implementation and management of leases, regular property inspections, and appropriate follow-up activities, including exotic control, fencing, clean-up, security, etc., on non-leased lands.

The FY2004 budget for Interim Property Management was $6,015,764. This includes personnel costs, contractual expenses for activities such as exotic control, cleanup, security, etc., and general administrative costs. Revenue generated by the Land Management Division from leases, sale of products, and other alternative sources for the year was $4,138,000. This was in addition to the $2,731,525 in management costs avoided (calculated at an average cost of $25 per acre) due to the 74 leases and management agreements in place for the 109,261 acres under contract. By maintaining the leased properties on the local tax rolls, the lessees paid $2,590,827 in property taxes for a total contribution by the Interim Property Management program of $9,460,449.