

EXECUTIVE SUMMARY

2008

SOUTH FLORIDA
ENVIRONMENTAL
REPORT

MARCH 1, 2008



A full decade ago, the Florida Department of Environmental Protection and the South Florida Water Management District first collaborated on a comprehensive report of restoration progress in South Florida. Ten years later, the progress to report is great indeed. With two volumes and an executive summary, the *2008 South Florida Environmental Report* thoroughly documents a year's worth of impressive restoration work by our agencies.

Continuing a tradition of excellence, the report again captures the world-class science behind the restoration effort. From wetland ecologists to civil engineers to budget analysts, professionals from dozens of disciplines are dedicated to this work. Few ecosystems in any part of the world are being studied and restored like America's Everglades.

As the cover of this booklet poignantly shows, this past year was extremely dry. One for the record books, in fact. Following two years of unprecedented hurricane activity and above-normal rainfall, the 2006–2007 drought severely impacted the entire South Florida region. Lake Okeechobee reached record lows in summer 2007, and a rainfall deficit of more than a foot was recorded across the region. A combination of voluntary and mandatory water use restrictions is in place to protect one of Florida's most valuable environmental resources: our water.

Despite weather extremes, restoration progress moved steadily forward. A highlight in this year's report is the success of programs for improving Everglades water quality. Best Management Practices together with six Stormwater Treatment Areas have removed nearly 2,700 metric tons of phosphorus from Everglades-bound waters.

To strengthen restoration across the region, the Northern Everglades and Estuaries Protection Program was added as a state initiative to improve the health of Lake Okeechobee and the St. Lucie and Caloosahatchee estuaries. At the northern reach of the Everglades, these water bodies will soon benefit from projects now being planned and implemented.

Despite its hardships, the 2006–2007 drought added unique opportunities for environmental restoration. Most notably, low water levels in Lake Okeechobee allowed roughly two million cubic yards of muck to be removed from the lake's shoreline, removing nearly 240 metric tons of in-lake phosphorus.

Our agencies continue to be inspired by the individual people, projects and programs that are making environmental restoration in South Florida a reality. As you turn the pages of this year's report and read about the progress, we trust you will be inspired as well.



Michael W. Sole
Secretary
Florida Department of
Environmental Protection



Carol Ann Wehle
Executive Director
South Florida Water
Management District



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2008 SOUTH FLORIDA

FOREWORD



The 2008 South Florida Environmental Report (SFER) marks a significant milestone in consolidated reporting on the Greater Everglades ecosystem, representing the tenth publication prepared jointly by the South Florida Water Management District and the Florida Department of Environmental Protection. For a full decade, our agencies have streamlined reporting into a comprehensive publication, now in two volumes and complemented by an outstanding Executive Summary. The SFER continues to serve the public and decision makers with thorough, up-to-date information on the progress of South Florida environmental restoration efforts.

Volume I, *The South Florida Environment*, documents relevant scientific and engineering efforts throughout South Florida, spanning diverse areas of the interconnected Northern and Southern Everglades systems. This volume satisfies the ever-growing list of annual reporting mandates required by the Everglades Forever Act, the Comprehensive Everglades Restoration Plan, the Northern Everglades and Estuaries Protection Program, and other state and federal laws and permits.

Volume II, *District Annual Plans and Reports*, comprises eight annual plans and reports required by all of Florida's water management districts. This volume captures the South Florida Water Management District's notable progress in implementing the 11 programs outlined in the agency's Strategic Plan. The volume also contains a consolidated electronic database, now in its fourth year, that provides cohesive reporting and allows for data retrieval of project-related information.

The complete 2008 Report, along with all previous consolidated reports, is available on the District's web site (www.sfwmd.gov/sfer) and also on the compact disc inside the back cover of this booklet. Overall, the details provided in the SFER represent the scientific foundation of the programs and projects that ultimately support prudent environmental decision making. With the ongoing support of our stakeholders and the public, the 2008 South Florida Environmental Report once again showcases progress and achievements as we work toward sound management and restoration of the entire South Florida region.

TABLE OF CONTENTS

The Bottom Line.....2

Volume I

The South Florida Environment5

Volume II

District Annual Plans and Reports39

Glossary50

Acknowledgments52

Cover Feature

Lake Okeechobee..... Back Cover

The Bottom Line

The 2008 South Florida Environmental Report represents over 50 individual reports woven into a single, two-volume publication. Covering the entire South Florida region, key Volume I findings were derived from the numerous research and monitoring projects during Water Year 2007 (WY2007) and highlight the District's financial resources management during Fiscal Year 2007 (FY2007). Volume II details the FY2007 planning and project status for eight annual reports required by all state water management districts under statutory mandates. A snapshot of the many noteworthy achievements for the reporting period is presented below.

VOLUME I, THE SOUTH FLORIDA ENVIRONMENT

Water Quality in South Florida

- Phosphorus source control programs are continuing to surpass expectations. Since 1994, Stormwater Treatment Areas (STAs) and Best Management Practices (BMPs) together have removed nearly 2,700 metric tons of total phosphorus (TP) that otherwise would have entered the Everglades.
- During WY2007, Everglades water quality generally met state numeric criteria, although excursions were found for dissolved oxygen, alkalinity, pH, specific conductance, and un-ionized ammonia. Similar to previous periods, most excursions were localized to specific areas of the Everglades Protection Area (EPA).
- Using WY2003–WY2007 TP data, only the unimpacted portions of the EPA met the TP rule criteria of the state's four-part test. In WY2007, the TP load into the EPA was approximately 46 percent lower than the previous year, primarily due to reduced flow volumes from the regional drought.
- Mercury levels in Everglades fish, which declined from the early 1990s to 1998, have changed little since 1998, and they remain above federal criteria guidance for fish consumption. Mercury hot spots persist; levels in fish in Everglades National Park have increased since 1998 and exceed federal wildlife criteria. Options for reducing inputs of atmospheric mercury and surface water sulfur are key to managing the mercury problem.

Long-Term Plan for Achieving Everglades Water Quality Goals

- As required by the Everglades Forever Act, the District is continuing implementation of the Long-Term Plan to achieve Everglades water quality goals. In FY2007, the Florida Department of Environmental Protection approved three Long-Term Plan revision packages. With collective input from stakeholders, plan revisions are done to ensure that new project-related information is properly incorporated into the restoration process.

Performance of the Stormwater Treatment Areas

- In WY2007, the six Stormwater Treatment Areas collectively treated over 900,000 acre-feet of Everglades inflow and reduced flow-weighted TP levels from a mean concentration of 187 parts per billion to an outflow concentration of 58 parts per billion. The STAs retained 153 metric tons of TP, reducing the inflow TP load to the Everglades by 71 percent.
- The newly constructed treatment cell expansions at STA-2, STA-5, and STA-6 became flow-capable in December 2006, increasing the amount of effective treatment area by almost 6,000 acres.
- Research supporting long-term performance of the STAs continued during WY2007. Information from these studies and opportune conditions during the regional drought facilitated major rehabilitation efforts in STA-1 West. Long-Term Plan STA enhancements through construction and vegetation conversions also continued this past year.

Performance of Everglades Source Controls

- With an 18 percent TP load reduction for WY2007, EAA source control BMPs continued to reduce phosphorus inputs to the Everglades for the twelfth consecutive year. Although it was the first year that the minimum reduction goal of 25 percent was not achieved, required



performance levels were met with the three-year average TP load reduction of 46 percent.

- Although C-139 basin TP loads were lower than historical amounts, compliance with regulatory loading requirements was not met. Rule development is under way to optimize the BMP program and implement measures to bring the basin into compliance.
- The District continued to implement source controls for all non-ECP basins and to track their performance relative to regulatory requirements. During WY2007, approximately 60 percent of the TP load from non-ECP basins came from the Feeder Canal basin, and efforts to improve water quality are being made to achieve water quality goals.

Hydrology and Ecology Issues in South Florida

- During WY2007, South Florida experienced a severe drought with over a foot of rainfall deficit across the region. Low rainfall resulted in a significant reduction in region-wide water levels and flows across the entire water management system. The drought resulted in a series of water conservation measures, particularly area-wide water use restrictions.
- Developed in 2007, a five-year Everglades research management plan outlines a strategic framework for guiding future scientific activities in support of agency-wide initiatives for Everglades restoration. Everglades research, such as ecosystem and vegetation studies, continues to support natural resource and water management decisions.
- In WY2007, the total number of wading bird nests in the Greater Everglades declined nearly 50 percent from WY2002, the best nesting year on record. Nest failures were attributed to poor foraging caused by dry conditions in late 2006 and rain-driven depth increases in spring 2007.
- Regional efforts to control nonindigenous species are continuing. In early 2007, an accelerated invasive plant management plan was implemented in the Arthur R. Marshall Loxahatchee National Wildlife Refuge. As of FY2007, 11,800 acres of melaleuca and *Lygodium* have been treated aerially and 7,120 acres have been ground-treated across South Florida. Biological control agent releases for these two invasives, and the Mexican bromeliad weevil, were also done to enhance regional control programs.

Comprehensive Everglades Restoration Plan and Acceler8 Performance

- South Florida ecosystem restoration is building on and complementing the Comprehensive Everglades Restoration Plan (CERP) with state initiatives such as Acceler8 and Northern Everglades. Launched in 2007, the state's Northern Everglades and Estuaries Protection Program builds upon CERP and includes projects that will benefit Lake Okeechobee and the St. Lucie and Caloosahatchee estuaries.

- The Acceler8 initiative continues to expedite key Everglades restoration projects. Construction is moving forward on the 190,000 acre-foot EAA Reservoir to provide restoration benefits to Lake Okeechobee and its adjoining estuaries, and the Southern Everglades.
- In 2007, the RECOVER team completed the System Status Report, which provides a baseline analysis of CERP monitoring data and a preliminary assessment of the ecological condition of the South Florida ecosystem.

Lake Okeechobee Management and Restoration

- The 2007 drought conditions were most pronounced in Lake Okeechobee with water levels at an all-time record low of 8.82 ft National Geodetic Vertical Datum on July 3, 2007. Inflows to the lake were reduced by 80 percent, and TP loads dropped to 203 metric tons. As a result of water restrictions, lake water releases for agriculture were reduced by 45 percent. Temporary forward pumps were also deployed to sustain water supply to the EAA despite low lake levels.
- The drought provided unique opportunities for lake management and restoration. During summer 2007, low water levels allowed roughly two million cubic yards of muck to be removed from about 2,000 acres of shoreline. This dredging is expected to restore habitat for submerged aquatic vegetation and native plants and wildlife, with an ancillary benefit of removing about 237 metric tons of phosphorus from the lake.
- In 2007, the Lake Okeechobee Protection Plan was updated to define current and proposed TP reduction projects for the lake and its surrounding watershed. Completed in 2007, the draft Phase II Lake Okeechobee Technical Plan identifies facilities to reduce TP loading to achieve the Total Maximum Daily Load for phosphorus. It also includes an estimate of the amount of water storage necessary to better manage lake ecology and reduce harmful discharges to the St. Lucie and Caloosahatchee estuaries.
- TP concentrations in Lake Okeechobee declined in WY2007, indicating some recovery from multiple, back-to-back hurricanes. To further reduce lake nutrient levels, over one-half of the watershed's agricultural acreage is currently enrolled in a voluntary BMP program to control TP discharges.

Kissimmee Basin Restoration

- Phase I restoration successfully reconnected 15 miles of former river channel to its floodplain. In a continuing partnership between the U.S. Army Corps of Engineers and the District, Phase IVa of the Kissimmee River Restoration Program was completed in September 2007. Phase IVa construction backfilled an additional 1.9 miles of canal, reestablished flow in 4 new miles of river channel and allowed inundation of 155 additional acres of floodplain wetlands.

- The river and its floodplain were affected by the 2007 drought. After six years of continuous flow, the Phase I restored area experienced no flow for 252 days from November 2006 to July 2007. As a result, densities of long-legged wading birds on the Phase I area floodplain, which had exceeded restoration expectations for the past five years, dropped this year due to limited foraging habitat.

Coastal Ecosystem Management and Restoration

- The District and its partners are continuing efforts to establish freshwater inflows that will protect and restore South Florida coastal ecosystems. Toward this goal in 2007, the Minimum Flow and Level (MFL) Rule for Florida Bay was adopted, and interactions of freshwater inflows and salinity were studied for the Loxahatchee River and the St. Lucie and Caloosahatchee estuaries. Science planning was also initiated for all the District's priority coastal systems.

Everglades Financial Report

- The Everglades Long-Term Plan's initial 13-year phase has a projected total cost of approximately \$1.7 billion, reflecting approved revisions through the end of FY2007. In FY2007, dedicated funding sources generated about \$88 million for the EFA Program, estimated to cost \$2.5 billion through FY2016.

VOLUME II, DISTRICT ANNUAL PLANS AND REPORTS

- Eighty percent of major District projects were within 30 days of their planned schedules as of September 30, 2007. During FY2007, the District collected 107 percent of budgeted revenue, up from 96 percent in FY2006. The District spent 63 percent of the total FY2007 budget of approximately \$1.2 billion, a decrease of 15 percentage points from the FY2006 expenditure rate.
- Since 2001, MFL criteria for 12 water bodies have been adopted by the District. In 2008, the District is scheduled to complete scientific peer review in support of developing an MFL for Biscayne Bay and a Water Reservation for Indian River Lagoon – South. In 2009, the District is scheduled to compile the scientific data in support of MFLs and Water Reservations for four additional water bodies.
- The District's total budgeted capital expenditures for FY2008 are \$819.5 million, which is 63.8 percent of the total annual budget of \$1.283 billion, and 17.9 percent of the projected five-year Capital Improvements Plan budget of \$4.6 billion. The FY2008 capital budget is \$87.8 million less than last year's, mainly due to the District's decision not to issue Certificates of Participation during FY2008.
- The District has allocated \$4.5 million in FY2008 and anticipates spending \$17.6 million in FY2008–FY2012 on water resource development projects identified in water supply plan updates. These projects include groundwater monitoring, resource assessments, feasibility studies, modeling, conservation, and water resource protection activities.



- The District continues its aggressive funding program for Alternative Water Supply (AWS) projects. For FY2008, \$45.9 million will be directed to AWS activities, including \$15.6 million from the state. When completed, the 72 AWS projects funded in FY2008 will provide an additional 81 million gallons per day.
- The Florida legislature continues its commitment to fund land acquisitions by extending funding of the Save Our Everglades Trust Fund through 2020. The District's aggressive acquisition of land has provided 99 percent of the land needed for Acceler8, and nearly all the land required for Kissimmee River Restoration. The Caloosahatchee River Basin Water Quality Treatment and Testing Facility, Northern Everglades project was added to the Florida Forever Program eligibility list.
- The District protects and restores over 1.3 million acres of public land while providing recreational opportunities. In FY2007, the District spent \$9.5 million for land management, and \$4.6 million in revenue was generated from agricultural leases and mitigation banks. Land management costs in FY2008, including capital improvements for recreation, are anticipated to be \$11.5 million.
- The District operates two regional mitigation projects, Corkscrew Regional Ecosystem Watershed and Pennsuco, to compensate for permitted wetland impacts. Neither project accepts new mitigation cash payments, but existing funds are used to restore and manage the sites. In FY2007, the District spent nearly \$1.7 million to restore over 7,100 acres in these areas, and anticipates FY2008 combined expenditures of \$1.4 million.

THE SOUTH FLORIDA ENVIRONMENT

VOLUME I

| | | |
|-------------------|--|-----------|
| CHAPTER 1A | Introduction to the 2008 South Florida Environmental Report – Volume I | 6 |
| CHAPTER 1B | Strategies for Reengineering Water Quality Monitoring in South Florida | 8 |
| CHAPTER 2 | Hydrology of the South Florida Environment | 10 |
| CHAPTER 3A | Status of Water Quality in the Everglades Protection Area | 12 |
| CHAPTER 3B | Mercury and Sulfur Monitoring, Research and Environmental Assessment in South Florida | 13 |
| CHAPTER 3C | Status of Phosphorus and Nitrogen in the Everglades Protection Area | 14 |
| CHAPTER 4 | Phosphorus Source Controls for the Basins Tributary to the Everglades Protection Area | 16 |
| CHAPTER 5 | STA Performance, Compliance and Optimization | 19 |
| CHAPTER 6 | Ecology of the Everglades Protection Area | 21 |
| CHAPTER 7A | Comprehensive Everglades Restoration Plan Annual Report | 23 |
| CHAPTER 7B | Update on RECOVER Implementation and Monitoring for the Comprehensive Everglades Restoration Plan | 26 |
| CHAPTER 8 | Implementation of the Long-Term Plan for Achieving Water Quality Goals in the Everglades Protection Area | 27 |
| CHAPTER 9 | The Status of Nonindigenous Species in the South Florida Environment | 28 |
| CHAPTER 10 | Lake Okeechobee Protection Program – State of the Lake and Watershed | 30 |
| CHAPTER 11 | Kissimmee Basin | 33 |
| CHAPTER 12 | Management and Restoration of Coastal Ecosystems | 35 |
| CHAPTER 13 | Everglades Forever Act Annual Financial Report | 37 |



Introduction to the *2008 South Florida Environmental Report – Volume I*

THE 2008 SFER MARKS THE TENTH YEAR OF UNIFIED REPORTING

For the tenth year, the *2008 South Florida Environmental Report* (SFER) consolidates over 50 agency reports into a single document. This introductory chapter provides the reader with a basic understanding of the governmental, scientific, and legal context behind the 2008 SFER – Volume I. Collectively, Volume I addresses many research and monitoring projects throughout the unique regions of South Florida including the Kissimmee Basin, Lake Okeechobee, Everglades, and South Florida's coastal ecosystems (see opposite map). Updates for the current reporting year, Water Year 2007 (May 1, 2006–April 30, 2007) and Fiscal Year 2007 (October 1, 2006–September 30, 2007), are provided throughout the volume. Overall, this inclusive report continues to be used by the South Florida Water Management District, the Florida Department of Environmental Protection, and other

agencies to support regional environmental management and restoration decisions.

The complete 2008 report is comprised of the two-volume Main Report and Executive Summary. Volume I, *The South Florida Environment*, is a technically based, peer-reviewed volume that provides data summaries for all major ecosystems across South Florida. In a 13-chapter framework, the topics covered in this volume are primarily the same as those in the 2007 SFER. In response to a recommendation from last year's peer-review panel, a special section in Chapter 1A was added this year to highlight the District's extensive public outreach efforts. A synthesis chapter (Chapter 1B) was also added to document progress on developing a strategy to reengineer water quality monitoring in South Florida. The hydrology of South Florida in Chapter 2 follows the introduction to provide supporting hydrologic information for subsequent chapters. Chapters 3 through 9 continue the overall objective to summarize information related to Everglades restoration efforts, along with annual reporting on the status of the Comprehensive Everglades Restoration Plan (CERP) and RECOVER (Chapters 7A and 7B, respectively).

With an integrated perspective on regional water management, this year's volume continues its coverage of Lake Okeechobee (Chapter 10), the Kissimmee Basin (Chapter 11), and coastal ecosystems (Chapter 12). Financial reporting during Fiscal Year 2007 for CERP (Chapter 7A), Lake Okeechobee (Chapter 10), and the Everglades (Chapter 13) is also provided. Volume I chapters are supported by an extensive amount of appended documentation providing data summaries and detailed analyses for the special-interest reader as well as complying with various permit requirements.

A NEW INITIATIVE PROMOTES INTEGRATION OF REGIONAL PROGRAMS AND PROJECTS

As part of the District's strategic initiative to better manage and report on the many programs and projects throughout South Florida, the region has been newly organized into two primary subregions – the Northern and Southern Everglades – based on delineated watershed boundaries. The Northern Everglades spans the Kissimmee area lakes and rivers, Lake Okeechobee,



THE DISTRICT IS CHARGED WITH SAFEGUARDING SOUTH FLORIDA'S WATER QUALITY AND WATER QUANTITY FOR TODAY AS WELL AS FOR FUTURE GENERATIONS.

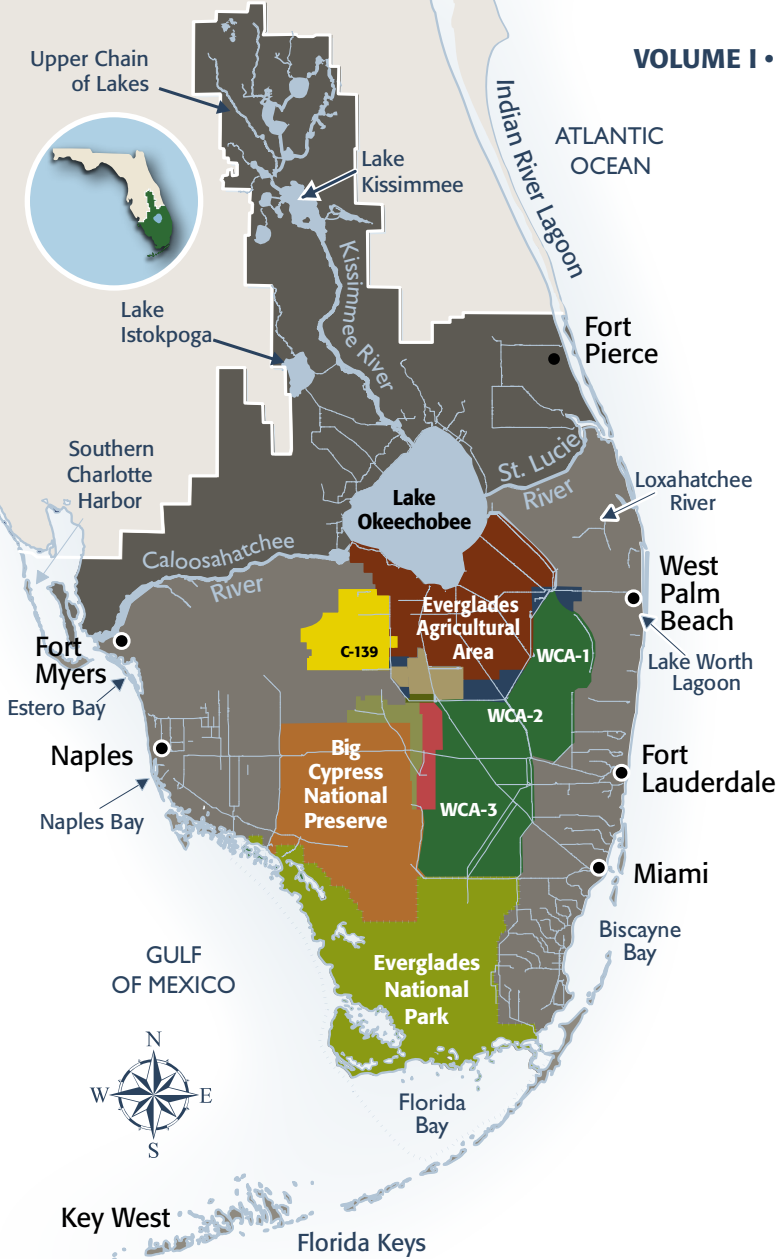
MAJOR AREAS OF THE SOUTH FLORIDA ENVIRONMENT

many regional programs and projects toward attaining the restoration goals of the entire Everglades system (see Volume I, Chapter 7A).









RECORD-BREAKING DROUGHT HITS SOUTH FLORIDA IN 2006 AND LINGERS IN 2007

Over the past century, the Kissimmee-Okeechobee-Everglades and coastal systems in South Florida have been altered fundamentally by changes in spatial extent, hydrology, water quality, and ecology. The massive undertaking of environmental management and restoration in South Florida is quite distinctive in regional scale and complex issues of water quality, flood control, natural systems, and water supply. The far-reaching impacts of these issues, along with related District programs and comprehensive restoration efforts throughout South Florida, are addressed throughout the 2008 SFER. Threading this information together, Chapter 1A provides an integrated summary of the many opportunities and obstacles facing these restoration efforts, which are particularly challenging as extreme meteorological conditions have overwhelmed the South Florida region in recent years.

Most notably, a severe drought has affected South Florida since late 2006. Following back-to-back years of unprecedented hurricane activity and higher-than-normal rainfall, the 2006–2007 drought has had far-reaching impacts on the District's entire 16-county region, which has experienced a combination of voluntary and mandatory water use restrictions since early 2007. While drought conditions diminished toward the coasts as the wet season began in June, water supplies in the center of the region – the Kissimmee Valley and Lake Okeechobee – continued to decline through early July. Widespread drought conditions continued into late 2007, particularly in the Lake Okeechobee watershed, as evidenced by record-low water levels and dry water control structures in the vicinity of the lake. Water use restrictions are expected to continue in order to balance longer-term regional water availability and supply needs. Further details on the drought and its related impacts on the regional water management system and restoration activities are highlighted throughout this volume, particularly in Chapters 2 and 10.



LEGEND

-  CANALS
-  NORTHERN EVERGLADES
-  WATER CONSERVATION AREAS
-  STORMWATER TREATMENT AREAS
-  MICCOSUKEE INDIAN RESERVATION
-  SEMINOLE INDIAN RESERVATION
-  ROTENBERGER AND HOLEY LAND
-  WILDLIFE MANAGEMENT AREAS

and the Caloosahatchee and St. Lucie rivers and estuaries, and encompasses the critical interaction between Lake Okeechobee and its downstream estuaries. The Southern Everglades covers the Water Conservation Areas, Big Cypress National Preserve, Everglades National Park/Florida Bay, and coastal bays and estuaries south of Lake Okeechobee. Importantly, this reorganization will help integrate the planning and implementation of the agency's

Strategies for Reengineering Water Quality Monitoring in South Florida

CONFEDERATION OF WATER QUALITY NETWORKS MUST BE RETHOUGHT

The water quality monitoring networks in South Florida represent a loose confederation of stations from programs and projects driven by various regulatory mandates and needs. Information from these networks is described throughout Volume I chapters in the 2008 SFER. Water quality monitoring by the South Florida Water Management District includes about 2,000 stations and 35,000 sampling events each year, and costs about \$18 million annually. This effort is expected to increase by at least 30 percent over the next decade as new projects are completed for comprehensive restoration across South Florida.



THE WATER CONSERVATION AREA 2A MARSH IS THE SUBJECT OF INTENSIVE MONITORING BY THE DISTRICT.

Faced with considerable escalating costs and increasing demands for monitoring, the District has periodically conducted multiple network “optimizations” to reduce redundancies in monitoring measurements or stations and to ensure that sampling provides essential information for the agency’s mission. While these evaluations have provided some efficiency, continued incremental optimization is likely to result in only modest increases in effectiveness and minimal overall savings. As such, the District is proactively approaching this matter from an entirely new direction by fundamentally reengineering the core concepts of water quality monitoring. The ultimate goal of the reengineering is a less costly monitoring system that provides similar, or even better, information to successfully address questions about the status of South Florida’s ecosystem and performance of regional restoration efforts.

The National Water Quality Monitoring Council has developed a monitoring framework with six activity areas (known as “cogs”) that serve to guide monitoring efforts. As shown on the opposite page, this framework will be used to rework the District’s monitoring into an integrated information system. Although our agency performs activities related to all cogs, current reengineering efforts will focus on the first two steps – “develop monitoring objectives” and “design monitoring program” – to set the stage for the other activities in a reengineered information system. In the near future, agency staff will be developing proposed changes to South Florida’s monitoring program. It is expected that these detailed proposals will be routinely reviewed by an interagency working group with representatives knowledgeable on the geographic setting, mandated requirements, and management informational needs. Stakeholder input from other agencies, organizations, and interested parties will be an important part of the reengineering process.

Required information must be clearly defined at the beginning of the process in order to develop monitoring objectives. Together, state and federal requirements clearly require ongoing monitoring for inflows and outflows of regional ecosystems, as well as various routine water quality sites, such as lakes, rivers, and marshes. However, even without these regulatory requirements, the District’s resource management responsibility could not be fulfilled without mission-critical information on water quality. Essential information needed from water quality

monitoring can be summarized as two broad objectives: to determine the quality of waters in the region and quantify any changes through time, and to assess the effectiveness of environmental management and water quality control programs. Collectively, these will be used to decide how to redesign monitoring programs for the region.

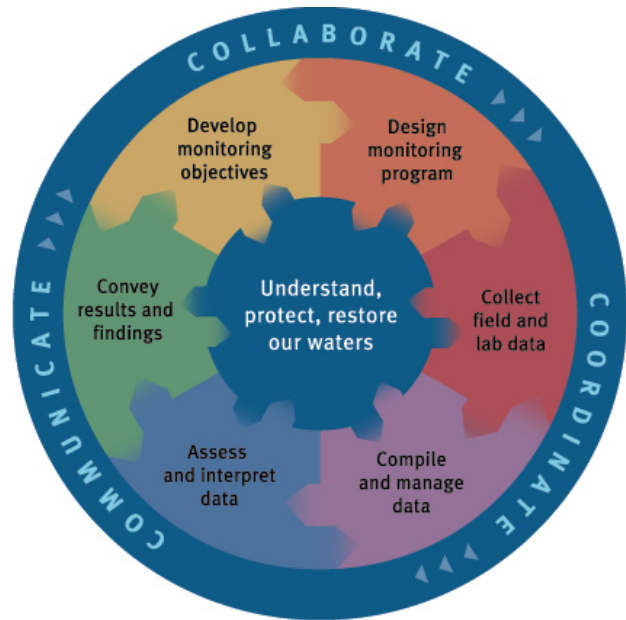
MONITORING IN WATER CONSERVATION AREA 2A PROVIDES A GOOD TEST CASE FOR REENGINEERING

Using the lessons learned from other national and international monitoring programs, the District is now applying this knowledge to propose restructured water quality monitoring in Water Conservation Area 2A (WCA-2A). WCA-2A was selected as a demonstration case for monitoring reengineering because it (1) is a major component of the remnant Everglades, (2) has been monitored extensively for nearly two decades, (3) has typical environmental gradients and mosaics of marsh habitats, and (4) has monitoring at inflow and outflow structures and the marsh itself.

The initial review of existing monitoring procedures quickly identified that field staff is sent to monitor every other week but often is not able to collect samples due to the absence of water or limited flow. As a result, the District has developed a proposal to use real-time flow data to determine the flow status of structures on a regular basis. Under the proposed sampling regime, crews will only be dispatched to collect samples if flow has been recorded at a structure within the previous two weeks. This procedure will efficiently decrease the number of field trips and simultaneously increase the number of samples collected. Similar to existing methods, in this new approach some stations will have a monthly default sampling frequency if not prompted by flow, allowing for some water quality information for periods without any flow.

The reengineered approach to monitoring water management structures was applied using sampling data from the past four years at the S-10 structures that move water into WCA-2A. The results of this test were promising, as all flow events would be sampled, and consistent monthly data for all the inflow structures would be available. When this approach is applied to all structures surrounding WCA-2A, triggering sampling from flow data could decrease field trips by over 50 percent – a major potential

FRAMEWORK FOR REENGINEERING WATER QUALITY MONITORING



FROM THE NATIONAL WATER QUALITY MONITORING COUNCIL, NOVEMBER 2002

cost savings. Consequently, it is expected that the newly proposed approach will successfully provide more useful information using less staff and financial resources.

The next phase of the WCA-2A test case will be an examination of the water quality monitoring within the marsh. The number of factors that must be considered is greater for marsh sampling and, to simplify the process, the network will be analyzed in zones with similar conditions across the area. Deciding on a core, mission-driven network will involve substantial input from the interagency working group and other stakeholders. As part of the reengineering process, other issues will also need to be addressed, such as standardizing methods for data collection, providing adequate quality assurance, determining the optimal frequency and number of sampling locations to meet informational needs, and considering non-traditional statistical approaches in design and data analyses. Collectively, the experience gained by rethinking water quality monitoring in WCA-2A will guide future monitoring optimizations in other geographic areas of South Florida.

Hydrology of the South Florida Environment

Most topics presented in the 2008 SFER – Volume I are strongly linked to regional hydrology. Leading this year's volume, Chapter 2 presents a comprehensive update on the hydrology of the area within the District's boundaries. This chapter provides an overview of the regional water management system and water management activities. Water Year 2007 (WY2007) hydrology, including rainfall, potential evapotranspiration, water levels, inflows, and outflows, for all major components of the South Florida regional water management system is presented and compared to the previous water year (WY2006) and historical conditions. A special section also documents the severe conditions associated with the current drought across South Florida. Additionally, relevant findings on South Florida's hydrologic monitoring system are highlighted in support of current and future regional water resource modeling, planning, and operational decisions.



DURING WATER YEAR 2007, THE ENTIRE SOUTH FLORIDA WATER MANAGEMENT SYSTEM WAS SEVERELY AFFECTED BY WIDESPREAD DROUGHT CONDITIONS.

REGIONAL DROUGHT STRESSES SOUTH FLORIDA'S WATER MANAGEMENT SYSTEM

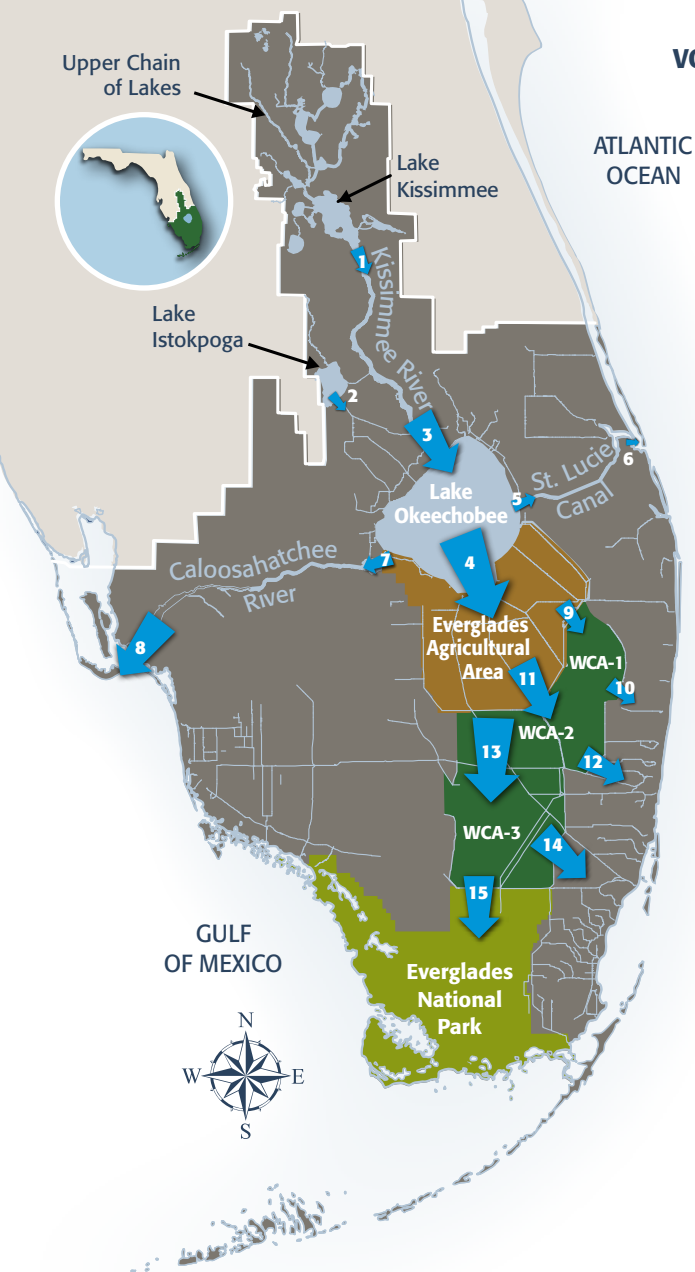
District water managers are constantly faced with the many challenges posed by hydrologic extremes when managing the day-to-day operations of the South Florida water management system. Notably, WY2007 was the third consecutive year of record-breaking figures. Unlike the back-to-back hurricanes experienced in WY2005 and WY2006 with higher-than-normal rainfall, this past year was marked by a lingering drought with far-reaching hydrologic effects throughout South Florida.

As depicted on the opposite map, regional surface water generally moves from north to the south, and there are water supply and coastal discharges to the east and the west. The 2006–2007 drought created an imbalance in water inputs and outputs drastically altering the region's hydrology. As a result of these drought-related impacts,

surface water inflows and outflows in the region were significantly reduced. During WY2007, discharges from Lake Kissimmee and Lake Istokpoga were 17 and 29 percent of historical average flows, respectively. Lake Okeechobee inflow was 30 percent of the historical average and 17 percent of WY2006 inflows. Outflows from Lake Okeechobee to the Everglades Agricultural Area and the Caloosahatchee and St. Lucie estuaries were also sharply reduced due to the limited storage in the lake as well as the diminished inflows into the lake. Flows into and out of the Everglades Protection Area were also reduced by as much as 51 percent.

THE 2006–2007 DROUGHT RANKS IN THE TOP SIX DRIEST PERIODS

The current drought ranks in the top six of the most severe regional droughts based on the rainfall received across South Florida during the wet and dry seasons of WY2007. Rainfall across the District in WY2007 (40.6 inches) was markedly lower than both the previous



REGIONAL INFLOWS AND OUTFLOWS



WATER FLOW (ACRE-FEET IN THOUSANDS)

| | WATER YEAR | |
|--|-------------------|-------------|
| | 2007* | 2006 |
| 1. Lake Kissimmee Outflows | 121 | 1,474 |
| 2. Lake Istokpoga Outflows | 64 | 528 |
| 3. Lake Okeechobee Inflows | 619 | 3,708 |
| 4. Lake Okeechobee Outflows | 908 | 3,979 |
| 5. St. Lucie Canal Inflows | 82 | 907 |
| 6. St. Lucie Canal Outflows | 21 | 1,193 |
| 7. Caloosahatchee Inflows | 180 | 2,175 |
| 8. Caloosahatchee Outflows | 694 | 3,616 |
| 9. Water Conservation Area 1 Inflows | 251 | 252 |
| 10. Water Conservation Area 1 Outflows | 232 | 206 |
| 11. Water Conservation Area 2 Inflows | 584 | 895 |
| 12. Water Conservation Area 2 Outflows | 460 | 1,109 |
| 13. Water Conservation Area 3 Inflows | 849 | 1,685 |
| 14. Water Conservation Area 3 Outflows | 565 | 1,821 |
| 15. Everglades National Park Inflows | 578 | 1,901 |

* Water Year 2007 flow is reflected on map.

water year, WY2006, (54.8 inches) and the historical average (52.8 inches). From May 2006 through April 2007, the District experienced a rainfall deficit of 12.1 inches, with the largest deficit of 22.3 inches in the Upper East Coast area. The Lake Okeechobee, East Everglades Agricultural Area, and Martin-St. Lucie areas had so little rainfall that such conditions are only expected to occur once every 100 years. In contrast, the Southeast (Broward, Miami-Dade, and Everglades National Park), the Big Cypress Preserve, and the Southwest Coast rainfall areas received more rain compared to the respective average rainfall. Despite these localized increases in rainfall, there was not enough rainfall over the Lake Okeechobee watershed to generate runoff sufficient enough to raise the lake level, thereby placing further constraints on regional water management.

RAIN DEFICITS TRIGGER LOWER WATER LEVELS ACROSS SOUTH FLORIDA

During WY2007, water levels in lakes in the Kissimmee and Okeechobee watersheds and the Water Conservation Areas were lower than historical averages and WY2006 water levels as a result of the extreme rainfall deficits. While Lake Okeechobee water levels approached record lows by the close of the water year, lake levels continued to decline to a historical record low in July 2007 (see Volume I, Chapter 10, for further details). As lake levels dropped, the amount of available water for water supply decreased drastically for the entire South Florida region. The prolonged drought continued through 2007, and heightened efforts to increase water conservation measures and proactively manage regional water resources are expected to continue into the foreseeable future.

Status of Water Quality in the Everglades Protection Area

Information from comprehensive water quality monitoring programs in the Everglades Protection Area (EPA) during Water Year 2007 (WY2007) is evaluated in Chapter 3A of the 2008 South Florida Environmental Report – Volume I. This chapter assesses water quality parameters that did not meet state Class III water quality criteria during WY2007 and evaluates conditions affecting water quality on a regional scale in the EPA. These criteria are defined in Section 62-302.530, Florida Administrative Code, and establish enforceable management and societal goals for Everglades water quality conditions.

EVERGLADES WATER QUALITY GENERALLY COMPLIES WITH STATE CRITERIA

The South Florida Water Management District annually monitors over 100 water quality parameters in the EPA. The Florida Department of Environmental Protection compares water quality data for about 80 of these parameters with the state's Class III water quality criteria pursuant to Chapter 62-302, Florida Administrative Code. Based on this evaluation, most WY2007 water quality data from the EPA continue to meet applicable water quality criteria. However, similar to recent years, some parameters exceeded state criteria (identified as “excursions”). These excursions vary greatly across different EPA regions, as expected considering local environmental conditions and water management activities. Continuing the trend observed in

previous years, water quality excursions in WY2007 were identified for dissolved oxygen, pH, alkalinity, conductivity, and un-ionized ammonia.

Dissolved oxygen excursions, within the interior marsh, occurred primarily in phosphorus-enriched areas. Such areas are expected to remain impaired until total phosphorus concentrations in surface water and sediment are reduced and biological communities recover. However, when unenriched (phosphorus-unimpacted) areas were evaluated separately, dissolved oxygen was classified as a minimal concern for the Everglades National Park and Water Conservation Area 2 (WCA-2) and a potential concern for the Arthur R. Marshall Loxahatchee National Wildlife Refuge (Refuge) and Water Conservation Area 3. Excursions from pH and alkalinity criteria continued to be restricted mainly to the Refuge and related to natural conditions within the area.

Five pesticides – atrazine, chlorpyrifos ethyl, p,p'-dichlorodiphenyldichloroethylene, dieldrin, and endosulfan – were each detected at concentrations above their respective Class III criteria or chronic toxicity-based guidelines. These pesticide excursions occurred at the inflows to the Refuge and WCA-2 and from the C-111 basin. These findings are consistent with previous consolidated reports, which have noted similar levels in localized areas across the EPA.

EACH YEAR, HUNDREDS OF HELICOPTER FLIGHTS ARE DEDICATED TO HELP DISTRICT FIELD STAFF COLLECT WATER SAMPLES IN THE MANY REMOTE AREAS ACROSS THE EVERGLADES.



Mercury and Sulfur Monitoring, Research and Environmental Assessment in South Florida

The Florida Department of Environmental Protection and the South Florida Water Management District continue to support studies into the causes, risks, and solutions to the Everglades mercury and sulfur problems. In the 2008 SFER – Volume I, Chapter 3B reports on the current status of mercury and sulfur science in South Florida, highlighting recent collaborative research findings and results during Water Year 2007.

FISH MERCURY LEVELS IN THE EVERGLADES CONTINUE TO EXCEED REGULATORY GUIDELINES

Methylmercury is a highly toxic form of mercury that bioaccumulates strongly in aquatic food chains, thereby posing significant health risks to humans and wildlife that consume fish. While mercury levels in Everglades largemouth bass declined substantially in the Water Conservation Areas (WCAs) from the early 1990s to 1998, they are little changed from 1998 to the present. These levels currently average about 0.4 milligrams per kilogram (mg/kg) and therefore remain above the recommended U.S. Environmental Protection Agency's human health criterion of 0.3 mg/kg for fish consumption. In contrast to the trend for the WCAs, mercury levels in bass from the Everglades National Park (Park) have generally increased since 1998 and are presently at elevated concentrations (up to 1.4 mg/kg) exceeding federal predator protection criteria. Mercury continues to be a regional water quality concern, particularly in methylmercury “hot spot” areas in the Park.

THE ROLE OF SULFUR IN IMPACTED EVERGLADES MARSHES IS KEY TO UNDERSTANDING THE MERCURY PROBLEM

Local mercury atmospheric emissions from South Florida have declined by about 90 percent since their peak levels in the early 1990s. However, in general total mercury wet deposition in South Florida did not decline significantly over the 1994–2006 period and remains greater than for



RESEARCH CONTINUES TO ASSESS THE EFFECTS OF ELEVATED LEVELS OF MERCURY AND SULFUR ON EVERGLADES WETLAND COMMUNITIES.

most other U.S. regions. This emphasizes the need to determine the relative importance of local, regional, and global atmospheric mercury sources to support evaluation of options for reducing mercury in the Everglades.

Sulfur has emerged as an important water quality issue, as it strongly affects the rate of methylmercury production and, as a biologically active element, sulfur has forms that are highly toxic (i.e., sulfide) or that may promote phosphate releases from sediments (i.e., sulfate). Sulfate levels above 1.0 milligram per liter (at or near background levels) are evident in about 60 percent of the Everglades marshes, with the highest concentrations (about 100 times greater) primarily in the northern Everglades Protection Area.

Further research is needed to quantify sulfur sources and better understand sulfur-related effects on the Everglades ecosystem and to evaluate the efficacy of sulfur loading controls in reducing mercury concentrations and other consequences of sulfur inputs. Additionally, existing monitoring and research data must continue to be analyzed to help focus priority research and analysis activities and to identify the best possible management options across the region.

Status of Phosphorus and Nitrogen in the Everglades Protection Area

The Everglades ecosystem evolved as a nutrient-poor, phosphorus-limited system, with the natural flora and fauna thriving under these harsh conditions. While primary nutrients, particularly phosphorus and nitrogen, in surface water are essential to the existence and growth of aquatic organisms, relatively small additions of these nutrients can have dramatic impacts on the native ecosystem. Large-scale efforts are continuing to monitor the status and trends of nutrients across the Everglades. In the 2008 SFER – Volume I, Chapter 3C presents an overview of the status of phosphorus and nitrogen levels in surface water within the Everglades Protection Area (EPA) during Water Year 2007 (WY2007) as well as comparisons to previous water years. The chapter also highlights efforts in assessing phosphorus in the EPA against the requirements in the approved phosphorus criterion rule.

PHOSPHORUS LEVELS IN THE EVERGLADES CONTINUE TO SHOW A STRONG RESPONSE TO RESTORATION EFFORTS

Similar to previous years, WY2007 total phosphorus (TP) concentrations in surface water showed a decreasing trend from north to south across the EPA regions. As shown on the opposite map, the highest levels were present in the inflow to the Arthur R. Marshall Loxahatchee National Wildlife Refuge (Refuge) and Water Conservation Area 2A (WCA-2A), with concentrations decreasing to a minimum within Everglades National Park (Park). Because TP levels in the EPA have shown marked changes in response to various restoration activities, historical datasets were reorganized in this year's chapter to provide a more meaningful comparison with the current water year's data.

During WY2007, TP concentrations in the northern portions of the EPA generally continued to decrease following the elevated levels observed in WY2005. These reductions are likely due to lower levels of phosphorus-enriched discharges from the Everglades Agricultural Area and Lake Okeechobee, improved treatment by STA-1E, and recovery from the climatic extremes of hurricanes and marsh dryouts experienced during WY2005. WY2007 inflow and interior geometric mean concentrations also were typically lower than the most recent three-year period, WY2005–WY2007. In contrast, increased TP concentrations in the southern portions of the EPA in WY2007 reflect a strong influence from recent dry conditions and low water levels from the drought.

During WY2007, TP loads from surface sources to the EPA totaled about 93.8 metric tons, with a flow-weighted mean concentration of 56.0 micrograms per liter – a decrease of approximately 46 percent compared to WY2006. This notable reduction resulted primarily from reduced flow volumes associated with the 2006–2007 drought. The effectiveness of the Best Management Practices (BMPs) and Stormwater Treatment Areas (STAs) also continues to be demonstrated by decreased TP loading to the EPA, although this is less apparent in the Park, where inflow concentrations have remained near background levels and TP loading responds more directly to changes in flow and climatic conditions.

SECOND YEAR OF APPLYING THE PHOSPHORUS WATER QUALITY CRITERION SHOWS SIMILAR TRENDS

The Florida Department of Environmental Protection developed a specific method to assess achievement of

IN 2007, WATER QUALITY SAMPLING PROVED CHALLENGING DUE TO EXTENSIVE DROUGHT CONDITIONS IN THE EVERGLADES.



TOTAL PHOSPHORUS CONCENTRATIONS IN THE EVERGLADES PROTECTION AREA

WATER YEAR 2007 GEOMETRIC MEAN PHOSPHORUS CONCENTRATIONS (PARTS PER BILLION)

REFUGE
inflow = 57.6
interior = 9.3

WCA-2A
inflow = 25.4
interior = 13.3

WCA-3A
inflow = 23.8
interior = 9.7

PARK
inflow = 11.1
interior = 6.3

Similar to last year, the results of the four-part assessment using WY2003–WY2007 data showed that the unimpacted portions of each WCA passed all parts of the test and therefore met the TP criterion. In contrast, WY2003–WY2007 data from the portions of each WCA that have been impacted by historical phosphorus enrichment did not meet the criteria due to failing one or more parts of the test. As predicted, the geometric mean TP concentrations at most individual sites within the impacted portions of the WCAs exceeded both the 10-ppb five-year network limit and the 15-ppb annual site limit. These findings are expected to occur for awhile because the high TP concentrations in existing soils in the WCAs are likely to take several decades to be restored to more historical levels. Due to the number of newly established monitoring sites and the dry conditions experienced during the last couple of years, TP data is limited in some portions of the EPA. As more robust datasets are established over the next several years, future assessments are expected to provide a more complete picture of phosphorus throughout the area.

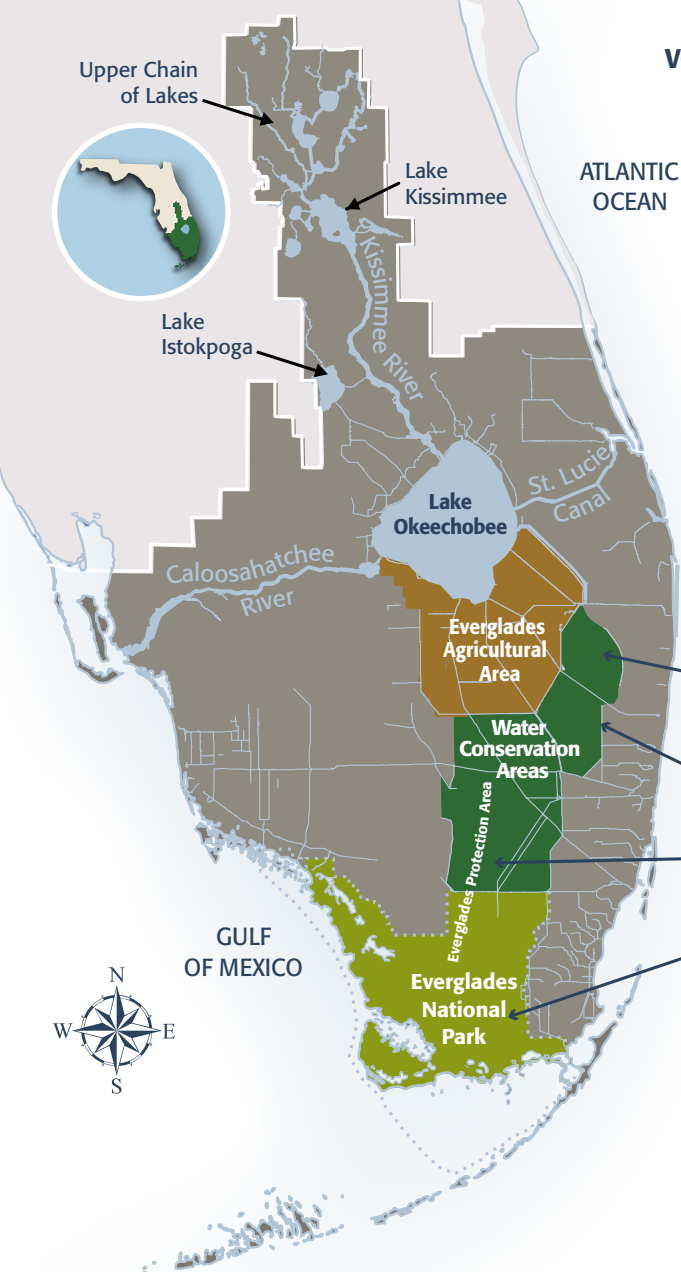
WATER YEAR 2005–2007 GEOMETRIC MEAN PHOSPHORUS CONCENTRATIONS (PARTS PER BILLION)

| EVERGLADES AREAS | INFLOW | INTERIOR |
|------------------|--------|----------|
| REFUGE | 65.9 | 11.1 |
| WCA-2A | 26.2 | 14.8 |
| WCA-3A | 24.0 | 9.4 |
| PARK | 9.8 | 5.8 |

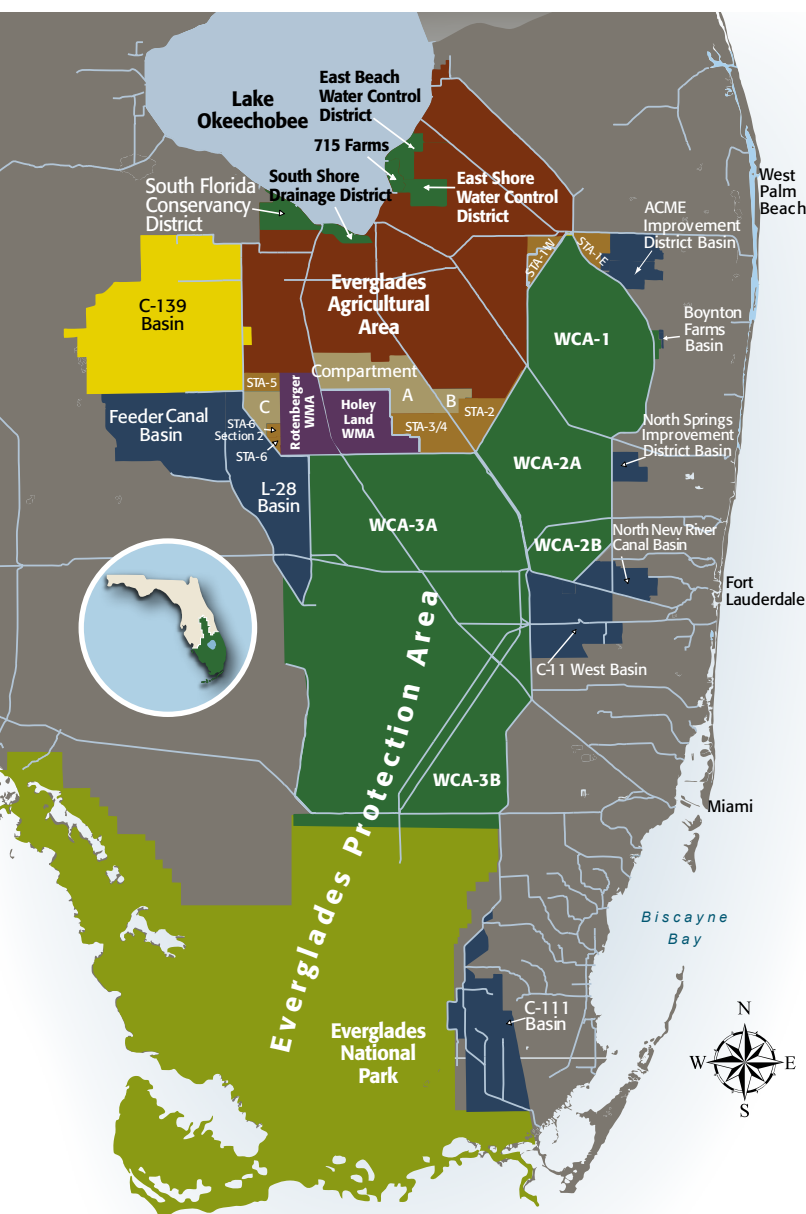
the TP criterion, which will serve as a uniform framework (or “template”) to guide future phosphorus evaluations in the EPA. Approved in mid-2005, the newly established assessment is based on the four-part test outlined in the TP rule and uses available data from existing monitoring sites in the EPA during the most recent five-year period. This test is comprised of four components, which establish goals for TP concentrations for the monitoring networks within each portion of the EPA and for individual monitoring stations within the EPA on an annual or five-year basis. Importantly, all four components of the test must be achieved for the water body to comply with the phosphorus criterion.

NITROGEN LEVELS IN THE EVERGLADES DIP SLIGHTLY IN WATER YEAR 2007

As in previous years, total nitrogen concentrations during WY2007 decreased moving south through the EPA. Similar to phosphorus, this gradient generally reflects the higher concentrations associated with developed landscapes to the northern portions of the system, with levels gradually decreasing as water flows southward across the marsh. Total nitrogen concentrations measured across all portions of the EPA during WY2007 were generally comparable to or slightly lower than those observed in previous years. These results demonstrate the continued effectiveness of agricultural BMPs and nutrient removal by the STAs. During WY2007, geometric mean total nitrogen concentrations at interior marsh and inflow stations, except Refuge inflows, were lower than previous water years, with levels from the Park to the Refuge ranging from approximately 1.0 to 2.1 parts per million, respectively.



Phosphorus Source Controls for the Basins Tributary to the Everglades Protection Area



LEGEND

- C-139 BASIN
- EVERGLADES AGRICULTURAL AREA BASIN
- NON-EVERGLADES CONSTRUCTION PROJECT BASINS

In the 2008 SFER – Volume I, Chapter 4 updates the progress of the Everglades Source Control Program, mandated by the amended Everglades Forever Act (EFA) to control phosphorus in discharges tributary to the Everglades Protection Area (EPA). The South Florida Water Management District must comply with specific requirements in the operating permits issued by the Florida Department of Environmental Protection to assure that the District complies with the EFA. These permits are the Everglades Construction Project (ECP) and non-Everglades Construction Project (non-ECP) permits. Both permits have adopted a comprehensive approach of controlling phosphorus at the source utilizing regulatory, voluntary, and educational programs. To meet both permit requirements, basin-specific water quality data for total phosphorus (TP) during Water Year 2007 (WY2007) is reported in this chapter.

Source controls are a core component of the overall Everglades Program. The ECP permit requires the District to construct, maintain, and operate the ECP in the Everglades Agricultural Area (EAA) and the C-139 basins, the largest tributary sources to the EPA (see map). It also requires the District to provide reasonable assurance that a phosphorus source control program using Best Management Practices (BMPs) has been implemented in these basins prior to discharging into Stormwater Treatment Areas (STAs).

The non-ECP permit regulates the operation and maintenance of discharge structures within the District's control, and that discharge into, within, or from the EPA but are not included in the ECP. The following eight drainage areas that discharge directly into the EPA, with limited downstream treatment through the STAs are known as non-ECP basins: the ACME Improvement District, North Springs Improvement District, C-11 West, North New River Canal, Feeder Canal, L-28, Boynton Farms, and C-111

TRIBUTARY BASINS IN THE EVERGLADES PROTECTION AREA

basins (see map). The District is responsible for administering source control programs in these basins as well as a monitoring program to measure program effectiveness toward achieving compliance with water quality standards.

In addition to the original EFA source control programs, the amended EFA references the Long-Term Plan for Achieving Water Quality Goals in the EPA, which identifies supplemental water quality improvement projects for ultimately achieving Everglades long-term water quality criteria (see Volume I, Chapter 8). For the ECP and non-ECP basins, Long-Term Plan objectives are to optimize existing phosphorus source control programs for urban and agricultural BMPs, and integration with the Comprehensive Everglades Restoration Plan (CERP) and other federal projects.

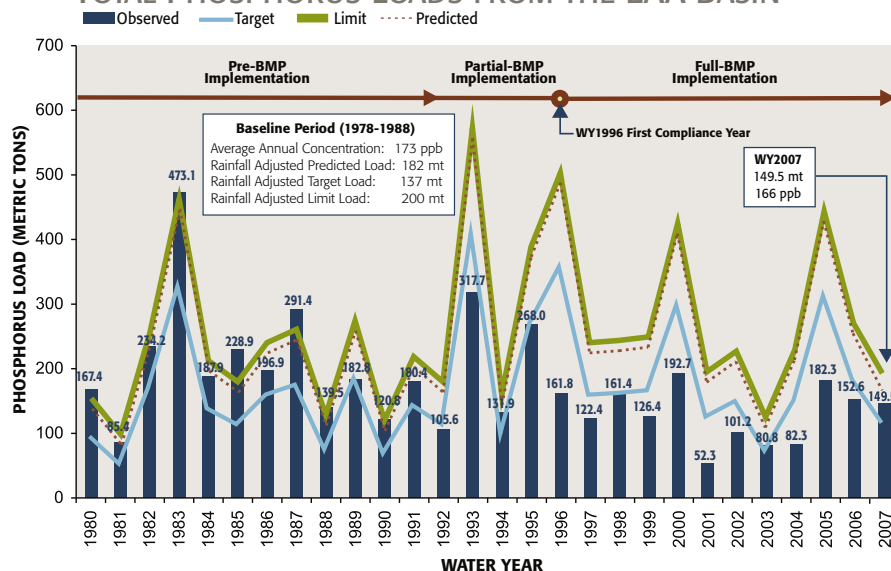
PHOSPHORUS SOURCE CONTROLS ARE MAKING A DIFFERENCE DESPITE CLIMATIC EXTREMES

The EAA basin source control BMPs have continued to reduce phosphorus inputs to the EPA for the twelfth consecutive year. Most notably, this program has prevented a total of 1,767 metric tons (mt) of phosphorus from leaving the EAA in runoff water. As shown on the top figure, the TP load discharged from the EAA basin in WY2007 was 150 mt, representing an 18 percent decrease from the TP load predicted from the 10-year, pre-BMP baseline period (October 1, 1978, through September 30, 1988). The EFA requires the EAA basin to reduce TP loads by 25 percent when compared to the baseline period using the statutorily mandated compliance methodology. Although this reduction goal was not attained in WY2007, the compliance performance levels continue to be met based on the current, three-year average load reduction of 46 percent, despite the extreme fluctuations between hurricane and drought conditions experienced over the past three water years. Adaptive management of both BMPs and STAs is expected to provide further declines in TP loads and concentrations attributable to the EAA basin and conveyed to the EPA.

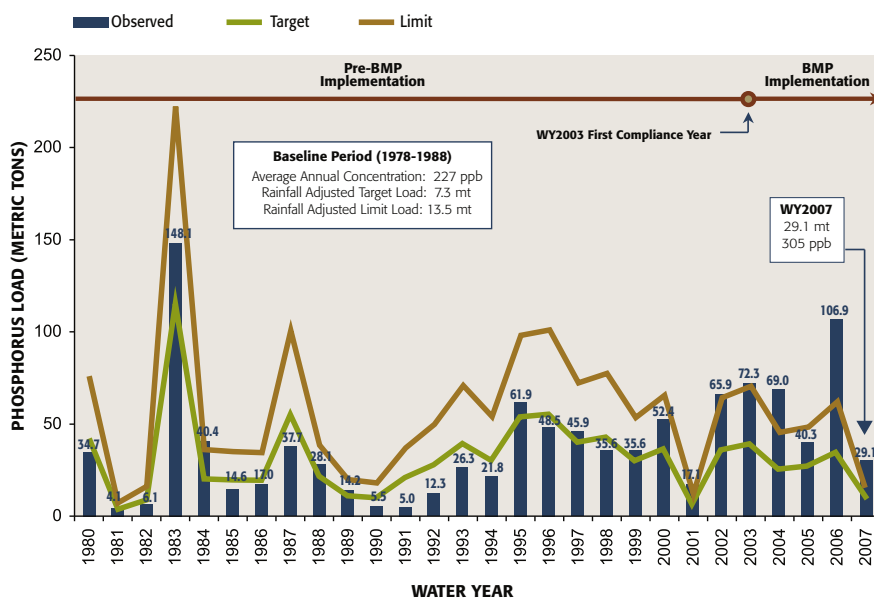
THE C-139 BASIN CONTINUES TO FACE NOTABLE CHALLENGES

WY2007 marks the fifth year of mandatory BMP implementation for the C-139 basin. Despite a low TP load and dry conditions, the basin did not meet its requirement

TOTAL PHOSPHORUS LOADS FROM THE EAA BASIN

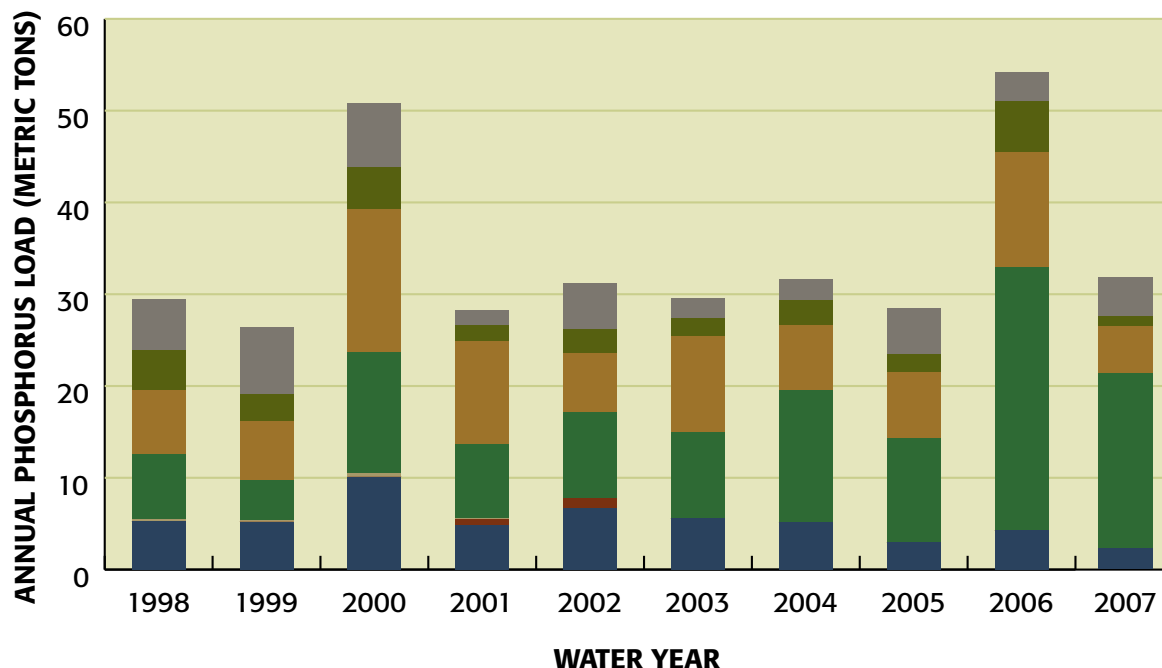


TOTAL PHOSPHORUS LOADS FROM THE C-139 BASIN



to maintain historical TP load levels (see bottom figure). Because the previous water year marked the fourth consecutive year of basin non-compliance with the EFA to maintain historical runoff loads, the District initiated rule development pursuant to Chapter 120, Florida Statutes, during WY2007 to ensure that the objectives of the EFA are met. Beyond BMPs, additional source control activities and investigations initiated in WY2006 or earlier were continued in WY2007, which include (1) increasing research on local phosphorus application rates and movement, (2) developing a hydrologic and water quality model to evaluate on-farm and regional water quality improvement projects,

TOTAL PHOSPHORUS LOAD DISTRIBUTIONS FOR THE NON-EVERGLADES CONSTRUCTION PROJECT BASINS



(3) expanding and optimizing the upstream water quality monitoring network, and (4) soliciting input from basin landowners on BMP implementation and water quality improvement activities.

FURTHER MEASURES TO REDUCE PHOSPHORUS CONTINUE IN OTHER TRIBUTARY BASINS

The primary strategy for the non-ECP basins is to further develop the BMP programs initiated in WY1998 and to rely on future CERP projects and other local construction projects for holding or diverting flows that ultimately discharge into the EPA. Unlike the ECP basins, currently there is no specific phosphorus requirement established at the point of discharge for the non-ECP basins. It is anticipated that the implementation of Water Quality Improvement Plans for each non-ECP basin will significantly contribute to achieving Everglades long-term water quality goals. These basin-specific plans include a combination of BMPs, landowner training and education, modified stormwater permits, cooperative agreements, and basin-specific regulatory programs. Water quality data is also continuously tracked so that the plans can be modified adaptively, as needed, to optimize phosphorus reduction at its source.

Water quality data from non-ECP structures in WY2007, the tenth year of non-ECP data, were evaluated against state water quality criteria to determine the effectiveness of source controls. The quality of water discharged into the

LEGEND

- ACME IMPROVEMENT DISTRICT BASIN
- C-111 BASIN
- L-28 BASIN
- FEEDER CANAL BASIN
- NORTH SPRINGS IMPROVEMENT DISTRICT BASIN
- NORTH NEW RIVER CANAL BASIN
- C-11 WEST BASIN

EPA during WY2007 was generally acceptable, with some exceptions such as phosphorus and dissolved oxygen. Similar to previous years, there were significant differences in TP concentrations between non-ECP basins, with the highest levels observed in the north and west (ACME Improvement District and Feeder Canal basins), decreasing southward with the lowest levels (C-111 basin). As shown on the figure above, in WY2007 the elevated TP load from the Feeder Canal basin was the main contributor of the non-ECP basins (about 60 percent) to the overall TP load into the EPA. The extreme rainfall received in the Feeder Canal basin from late August through mid-September 2006 likely contributed to this high level. The District is continuing to implement source control measures for all non-ECP basins and track their performance against downstream established TP concentration limits and proposed Technology-based Effluent Limitations.

STA Performance, Compliance and Optimization

As mandated by the 1994 Everglades Forever Act, over 40,000 acres of large constructed wetlands, known as Stormwater Treatment Areas (STAs), have been established along the southern and eastern extent of the Everglades Agricultural Area and are managed by the South Florida Water Management District. As surface water moves through vegetated treatment cells, the STAs accumulate phosphorus in sediments through biological and chemical processes, thereby reducing total phosphorus (TP) levels in waters entering into the Everglades Protection Area (EPA). In the 2008 SFER – Volume I, Chapter 5 presents the Water Year 2007 (WY2007) status of the six STAs (STA-1E, STA-1W, STA-2, STA-3/4, STA-5, and STA-6) including operations, maintenance, and management; phosphorus removal performance; water quality monitoring; and permit compliance (see overview on page 20). This chapter also summarizes the progress of the STA enhancements projects identified in the Long-Term Plan for Achieving Water Quality Goals in the EPA, known as the Long-Term Plan (see Volume I, Chapter 8).

TREATMENT AREAS CONTINUE TO PERFORM WELL DESPITE SOME DIFFICULTIES

The ability of the STAs to assimilate phosphorus is a vital part of Everglades restoration. Notably, the STAs have retained over 900 metric tons (mt) of TP since 1994. In WY2007, the STAs combined received more than 900,000 acre-feet of inflow, a decrease of about 36 percent from WY2006 due to drought conditions

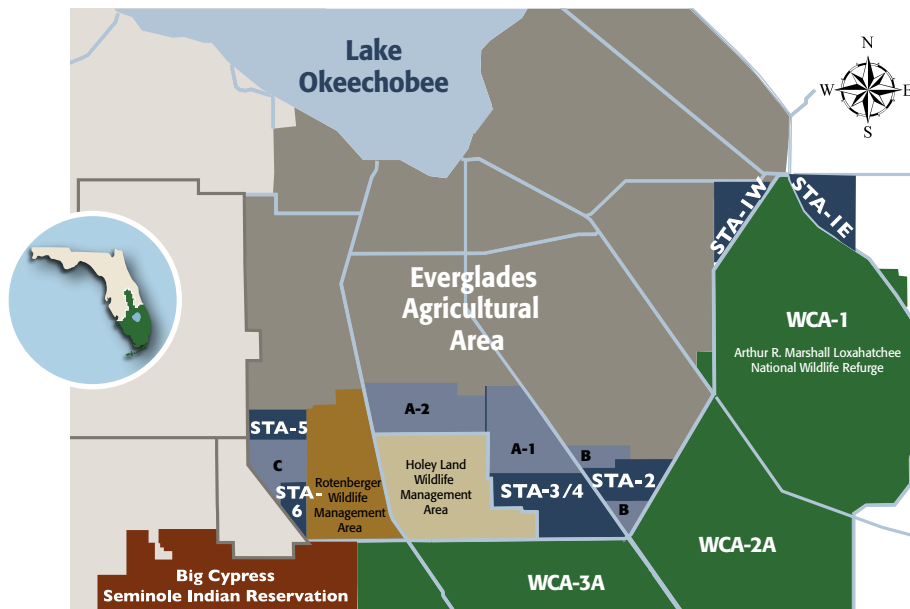
experienced in the region. During this water year, the STAs reduced TP levels from an inflow flow-weighted mean concentration of 187 parts per billion (ppb) to an outflow concentration of 58 ppb. The STAs also retained 153 mt of phosphorus, while reducing the inflow TP load by 71 percent. Despite operational difficulties and climatic extremes from hurricanes to droughts over recent years, overall the STAs continue to significantly reduce phosphorus levels in stormwater discharges to the EPA.

NEW CELL EXPANSIONS ARE COMPLETED IN WATER YEAR 2007

Structural, vegetative, and operational enhancements for each STA are outlined in the Long-Term Plan. In support of these efforts, many STA expansion and enhancements projects were executed in WY2007. STA enhancements include the construction of interior levees and water control structures, improvements for surface water flow, and adjustments to vegetation composition. Notably, newly constructed cell expansions at STA-2, STA-5, and STA-6 became flow-capable in December 2006, increasing the total amount of effective treatment area by nearly 6,000 acres. Additionally, the District is designing and constructing facilities to provide recreational use opportunities for the public. Duck hunting, bird watching, and hiking are currently offered at STA-1E, STA-1W, STA-3/4, and STA-5, while more activities and locations, such as STA-2, will be added in future years.

DURING WATER YEAR 2007, STORMWATER TREATMENT AREA ACTIVITIES INCLUDED LONG-TERM PLAN ENHANCEMENTS CONSTRUCTION, REHABILITATION EFFORTS, AND OPTIMIZATION AND SUSTAINABILITY STUDIES.





2007 DROUGHT CONDITIONS CUT OFF WATER FLOW FROM LAKE OKEECHOBEE

During the 2006–2007 drought, the District's STA Management Division and Operations and Maintenance Department worked together closely to set priorities and water delivery strategies. Drought target stages were developed with minimal water depths established at 6 inches for submerged aquatic vegetation (SAV) communities and 6 inches below the ground surface for the emergent-dominated treatment cells. The durations of low water stage and possible impacts on the vegetation were taken into account, along with the likelihood of

invasion by exotics. During WY2007, the STAs received about 15,000 acre-feet of water from Lake Okeechobee before the lake stage became too low for water to move through the control structures. Existing waters in the STAs enabled levels within most of the treatment cells to stay close to the drought target stage. A series of drought-related studies are currently under way to determine optimum water depths for desirable vegetation, stress indicators, and the recovery potential of drought-impacted plants.

STA OVERVIEW

DURING WATER YEAR 2007*

| | |
|----------------|---|
| STA-1E | <ul style="list-style-type: none"> Inflow TP reduced from 239 ppb to 71 ppb 73% reduction in TP load Retained 23.3 mt TP Operational permit issued in August 2006 Construction of USACE PSTA Demonstration Project completed; Cells 1 and 2 will remain off-line during the demonstration phase Recreational opportunities (bird watching) occurred; recreational facilities under construction |
| STA-1W | <ul style="list-style-type: none"> Inflow TP reduced from 277 ppb to 119 ppb 55% reduction in TP load Retained 23.0 mt TP Major rehabilitation efforts conducted in Eastern Flow-way (Cells 1 and 3) and Western Flow-way (Cells 2 and 4) Long-Term Plan Enhancements completed in Eastern Flow-Way (Cells 1 and 3) Recreational opportunities (bird watching) occurred; recreational facilities under construction |
| STA-2 | <ul style="list-style-type: none"> Inflow TP reduced from 167 ppb to 41 ppb 76% reduction in TP load Retained 33.9 mt TP New treatment cell (Cell 4) became flow-capable in December 2006 |
| STA-3/4 | <ul style="list-style-type: none"> Inflow TP reduced from 146 ppb to 22 ppb 86% reduction in TP load Retained 60.1 mt TP Full-scale PSTA Implementation Project is in operational phase Vegetation conversion under way in Cell 1 Construction of recreational facilities completed |
| STA-5 | <ul style="list-style-type: none"> Inflow TP reduced from 299 ppb to 192 ppb 41% reduction in TP load Retained 8.8 mt TP New treatment area (Flow-way 3) became flow-capable in December 2006 Recreational opportunities (hunting) occurred |
| STA-6 | <ul style="list-style-type: none"> Inflow TP reduced from 109 ppb to 45 ppb 79% reduction in TP load Retained 3.4 mt TP New treatment area (Section 2) became flow-capable in December 2006 |

PROGRESS CONTINUES TO BE MADE TO ENHANCE AND STABILIZE TREATMENT AREAS

Applied research conducted in the STAs is focusing on ways to optimize performance and stabilize the STAs for long-term sustainability. Using information from research studies and utilizing the opportunities granted by the regional drought conditions, major rehabilitation efforts were completed in STA-1W. These activities included removing phosphorus-rich floc and sediment from treatment cells, adding narrow emergent vegetation strips within submerged aquatic vegetation cells, and planting rice to stabilize sediments and allow establishment of more desired plants.

The establishment of more desirable vegetation, particularly those species that are most effective in phosphorus removal, is key to STA management. In summer 2007, nearly 60,000 pounds of SAV were harvested from STA-2 and added to the treatment areas at STA-1W using helicopters. A full-scale implementation project using algae, referred to as Periphyton Stormwater Treatment Areas (PSTA), is now in the operational phase in STA-3/4. In WY2007, the U.S. Army Corps of Engineers (USACE) completed construction of the PSTA project in STA-1E. Focused efforts to optimize STA performance are continuing, and additional improvements are being made as new information becomes available.

*See text on pages 19 and 20 for definitions of acronyms used in the table.

Ecology of the Everglades Protection Area

SCIENTIFIC RESEARCH IS VITAL TO RESTORING EVERGLADES HABITATS

Over the last century, drainage of the Everglades has dramatically changed South Florida's landscape. As a result of this altered hydrology, the Everglades has been reduced to half its original size, water tables have dropped, hydroperiods have been altered, flows have been diverted, wetlands have been impounded, wildlife has been reduced, water quality has been degraded, and habitats have been invaded by nonindigenous plants and animals. It is evident that several important factors – diminished extent of the Everglades and surrounding uplands, changes in the soil and topography, presence of exotic species, and the current system of canals and levees – all constitute constraints on environmental restoration to pre-drainage conditions. The challenge facing science and society is determining which key hydrologic driving forces will be restored to guide future succession in the remaining Everglades. Research efforts are essential to meet this challenge.

In the 2008 SFER – Volume I, Chapter 6 updates recent ecological research programs and studies associated with wildlife, plant, ecosystem, and landscape ecology of the Everglades Protection Area during Water Year 2007 (WY2007). These programs, sponsored by the South

Florida Water Management District and other collaborating agencies, are focusing on some key research areas, including hydrology, water quality, and ecosystem structure and function, to support the development of performance measures and identification of alternatives for Everglades preservation and restoration.

WADING BIRD NESTING DROPS IN 2007

Wading birds are excellent indicators of wetland ecosystem health and therefore have a central role in Everglades restoration and water management. Wading bird nesting success is focused on five species in the Greater Everglades region, including the great egret (*Casmerodius albus*), snowy egret (*Egretta thula*), tricolored heron (*Egretta tricolor*), white ibis (*Eudocimus albus*), and wood stork (*Mycteria americana*). The timing of breeding, number of nests, and location of nesting colonies within the Everglades are specific parameters being used to evaluate restoration progress. Wading birds are of special interest to the public and play a prominent role in the District's operations as well as various initiatives, such as the development of Minimum Flows and Levels.

For the past 11 years, the District and other partnering agencies have been monitoring and reporting on annual wading bird nesting success in South Florida. The estimated

IN SUMMER 2006, PRESCRIBED BURNING WAS CONDUCTED FOR
FIRE PROJECT EXPERIMENTS IN WATER CONSERVATION AREA 2A.



number of wading bird nests in South Florida in WY2007 was about 37,600. Following a rising trend in recent years, this represents more than a 30 percent decline since WY2006, and is nearly 50 percent lower than WY2002 – the best nesting year on record since the 1940s. This year's decrease in nests was attributed to poor foraging caused by dry conditions in late 2006 and rain-driven depth increases in spring 2007, which coincided with the breeding season. Such far-reaching impacts of hydrological variations on food supplies for wading birds have also been observed in more detailed, experimental feeding programs.

STUDIES FOCUS ON THE RECOVERY OF IMPACTED EVERGLADES ECOSYSTEMS

A significant portion of the Everglades ecosystem has been impacted by excessive phosphorus levels. Under current regional conditions, phosphorus-enriched areas are readily evidenced by nearly 30,000 acres of cattail (*Typha spp.*) stands that have extensively replaced the historic Everglades landscape of a sawgrass and slough mosaic. Over and above the ongoing efforts being implemented by the District to monitor and control the release of elevated phosphorus into the Everglades, considerable restoration activities are also under way to remove invasive cattail across the Water Conservation Areas. For the second year, the District continued efforts for two projects in Water Conservation Area 2A to evaluate how the large-scale manipulation of cattail communities affects impacted ecosystems. The first project, the Fire Project, uses controlled burning to physically remove cattails. The second project, the Cattail Habitat Improvement Project, uses herbicides to maintain slough-like openings, similar to those present in unimpacted areas of the Everglades, to increase wildlife utilization.

The past year's preliminary findings of these two projects highlighted some significant ecological mechanisms. One is the significant increase in total phosphorus concentrations in both surface water and pore water in sediment following a cattail fire. Another is the ability for open plots to grow more nutritional plants, such as algae, and support more foraging for wading birds than the surrounding cattail habitat. Examining fire as a possible management tool for vegetation recovery also has generally shown that fire does affect vegetative and biogeochemical processes within the impacted areas. Continued sampling and analysis over the next few years will assess whether sawgrass can replace cattail, and whether open plots can function as natural sloughs. Together, these projects will help to better understand the factors and uncertainties involved in accelerating the recovery of impacted regional wetlands.



PLANTED TREE ISLANDS AND FLUMES IN THE LOXAHATCHEE IMPOUNDMENT LANDSCAPE ASSESSMENT AREA ARE BEING USED TO STUDY WETLAND HEALTH.

PLANNING PROVIDES A FRAMEWORK FOR EVERGLADES RESEARCH

The District's mission is to manage and protect water resources of the region by balancing and improving water quality, flood control, natural systems, and water supply. Environmental science provides much of the basis for defining and deciding the nature of this balance and effectively improving management for each of these often competing missions. Within this framework, the agency's Everglades Division provides the best possible scientific basis for environmental management by designing and conducting high quality applied and innovative science to sustain, restore, and manage the Everglades ecosystem. In 2007, the division prepared a five-year Everglades research management plan, which provides a strategic framework for guiding future scientific activities that support the District's efforts to manage and restore the Everglades system. It focuses on understanding four general areas of Everglades components or functions that are strongly affected by water management. These include the (1) relationships of food webs and wading bird dynamics, (2) affects of phosphorus enrichment on ecological recovery, (3) ecosystem processes related to soil dynamics and the functional linkage of the Everglades and Florida Bay, and (4) structure and function of major landscape features, such as tree islands and ridge and slough communities.

Comprehensive Everglades Restoration Plan Annual Report

The Comprehensive Everglades Restoration Plan (CERP) is the foundation for the largest ecosystem restoration effort in the world. CERP is focused on restoring the quantity, quality, timing, and distribution of water to the Everglades and other components of the regional ecosystem. Under the 2000 Water Resources Development Act, the U.S. Congress approved this landmark plan and provisionally authorized 10 initial full-scale projects and six pilot projects. These authorized projects include water storage reservoirs, water treatment areas for waters delivered to the Everglades and coastal estuaries, and other key wetland restoration projects. As the major local sponsor, the South Florida Water Management District is partnering with the U.S. Army Corps of Engineers (USACE) and the Florida Department of Environmental Protection (FDEP) to implement CERP, along with related Feasibility Studies and Critical Restoration Projects that support the plan.

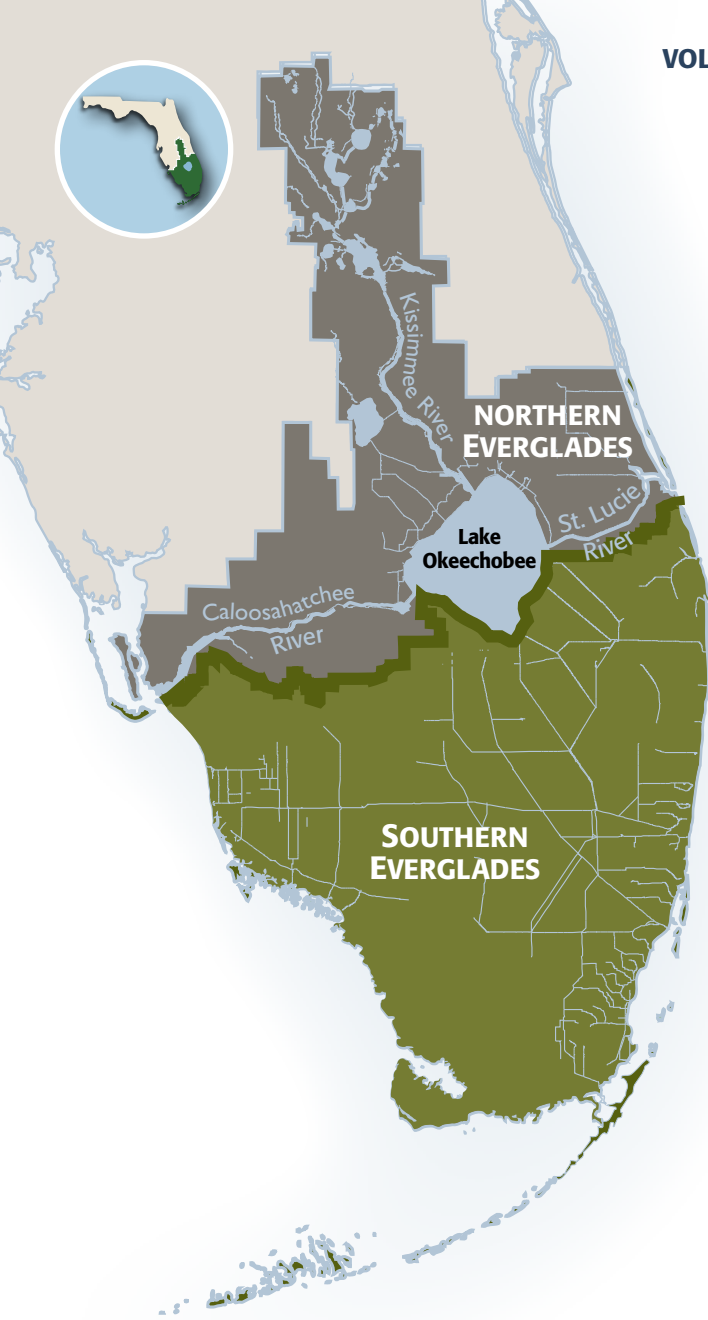
The overarching goal of CERP is to restore, preserve, and protect South Florida's ecosystem while providing for other water-related needs of the region, such as water supply and flood protection. Strategies for achieving this ambitious goal include completing Acceler8 projects, continuing to acquire necessary land, finalizing federal Project Implementation Reports (PIRs), and completing project design and construction. In the 2008 SFER – Volume I, Chapter 7A highlights the progress of CERP implementation and related financial information for Fiscal Year 2007 (FY2007), fulfilling the statutorily mandated CERP Annual Report and other permit-related reporting. The chapter also summarizes the status of other state initiatives for Everglades restoration, such as Acceler8 and the Northern Everglades and Estuaries Protection Program, that are consistent with the objectives of CERP and the Everglades Long-Term Plan.

THE NORTHERN EVERGLADES AND ESTUARIES PROTECTION INITIATIVE WAS UNVEILED IN SUMMER 2007

In 2004–2005, the State of Florida recognized opportunities to expedite the Everglades restoration process by accelerating the design and construction of key components of CERP and the Long-Term Plan. Since that time, project planning activities have taken place, project sites have been identified and acquired, and design and construction activities are under way. Key state initiatives that are expediting South Florida ecosystem restoration include Acceler8, Lake Okeechobee and Estuary Recovery, and land acquisition for implementing planned projects. In 2007, the Florida legislature and governor authorized additional initiatives that include focused funding for Lake Okeechobee watershed and the Caloosahatchee and St. Lucie estuaries in the Northern Everglades (see opposite map with highlights). The 2007 State of Florida Watershed Restoration Legislation, also known as the Northern Everglades and Estuaries Protection Program, includes requirements for the District to prepare individual watershed research and protection plans and water quality monitoring programs for each of the Northern Everglades watersheds. Overall, this initiative is designed to promote integration of the many regional restoration programs and projects across the entire Northern and Southern Everglades.

CONSTRUCTION OF THE C-43 RESERVOIR TEST CELL WAS COMPLETED IN 2007.





NORTHERN EVERGLADES AND ESTUARIES PROTECTION PROGRAM OVERVIEW

A MAJOR REGIONAL INITIATIVE THAT:

- Recognizes the entire South Florida ecosystem from Kissimmee Basin to Florida Bay and Keys
- Builds upon and dovetails restoration plans currently under way
- Expands the Lake Okeechobee Watershed Protection Plan
- Adds Watershed Protection Plans for the Caloosahatchee and St. Lucie rivers
- Extends state funds for CERP and Northern Everglades restoration efforts through 2020

MANY SUCCESSES TOWARD EVERGLADES RESTORATION WERE ACHIEVED IN FISCAL YEAR 2007

During FY2007, significant progress continued in planning for CERP projects and in constructing the Critical Restoration Projects that provide part of the foundation for CERP. The District continued its partnership with the USACE to prepare PIRs and Feasibility Studies. Project-related activities, including project planning, design, and construction, are under way for all Acceler8 projects. Highlights of key achievements include the following:

- In November 2007, the U.S. Congress approved a \$22 billion water resources bill, known as the 2007 Water Resources Development Act. This act authorizes several regional infrastructure projects, including two major wetlands restoration projects for the Everglades, the



IN JUNE 2007, GOVERNOR CHARLIE CRIST SIGNED THE LANDMARK LAW ON THE NORTHERN EVERGLADES AND ESTUARIES PROTECTION PROGRAM.



CONSTRUCTION OF THE MASSIVE EVERGLADES AGRICULTURAL AREA RESERVOIR ON A 16,700-ACRE PARCEL SOUTH OF LAKE OKEECHOBEE WAS LAUNCHED IN FISCAL YEAR 2007.

Indian River Lagoon – South Project, and the Picayune Strand Hydrologic Restoration Project. It also authorizes the Fran Reich Preserve Project, formerly known as the Site 1 Impoundment.

- Acceler8 was successful in continuing its restoration projects during FY2007, with project design near or fully complete for the Acme Basin B, Picayune Strand, and the C-43 (Caloosahatchee River) West, C-44 (St. Lucie Canal), and Everglades Agricultural Area reservoirs. Also, this past year construction was started for the Everglades Agricultural Area Reservoir.
- The District continued its planning efforts with the USACE to prepare PIRs. As of the end of FY2007, PIRs for five Acceler8 projects have been completed. Three of these projects, Indian River Lagoon – South, Fran Reich Preserve, and the Picayune Strand Restoration, were included in the 2007 Water Resources Development Act and the projects were authorized in November 2007. PIRs for the Broward Water Preserve Areas and the C-43 Reservoir projects were completed in FY2007, and these projects are pending congressional authorization.
- Critical Restoration Projects were substantially completed during FY2007, as reservoirs and Stormwater Treatment Areas were constructed in the Taylor Creek and Nubbin Slough basins and the Ten-Mile Creek Basin to improve the timing and quality of water deliveries from associated watersheds. During FY2007, the regional drought prevented start-up operations and testing at these sites. Dredging operations for the Lake Trafford Critical Restoration Project were halted in April 2007 due to drought conditions in this area. Additionally, the Tamiami Trail Culvert Critical Restoration Project was completed this past year.

IN FISCAL YEAR 2007, NEARLY 4,200 ACRES OF LAND WERE ATTAINED BY THE STATE FOR EVERGLADES RESTORATION

The CERP Program represents the largest annual capital budget of the District's 11 programs to implement the agency's strategic priorities. The financial and project status reporting for CERP is outlined in three parts and was prepared mutually by the District and the FDEP. In Part (A), the District and the FDEP jointly identify funding sources and amounts, itemize FY2007 expenditures and fund balances, and provide a schedule of anticipated expenditures for FY2008. In FY2007, total CERP revenues were \$710.9 million and total CERP expenditures were \$329.0 million (unaudited). The anticipated expenditures for FY2008 are \$495.1 million (unaudited).

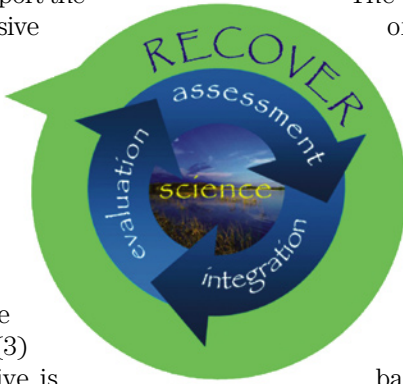
In Part (B), the FDEP provides a detailed report on all state funds appropriated and expended on current land acquisition projects related to CERP. The amount of expenditures to be credited toward the state's share of funding for executing CERP will be determined in each project's cooperative agreement.

In Part (C), the District and the FDEP provide a progress report on CERP's implementation, including status of acquired land. During FY2007, 4,195 acres were acquired for CERP projects at a total cost of \$67.7 million. Nearly 57 percent of the land for CERP has been acquired as of the end of the fiscal year.

Update on RECOVER Implementation and Monitoring for the Comprehensive Everglades Restoration Plan

RECOVER PROVIDES ESSENTIAL SUPPORT FOR THE COMPREHENSIVE EVERGLADES RESTORATION PLAN

RECOVER (Restoration Coordination and Verification) organizes and applies scientific and technical information to support the goals and purposes of the Comprehensive Everglades Restoration Plan (CERP). Sponsored by the U.S. Army Corps of Engineers and the South Florida Water Management District, RECOVER is a multi-agency team of scientists, modelers, planners, and resource specialists. The three primary goals of RECOVER are to (1) evaluate CERP's performance, (2) improve the plan during its implementation, and (3) ensure that a system-wide perspective is maintained throughout the restoration program. In the 2008 SFER – Volume I, Chapter 7B provides an update on RECOVER's monitoring and assessment activities and highlights the efforts being performed by RECOVER to aid in implementing and expediting Comprehensive Everglades Restoration Plan projects (see Volume I, Chapter 7A). Further information on RECOVER can be found at www.evergladesplan.org/pm/recover/recover.cfm.

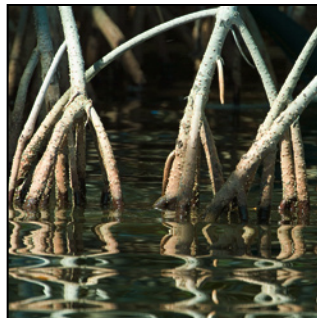


SYSTEMWIDE ASSESSMENT WILL BE USED TO MEASURE SUCCESS OF REGIONAL ECOSYSTEM RESTORATION

One of RECOVER's primary functions is to assess the ecological health of South Florida's ecosystem.

The focus of this year's chapter is a summary of the 2007 System Status Report, which was completed by the RECOVER team in November 2007. The report analyzes monitoring data from CERP's Monitoring and Assessment Plan and other sources, and provides a preliminary assessment of the ecological condition of the areas of the South Florida ecosystem that are expected to be affected by CERP implementation. Importantly, this comprehensive assessment will be used as a baseline to measure ecological effects as CERP and restoration projects are implemented across the region. This approach considers many vital elements of the broad ecosystem, such as submerged aquatic vegetation in Lake Okeechobee, seagrass habitat in coastal estuaries, and fish and wading birds in the Greater Everglades. Such comprehensive efforts are essential for restoring the Everglades ecosystem and its function, and are instrumental to the CERP Program's overall success.

RECOVER ENSURES THAT A SYSTEMWIDE PERSPECTIVE IS MAINTAINED AS EVERGLADES RESTORATION PROCEEDS.



Implementation of the Long-Term Plan for Achieving Water Quality Goals in the Everglades Protection Area

MEETING WATER QUALITY STANDARDS BY IMPLEMENTING THE LONG-TERM PLAN IS A STRATEGIC PRIORITY

The long-term Everglades water quality goal is for all surface water discharges to the Everglades Protection Area (EPA) to achieve and maintain water quality standards, in accordance with the Everglades Forever Act. To achieve this goal, the South Florida Water Management District is implementing the projects outlined in the 2003 Long-Term Plan for Achieving Water Quality Goals in the EPA (known as the Long-Term Plan) and its subsequent amendments. In the 2008 SFER – Volume I, Chapter 8 updates the progress on implementing the Long-Term Plan. The diverse activities in this plan are covered in several Volume I chapters including Chapter 3C (Everglades water quality), Chapter 4 (phosphorus source controls for Everglades tributary basins), Chapter 5 (performance and enhancements of the Stormwater Treatment Areas, or STAs), Chapter 6 (research on impacted Everglades ecosystems), Chapter 7A (STA Expansions under Acceler8), and Chapter 13 (financial reporting on Long-Term Plan activities).

DISTRICT PROGRAMS CONTINUE TO EXCEED EXPECTATIONS FOR IMPROVING EVERGLADES WATER QUALITY

Substantial progress toward reducing total phosphorus (TP) levels discharged into the EPA has been made by the State of Florida and other stakeholders. Since their inception and through the end of April 2007, the Everglades Agricultural Area's Best Management Practices and the Stormwater Treatment Areas combined have removed about 2,680 metric tons of TP that otherwise would have entered the Everglades. Of this amount, approximately 180 metric tons of TP were removed in Water Year 2007. Many phosphorus source control measures are being implemented in urban and other tributary basins throughout the region.



LAUNCHED IN EARLY 2006, CONSTRUCTION ACTIVITIES ARE UNDER WAY ON THE LONG-TERM PLAN PROJECT, ACME BASIN B.

LONG-TERM PLAN REVISIONS IMPROVE MEASURES FOR PHOSPHORUS REDUCTION IN THE EVERGLADES

In keeping with the requirements of the 2003 Everglades Forever Act, the Long-Term Plan is revised in an adaptive manner to ensure new information is incorporated as expeditiously as possible. The revisions are executed through collective input from the state, stakeholders, and the public, and are intended to aid in the state's comprehensive efforts to meet the Everglades water quality goals. As of the end of Fiscal Year 2007, eight revisions to the plan have been approved by the Florida Department of Environmental Protection. The initial five revisions are highlighted in Volume I, Chapter 8 of the 2005–2007 SFERs, and three revision packages were approved in Fiscal Year 2007.

The Status of Nonindigenous Species in the South Florida Environment

Some nonindigenous plants and animals can aggressively invade natural habitats and significantly alter the ecology of natural systems. Nonindigenous species have not only become one of the most serious global environmental problems, they are also a serious concern throughout Florida. During Fiscal Year 2007, the South Florida Water Management District spent nearly \$24 million on the prevention, control, and management of invasive plants in South Florida. The environmental and economic costs of invasive plants are only part of the problem, as South Florida has more introduced animals than any other region in the United States and ranks high in this regard globally. This presents a huge challenge for governmental agencies, such as the South Florida Water Management District, that are tasked with managing and restoring South Florida's degraded environment. Successful ecosystem restoration hinges on being able to reverse the detrimental human-related impacts, like nonindigenous species, that have occurred over the last century while preventing further degradation.

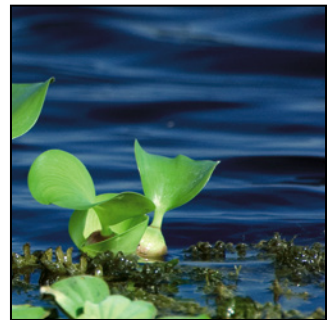
In the 2008 SFER – Volume I, Chapter 9 presents a detailed evaluation of nonindigenous species in South Florida. The chapter reviews the broad concerns involving these species in the region and their relationship to restoration, management, planning, organization, and funding. It also documents recent progress and successes that have been made. The chapter also details where future efforts lie to bridge data gaps and improve interagency coordination. This year's chapter provides a comprehensive list of species and an account of the magnitude and extent of the threats they pose to South

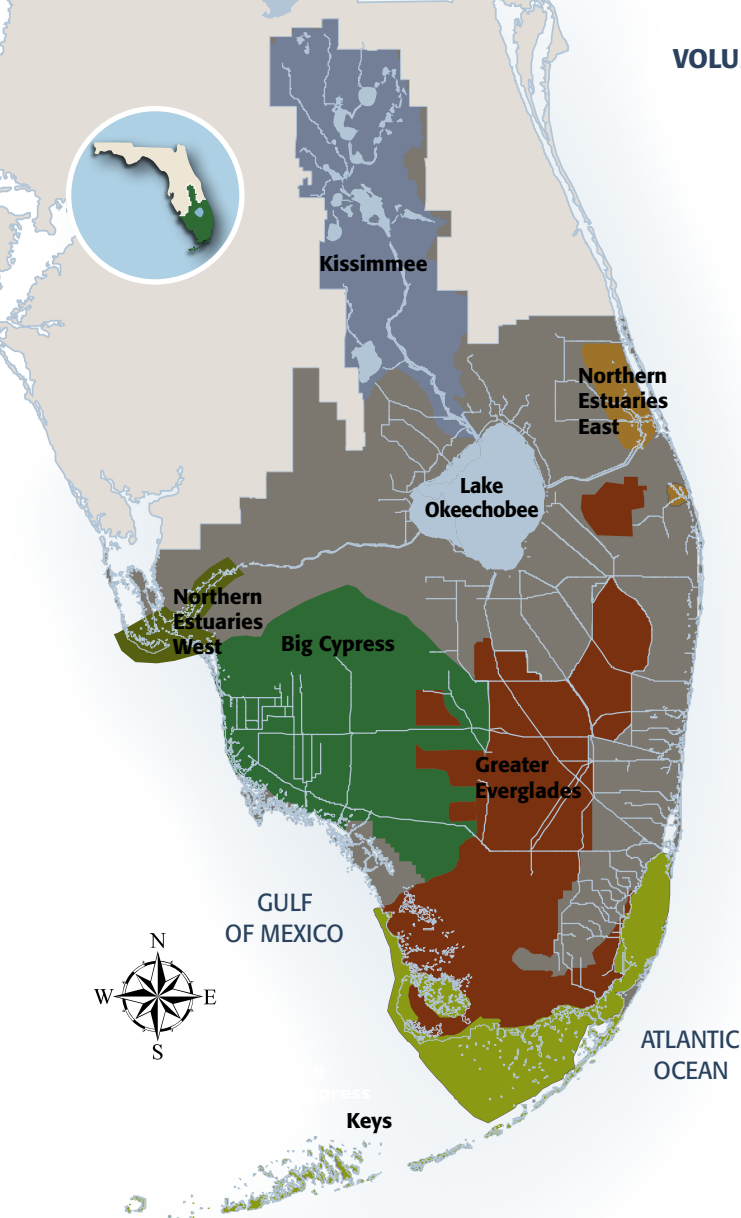
Florida's ecosystem even though ecological and biological information on many species is still unknown. For the first time, this year's report lists a number of a species that have yet to become invasive in Florida but are considered serious potential threats to South Florida environments.

EXOTIC SPECIES INCREASINGLY THREATEN SOUTH FLORIDA'S HABITATS

This year's chapter continues to provide highlights of the nonindigenous species organized within eight South Florida regions (see opposite map). These areas correspond with the Comprehensive Everglades Restoration Plan's bio-regional components (known as modules) to aid in improving the coordination of invasive species management with regional restoration. Twenty-five species of nonindigenous plants across all modules are considered as priorities for control. Old World climbing fern (*Lygodium microphyllum*), melaleuca (*Melaleuca quinquenervia*), and Brazilian pepper (*Schinus terebinthifolius*) are generally a priority in all regions, while aquatic plants such hydrilla (*Hydrilla verticillata*) and water hyacinth (*Eichhornia crassipes*) are high priorities in the Kissimmee and Lake Okeechobee modules. There are also considerable numbers of nonindigenous animals known to occur throughout the modules, ranging from approximately 55 species in the Kissimmee Module to over 150 species in the Greater Everglades and Southern Estuaries modules. Despite these numbers, prioritizing animals for control has posed serious challenges and, to date, no attempt has been made to prioritize animal threats across agencies.

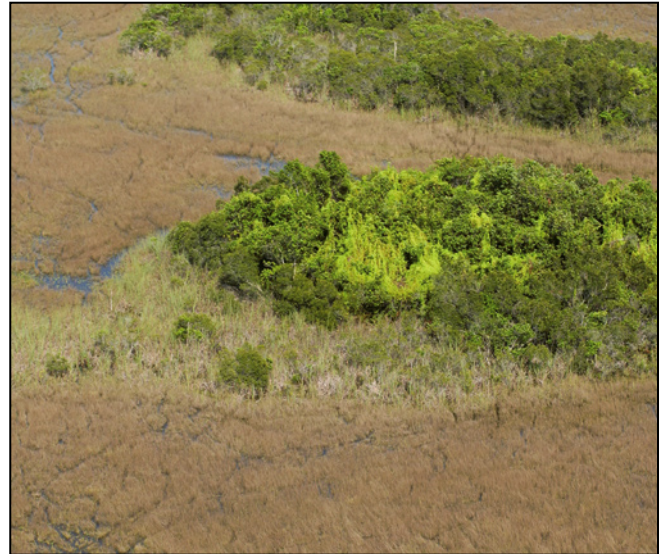
OVER 100 NON-NATIVE PLANT SPECIES, SUCH AS THE INVASIVE WATER HYACINTH (*EICHHORNIA CRASSIPES*), ARE KNOWN TO EXIST AND THREATEN NATIVE AQUATIC HABITATS THROUGHOUT SOUTH FLORIDA.





REGIONAL RECOVER MODULES

Widespread efforts to control nonindigenous plants across South Florida continued in WY2007. Melaleuca has been systematically cleared from Water Conservation Areas 2A, 3A, and 3B and Lake Okeechobee, which are now under maintenance control. An accelerated invasive plant management plan was implemented in the Arthur R. Marshall Loxahatchee National Wildlife Refuge (Refuge) in 2007. This effort aims to complete the first treatment of all invasive plant infestations within the Refuge by September 2008. To date, 11,800 acres of melaleuca and *Lygodium* have been treated aerially, and 7,120 acres have been ground-treated in the Refuge.



A BIRD'S EYE VIEW OF *LYGODIUM* INVADING A TREE ISLAND IN WATER CONSERVATION AREA 1

An early detection and rapid response eradication program continued for the Gambian pouch rat (*Cricetomys gambianus*) in the Keys module, and the purple swamp hen (*Porphyrio porphyrio*) in the Greater Everglades module. Burmese python (*Python molurus bivittatus*) populations continue to expand at an alarming rate across South Florida. In April 2007, a Burmese python was discovered on Key Largo. This is the first time this species has been found south of Everglades National Park. In October 2007, the number of snakes removed from South Florida was 200, double the number captured in 2005. To address this rapid growth, Everglades National Park and the South Florida Water Management District are developing a detailed plan to improve python management efforts. Additionally, trapping techniques are in place and a python tracking system is being used to monitor this ever-expanding species.

A NEW BIOCONTROL FLY IS RELEASED TO PROTECT NATIVE EVERGLADES PLANTS

Biological control is a key tool for effective long-term management of many invasive plant and animal species. Research programs to develop additional biocontrol agents and to optimize methods of treatment are continuing at an accelerated pace in South Florida. In 2007, several biological control agent releases, including leaf-eating moths for melaleuca and *Lygodium*, were completed. Of particular note is the release of a biocontrol fly in the Refuge to help control the invasive Mexican bromeliad weevil (*Metamasius callizona*) that threatens several varieties of Florida's native bromeliads.

Lake Okeechobee Protection Program – State of the Lake and Watershed

The largest freshwater body in the southeastern United States, Lake Okeechobee is a key component of South Florida's interconnected hydrological and ecological systems. As a highly valued resource that benefits the region's population and environment, the lake provides water supply and flood control for neighboring areas and recreational fishing, which brings millions of dollars to the local economy. The lake is also home to migratory water fowl, wading birds, and a variety of endangered species.

Lake management is essential to address three key issues – excessive phosphorus loading, unnatural fluctuations in water levels, and the rapid spread of invasive exotic species – facing the lake and its surrounding watershed. The South Florida Water Management District and its partnering agencies are addressing these interrelated issues to rehabilitate the lake and improve its function as a valuable ecosystem. In concert, the District and the U.S. Army Corps of Engineers are implementing Comprehensive Everglades Restoration Plan components in the watershed to partially address elevated total phosphorus (TP) levels and provide alternative water storage areas to properly regulate lake water levels, while maintaining its water supply and other water resource functions.

IN SUMMER 2007, OVER TWO MILLION CUBIC YARDS OF MUCK WERE REMOVED FROM ABOUT 2,000 ACRES OF EXPOSED SHORELINE AROUND LAKE OKEECHOBEE.



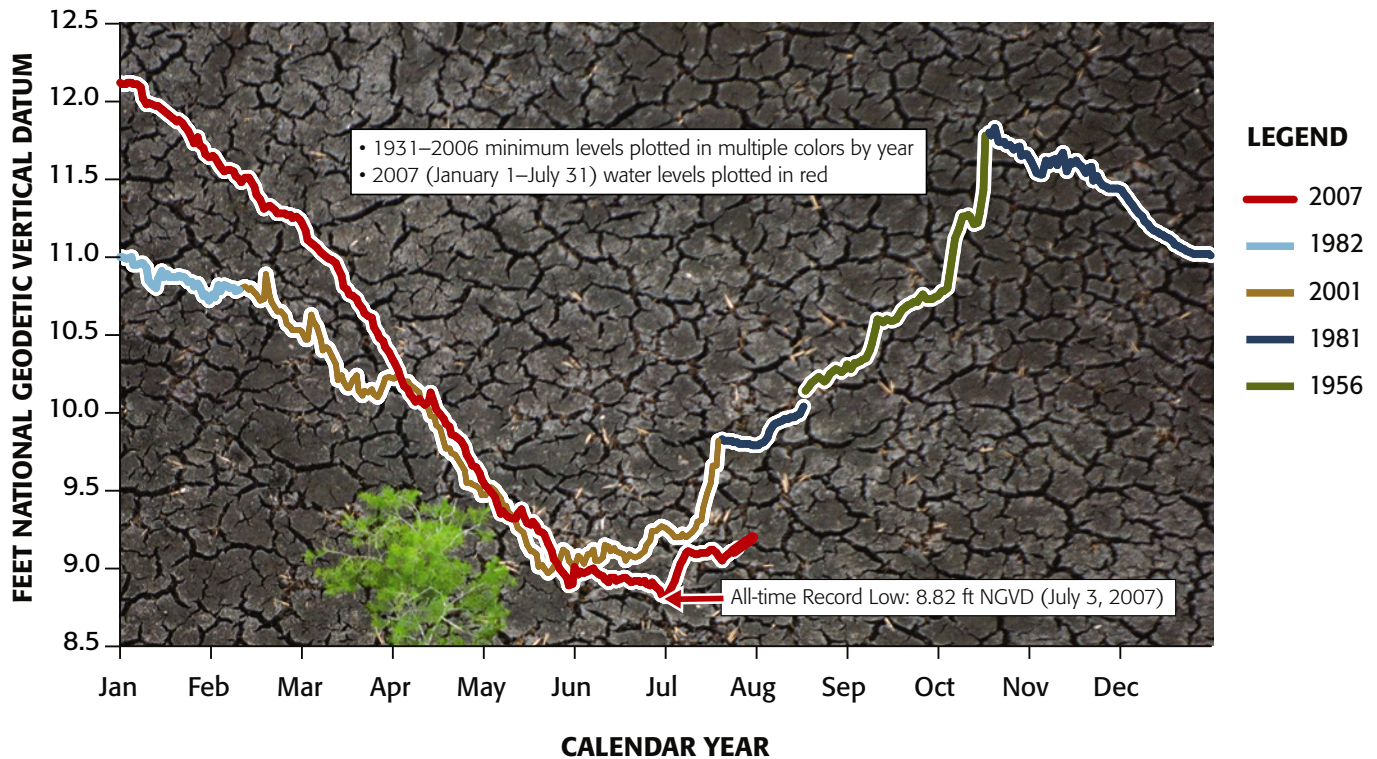
In the 2008 SFER – Volume I, Chapter 10 presents the Water Year 2007 (WY2007) status of Lake Okeechobee and its watershed. The major focus beyond nutrient management, water quality, and exotic plants has been the regional drought, which has resulted in very low water levels. This year's chapter highlights water management related to the drought conditions and project-related activities established in the Lake Okeechobee Protection Program, the Lake Okeechobee & Estuary Recovery Plan, and the Northern Everglades and Estuaries Protection Program. Financial reporting on the program's implementation during Fiscal Year 2007 is also covered in the chapter.

LAKE OKEECHOBEE WATER LEVELS PLUNGE TO RECORD LOWS IN 2007

Of all the areas across South Florida, Lake Okeechobee was most dramatically affected by the 2006–2007 drought, with far-reaching impacts carrying forward into the 2008 calendar year. During WY2007, the total flow of water to Lake Okeechobee was approximately one-sixth of the amount recorded in WY2006. As depicted on the opposite figure, this reduced flow led to a steady decline of lake stage from 13.46 feet National Geodetic Vertical Datum (NGVD) on May 1, 2006, to 9.65 feet NGVD on April 30, 2007. Underscoring the region's most pronounced drought-related effects, lake water levels reached an all-time record low of 8.82 feet NGVD on July 3, 2007 (see opposite figure).

The drastic water level declines in Lake Okeechobee led to the establishment of water restrictions throughout South Florida. These restrictions increased in severity from Phase I in November 2006 to Phase III implemented in May 2007, which reduced lawn watering to one day a week and agriculture watering by 45 percent. Fourteen temporary forward pumps were also deployed in Lake Okeechobee in March and April 2007 to maintain water supply to the Everglades Agricultural Area.

2007 LAKE OKEECHOBEE MINIMUM WATER LEVELS COMPARED TO PREVIOUS YEARS (1931–2006)



DROUGHT CONDITIONS OFFER SOME OPPORTUNITIES FOR IMPROVING LAKE HEALTH

While the relentless drought posed many challenges to water managers this past year, it also provided several opportunities for lake-wide management and restoration efforts. During summer 2007, roughly two million cubic yards of nutrient-rich muck were successfully removed from an estimated 2,000 acres of shoreline from six areas along the north and west portions of Lake Okeechobee – a cost-effective achievement stemming from prolonged drought conditions in both the Kissimmee and Okeechobee watersheds. This removal is expected to restore the lake’s submerged aquatic vegetation (SAV) habitat for native plants and wildlife and improve water quality once water levels return to more normal conditions. It also has an ancillary benefit of removing approximately 237 metric tons (mt) of total phosphorus from the lake.

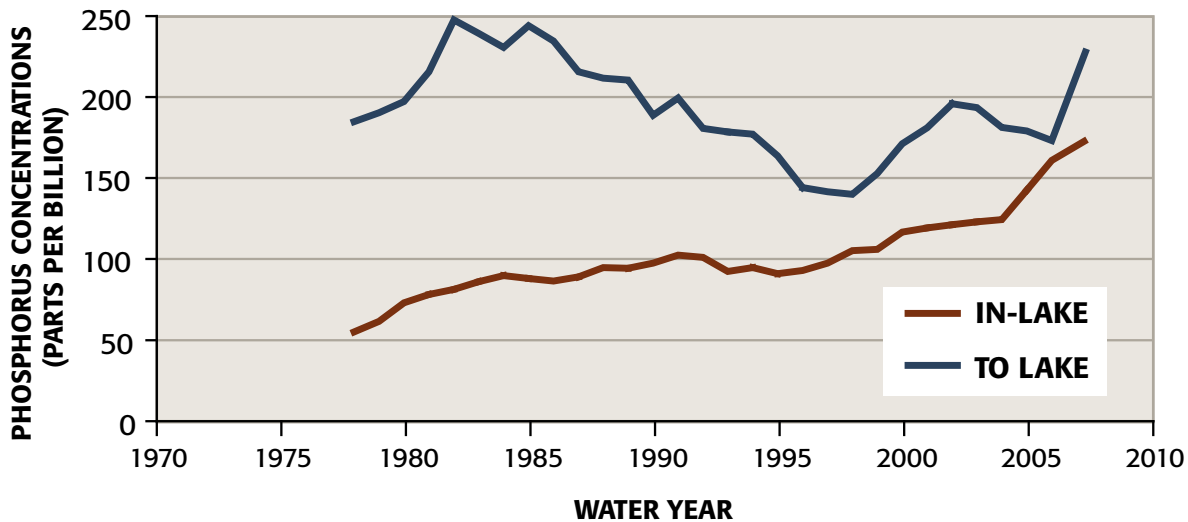
The low lake levels provided an opportunity to burn large areas of torpedograss (*Panicum repens*) in the littoral region. This was followed by chemical treatment to

control the reemergence of this exotic invasive plant. Low lake levels also improved the nearshore light penetration, allowing SAV regrowth after two consecutive years of high and turbid waters following the 2004 and 2005 hurricane seasons. Overall, these marked changes should provide noticeable improvements in the health of the lake’s ecosystem in the coming years.

LAKE SHOWS SOME SIGNS OF RECOVERY, WHILE MORE COMPREHENSIVE EFFORTS ADDRESS WATER QUALITY ISSUES

Excessive TP loads to Lake Okeechobee originate from the predominantly agricultural and urban activities in its watershed. To address these loads, the 2000 Lake Okeechobee Protection Act mandates that the lake’s Total Maximum Daily Load (TMDL) of 140 mt per year – considered necessary to achieve the in-lake target of 40 parts per billion (ppb) – be met by 2015. The act also requires that the Lake Okeechobee Protection Plan be reevaluated every three years to determine if further TP load reductions are needed to achieve the TMDL, which was

TOTAL PHOSPHORUS INFLOW AND LAKE CONCENTRATIONS WITH FIVE-YEAR MOVING AVERAGE



done in 2007. The revised plan contains an implementation schedule designed to reduce phosphorus load to the lake to meet 140, mt by 2015, and includes exotic species control, research, and monitoring activities.

The draft Phase II Lake Okeechobee Technical Plan was also completed this past year. The plan identifies facilities to reduce TP loading to the lake to achieve the lake's TMDL. It also identifies the amount of storage necessary to better manage the lake within more ecologically desirable levels and reduce harmful discharges to the St. Lucie and Caloosahatchee estuaries. As a measure to further reduce excess lake nutrients, over one-half of the watershed's agricultural acreage is currently enrolled in a voluntary program to plan and implement Best Management Practices to control TP discharges into the lake.

Based on the most recent five-year period (WY2003–WY2007), the average TP load to the lake is 630 mt per year, which is over four times higher than the established TMDL. The annual TP load for WY2007 was 203 mt, mainly attributable to the extremely dry conditions in the watershed. This represents nearly a 75 percent reduction from WY2006, which included a wet summer and the passage of Hurricane Wilma. For the in-lake average annual TP concentration, the five-year moving average was 173 ppb in WY2007, slightly increasing from WY2006 levels (see above figure). During WY2007, the annual average in-lake TP concentration was 179 ppb, roughly a 20 percent reduction from the two highest annual averages in WY2005 and WY2006. This decline indicates some recovery in the lake after passage of the 2004–2005 hurricanes.

In-lake TP levels have not declined over the last decade because external loads have remained high and lake sediment, containing thousands of tons of phosphorus, continues to replenish this nutrient in lake water. The lake's response to load reductions is a gradual process that is expected to take decades. To aid this process, the 2007 Lake Okeechobee Protection Plan evaluation report provides a phased, comprehensive approach to reduce TP loading to the lake. More than 55 projects are being undertaken by the District and collaborating agencies to reduce phosphorus exports to the lake from the watershed. To further bolster these comprehensive efforts, the Lake Okeechobee & Estuary Recovery (LOER) Plan is being implemented to provide measurable and meaningful improvements to water quality and quantity in the lake and its downstream estuaries, the Caloosahatchee and St. Lucie estuaries.

In 2007, the Florida legislature substantially expanded the Lake Okeechobee Protection Act to include protection and restoration of the Lake Okeechobee watershed and adjacent estuaries (see Volume I, Chapter 7A). At the same time, the legislature also extended the Save Our Everglades Trust Fund for 10 years, providing a dedicated state funding source for the restoration through 2020. Collectively, these efforts are designed to improve water quantity, expand water storage, facilitate land acquisition, and enhance lake and estuary health. To support these enormous commitments, in Fiscal Year 2007 a total of \$35.5 million was appropriated to the Lake Okeechobee Protection Program and the LOER fast-track projects, and \$49 million to the Northern Everglades funding that is specific to the lake.

Kissimmee Basin

Encompassing approximately 3,000 square miles, the Kissimmee watershed forms the headwaters of the Kissimmee-Okeechobee-Everglades system. The watershed is comprised of a diverse group of wetland aquatic ecosystems within its Upper Basin – with more than two dozen water bodies and their tributary streams, known as the Kissimmee Chain of Lakes – and the Kissimmee River and floodplain in the Lower Basin. In the 1960s, the meandering Kissimmee River was channelized to prevent catastrophic flooding and much of the original floodplain was drained. However, there were pronounced impacts on the ecosystem – drastic declines in wetlands and wintering waterfowl, wading bird, and fish populations and associated loss of ecosystem functions. In the 2008 SFER – Volume I, Chapter 11 highlights major projects and key activities during Water Year 2007 (WY2007) associated with the Kissimmee River Restoration Project and other Kissimmee Basin initiatives. The chapter also summarizes the mission-critical activities of the South Florida Water Management District for flood control, water supply, water quality, and natural systems in the Upper and Lower Kissimmee basins.

DROUGHT RESULTS IN NO FLOW TO THE KISSIMMEE RIVER FOR NEARLY EIGHT MONTHS

During WY2007, the Kissimmee Basin experienced a remarkable year of below-average rainfall, primarily due to the 2006–2007 drought across the South Florida region. The total rainfall in the Upper and Lower basins was approximately 34 inches for each basin, representing about 30 percent less than historical annual averages. The extreme lack of rainfall resulted in the need to end releases from the Upper Basin into the Kissimmee River in November 2006, resulting in the lack of flow for the first time since completion of Kissimmee River Restoration Project's Phase I backfilling in 2001. With the return of a relatively normal wet season, water flow into the river was finally restored in July 2007. Despite the drought and no-flow conditions in the Phase I reach, mean dissolved oxygen concentrations remained at suitable levels to support aquatic invertebrates and fishes through most of July. However, densities of foraging long-legged wading birds on the restored floodplain, which had exceeded

A SECTION OF RESTORED RIVER CHANNEL ALONG THE LOWER STRETCHES OF THE KISSIMMEE RIVER



restoration expectations each year from WY2002–WY2006, dropped this past year to the lowest levels recorded since 2001. This decrease was likely in response to limited foraging habitat due to inadequate water depths on the floodplain.

SECOND PHASE OF KISSIMMEE BASIN CONSTRUCTION IS COMPLETED IN 2007

The South Florida Water Management District and the U.S. Army Corps of Engineers are collaborating on the Kissimmee River Restoration and the Kissimmee River Headwaters Revitalization projects. Together, these large-scale restoration projects will (1) reestablish the river-floodplain system's ecological integrity by reconstructing the river's physical form and reestablishing pre-channelization hydrologic characteristics (stage and discharge), (2) provide the water storage and regulation schedule modifications needed to approximate the historical flow characteristics of the Kissimmee River system, and (3) increase the quantity and quality of shoreline habitat in lakes Kissimmee, Hatchineha, Tiger, and Cypress for the benefit of fish and wildlife.

The first of four major phases of canal backfilling was completed in early 2001, resulting in 15 continuous miles of reconnected river channel, and reclaiming almost 6,000 acres of floodplain wetlands. The second phase of construction – backfilling of 1.8 miles of C-38 canal, removal of three weirs, and excavation of some portions of river channel – was completed in September 2007. Baseline studies to characterize pre-restoration conditions are now under way in the remaining areas where restoration efforts are planned. It is projected that all restoration-related construction will be completed by 2012 and evaluation of restoration success will continue through 2017. In total, this project will restore ecological integrity to approximately 20 square miles of river/floodplain habitat and over 40 continuous miles of meandering river channel.

KISSIMMEE ECOSYSTEM SHOWS PROMISING RESPONSE TO RIVER RESTORATION

A key element of the Kissimmee River Restoration Project is a comprehensive, multi-phased evaluation program for tracking ecological responses to restoration. To address the goal of ecological integrity, the evaluation program has a broad scope encompassing hydrology, water quality, and major biological communities such as plants, invertebrates, fish, and birds. Prior to the first phase of restoration construction, monitoring was conducted for



THE NUMBER OF AMPHIBIANS, LIKE THE GREEN TREE FROG (*HYLA SPECIES*), IS AN INDICATOR BEING USED TO MEASURE KISSIMMEE RESTORATION SUCCESS.

all these components to establish a baseline for evaluating future changes. A set of restoration expectations also was developed to predict changes anticipated to result from restoration. Although this phase of the restoration has been in place for only a few years, many positive responses are already being observed. These responses include increases in dissolved oxygen levels, reductions in accumulated sediments, and increased populations of bass and other sunfishes in river channels. Despite the WY2007 decline in wading bird densities, use of the floodplain by wading birds exceeded restoration expectations in the previous four years of record. Also, a recently completed floodplain vegetation map based on 2003 aerial photography shows dramatic increases in wetland vegetation within just two years following completion of the Phase I construction – another promising result of the Kissimmee restoration efforts.

LONG-TERM LAKE MANAGEMENT PLAN IS NEAR COMPLETION

Through coordinated efforts between the District and other partnering agencies, the Kissimmee Chain of Lakes Long-Term Management Plan is expected to be released in early 2008. The goal of the Long-Term Management Plan is to improve the health and sustainability of regulated lakes in the Upper Kissimmee Basin. Objectives fall under the categories of hydrologic management, habitat preservation and enhancement, aquatic plant management, water quality improvement, and recreational and public use. It is intended to complement existing local government and watershed projects and initiatives, such as the Kissimmee Basin Water Supply Plan, the Lake Okeechobee Protection Plan, Total Maximum Daily Loads, the Kissimmee River Restoration Project, and regional land management activities.

Management and Restoration of Coastal Ecosystems

One of the primary goals of the South Florida Water Management District is to manage freshwater discharges to South Florida's estuaries in a way that preserves, protects and, where possible, restores these critical ecosystems. Three major issues – altered delivery of fresh water, declining water quality, and continued habitat loss – are impacting South Florida's coastal ecosystems. The cumulative impact of these stresses has resulted in altered ecosystem structure and impaired function throughout the region. The District is working with many organizations to produce a broad range of information and tools to improve management of freshwater input to coastal estuaries. The agency has increased this scientific effort in support of the Comprehensive Everglades Restoration Plan and other critical needs, including development of Minimum Flows and Levels (MFLs), Water Reservations, Pollutant Load Reduction Goals, and Total Maximum Daily Loads. In the 2008 SFER – Volume I, Chapter 12 highlights aspects of this progress and related collaborative management and restoration efforts, with a special focus on Florida Bay in this year's report.

NEW COASTAL RESOURCE SCIENCE PLANS ARE RELEASED IN 2007

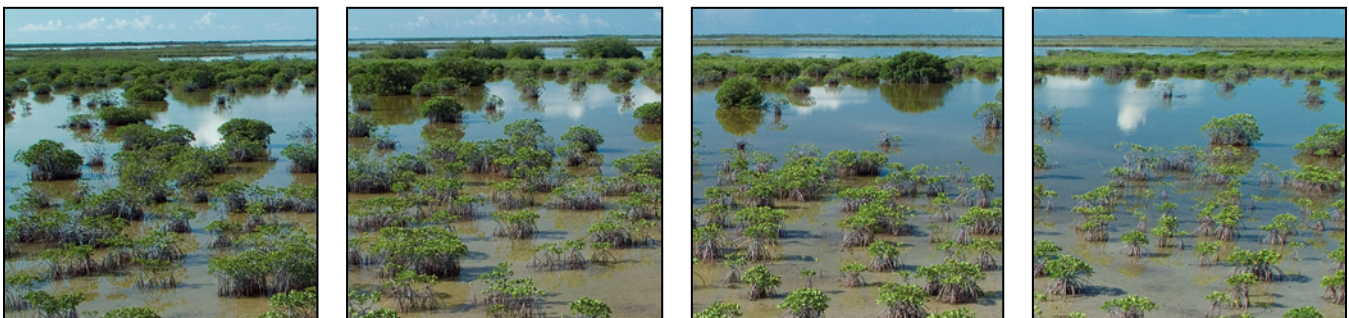
Coastal resources within the District's boundaries include several major watershed-estuarine systems: Southern Indian River Lagoon, including the St. Lucie River and Estuary; Loxahatchee River and Estuary; Lake Worth Lagoon; Caloosahatchee River and Estuary; Southern Charlotte Harbor; Estero Bay; Naples Bay; Biscayne Bay; and Florida Bay and the Florida Keys. Given the variety of issues, legal mandates, and oversight requirements of state

and federal agencies, each ecosystem is at a different stage of science, management, and restoration. Each system possesses unique characteristics, and a major challenge facing the District and its partners is to identify common hydrological and ecological principles that can be used to manage these systems on a regional scale. To help guide the future direction of coastal resource management, the District is developing science plans for each priority area. In 2007, the District's Coastal Ecosystems and Everglades divisions prepared science plans to provide a strategic framework for scientific activities that support the District's efforts to better manage our coastal ecosystems.

INTERAGENCY EFFORTS CONTINUE TO BRIDGE THE LINKS BETWEEN WATER MANAGEMENT AND COASTAL SYSTEMS

Coastal estuaries depend on fresh water for their existence and health. Over the past year, the District continued its efforts to better understand the links between healthy estuarine function and inflow of fresh water to support day-to-day management, restoration projects, and long-term planning. In collaboration with partnering agencies, this has been accomplished through a combination of monitoring, applied research, and model development. There also has been continued support in establishing technical criteria for the development of MFLs for several water bodies, including Florida Bay (see Volume II, Chapter 3). Water quality continues to be a major concern, and the District routinely coordinates with the Florida Department of Environmental Protection (FDEP) to address regional water quality concerns. Ongoing investigations are being conducted to quantify controls on

RED MANGROVE (*RHIZOPHORA MANGLE*) AND MUD FLATS ALONG THE BANKS OF FLORIDA BAY





A DISTRICT SCIENTIST MONITORS SEAGRASSES ALONG TRANSECTS IN THE ST. LUCIE ESTUARY.

coastal water quality, particularly as quality is affected by freshwater inflow and its management. Some key highlights of these many efforts during Water Year 2007 (WY2007) are presented below. Because Florida Bay was emphasized in this year's chapter, highlights for this system are presented separately.

WATER YEAR 2007 HIGHLIGHTS OF SOUTH FLORIDA COASTAL ECOSYSTEMS

Monitoring

The District implemented elements of the Restoration Plan for the Northwest Fork of the Loxahatchee River during WY2007. Related efforts included the addition of groundwater wells along vegetation transects, vegetation monitoring, improving the water quality monitoring program, and conducting oyster health surveys. To support refinement of salinity targets in Lake Worth Lagoon, an improved salinity monitoring program was initiated this past year.

Modeling

In WY2007, the District continued to make improvements to the hydrodynamic and salinity model for the Caloosahatchee Estuary, which is being used to predict salinity distribution in the estuary for the Acceler8 C-43 (Caloosahatchee River) West Reservoir Project. A hydrodynamic and water quality model was also calibrated for the St. Lucie Estuary that will be used to support RECOVER and the Northern Everglades and Estuaries Protection Program. Additionally, hydrodynamic modeling of Naples Bay was initiated to support the goals of the recently adopted Surface Water Improvement and Management Plan.

Applied Research

A two-year project to examine the influence of freshwater discharge on larval fish in Estero Bay was completed in WY2007. Studies to examine the effects of nutrients on algal growth in the St. Lucie and Caloosahatchee estuaries were initiated. In support of MFLs, studies to determine the impact of freshwater springs on salinity in Biscayne Bay were also conducted.

2008 SPECIAL FEATURE: FLORIDA BAY

- In WY2007, the Florida Bay MFL rule was approved by the District's Governing Board and the FDEP. A strategic plan to prevent future MFL violations and further improve the MFL rule was also approved, and ecological research was initiated to implement the plan. Despite regional drought conditions, the rule's salinity criterion was not exceeded in WY2007.
- Evidence suggests that ongoing agency operations to restore more natural water distribution patterns in southeastern Everglades National Park resulted in improved water flows to Florida Bay over the past year. Salinity in central Florida Bay was only 6 percent higher than average.
- Water quality continued to be a concern in Florida Bay during the past year, with sustained algal blooms in the central and eastern bay. The eastern bloom was likely due to a combination of factors associated with three 2005 hurricanes, discharge of fresh water and nutrients from the C-111 canal, and nearby road construction along U.S. Highway 1. Likely as a consequence of this bloom, there was extensive seagrass habitat loss in Barnes Sound and Blackwater Sound.

Everglades Forever Act Annual Financial Report

Pursuant to the 1997 Everglades Oversight Act, the South Florida Water Management District is required to annually provide detailed financial information on Everglades restoration. The Everglades Forever Act (EFA) also requires the District to account for all monies used to fund the Everglades Construction Project (ECP) and the Long-Term Plan for Achieving Water Quality Goals for Everglades Protection Area Tributary Basins (Long-Term Plan) and to provide a comparison annually of actual versus projected revenues and a projection of costs and revenues over the next five-year period. These annual financial reports are central to the 2008 SFER – Volume I, Chapter 13.

DEDICATED FUNDS CONTINUE TO SUPPORT SOUTHERN EVERGLADES RESTORATION

The 1994 ECP, a major element of the Everglades Restoration Program and the 1994 Everglades Forever Act, is one of the nation's largest environmental restoration projects, with a projected cost of \$836.2 million over 20 years. The 2003 state legislative session amended the 1994 EFA to include the Long-Term Plan as the strategy for achieving the Everglades long-term water quality goals. The amended EFA also expanded the use of the 1/10 mill *ad valorem* tax to include the initial phase of the Long-Term Plan, including Stormwater Treatment Area (STA) enhancements, research, and operation and maintenance. For Fiscal Year 2008 (FY2008), the EFA millage rate has been reduced to 0.0894 mill as a result of the legislatively mandated state property tax reduction in 2007.

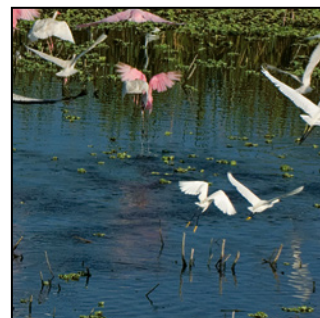
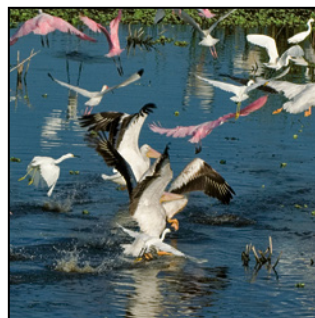
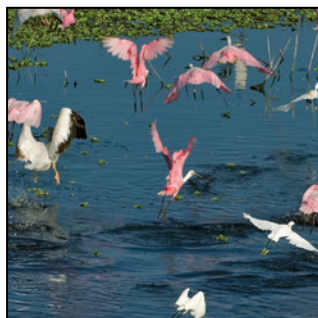
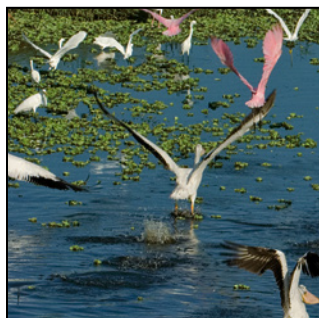
The 2003 Long-Term Plan continues and expands the goals and objectives of the 1994 ECP and is a critical component of the overall effort to restore and protect the Everglades. Currently, the Long-Term Plan's initial 13-year phase has a projected total cost of approximately \$1.7 billion. This revised estimate reflects the approved revisions to the Long-Term Plan through the end of FY2007. Further information on the STAs and the Long-Term Plan can be found in Volume I, Chapters 5 and 8, respectively.

The Florida Bay Restoration Program has a projected total cost of \$367 million. In 1996, the District and the Florida Department of Transportation received federal authorization to redirect the use of Alligator Alley tolls for both restoration programs. A total of \$37.1 million – split equally between both restoration programs – has been received since 1997. Further information on Florida Bay can be found in Volume I, Chapter 12.

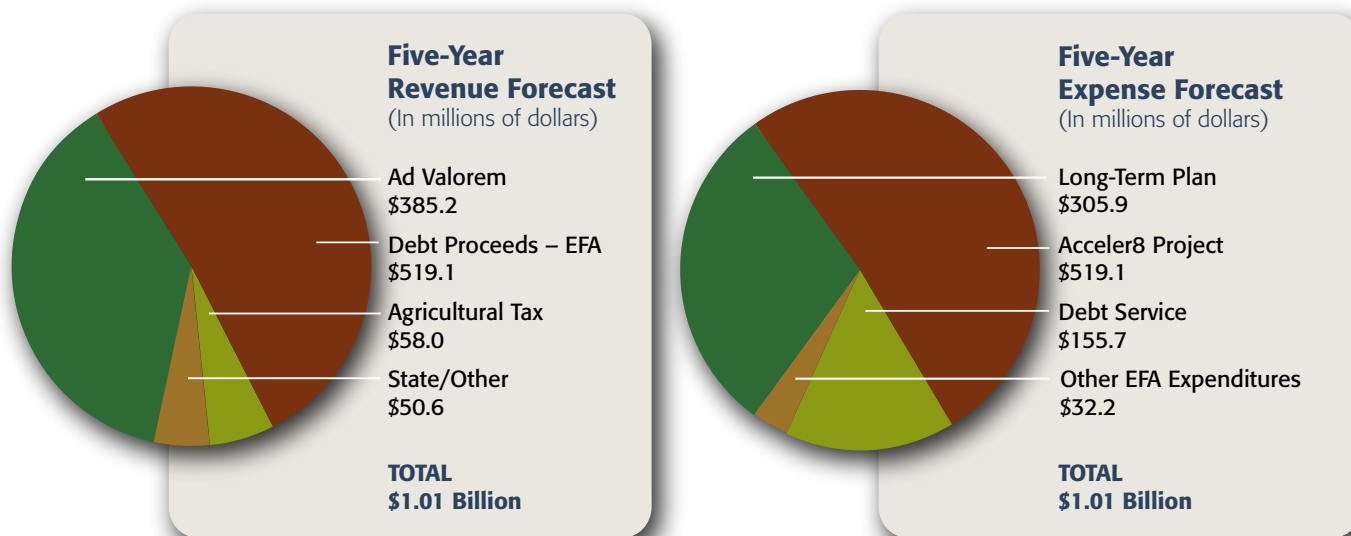
EVERGLADES FUNDING SOURCES RAISE \$88 MILLION IN FISCAL YEAR 2007

The District, other agencies, and the agricultural community share the cost of implementing the ECP, the Long-Term Plan and other EFA-related activities. Funding sources designated by the EFA for the ECP, the Long-Term Plan, and other EFA-related activities include 1/10 mill (0.0894 mill in FY2008) *ad valorem* tax, agricultural privilege taxes, state land funds, federal funds, excess revenues from Alligator Alley tolls, other

DEDICATED FUNDS ARE SUPPORTING STORMWATER TREATMENT AREA EXPANSIONS TO HELP REALIZE EVERGLADES RESTORATION GOALS.



FIVE-YEAR EVERGLADES FOREVER ACT PROGRAM ESTIMATES (FISCAL YEARS 2008–2012)



environmental mitigation funds, and any additional funds that become available. Since 1994, net revenues received were \$774.1 million. In FY2007, net revenues totaled \$88.0 million (unaudited), of which \$82.9 million was received from *ad valorem* and agricultural privilege tax collections, and the remaining \$5.1 million came from the other above-listed sources.

Since the EFA's enactment, the District has dedicated its maximum Okeechobee Basin 1/10 mill *ad valorem* (0.0894 mill in FY2008) taxing authority to the ECP, the Long-Term Plan, and other EFA-related activities. Through FY2007, \$504.1 million net *ad valorem* tax revenue was received for Everglades restoration, of which \$71.6 million (unaudited) was collected in FY2007. The revised 0.0894 mill *ad valorem* tax is projected to generate \$73.2 million in FY2008.

To fund the first phase of the Everglades Restoration Program including implementation of the Long-Term Plan, the EFA imposes an annual tax on agriculture within the Everglades Agricultural Area (EAA) and C-139 basins. Net EAA agricultural privilege taxes collected from FY1995–FY2007 were \$152.8 million. During this period, the net C-139 basin agricultural privilege taxes totaled \$6.9 million. Net agricultural privilege taxes received in FY2007 were \$11.4 million (unaudited) and are projected to be \$11.6 million in FY2008.

DISTRICT-ISSUED BONDS IN 2009 ARE EXPECTED TO PROVIDE OVER \$519 MILLION FOR EXPEDITED RESTORATION PROJECTS

As shown in the pie charts above, the five-year forecast (FY2008–FY2012) of revenues by source and expenditures for the EFA Program totals just over \$1 billion. The expenditure forecast is comprised of \$980.7 million for the overall Long-Term Plan, of which \$519.1 million is for the Long-Term Plan Acceler8 projects, which are planned to be financed through Certificates of Participation (COPs). When combined with the federal share of the 1994 ECP, the debt service payments associated with the issuance of COPs, the local share of the 1994 ECP, and other EFA-related expenditures, the total current estimated cost of implementing the EFA Program through FY2016 is \$2.5 billion.

It is anticipated that District-issued COPs will be offered nationally in the primary stock market to provide earmarked funds for upcoming EFA projects. COPs to be issued in 2009 are expected to raise \$519.1 million. These funds will be used for the Long-Term Plan Acceler8 projects, STA Buildouts for Compartments B and C, as part of coordinated regional efforts to step up Everglades restoration.

DISTRICT ANNUAL PLANS AND REPORTS

VOLUME II

| | | |
|-------------------|--|-----------|
| CHAPTER 1 | Introduction to the 2008 South Florida Environmental Report – Volume II | 40 |
| CHAPTER 2 | Fiscal Year 2007 Annual Work Plan Report | 41 |
| CHAPTER 3 | 2008 Minimum Flows and Levels Priority List and Schedule | 42 |
| CHAPTER 4 | Five-Year Capital Improvements Plan | 44 |
| CHAPTER 5A | Five-Year Water Resource Development Work Program. | 45 |
| CHAPTER 5B | Alternative Water Supply Annual Report | 46 |
| CHAPTER 6A | Florida Forever Work Plan, 2008 Annual Update | 47 |
| CHAPTER 6B | Land Stewardship Annual Report | 48 |
| CHAPTER 7 | Mitigation Donation Annual Report | 49 |



Introduction to the *2008 South Florida Environmental Report – Volume II*

In the *2008 South Florida Environmental Report – Volume II*, Chapter 1 provides an overview of the reporting objectives, as well as a basic understanding of the governmental and legal basis for this volume. It has been prepared in accordance with Chapter 2005-36, Laws of Florida. This legislation calls for all five of Florida's water management districts to consolidate annual plans and reports submitted to Florida's governor and legislature. Whereas Volume I of the SFER includes reports unique to the District, Volume II includes the reports that are prepared by all five of Florida's water management districts.

EIGHT REPORTS ARE COMBINED INTO VOLUME II

Volume II incorporates eight plans and reports that are required annually by each of Florida's five water management districts. The agencies have consolidated documents to improve reporting efficiency, quality, and accessibility. This unified reporting facilitates communication, making information more accessible to policymakers, stakeholders, and the public. The chapter content and topics in Volume II are consistent with the corresponding reports of the other districts. The following

eight reports have been consolidated into the correlating chapters in Volume II:

- Annual Work Plan Report
- Minimum Flows and Levels Priority List and Schedule
- Five-Year Capital Improvements Plan
- Five-Year Water Resource Development Work Program
- Alternative Water Supply Annual Report
- Florida Forever Work Plan, Annual Update
- Land Stewardship Annual Report
- Mitigation Donation Annual Report

The design of this single submission fulfills mandated reporting requirements, facilitates comparisons to the earlier separate reports, and enables state-wide evaluations with corresponding chapters in the consolidated reports of the other water management districts. The project-related information in this volume is described on a fiscal-year basis (from October 1 through September 30), representing the 12-month period for which the District's Performance Management cycle – the Strategic Plan, Annual Work Plan, Annual Budget, and Reporting and Evaluation – is developed and implemented.

THE DISTRICT OPERATES AND MAINTAINS THE WORLD'S LARGEST WATER MANAGEMENT SYSTEM, COMPRISED OF CANALS, PUMP STATIONS, AND OTHER WATER CONTROL STRUCTURES.



AGENCY DATABASE UPDATES PROJECTS FOR FOURTH YEAR

In its fourth year, the Consolidated Project Report Database has been updated and includes descriptions of District projects (activities with start and end dates) and processes (ongoing activities) that are referenced in the 2008 SFER. This database is designed to uniformly describe projects and processes linked to report-related planning efforts, while providing these descriptions only once rather than repeating them in several reports. Storing project and process information in a single location enables rapid data sorting, searches, and retrieval for efficient information and project management. Future SFERs will continue to provide updated information. Further details on the database are provided in the appendices to this chapter.

Fiscal Year 2007

Annual Work Plan Report

The South Florida Water Management District's annual business cycle is comprised of four main elements: the Strategic Plan, Annual Work Plan, Annual Budget, and Reporting and Evaluation. In this process, Work Plan Reports on the agency's project and financial status are prepared quarterly, and the 4th Quarter Report represents the status at the end of the fiscal year. In the 2008 SFER – Volume II, Chapter 2 presents the year-end report of the Annual Work Plan, the final step of the annual process, and details the District's major project activities during Fiscal Year 2007 (FY2007). This chapter reports on the status of planned project schedules, financial summaries for the agency's 11 programs, and the success indicators for each of these programs, as outlined in the District's Strategic Plan.

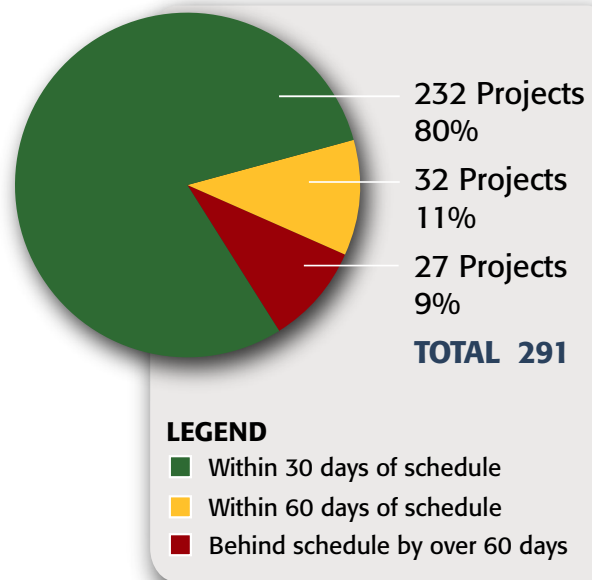
PROJECT SCHEDULE CRITERIA IS TIGHTENED AGAIN

In FY2007, adherence to the planned schedules for major District projects was categorized using the following criteria: "green" – within 30 days of schedule; "yellow" – within 60 days of schedule; or "red" – behind schedule by more than 60 days (see pie chart). It is important to note that each of these reporting criteria was tightened from those used in FY2006, as the specific timeframes used to measure project status were reduced for the second year in a row. Using these updated criteria, District projects were green for 80 percent of major projects and yellow for 11 percent of the projects. This represents a total of 91 percent of all projects that were within 60 days of the schedules set in the FY2007 Annual Work Plan.

REVENUES WERE UP WHILE EXPENDITURES WERE DOWN IN FISCAL YEAR 2007

This year's Annual Work Plan Report tracked the status of revenues collected and the expenditure rates. During FY2007, the District collected 107 percent of budgeted revenue or \$1.379 billion – up from 96 percent in FY2006 – including 99 percent of budgeted taxes (both *ad valorem* taxes and agricultural privilege taxes), 61 percent of intergovernmental revenues, 609 percent of budgeted investment earnings, and 138 percent of the budgeted Certificates of Participation revenue from the sale of the first series of certificates in November 2006. The

FISCAL YEAR 2007 STATUS OF MAJOR DISTRICT PROJECTS (OCTOBER 1, 2006–SEPTEMBER 30, 2007)



Certificates of Participation budget of \$413.6 million was based on construction schedules and cash-flow needs.

Expenditure rates were tracked as an indicator of overall program activity. In FY2007, the District spent 63 percent of the total budget of approximately \$1.182 billion (excluding personnel and reserves). This represents a decrease of 15 percentage points from the 78 percent rate from the FY2006 time period. Both discretionary (81 percent from 86 percent) and restricted (58 percent from 75 percent) FY2007 budget expenditure rates decreased from the FY2006 rates. Of the 11 programs, five achieved overall (combined discretionary and restricted) expenditure rates higher than in FY2006. Factors contributing to the change in overall performance include staffing redirection to work on drought activities, lower than anticipated flood control activities, and significant outstanding year-end construction contracts and approved acquisitions that did not close.

2008 Minimum Flows and Levels Priority List and Schedule

THE STATE HAS ADOPTED MINIMUM FLOWS AND LEVELS FOR 12 WATER BODIES IN SOUTH FLORIDA

Florida law requires that all water management districts establish Minimum Flows and Levels (MFLs) for surface waters and aquifers within their jurisdiction. The minimum flow is defined as the “limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area.” State law also allows for the establishment of Water Reservations, defined as surface waters set aside in a certain location, time, or quantity and designated for a specific use that may

be required for the protection of fish and wildlife or public health and safety. In the 2008 SFER – Volume II, Chapter 3 describes the general process and legal requirements for development of MFL criteria, the linkage between MFLs and other South Florida Water Management District planning documents, and the newly adopted 2008 MFL Priority Water Body List and Schedule. This chapter also includes priorities for the establishment of Water Reservations, as allowed under Florida law.

As depicted on the opposite map, MFL criteria have been adopted for 12 water bodies within the South Florida Water Management District’s boundaries, including eight water bodies in 2001, two in 2002, and two in 2006. These water bodies include Lake Okeechobee; four areas of the Everglades including Water Conservation Areas 1, 2, and 3, and Everglades National Park; Florida Bay; most of the Biscayne aquifer; Lower West Coast aquifers; Caloosahatchee River and Estuary; St. Lucie River and Estuary; the Northwest Fork of the Loxahatchee River; and Lake Istokpoga.

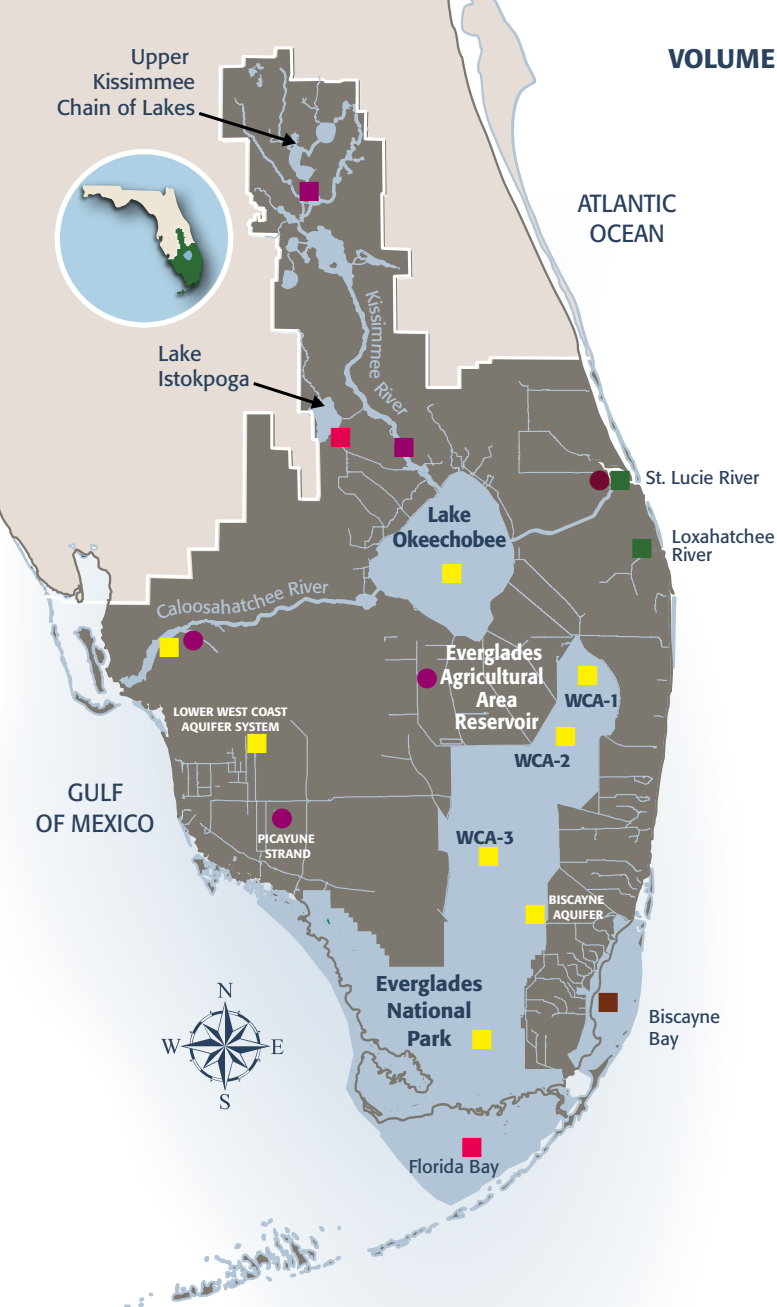
THE DISTRICT WILL COMPLETE A WATER RESERVATION FOR THE INDIAN RIVER LAGOON – SOUTH BASIN IN 2008.



PROACTIVE STEPS ARE BEING TAKEN TO RESERVE WATER FOR EVERGLADES RESTORATION

In February 2007, the District’s Governing Board adopted the Regional Water Availability Rule, which restricts the permitting of additional consumptive uses in the Water Conservation Areas, Everglades National Park, and Loxahatchee River basins. The protections afforded in these basins by this rule exceeded those scheduled in the 2007 Priority Water Body List. Therefore, the list was updated to focus on developing MFLs and Water Reservations for other water bodies.

The 2000 Water Resources Development Act requires that Water Reservations be established before federal funds can be spent on Everglades restoration projects. The updated schedule for Water Reservations reflects Everglades restoration projects that were congressionally authorized in the 2007 Water Resources Development Act.

**LEGEND**

— PRIORITY WATER BODIES

YEAR ESTABLISHED**MINIMUM FLOWS
AND LEVELS**

- 2001
- 2002
- 2006
- 2008
- 2009

**WATER
RESERVATIONS**

- 2008
- 2009

REGIONAL PRIORITY WATER BODIES

A NEW REPORTING PROCESS FOR MINIMUM FLOWS AND LEVELS AND WATER RESERVATIONS IS LAUNCHED IN 2007

In 2007, the District began reporting the priority schedule in a three-step process. The revised reporting approach includes a multi-year schedule that estimates the time required to complete each step. The schedule for rule development is driven by the results of scientific peer review and public discussion of the rule proposal. This greater level of detail is different from previous priority lists where all activities were combined in a single year.

Under the new reporting process, in the first step the District will evaluate the available science that links ecological components of the resource to water flows or levels to be protected by regulation. In the second step, scientific peer review will be conducted to determine if the linkages are scientifically sound. In the last step, rule development will be completed where supporting data are sufficient. If the expert peer review concludes that data are insufficient, then additional research and analysis may be deemed necessary to complete the process.

In 2008, the District has scheduled completion of the first two steps for Indian River Lagoon – South (a Water Reservation to support the Comprehensive Everglades Restoration Plan [CERP] Acceler8 project) and Biscayne Bay (a potential MFL). Subsequent actions for these water bodies will depend upon the respective findings of the scientific peer-review panels.

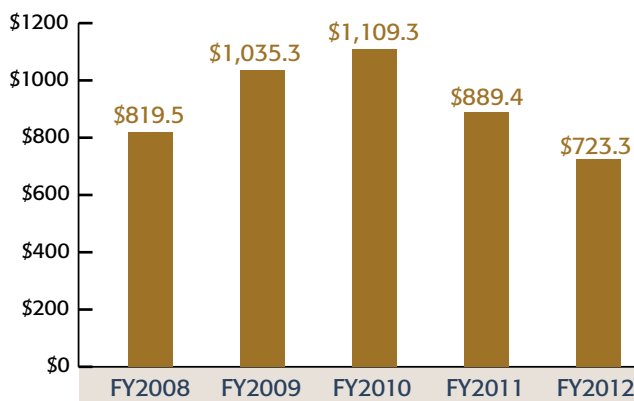
In 2009, the District plans to complete Step 1 actions in support of (1) MFLs for the Kissimmee River and Upper Kissimmee Chain of Lakes and (2) Water Reservations in support of CERP Acceler8 projects for the Everglades Agricultural Area Reservoir, the Caloosahatchee River reservoir, and Picayune Strand. It is expected that further updates on these noteworthy efforts will be presented in future South Florida Environmental Reports.

Five-Year Capital Improvements Plan

The Five-Year Capital Improvements Plan (CIP) includes estimated capital project expenditures, anticipated revenues, and project descriptions for the five-year period, Fiscal Years (FY) 2008–2012. The CIP supports the District's priorities, provides a mechanism for decision making, and serves as a financial management and reporting document. Capital improvement projects include improvement/refurbishment, construction, and land acquisition for eight of the 11 District programs. In the 2008 SFER – Volume II, Chapter 4 provides the five-year financial schedule of revenues and expenditures for those capital projects approved for FY2008, along with the District's four-year capital project forecast. It also includes a description for each of the capital projects found in the Consolidated Project Report Database (see Volume II, Appendix 1-3).

FIVE-YEAR ANNUAL CAPITAL BUDGET ESTIMATES (FISCAL YEARS 2008–2012)

MILLIONS



| | FY2008 | FY2009 | FY2010 | FY2011 | FY2012 |
|--------------------------|----------------|------------------|------------------|----------------|----------------|
| Coastal Watersheds | \$35.0 | \$60.4 | \$56.3 | \$2.4 | \$2.5 |
| Lake Okeechobee | \$99.8 | \$56.4 | \$75.2 | \$162.6 | \$142.4 |
| Kissimmee Watershed | \$12.1 | \$0.3 | \$0.3 | \$0.3 | \$0.3 |
| CERP | \$496.2 | \$548.5 | \$548.8 | \$476.7 | \$389.3 |
| District Everglades | \$111.3 | \$294.8 | \$345.2 | \$161.0 | \$100.6 |
| Mission Support | \$1.4 | \$0.8 | \$0.4 | \$0.4 | \$0.3 |
| Land Stewardship | \$1.1 | \$12.6 | \$12.3 | \$11.7 | \$10.8 |
| Operations & Maintenance | \$62.6 | \$61.5 | \$70.8 | \$74.3 | \$77.1 |
| Total | \$819.5 | \$1,035.3 | \$1,109.3 | \$889.4 | \$723.3 |

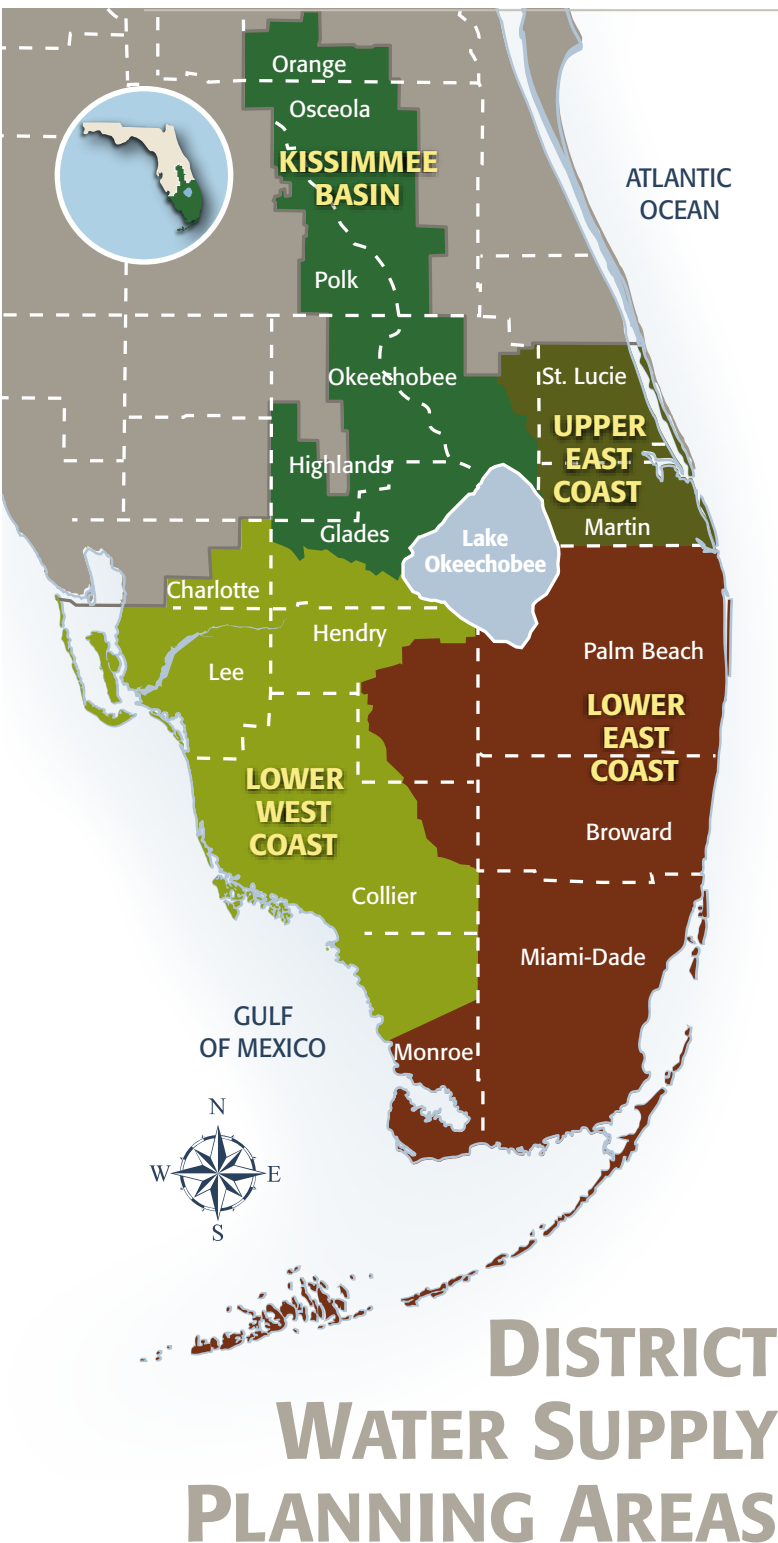
PLAN FUNDING IS ALIGNED WITH STRATEGIC PRIORITIES

As reflected in the chart below, an annual capital budget for the eight District programs presented in the CIP are consistent with the following strategic priorities established by the District's Governing Board: (1) expedite Everglades restoration by advancing construction schedules of key projects, (2) achieve Everglades water quality standards by implementing the Long-Term Plan, (3) protect and restore natural systems in the Northern Everglades (Kissimmee, Lake Okeechobee, Caloosahatchee and St. Lucie watersheds) by increasing storage capacity and water quality treatment, and (4) refurbish the regional water management system by implementing the 50-year plan. As shown in the table, the Comprehensive Everglades Restoration Plan (CERP) and District Everglades programs receive the major share of the District's capital budget.

PLAN FORECASTS \$4.6 BILLION TO BE SPENT OVER THE NEXT FIVE YEARS

The five-year (FY2008–FY2012) CIP represents \$4.6 billion in projects. As shown in the chart, the total FY2008 budgeted capital expenditures are \$819.5 million, representing 63.8 percent of the total District FY2008 budget of \$1.283 billion and 17.9 percent of the total five-year CIP projected budget. The FY2008 capital budget is \$87.8 million, or 9.7 percent less than last year's \$907.3 million. The most significant decreases are \$80.4 million for CERP and \$62.8 million for District Everglades, mainly due to the decision not to issue Certificates of Participation in FY2008. There were significant increases to the Lake Okeechobee and Coastal Watersheds programs. In 2007, the Florida legislature expanded the Lake Okeechobee Protection Act to strengthen protection for the Northern Everglades and extend the Save Our Everglades Trust Fund through 2020. As a result, in FY2008 the District received an additional \$100 million for the Northern Everglades initiative. These additional funds increased the CIP for the Lake Okeechobee Program by \$45.6 million and Coastal Watersheds Program by \$35 million in comparison to FY2007.

Five-Year Water Resource Development Work Program



CHANGING REGIONAL WATER NEEDS ARE BEING ADDRESSED BY UPDATED WATER SUPPLY PLANS

Implementing regional water supply plans is a District strategic priority. Water supply plans contain strategies to meet future urban and agricultural water demands, while meeting the needs of the environment. Regional water supply plans are updated every five years and encompass a 20-year planning horizon for each of the agency's four planning regions: Upper East Coast, Kissimmee Basin, Lower West Coast, and Lower East Coast (see map). State law requires that each water management district prepare an annual Five-Year Water Resource Development Work Program to provide an update and describe the agency's implementation strategy for the water resource development component of each regional water supply plan. The Work Program is included within the 2008 SFER – Volume II as Chapter 5A to fulfill various reporting requirements on planning, projects, and funding related to water supply.

The first water supply plan for the Upper East Coast was completed in 1998, updated in 2004, and amended in 2006. In 2000, a regional water supply plan was developed for each of the District's other three planning areas – the Kissimmee Basin, Lower West Coast, and Lower East Coast. The 2005–2006 updates for all plans have been completed. The updated plans identify water resource development and water supply development projects that are expected to meet the needs of all reasonable beneficial uses by 2025 during a 1-in-10 year drought event, while sustaining the region's water resources and related natural systems.

The District has allocated \$4.5 million in Fiscal Year 2008 (FY2008) for water resource development projects and anticipates spending \$17.6 million on these projects over the next five-year period (FY2008–FY2012). These allocations include \$1.58 million in FY2008 and \$7.4 million from FY2008–FY2012 to implement the Comprehensive Water Conservation Program, which carries out the recommendations of Florida's Water Conservation Initiative to improve efficiency in all water use categories. These projections do not include Comprehensive Everglades Restoration Plan environmental restoration projects, Aquifer Storage and Recovery projects, and projects not identified in the 2005–2006 Water Supply Plan Updates and Upper East Coast Plan Amendment.

Alternative Water Supply Annual Report

Due to the limitations that exist on development of traditional freshwater sources within the South Florida Water Management District, most future water needs will be met primarily through development of alternative water sources. To proactively address this important issue, the District has had a very successful grant program to support development of Alternative Water Supply (AWS) projects for over a decade. This program has invested close to \$170 million since 1996 for the construction of almost 400 AWS projects. Projects eligible for funding under this program include the use of nontraditional water supply sources such as reclaimed water, stormwater, salt and brackish water, and surface water captured predominately during wet-weather flows, and sources made available through additional storage capacity. In the 2008 SFER – Volume II, Chapter 5B provides an annual update on the agency's AWS funding efforts during Fiscal Year 2007 (FY2007).

ALTERNATIVE WATER SUPPLY FUNDING PROGRAM SHOWS MARKED SUCCESS

In 2005, the Florida legislature created the Water Protection and Sustainability Program that provides significant annually recurring state funding for the construction of AWS projects. This included \$30 million to the South Florida Water Management District for the first year of the program (FY2006) and \$18 million in subsequent years. The District's AWS Funding Program, used to administer Water Protection and Sustainability Program funding, has been a success. In FY2006 and FY2007 combined, 142 projects received \$85 million in state and District funding, with matching funds from our partners approaching \$340 million and 196 million gallons per day of water made available.

The District received 79 applications during the FY2008 solicitation period. In September 2007, the District's Governing Board approved \$45.9 million to fund 72 FY2008 projects expected to create an additional 81 million gallons per day, bringing the total anticipated water made available to 277 million gallons per day since the passage of the 2005 legislation.

STATE AND LOCAL PARTNERSHIPS CONTINUE TO ADVANCE FUTURE ALTERNATIVE WATER SUPPLIES FOR SOUTH FLORIDA COMMUNITIES

The Lake Region Water Treatment Plant, under construction in Belle Glade by the Palm Beach County Utilities Department, provides an excellent example of the regional benefits of the AWS Funding Program. While the cities of Belle Glade, Pahokee, and South Bay have historically obtained potable water from Lake Okeechobee, recent drought and past environmental concerns have highlighted the importance of developing an AWS source for these local communities. The new 10-million-gallon-per-day, state-of-the-art reverse osmosis plant will tap into the Floridan Aquifer, providing a safe and reliable source of drinking water for decades to come.

IN SUMMER 2008, THE NEW LAKE REGION REVERSE OSMOSIS PLANT WILL START SUPPLYING POTABLE WATER TO SOUTH LAKE OKEECHOBEE COMMUNITIES.



Florida Forever Work Plan, 2008 Annual Update

In the 2008 SFER – Volume II, Chapter 6A presents the 2008 annual update of the Florida Forever Work Plan, listing projects eligible for funding under the Florida Forever Act and reporting on the South Florida Water Management District's work plan progress and changes since last year's update. This update focuses on land acquisition requirements – acres to be acquired and costs – over the next five fiscal years (FY2008–FY2012). In addition, the plan provides a summary of land acquisition activity for eligible projects as of the end of FY2007. Details on the District's land management activities are presented in Volume II, Chapter 6B.

The 2008 update identifies a total of 54 eligible projects, which includes Comprehensive Everglades Restoration Plan (CERP), Florida Forever/Save Our Rivers (FF/SOR), Northern Everglades and Estuaries Protection Program, and other related projects. The Caloosahatchee River Basin Water Quality Treatment and Testing Facility has been added to the list of eligible projects in this reporting cycle.

THE STATE CONTINUES ITS COMMITMENT TO FUNDING EVERGLADES RESTORATION

The total projected real estate expenditures for eligible projects for FY2008–FY2012 is \$581 million – \$576 million for land acquisitions and \$5 million to construct engineering solutions to minimize more costly acquisitions. These forecasts incorporate the future lands needed for CERP and other water resource projects.

In 2007, as part of Senate Bill 392, the Florida legislature renewed the Save Our Everglades funding for an additional 10 years, and provided an additional \$26.6 million to be used for FY2008 land acquisitions within the Northern Everglades ecosystem. Over the next five years, the District expects to receive a total of \$637 million from the Florida Forever and Save Our Everglades Trust Funds (FF/SOETF). In July 2007, the District's Governing Board amended the FY2007 budget, authorizing the advance use of \$56 million of the FY2008 funds to acquire critical lands needed for CERP, Corkscrew Regional Ecosystem Watershed, and Kissimmee River Restoration projects. The remaining projected FF/SOETF balance of \$581 million will be used to fund the estimated FY2008–FY2012 real estate expenditures.

DISTRICT ACQUIRES LAND FOR WATER RESOURCE AND CONSERVATION PROJECTS

The FY2007 District land acquisition activity concluded with total land purchases of 7,331 acres for \$84.7 million. The acres acquired added to the total of District-owned natural lands and the land to be used for the construction of water resource projects. The District currently has 35 FF/SOR projects, including the Kissimmee River and Kissimmee Chain of Lakes, with a total of 1.2 million natural land acres acquired. A total of 217,584 acres, or 56 percent, of the land need for CERP projects have been acquired. The District's aggressive purchase of CERP land has provided 99 percent of the real estate needed for construction of Acceler8 projects.

AS OF 2007 FISCAL YEAR END, 99 PERCENT OF THE LANDS NEEDED FOR ACCELER8 PROJECTS HAVE BEEN ACQUIRED, SUCH AS CRITICAL ACQUISITIONS FOR THE BISCAYNE BAY, CUTLER WETLANDS FLOW-WAY PROJECT.



Land Stewardship Annual Report

THE DISTRICT STEWARDS PUBLIC LANDS FOR MANY REGIONAL BENEFITS

The Land Stewardship Program is responsible for the planning and management of the South Florida Water Management District lands. This includes Save Our Rivers (SOR) and other lands for natural system conservation as well as those lands being held for future water resource projects. The Land Stewardship Program is also responsible for the implementation and administration

HEALTHY COMMUNITY PLANT REGROWTH FOLLOWS CONTROLLED BURNS THAT SIMULATE NATURAL FIRE.



of mitigation banks and regional off-site mitigation areas as well as overseeing recreation on District lands. Each year, the District is required to report on land management activities for all agency-owned properties and associated project areas. In the 2008 SFER – Volume II, Chapter 6B highlights the 22 SOR and Florida Forever natural lands projects for the District's five land management regions – Upper Lakes, Kissimmee/Okeechobee, East Coast, Everglades, and West Coast – and the current (Fiscal Year 2007) and projected (Fiscal Year 2008) land management activities and acquisition status for each region. The chapter also includes project-specific descriptions for each of the District's Land Stewardship Program's major components – hydrologic and habitat restoration, vegetation management, exotic species control, prescribed burning, wildlife management, public use, environmental education, law enforcement, mitigation, infrastructure management, planning, monitoring, and the management of project lands – which are those lands acquired for future implementation of the Comprehensive Everglades Restoration Plan and other water resource projects.

MULTIAGENCY PARTNERSHIPS MANAGE OVER 1.3 MILLION ACRES OF PUBLIC LANDS

Over the course of its history, the District and its partnering agencies have acquired nearly 1.2 million acres of environmentally sensitive lands. These lands span across the entire South Florida region from the northern reaches of the Kissimmee Chain of Lakes to the Southern Glades Wildlife and Environmental Area near Everglades National Park. As of September 2007, the District owns, and with its partners, manages over 1.3 million acres of SOR and other valued lands, including key designated areas for planned Everglades restoration projects. To support extensive land management efforts, the District uses more than 100 separately managed contracts, agreements, and leases with other governmental agencies and private entities. The Fiscal Year 2007 budget for the Land Stewardship Program was \$10.9 million. Revenue generated from agricultural leases, sale of products, mitigation banks, and other alternative sources for this fiscal year was in excess of \$4.6 million. Management activities for Fiscal Year 2008 are anticipated to be an estimated total cost of \$11.5 million.

Mitigation Donation Annual Report

Mitigation is the acquisition, creation, restoration, or enhancement of wetlands to compensate for permitted wetland impacts. Each year, Florida's water management districts are required to report on the expenditure of funds received as mitigation for wetland impacts. Mitigation funding allows the South Florida Water Management District to direct funds towards priority restoration that benefits the South Florida ecosystem, at costs that are comparable to or less than other forms of mitigation.

In the 2008 SFER – Volume II, Chapter 7 highlights the District's mitigation fund expenditures for Fiscal Year 2007 (FY2007) and the utilization of mitigation funds anticipated for FY2008 for the two regional mitigation projects: Corkscrew Regional Ecosystem Watershed (CREW) and Pennsuco. The chapter also highlights the restoration, monitoring, and management efforts for these projects. Covering over 60,000 acres in Lee and Collier counties, CREW contains some of the largest remaining pristine cypress wetlands in the United States providing habitat to many protected species. Covering about 13,000 acres in Miami-Dade County, Pennsuco is an impaired wetland ecosystem that likely will continue to degrade and further impact adjacent natural areas unless widespread invasive exotics are reduced. Beyond providing regional ecological benefits, enhancement of these vital wetlands will contribute to overall Everglades restoration goals.

REGIONAL MITIGATION EFFORTS CONTINUE TO ENHANCE WETLANDS

In 1995, the District began accepting cash payments for the CREW and Pennsuco projects as a form of mitigation to offset impacts to other wetlands. Mitigation funding has provided land acquisition, chemical treatment of exotics, hydrologic enhancement (CREW only), environmental monitoring, security and land management. Although both projects no longer accept mitigation funds, existing dedicated funds continue to provide mitigation efforts at the sites.

In FY2007, the District expended over \$1.1 million on land acquisition in CREW and nearly \$1.7 million on restoration for the two mitigation projects. FY2007 funding supported exotic treatments on 1,678 acres in CREW and 5,466 acres in Pennsuco. The ongoing restoration efforts in both areas are proving successful. Native vegetation is showing a strong recovery in Pennsuco, with only 3 percent of the area now represented by melaleuca. There has been a decrease in invasive plants on CREW lands, which has positively resulted in increased native species.

The anticipated total expenditures for FY2008 are \$2.4 million. Of this amount, approximately \$400,000 is dedicated to restoration and monitoring in CREW. In FY2007, about \$1 million is budgeted for the treatment of exotics and continued monitoring in Pennsuco. Due to efficiencies in conducting exotic treatments in Pennsuco, a surplus of available funds will provide roughly \$1 million for demolition, cleanup, security surveillance, and exotic control for projects outside Pennsuco.

PRESERVING AND RESTORING REGIONAL WETLANDS IS VITAL TO PROTECTING SOUTH FLORIDA'S WILDLIFE, SUCH AS THE NATIVE WADING BIRD, WHITE IBIS (*EUDOCIMUS ALBUS*).





Glossary

Acceler8: A commitment through interagency partnerships to revitalize the ecosystem by stepping up the pace for funding, design, and construction of eight critical Everglades restoration projects.

Acre-feet (ac-ft): The volume required to cover one acre to a depth of one foot, commonly used to express large volumes of water (1 acre-foot = 325,900 gallons).

Ad valorem tax: A tax imposed on the value of real and personal property, as certified by the property appraiser in each county.

Alternative Water Supply (AWS): A supply of water that has been reclaimed after municipal, commercial, and/or agricultural uses; or a supply of storm water, or brackish or salt water, that has been treated in accordance with applicable rules and standards sufficient to supply an intended use.

Aquifer Storage and Recovery (ASR): The injection of fresh water into a confined saline aquifer when water supply exceeds demand, and recovering it when there is a supply deficit.

Best Management Practices (BMPs): Land, agricultural, industrial, and waste management techniques that reduce pollutant export from a specified area.

Certificates of Participation (COPs): As defined by Florida law (Section 373.584, Florida Statutes), a type of revenue bond that water management districts may issue to finance undertaking of any capital or other project for purposes permitted by the state's constitution.

Compliance monitoring: In a water quality management program, compliance is associated with meeting permit conditions as well as ambient standards. Ongoing monitoring provides periodic water quality data used to assess compliance.

Discharge (or flow): The rate of water movement past a reference point, measured as volume per unit time (usually expressed as cubic feet or cubic meters per second).

Ecosystem: Biological communities together with their environment, functioning as a unit.

Estuary: The part of the wide lower course of a river where its current is met by ocean tides; or an arm of the sea at the lower end of a river where fresh and salt water meet.

Everglades Agricultural Area (EAA): An area extending south from Lake Okeechobee to the northern levee of Water Conservation Area 3A, from its eastern boundary at the L-8 canal to the western boundary along the L-1, L-2, and L-3 levees. The EAA incorporates almost 3,000 square kilometers (1,158 square miles) of highly productive agricultural land.

Everglades Construction Project (ECP): The foundation of a large ecosystem restoration program, composed of 12 interrelated construction projects between Lake Okeechobee and the Everglades, currently including nearly 45,000 acres of Stormwater Treatment Areas with an additional 15,000 acres planned for future completion. It also contains four hydropattern restoration projects that will improve the volume, timing, and distribution of water entering the Everglades.

Everglades Forever Act (EFA): A 1994 Florida law (Section 373.4592, Florida Statutes), amended in 2003, to promote Everglades restoration and protection. This will be achieved through comprehensive and innovative solutions to issues of water quality, water quantity, hydroperiod, and invasion of exotic species to the Everglades ecosystem.

Everglades Protection Area (EPA): As defined in the Everglades Forever Act, the EPA is comprised of Water Conservation Areas 1, 2A, 2B, 3A, and 3B, the Arthur R. Marshall Loxahatchee National Wildlife Refuge, and Everglades National Park.

Expenditure: The disbursement of appropriated funds to purchase goods or services.

Fiscal Year (FY): The 12-month period for which the annual budget is developed and implemented. The fiscal year for the District begins on October 1 and ends on September 30.

Florida Forever Act: A 1999 Florida law (Section 259.105, Florida Statutes) authorizing the issuance of up to \$3 billion in bonds over a 10-year period. This funding is used for land acquisition, water resource development, stormwater management projects, water body restoration activities, recreational facilities, public access improvements, and invasive plant removal.

Florida Statutes (F.S.): A permanent collection of state laws organized by subject area into a code made up of titles, chapters, parts, and sections. The Florida Statutes are updated annually by laws that create, amend, or repeal statutory material.

Flow-weighted mean concentration: The average concentration of a substance in water, corrected for the volume of water flow at the time of sampling. Samples taken when flow is high are given greater weight in the average.

Geometric mean: A statistical average of a set of transformed numbers, often used to represent a central tendency in highly variable data, such as water quality. It is calculated from data transformed using powers or logarithms and then transformed back to original scale after averaging.

Loading (or mass loading): The amount of material carried by water into a specified area, expressed as mass per unit of time. One example is phosphorus loading into WCA-2A, measured in metric tons per year. Note that 1 metric ton (mt) is equivalent to 1,000 kilograms, or 2,205 pounds.

Northern Everglades Initiative: As defined by Florida law (Section 373.4595, Florida Statutes), a regional effort to holistically restore the Everglades through increased focus and integration of regional projects in the Northern Everglades, including the Lake Okeechobee watershed and the Caloosahatchee and St. Lucie River watersheds and estuaries.

Parts per billion (ppb): A unit of measure, equivalent to micrograms per liter (1 ppb = 1 µg/L).

Phosphorus: An element that is essential for life. In freshwater environments, phosphorus is often in short supply; increased levels of this nutrient can promote the growth of algae and other plants.

Revenue: Monies received from all sources, with the exception of fund balances, that will be used to fund expenditures in a fiscal year.

Slough: A depression associated with swamps and marshlands containing areas of slightly deeper water and a slow current, such as the broad, shallow rivers of the Everglades.

Stage: The height of a water surface above an established reference point. This vertical control measurement is usually expressed as feet National Geodetic Vertical Datum of 1929 (NGVD29) or feet North American Vertical Datum of 1988 (NAVD88).

Stormwater Treatment Area (STA): A large, constructed wetland designed to remove pollutants, particularly nutrients, from stormwater runoff using natural processes.

Submerged aquatic vegetation (SAV): Wetland plants that exist completely below the water surface.

Total Maximum Daily Load (TMDL): The maximum allowed level of pollutant loading for a water body, while still protecting its uses and maintaining compliance with water quality standards, as defined in the Clean Water Act.

Water Conservation Areas (WCAs): Diked areas of the remnant Everglades that are hydrologically controlled for flood control and water supply purposes. The WCAs are primary targets of Everglades restoration and major components of the Everglades Protection Area.

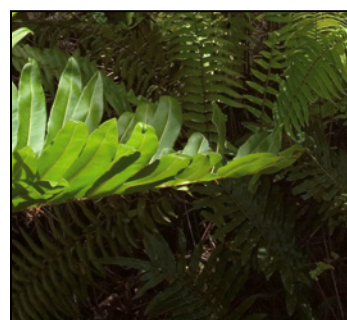
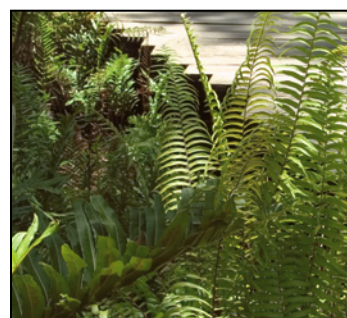
Water quality: The physical, chemical, and biological condition of water as applied to a specific use, typically propagation of fish and wildlife, public water supply, industry, or recreation.

Water quality criteria: Constituent concentrations based on scientific data and judgments on the relationship between pollutant concentrations and environmental and human health effects.

Watershed: A region or area bounded peripherally by a water parting and draining ultimately to a particular watercourse or body of water.

Water Year (WY): The period from May 1 through April 30, during which water quality and other data are collected and reported in the South Florida Environmental Report.

Wetland: An area that is inundated or saturated by surface water or groundwater with vegetation adapted for life under those soil conditions (for example, lakes, swamps, and marshes).



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Editorial and Production Team: To organize the development of this lengthy report under tight deadlines, continuous project management and close teamwork by the SFER production management team is required throughout the report production process. The team demonstrates advanced organizational skills as it expertly guides this annual process. The exceptional cooperation and productivity of the 2008 SFER editorial and production team are respectfully acknowledged, as well as the support of the District's Creative Services Division in producing the 2008 SFER Executive Summary. The outstanding work performed under contract to the District by the SFER technical editors as well as the SFER Executive Summary graphic designer, Gail Marcarelli, is also immensely appreciated.

Project Team: The management of Volume I is centered in the District's Environmental Resource Assessment Department. The Volume I staff works closely with the Florida Department of Environmental Protection's Water Quality Standards and Special Projects Program

to jointly coordinate the creation of Volume I, Chapter 3, and its associated appendices. The District's Finance and Administration Department provides oversight and support for the development of Volume II. Along with the significant contributions of these project management teams, this large, multidisciplinary document could not be produced without the guidance of our agencies' executive managers.

Peer Review and Public Workshop: The incredible knowledge and experience of the expert panel assembled for the 2008 SFER Peer Review and Public Workshop are greatly valued. The panel provided insightful and thorough scientific peer review in the major subject areas covered in Volume I. The District's Environmental Resource Assessment staff is also recognized for their vital assistance in conducting this year's workshop.

Other Contributors: The extensive amount of data and other information provided throughout Volume I are largely supported by the three divisions of the District's Environmental Resource Assessment Department – Water Quality Monitoring, Water Quality Analysis, and Water Quality Assessment. The long list of individuals throughout these divisions that have contributed to the essential data collection, monitoring, analyses, validation, and technical assessments for multiple Volume I chapters and appendices continues to contribute to the enormous success of this report, and their efforts are deeply appreciated. Project managers and chapter authors are also appreciatively recognized for updating the 2008 SFER Consolidated Project Report Database.

For further reference, a more detailed list of authors and contributors is presented on the acknowledgments page of the 2008 Main Report.

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For additional *2008 South Florida Environmental Report* copies, or for the Consolidated Project Report Database CD, please contact the District's Reference Center at 561-682-2850. The complete 2008 report is also available online at www.sfwmd.gov/sfer



On the cover: Lake Okeechobee — derived from the Seminole Indian term meaning “big water” — is a shallow, 730-square-mile lake located in south-central Florida and is notably the largest freshwater body in the southeastern United States. The lake receives water from the Kissimmee River, Lake Istokpoga, and other basins to the north, and its waters flow south into the Everglades Protection Area and to Florida’s two coasts via the St. Lucie and Caloosahatchee rivers. As the heart of South Florida’s interconnected water management system, Lake Okeechobee meets many important needs, including water supply, flood protection, and habitat for native plants and birds. Sport and commercial fisheries in the lake are nationally known and economically valuable.

In just four years, the South Florida environment has experienced remarkable climatic extremes. Back-to-back hurricanes arrived in 2004 and 2005 followed by prolonged drought conditions in 2007 that visibly impacted Lake Okeechobee (see front and back cover). Diminished rainfall across the region produced record-low water levels in the lake, with far-reaching effects across the entire water management system. In response, the South Florida Water Management District implemented comprehensive water conservation measures to safeguard water resources while continuing to balance flood control, water supply, and environmental restoration needs.

For more information on water conservation, visit www.sfwmd.gov/conserve



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