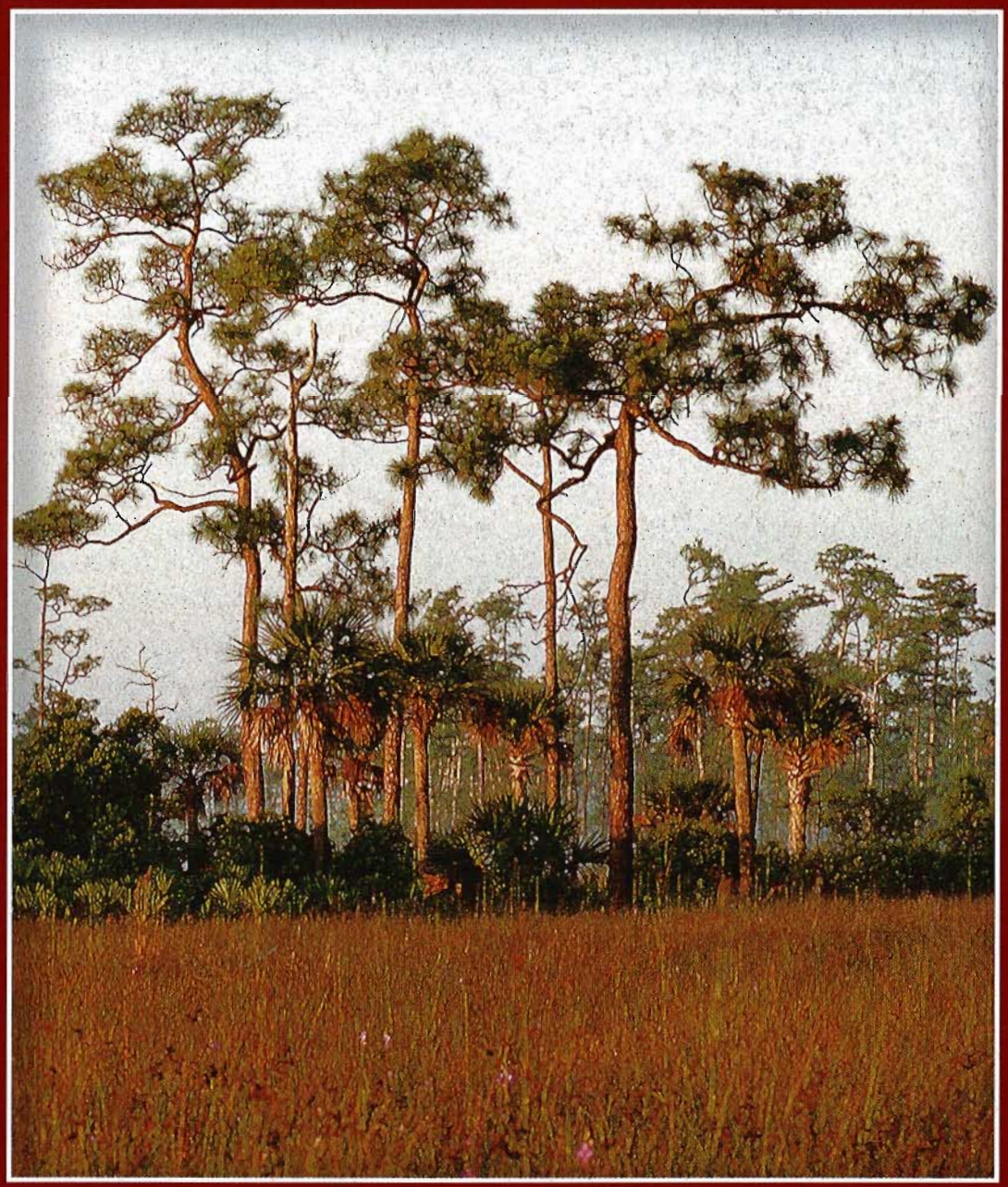
'97 Everglades

ANNUAL REPORT



SOUTH FLORIDA WATER MANAGEMENT DISTRICT

The front cover of this report is a photographic interpretation of a sawgrass marsh blending into a tree island in the Everglades.

On the back cover, the afternoon sun casts a shadow over the watery landscape of Everglades National Park. Dwarf cypress trees are interspersed through a sawgrass marsh.

1997 Everglades Annual Report

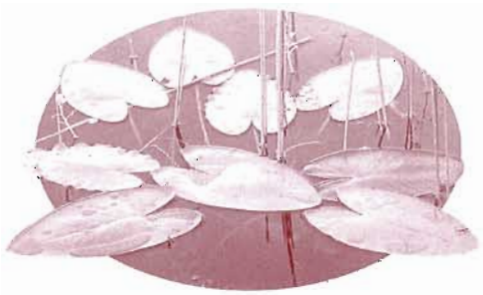
Florida's Everglades is the largest wetland and subtropical wilderness in the United States, and is a rare ecological resource. Everglades National Park, established in 1947, is designated an International Biosphere Reserve, an Outstanding Florida Water, and a United Nations World Heritage Site. The Arthur R. Marshall Loxahatchee National Wildlife Refuge, established in 1951, is designated an Outstanding Florida Water and Critical Habitat for the endangered Snail Kite. Another 720,000 acres of Everglades habitat lies between the Refuge and Park in the other Water Conservation Areas. The "River of Grass" contains a unique diversity of plants and wildlife not found anywhere else.

For more than a century, man altered the ecosystem to provide for the development of a growing population, for agriculture, and to protect against deadly hurricanes and droughts. In fact, water management efforts supported by citizens, the state, and federal government helped make Florida one of the fastest-growing states in the nation. In the last 30 years, however, a greater appreciation for the value of natural ecosystems has evolved. A better understanding of environmental resources has shown that impacts to even a small part of the system can have widespread repercussions.

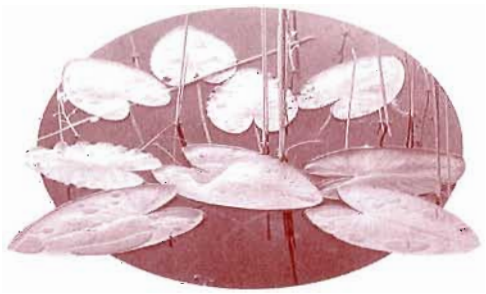
Today the Everglades faces critical challenges from more than 100 years of change. Phosphorus-enriched stormwater runoff from agriculture and other sources is disrupting the ecosystem's native populations of plants and animals. Other threats include changes in the quantity, distribution and timing of fresh water; infestation of non-native plants; mercury accumulation in Everglades' fish, birds and mammals; and a reduction in the size of the ecosystem. Construction and operation of the Central & Southern Florida Flood Control Project altered water conditions in the Everglades, adversely affecting native flora and fauna. At the south end, Florida Bay is experiencing algal blooms, seagrass die-offs and elevated salinity levels.

The Everglades Forever Act passed by the Florida Legislature in 1994 establishes a comprehensive program to restore significant portions of the remnant Everglades. This annual progress report covers efforts toward these goals during the 12 months ending September 30, 1997. It is the seventh annual report and is presented to the Governor, the Speaker of the House of Representatives, the Minority Leader of the House of Representatives, the President of the Senate, the Minority Leader of the Senate, the Florida Department of Environmental Protection, and the Joint Legislative Committee on Everglades Oversight.

The South Florida Water Management District develops this report in coordination with the following state and federal organizations: Florida Department of Environmental Protection, Arthur R. Marshall Loxahatchee National Wildlife Refuge, Everglades National Park, United States Army Corps of Engineers, United States Environmental Protection Agency, and South Florida Ecosystem Restoration Task Force.



1997 Everglades Annual Report



Abbreviations

Act.....1994 Everglades Forever Act
Corps of Engineers.....United States Army Corps of Engineers
District.....South Florida Water Management District
Park.....Everglades National Park
Refuge.....Arthur R. Marshall Loxahatchee National Wildlife Refuge
Restudy.....C&SF Project Comprehensive Review Study

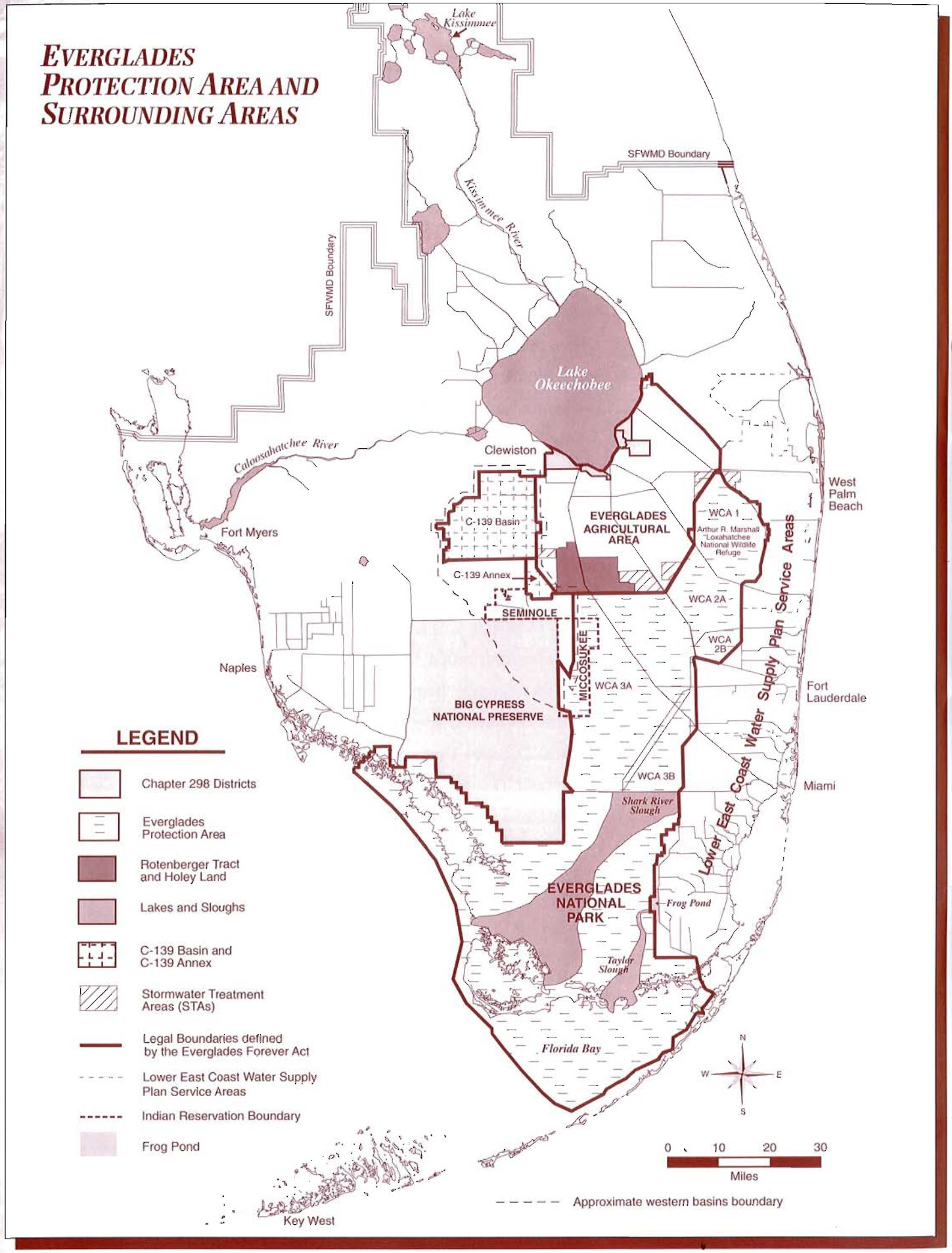
BMP.....Best Management Practice
C&SF.....Central & Southern Florida Project
DEP.....Florida Department of Environmental Protection
EAA.....Everglades Agricultural Area
ENR.....Everglades Nutrient Removal Project
M/WBE.....Minority/Women Owned Business Enterprise
NPDES.....National Pollution Discharge Elimination System
STA.....Stormwater Treatment Area
USEPA.....United States Environmental Protection Agency

Note to Readers:

1994 Everglades Forever Act. This report was originally created to provide an annual update of the 1991 Everglades Protection Act. It was changed three years later to address the subsequent 1994 Everglades Forever Act (Ch. 94-115, Laws of Florida; now contained in Section 373.4592, Florida Statutes). Information on the implementation of the Everglades Forever Act is found throughout this report.

1997 Everglades Oversight Act. In 1997 a new Florida law was created calling for expanded Everglades oversight (Ch. 97-258, Laws of Florida), which requires that the District report on construction and funding issues. Implementation of this Act is covered in the three sections of this report: Everglades Construction Project, Funding, and Appendix. The 1997 Oversight Act also calls for the District to report on plans, permits, land acquisition agreements, modifications, and the overall status of the Everglades Forever Act. The entire report serves this purpose.

EVERGLADES PROTECTION AREA AND SURROUNDING AREAS



Introduction

Florida's Everglades Forever Act (Act) outlines a comprehensive plan to restore a significant portion of the remaining Everglades ecosystem through land acquisition, construction, research and regulation. The general goal is to improve water quality, water quantity (hydroperiod), and prevent the spread of exotic species. The overall restoration and cleanup effort described in the Act is known as the "Everglades Program."

"Everglades Protection Area" Outlined

As part of the greater south Florida ecosystem, the area identified for restoration is comprised of Everglades Water Conservation Areas 1, 2A, 2B, 3A and 3B in western Palm Beach, Broward and Dade counties; the Arthur R. Marshall Loxahatchee National Wildlife Refuge (Refuge); and Everglades National Park. This region is known as the "Everglades Protection Area." The Act calls on state and federal agencies to coordinate efforts to carry out the Everglades Program. Most responsibility is with the South Florida Water Management District (District). The Florida Department of Environmental Protection (DEP) is jointly responsible with the District for more than half the projects. The United States Army Corps of Engineers and several other federal agencies also contribute to restoration efforts.

Fourth *Everglades Program Management Plan* Released

The District's Ecosystem Restoration Department oversees restoration programs from the Kissimmee River headwaters to Florida Bay. Key Everglades Program components — construction, research and program management — are housed in this department. In 1994 the District and DEP jointly released a report: *The Everglades Program Implementation: Program Management Plan* explaining the Act's many components. A total of 55 projects divided into seven categories are delineated from the Act. This comprehensive program management plan outlines objectives, activities and estimated completion dates for each project. The District updates this document annually. The third revision was released in late 1997.

Interagency Cooperation Key to Success

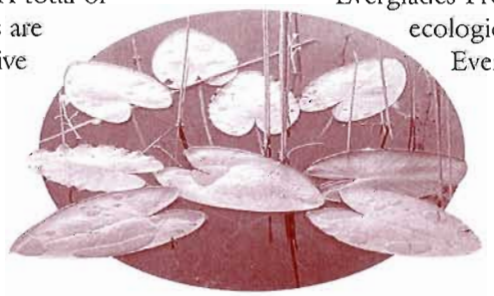
Successful implementation of the Everglades Program depends on effective coordination among participating agencies. The Act directs the District and DEP to work together to fulfill project goals. The Act also directs the District to pursue some goals through cooperative arrangements with the federal government, notably, the Corps of Engineers. In addition, other state and federal agencies have a support role for implementing Everglades Program projects.

Communication of Issues

Communication of Everglades issues to local governments and citizens is essential. District staff regularly meet with government officials, citizen groups and media; distribute publications and news releases; and discuss Everglades issues at Governing Board and other publicized meetings and workshops.

Florida Bay Restoration Included

Provisions addressing Florida Bay restoration and the Emergency Interim Plan requiring increased fresh water flows to the bay were included in the same legislation (Senate Bill 1350), but are in a separate statutory section (creating chapter 373.4593, Florida Statutes). A discussion of Florida Bay is included in this report for several reasons. First, much of Florida Bay is included in the Everglades Protection Area described in the Act. Second, hydroperiod and pollution reduction are part of the Act for the 80% of Florida Bay contained within the Everglades Protection Area. Third, both systems are ecologically intertwined, and changes to the Everglades ecosystem affect Florida Bay.



Everglades Restoration Timelin

1947 — Everglades National Park is dedicated.

River of Grass, by Marjory Stoneman Douglas, first draws attention to plight of Everglades.

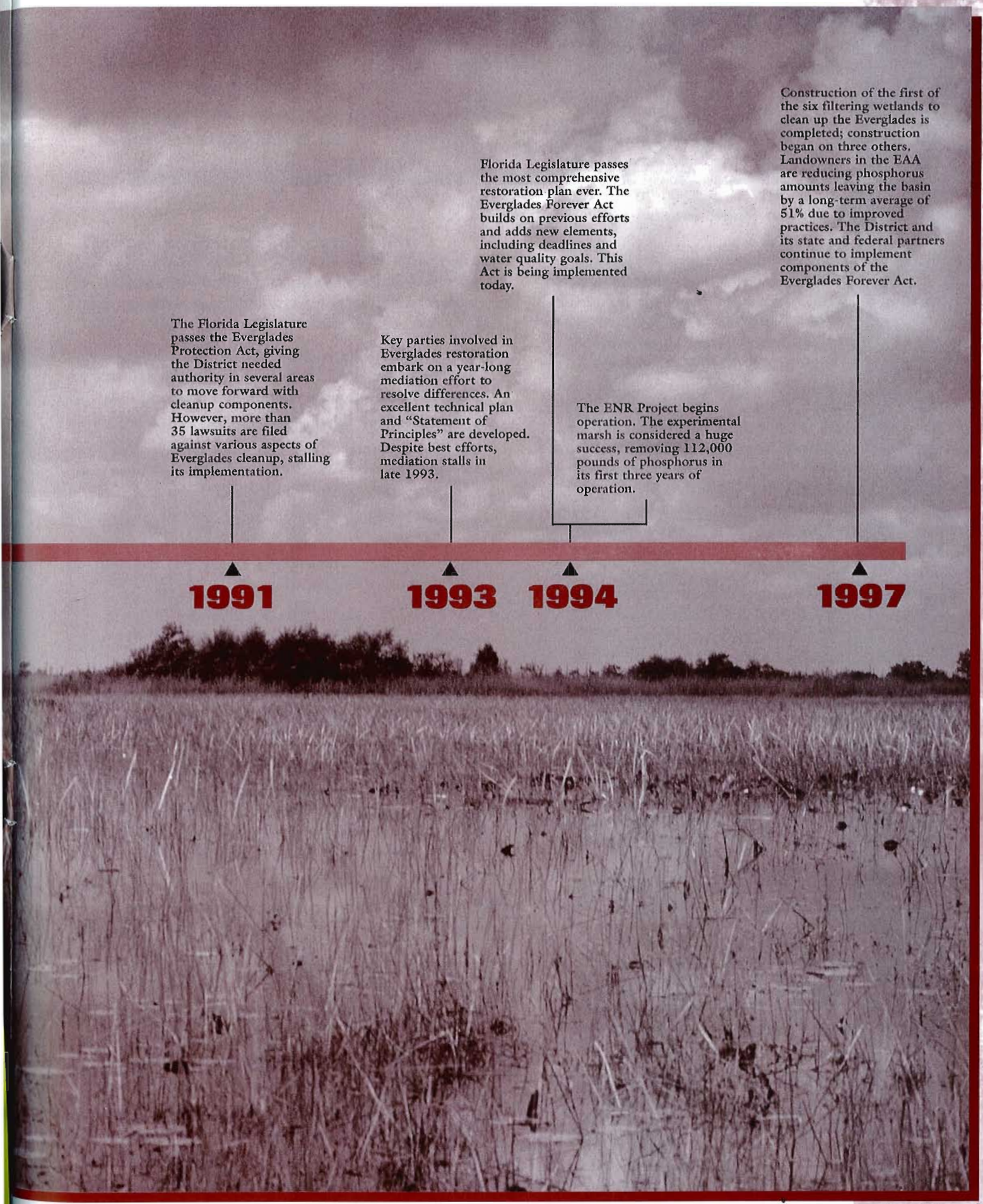
1970's — The environmental movement gains momentum, and many begin to call for Everglades restoration. Early studies and research programs begin.

1983 — Governor Graham launches Save Our Everglades. The program's goal is that by the year 2000, the ecosystem will look and function more like it did in 1900 than in 1983. Much progress has been made from the Kissimmee River headwaters to Big Cypress National Preserve, and work continues.

1987 — Florida Legislature passes the Surface Water Improvement and Management Act. The first cleanup plan for the Everglades is created under this new state law.

1988 — Construction begins on the Everglades Nutrient Removal Project, the first manmade wetland to remove phosphorus.

National attention is focused on the Everglad when the federal government sues the D and state for allegedly n enforcing water quality laws. The lawsuit is set several years later, but remains on appeal toda


The Florida Legislature passes the Everglades Protection Act, giving the District needed authority in several areas to move forward with cleanup components. However, more than 35 lawsuits are filed against various aspects of Everglades cleanup, stalling its implementation.
1991
Key parties involved in Everglades restoration embark on a year-long mediation effort to resolve differences. An excellent technical plan and "Statement of Principles" are developed. Despite best efforts, mediation stalls in late 1993.
1993
Florida Legislature passes the most comprehensive restoration plan ever. The Everglades Forever Act builds on previous efforts and adds new elements, including deadlines and water quality goals. This Act is being implemented today.
The ENR Project begins operation. The experimental marsh is considered a huge success, removing 112,000 pounds of phosphorus in its first three years of operation.
1994
Construction of the first of the six filtering wetlands to clean up the Everglades is completed; construction began on three others. Landowners in the EAA are reducing phosphorus amounts leaving the basin by a long-term average of 51% due to improved practices. The District and its state and federal partners continue to implement components of the Everglades Forever Act.
1997

Highlights

The past year has been productive for Everglades restoration, with the District and its state and federal partners continuing to execute components of the Everglades Forever Act and separate provisions for Florida Bay. The Everglades Construction Project forged ahead, with one of the six constructed wetlands (STA-6) completed on October 31, 1997 and another three under way. Research continued to investigate the source of mercury, the level of phosphorus which will not cause an imbalance in the ecosystem, and supplemental technologies to reduce nutrients. The District continues to remove thousands of unwanted melaleuca trees, send more fresh water to Florida Bay, and develop and oversee regulatory programs for the Everglades Agricultural Area (EAA) and other basins that discharge stormwater to the Everglades.

An exhaustive review of all funding issues was conducted by the District and DEP early in the year. The review identified ways to save approximately $25 million in overall construction costs. The six-member Joint Legislative Committee on Everglades Oversight was created in 1997 (Ch. 97-258, Laws of Florida) to monitor funding and construction issues related to the Everglades Construction Project. The committee met several times this summer and fall to start its work.

Some hurdles remain. A construction bid dispute delayed construction of two Stormwater Treatment Areas (STAs) for at least three months. The Florida Supreme Court decision on Amendment 5 and subsequent legislation could affect funding. Lawsuits and permitting issues continue to slow the process. Overall, however, the District remains on track with the remaining Act requirements. Highlights of 1997 follow:

Construction Project

- The District received a Corps of Engineers dredge and fill permit for the construction of the project in March. Although construction of the filtering wetlands began, several permit issues remain to be resolved.
- The 1996 Federal Water Resources Development Act authorized the Corps of Engineers to proceed with design and construction of STA-1 East.
- The District received a DEP permit for the construction, operation and maintenance of STA-6 Section 1 in July. Activity continued on obtaining similar permits for the other constructed wetlands.
- Construction of the smallest wetland was completed on October 31, 1997. Improvements to the 870-acre STA-6 Section 1 took six months to complete.
- Contracts for the construction of STA-1 West, STA-2, and STA-5 were awarded in October and work was scheduled to begin by the end of the year.
- The District made cost-effective changes to the project which will save approximately $25 million in the coming years by optimizing schedules, reviewing cash-flow, using rebuilt engines, and implementing other modifications.
- The Everglades Nutrient Removal (ENR) Project completed its third year of operation and continues to exceed expectations, reducing phosphorus concentrations to 22 parts per billion on average, and reducing phosphorus loads by a long-term cumulative average of 83%. The project removed 112,000 pounds of phosphorus during its first three years of operation through July 31, 1997.
- The District received a modification to the state operating permit for the ENR Project. It acknowledges the absence of many contaminants in the constructed wetland, and reduces the monitoring program accordingly.
- A total of 13,727 acres of land was acquired for the Everglades Construction Project. The District now owns 72% of the lands needed for the STAs and related construction — or 33,920 acres out of the 47,250 required.
- The District entered into an agreement with Closter Farms, a drainage district on the south shore of Lake Okeechobee, to fund the design and construction to redirect its stormwater from Lake Okeechobee to a constructed wetland, and to make other improvements in its water management practices.

- The District began construction of STA-1 inflow and distribution works in the spring of 1997, which will allow water from the S-5A pump station to be routed into STA-1 West and STA-1 East.
- The District approved a Minority/Woman Owned Business Contracting Rule which became effective in October 1996, and is actively seeking supplier diversity participation in the Everglades Construction Project.

HYDROPATTERN RESTORATION

- A draft of the Lower East Coast Regional Water Supply Plan, describing a plan to determine freshwater requirements for the Everglades ecosystem, was released in March.
- A draft report describing the scientific and technical basis for establishing minimum water levels in Lake Okeechobee, the Everglades, and the Biscayne Aquifer was completed in August.
- The comprehensive review (Restudy) of the Central and Southern Florida (C&SF) Project mandated by the U.S. Congress continued. Evaluation of alternative plans for modifying the C&SF Project planning alternatives began in the fall of 1997 and will continue through April 1998.

RESEARCH AND MONITORING

- The District continued research to define at what phosphorus concentration there would be no imbalance of flora or fauna in the Everglades.
- The District, in cooperation with its state and federal partner agencies, began investigating seven supplemental technologies to be used in conjunction with the STAs to reduce effluent phosphorus concentrations to between 50 and 10 parts per billion. The agency also:
- determined that 95% of the new mercury entering the Everglades is believed to have originated through rainfall,
- initiated monitoring of sites downstream of the STAs to provide a baseline for assessment of nutrient retention and hydropattern restoration effects,
- identified the water levels required to support wading bird foraging in the Everglades,
- completed development of the first regional water quality model for the Everglades,
- opened a botanical research complex in Boca Raton to conduct experiments concerning nutrient thresholds and minimum flows and levels, and
- opened an experimental research facility in Key Largo as a joint project with the Everglades National Park (Park) to quantify salinity effects on vegetation.

REGULATION

- The EAA growers have reduced phosphorus loads leaving their lands by 51% over the past three years through improved farming practices.
- The District released its second annual *Everglades Best Management Practice (BMP) Program Report* for the 1996 and 1997 water years. The agency also:
- continued to send additional water from Lake Okeechobee to the northern Everglades to make up for water lost due to BMP programs,
- began developing a regulatory program for the C-139 basin, and
- continued to evaluate the extent of nutrient-reduction programs needed for the lower western basins and other east coast basins that discharge to the Everglades.

EXOTIC SPECIES CONTROL

- Efforts have finally turned the tide on the expansion of melaleuca within the historic Everglades. While the invasive tree is not eradicated, its numbers are decreasing.
- The District continued to fight melaleuca on three battlefronts: through manual removal, through use of aerial herbicide applications, and through insect warfare conducted in cooperation with the U.S. Department of Agriculture.
- The District is also involved in programs to keep other unwanted species such as Brazilian pepper and numerous vines and water plants in check.

FUNDING

- The District and DEP completed a two-month review of cost allocation in light of a possible funding shortfall and the potential impact of Amendment 5 to the Florida Constitution. Numerous public meetings were held in January and February 1997 to solicit input regarding "fair share" issues.
- During the summer and fall, the District provided informational briefings on the Everglades Construction Project to the Joint Legislative Committee on Everglades Oversight.

- The District established the Everglades Trust Fund, which was passed by referendum by the citizens of Florida in November 1996. The 1997 Legislature provided detailed instructions on the funds which needed to be deposited into this account.

Florida Bay Restoration

- District-supported historical studies show that significant changes in salinity conditions occurred when the Flagler Railroad and C&SF Project were constructed. This information is being considered today when evaluating operational changes and construction modification to the regional flood control project to benefit Florida Bay.
- Construction is nearly complete on a water control structure designed to pump a maximum of 5.67 cubic feet per second into Taylor Slough (or up to 366 million gallons a day), an important tributary of Florida Bay.
- Spoil mounds were removed in connection with the C-111 South Dade Project to improve the hydrology of the southern Everglades and Florida Bay by allowing sheetflow of water to the bay. A monitoring and research program was initiated downstream of the spoil removal sites to assess the benefits of these changes.
- In the fall of 1997, the District released a comprehensive document outlining the ecological understanding of Florida Bay and the southern Everglades: *The Natural Systems Team Report to the Southern Everglades Restoration Alliance*. The work included contributions from state and federal agencies.

Agricultural and urban stormwater will be pumped into a constructed wetland from an inflow canal, where phosphorus is removed through biological processes. STA-6 Section 1 is shown in foreground.

Program Elements

EVERGLADES CONSTRUCTION PROJECT

The Everglades Construction Project element contains 18 projects. The primary components are the six "Stormwater Treatment Areas," referred to as STAs. These STAs will be large constructed wetlands that receive nearly 1.4 million acre-feet per year of stormwater runoff from the EAA, adjacent watersheds and regulatory releases from Lake Okeechobee. (One acre-foot of water is 325,828 gallons.) The STAs will treat incoming water through naturally occurring biological and physical processes to remove phosphorus down to the interim level of 50 parts per billion. The STAs will comprise a total area of approximately 47,250 acres, with a total effective treatment area of approximately 42,000 acres. Treated discharge from the STAs will be directed to the Everglades Protection Area to improve water flow, timing, quantity, and quality.

1997 Overview

Much progress was made in 1997 toward the development of these important wetlands. Construction on the smallest wetland (STA-6 Section 1) began in April and was completed in late October 1997. Detailed designs and bid packages were finished for three other wetlands (STA-5, STA-1 West, and STA-2). Construction contracts were awarded in October and work was scheduled to start by the end of the year. Construction on STA-1 West and STA-2 was delayed three months due to a bid protest. A three-day administrative hearing took place in mid-September, and a favorable ruling was received in October. Construction of the components required to begin start-up operation for STAs 1 West, 2, and 5 will be completed in 1999, and the remaining three STAs (STA-1 East, STA-3/4 and STA-6 Section 2) will be finished in 2002, 2003, and 2004. Lastly, the District made cost-effective changes to the project which will save approximately $25 million in the coming years by optimizing schedules, reviewing cash-flow, using rebuilt engines, and implementing other modifications.

Pilot Wetland Completes Third Year

Since 1994 the District has been operating a prototype STA known as the ENR Project. Encompassing nearly 4,000 acres of former agricultural fields, the ENR Project is the nation's largest constructed wetland designed to treat agricultural runoff. The project serves the primary purposes of 1) reducing phosphorus in stormwater entering the Refuge, 2) providing design, operation and management experience necessary for larger-scale application of this wetland treatment science, and 3) implementing optimal nutrient-removal technology.

This project is considered very successful, reducing phosphorus beyond initial expectations. In its first three years of operation, almost 112,000 pounds of phosphorus have been removed from water that would have otherwise entered the Refuge. Phosphorus loads have been reduced by a long-term average of 83%. The long-term flow-weighted outflow concentration was 22 parts per billion of phosphorus – well below the long-term 50 parts per billion average the project is designed to achieve. Reductions in mercury load were also documented in 1997. This performance proves that the ENR's design is appropriate for the larger STAs. Because the project has received international interest, site tours are frequently given to visiting scientists and foreign dignitaries.

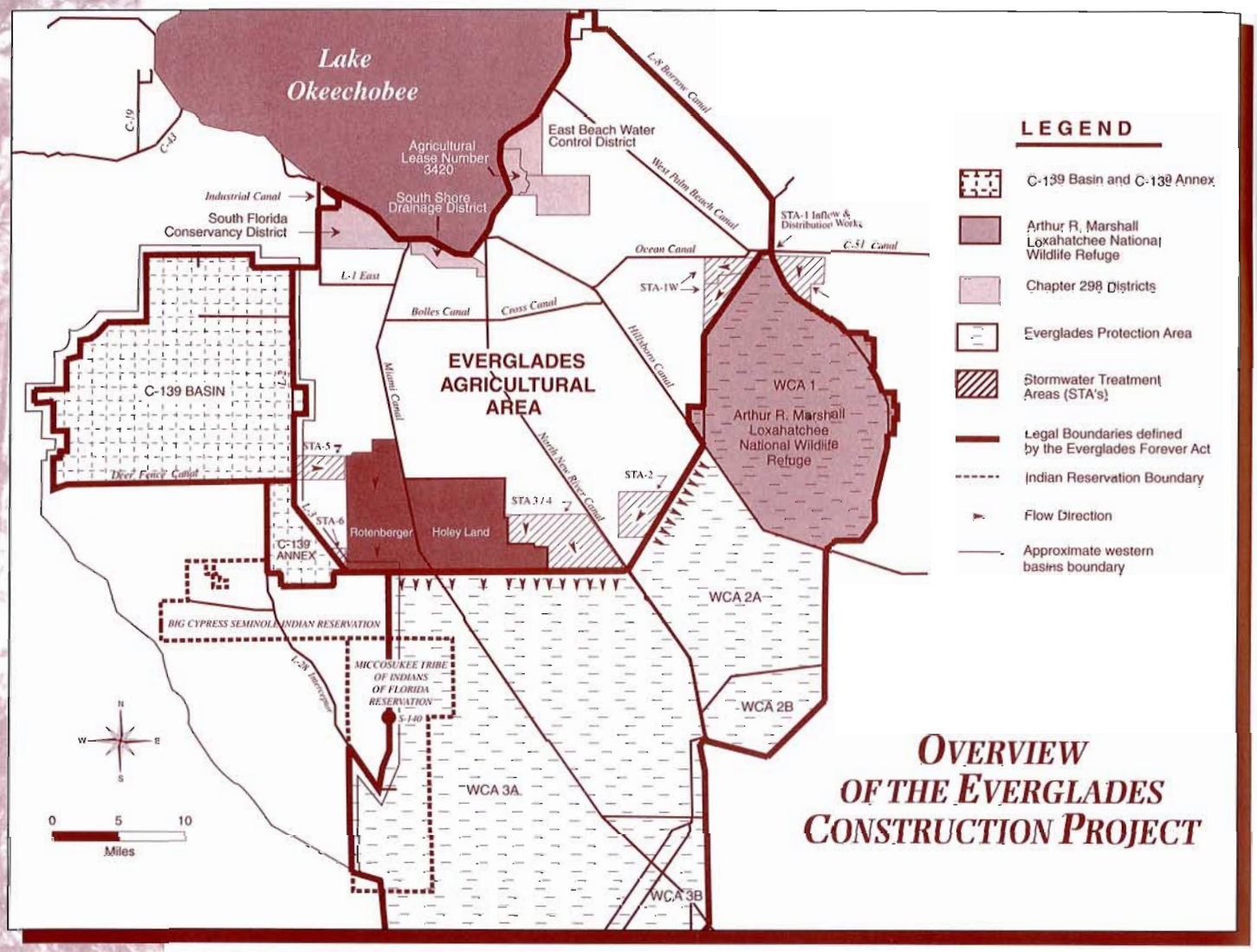
In May 1997 the District received a modification to the state operating permit for the project. The modification acknowledges the absence of many contaminants in the ENR, and reduces the monitoring program accordingly.

STAs are Cornerstone of the Cleanup Project

The ENR Project has demonstrated that wetland treatment technology reduces phosphorus load, and is the appropriate cleanup method to use. The cornerstone of the Everglades cleanup project is the construction of six wetlands (in addition to the ENR) to treat stormwater runoff. The ENR eventually will be incorporated into STA-1 West.

Nearly 1.4 million acre-feet of water will be treated in these wetlands, which will then be directed to the Everglades. This treated water will be directed to the Refuge, Water Conservation Areas 2-A and 3-A, the Big Cypress Seminole Indian Reservation, and to the Rotenberger Wildlife Management Area which is an Everglades remnant.

Hydroperiod — or improved timing, flow, amount and distribution of water — will be restored in Water



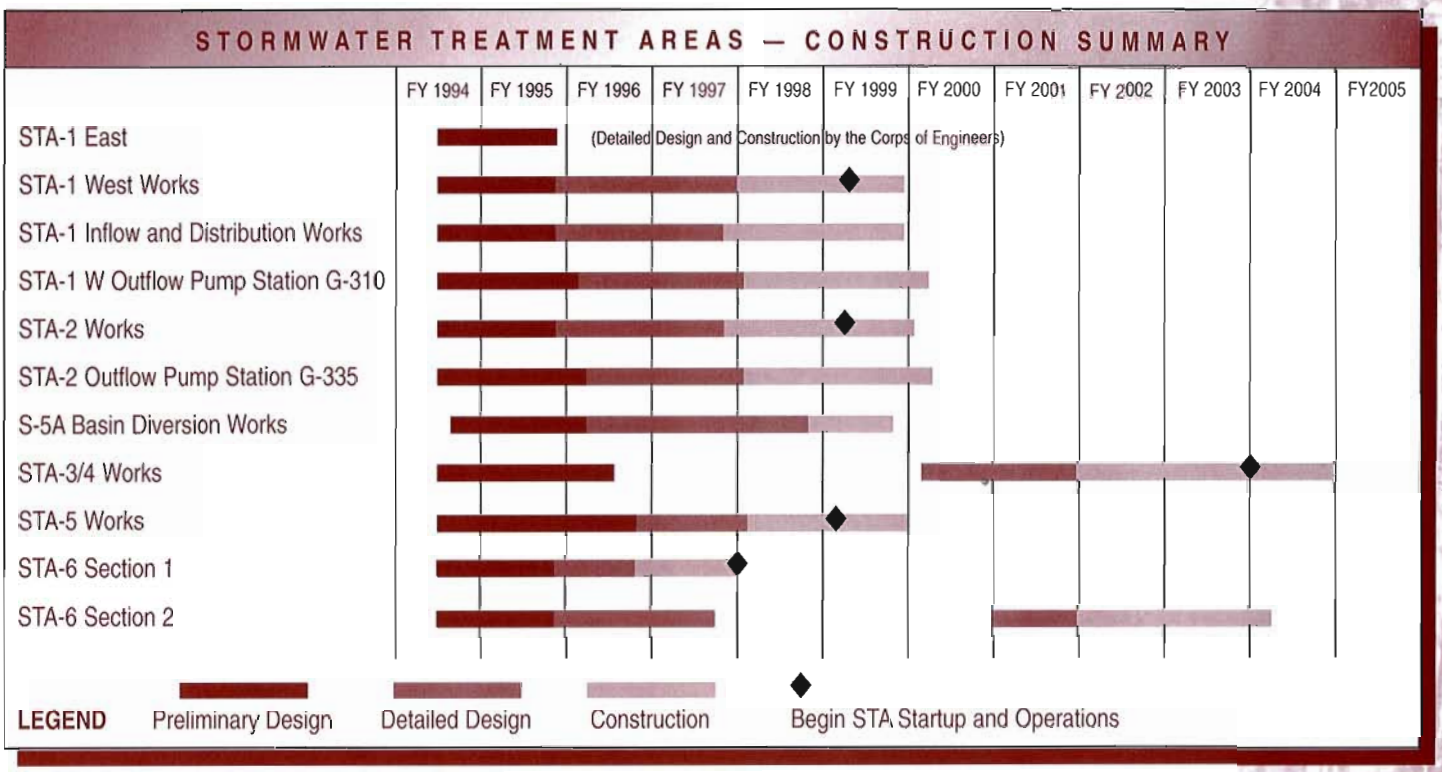
OVERVIEW OF THE EVERGLADES CONSTRUCTION PROJECT

Conservation Areas 2A and 3A through structural modifications. These modifications will encourage uniform sheetflow distribution of the water from STA-2 across approximately 7.5 miles of the northwest boundary of Water Conservation Area-2A, an area that does not presently receive surface sheetflow. Hydroperiod restoration of Water Conservation Area-3A will be enhanced by structural modifications that will encourage uniform sheetflow distribution of the treated water from STA-3/4 across 8 miles of the north boundary of Water Conservation Area-3A, an area which also does not presently receive surface sheetflow.

Stormwater runoff from the northern C-139 basin in Hendry County will be routed through and treated by STA-5. The stormwater runoff from an 11,200-acre basin in southwest Palm Beach County and the balance of the C-139 basin will be routed through STA-6. The treated discharge from STA-6 and STA-5 will provide water supply and hydroperiod restoration benefits to the Big Cypress Seminole Indian Reservation, Water Conservation Area-3A and local landowners, and the Rotenberger Wildlife Management Area.

Another principal component of the Everglades Construction Project is the construction and modification of water control facilities to restore the hydroperiod of the 29,000-acre Rotenberger area. The DEP is acquiring the approximately 3,000 remaining acres of inholdings in Rotenberger, land now in private ownership, as partial mitigation for the use of 4,676-acre Brown's Farm. The District will purchase the remaining mitigation acres for the use of Brown's Farm and other similar public lands incorporated into the STAs.

Today stormwater runoff from combined agricultural and urban sources discharge directly to Lake Okeechobee from the five adjacent water control districts (known as the four Chapter 298 stormwater management districts and State of Florida agricultural lease number 3420). These water control districts will complete conveyance system modifications to redirect up to 80% of their runoff to the District's primary canal system for subsequent treatment by three STAs: STA-1 West, STA-2, and STA 3/4. Additionally, control structures will be built or modified to redirect runoff from the relatively pristine northern L-8 basin watershed into Lake Okeechobee.



NOTE: Dates are estimates based on the best available information as of November 1997. The STA operational start-up begins the initial flooding of soil to encourage plant growth and soil phosphorus stabilization.

Engineering Design Completed in 1997

The conceptual design document for the Everglades Protection Project (Burns & McDonnell, 1994) was cited in the Act as the technical plan for the Everglades Construction Project. The subsequent phase of engineering reports and general design memoranda were completed in 1995 for many components of the project. After addressing design issues raised by third parties, the general design memorandum for the remaining western projects (STA-5, STA-6, Rotenberger restoration and west Water Conservation Area-3A hydropattern restoration) was completed in 1996.

Following the general design memoranda, efforts immediately transitioned to the final design phase, where plans and specifications for construction of the STAs were developed. Detailed designs of STA-1 inflow and distribution works, STA-1 West, STA-2, STA-5 and the outflow pump stations for STA-1 West and STA-2 were completed in 1997.

Refinements to the Design Allowed

The Act allows for refinements to the 1994 conceptual design, and some additional refinements have since been made. These include modifications to minimize wetland impact, provide for public recreation, and potentially treat stormwater from the C-139 annex in Hendry County. Changes for reasons other than standard engineering practices are subject to review by the DEP through the Everglades Construction Project permitting process.

Refinements to the conceptual design have been made through an open and collaborative design review process. The STA Design Review Group contains representatives of state, federal and tribal agencies, environmental groups and agricultural interests, many of whom have been involved continuously in design issues since 1991. This review group has met dozens of times since the Everglades Forever Act was passed and has contributed information on every STA design. Many items have been discussed at District Governing Board workshops beginning in 1994. These public forums have provided many opportunities for open discussions and guidance. In addition, the federal construction permit was developed through a public process and resulted in many refinements to the scope and time frame of the Everglades Construction Project. Several modifications of the STAs conceptual design are worthy of note, and are presented in the appendix of this document.

Construction Accomplishments and Setbacks

Although advertisement of construction packages commenced upon completion of the detail engineering designs, factors outside the control of the District have resulted in delayed construction starts for several STAs. A summary of the accomplishments and setbacks follows.

- Construction of STA-6 Section 1 began in the spring of 1997 and was completed approximately six months later. Despite the 10-month period spent in issue resolution for the Western Projects (STA-5, STA-6, Rotenberger improvements and western Water Conservation Area-3A hydropattern restoration), the District completed STA-6 Section 1 on October 31, 1997.

A ground-breaking ceremony in April marks the beginning of construction of STA-6 Section 1.

Earth movers begin the work to build the STA. Construction was completed in late October.

- Construction of STA-1 inflow and distribution began in the spring of 1997 in the northern 280 acres of the Refuge. Project features will facilitate movement of water from the S-5A pump station into STA-1 West and STA-1 East as they are ready for operation.
- Construction of STA-1 West Works was delayed due to a protest over the intended award to the lowest responsive bidder. The project delay is estimated at three-and-one-half months.
- Construction of STA-2 Works likewise has been delayed due to a protest over the intended award to the lowest responsive bidder. The project delay is also estimated at three-and-one-half months.
- The award for the manufacture of the outflow pump and gears for STA-1 West and STA-2 was delayed by two months due to a formal protest filed by a manufacturer. The protest was dismissed with prejudice by the Governing Board and the technical issues raised in the protest were clarified with the assistance of the Corps of Engineers.
- Construction of STA-5 was scheduled to begin in November 1997. Despite the 10-month period spent in issue resolution for the Western Projects, the District is proceeding on track to meet scheduled completion dates through innovative construction management procedures.
- Construction of the Rotenberger improvements and the western Water Conservation Area-3A hydropattern restoration project has been postponed due to the restrictions contained in the dredge and fill permit issued by the Corps of Engineers.

STA Operations Reviewed

Everglades Construction Project schedules were reviewed and optimized in 1997 in an attempt to ensure completion of the STA components required to begin start-up operation by the dates indicated in the Act and the proposed modification to the federal Settlement Agreement.

All newly-constructed wetlands experience a stabilization period to adapt to the nutrient and hydrologic regimes before they achieve full design performance. For the purpose of the STAs, this stabilization occurs during two operational phases: the start-up phase prior to STA discharge, and the flow-through phase after discharges begin.

Start-up Operations

The initial phase for each STA is the start-up operations. The objective of the start-up operational phase is to ensure the STA provides a net improvement in phosphorus water quality. To meet that objective, state and federal regulatory agencies prohibit discharge until monitoring results demonstrate that phosphorus levels within the STA are at or below inflow concentrations. Once this net improvement is demonstrated, the STAs will be authorized to begin flow-through operations. During the start-up period, untreated water will continue to enter the northern Everglades.

During the start-up operational phase, the STA is gradually flooded and two processes occur that influence nutrient-removal performance: vegetation development and reduction of phosphorus levels in water column above the formerly fertilized agricultural soils. Vegetation cover is established through volunteer, or natural, recruitment, i.e., taking advantage of available seed sources in the soil or adjacent vegetated areas, without the benefit of individual plantings. This development is subject to site-specific conditions and each STA is unique. Hence, for each specific

STA, there remains scientific uncertainty on the anticipated rate of vegetation development, as well as the influence on phosphorus removal. The best professional judgment of District scientists is that the STAs will require six to nine months for vegetation to grow in to the point that the STAs produce a net benefit in reducing phosphorus. This time frame is very dependent on site-specific antecedent soil and vegetation conditions.

Concurrent with vegetation development, phosphorus levels are reduced in the water column above the formerly fertilized agricultural soils. Studies of soil and water column phosphorus levels following inundation were conducted in the ENR Project to document the length of time required for phosphorus levels to be reduced and stabilized below 50 parts per billion. These studies suggested approximately 10 months were required, however, under different field conditions, the process may take a shorter or longer period of time.

Once the net improvement in phosphorus levels is demonstrated, it is anticipated that permits will authorize the STAs to begin full flow-through operations.

Flow-through Operations

Stabilization of the STA will continue into the flow-through operational phase. In establishing compliance measures, both DEP and USEPA have recognized this period in permits issued for the ENR and the DEP permit for STA-6 Section 1. This is consistent with the Everglades Forever Act permitting guidelines.

The current schedules are a refinement of the initial 1994 schedules and incorporate recent experience that wasn't available at the time the initial schedules were developed. The initial schedules in the 1994 Conceptual Design (and subsequently adopted in the Act) were developed by state and federal agencies assuming the STAs would begin discharging immediately after construction was complete. At that time, there was no state or federal permit experience to suggest a start-up period prohibiting discharge. Indeed, during the development of the implementation schedules as part of the 1993 mediation, it was understood that no federal operating permit would be required for the STAs, based on an August 1990 interagency meeting in Jacksonville regarding the ENR Project. The February 1994 Conceptual Design reflects the uncertainty of whether or not a National Pollution Discharge Elimination System (NPDES) permit would be required, and assumes that if NPDES permits are required, that permit conditions would not impact the implementation schedule.

After performance experience at the ENR, we anticipate that STA permits will prohibit discharge for up to several months following construction. The schedule impact of the start-up phase was determined only after the schedule was adopted by the Act. Since the 1994 schedules had no "slack" in the design and construction activities, the start-up operations could only occur following the construction deadlines in the Act. Based on the permits restricting discharge from the ENR Project and subsequent start-up experience, the construction schedules were recently optimized in an attempt to ensure that the STAs would begin flow-through operation at the earliest practical time that the District anticipates the authorization to discharge.

To the extent that schedules for flow-through operation are later than the construction dates within the Act, the differences are a product of factors outside of the District's control. These include timely receipt of funds, construction bid protests, permitting requirements and the rate of vegetative growth within the STAs. Also, dates and timeframes in the Act do not agree with the Settlement Agreement signed several years earlier, although the parties submitted proposed modifications in 1995 to synchronize the dates. A decision is still pending in Federal Court on whether the Settlement Agreement may be modified to reflect the Act dates and time frames.

Corps of Engineers' Participation

The Act provides direction to the District to seek participation of the federal government, specifically from the Corps of Engineers for the design and construction of STA-1 East. With the passage of the federal Water Resources Development Act in late 1996, the Corps of Engineers was authorized to complete the design and construction of STA-1 East. In September 1997 the Corps released a draft revision to the C-51 West End Flood Control Project that recommends the authorized STA-1 East plan, and a draft Environmental Impact Statement for the project. The District and Corps are currently negotiating a Project Cooperative Agreement defining the responsibilities of each agency during the remaining design, construction and operational phases of the project.

Additional federal legislation in 1997 should pave the way for the District to be reimbursed for approximately $21 million for land acquired on behalf of the federal government for STA-1 East. It is anticipated that the U.S. Department of Interior will fund the remaining land acquisition for the project.

Permit Required for the Project

The Act gives the District state authority to begin construction of the Everglades Construction Project prior to final DEP agency action, or notice of intended action, on any permit required under the Act. However, federal permitting requirements call for acquisition of a Corps of Engineers' dredge and fill permit prior to the start of construction.

The Final Programmatic Environmental Impact Statement for the entire Everglades Construction Project provided all information necessary for the Corps' permit, and was transmitted for public review on September 23, 1996. In

Improvements to 15 test cells in the ENR were completed in 1997. The test cells will be used by the District in its program to evaluate the feasibility of supplemental technologies for reducing phosphorus. Pictured is one of two sets of test cells in the ENR Project.

March 1997, the District received the Corps' dredge and fill permit authorizing construction of most of the components of the Everglades Construction Project. However, the Governing Board has not yet accepted or signed the permit because it includes conditions the District does not agree with. The District and federal government are attempting to resolve the dispute. In the meantime, both parties agreed that the most prudent action is to proceed with construction of the Everglades cleanup, and the District is acting in accordance with the permit conditions. The federal government agreed that the District does not waive its rights to appeal the permit by starting work on the project. The initial set of modifications were received in June 1997.

In response to requests for more than 60 modifications to the permit conditions, the Corps issued Modification No. 1 in June 1997 and was preparing to issue Modification No. 2 in the fall of 1997. The major outstanding issues include accelerated time frames for some Everglades Construction Project components and delays in other components, redundant or conflicting operating conditions, inconsistent phosphorus load reduction goals, mitigation requirements and consistency with state water quality requirements. The Corps may require supplemental National Environmental Policy Act (NEPA) documentation for components of the Everglades Construction Project that have not yet been designed or because of significant changes to the present design.

In July 1997 the District received the state construction, operation and maintenance permit for STA-6 Section 1 from the DEP. The USEPA determined that an NPDES permit would not be required for STA-6 Section 1. Acquisition activity continued on the remaining permits for the other STAs.

Land Acquisition

Approximately 47,250 acres are needed for the Everglades Construction Project to construct the STAs and the hydropattern restoration projects. The District acquired 13,727 acres of land in 1997 for the Everglades Construction Project. Overall, 33,920 acres — or 72% — have now been acquired, leaving 13,330 acres remaining to be acquired.

The DEP is responsible for the acquisition of inholdings within the Rotenberger Wildlife Management Area. Delays have occurred in the acquisition of critical parcels along the northern boundary of the Rotenberger area, which may result in a slight delay in the construction of the STA-5 discharge canal.

STATUS OF LAND ACQUISITION

STA	ACRES:		
	Required	Acquired	Remaining
STA-1 East	6,501	2,562	3,939
STA-1 West	7,365	7,365[1]	0
STA-2	7,774	7,700[2]	74[3]
STA-3/4	17,944	10,121	7,823
STA-5	5,154	5,154	0
STA-6	2,512	1,018	1,494
TOTAL	47,250	33,920	13,330

[1] (including the area now occupied by the ENR Project)
[2] (including Brown's Farm)
[3] (remaining for the S-5A basin diversion works)

Other Issues

The 1997 Florida Legislature passed Ch. 97-258 Laws of Florida, which among other provisions, establishes a Joint Legislative Committee on Everglades Oversight. In August 1997, the Committee held its first meeting at the District, followed by a field tour of the STAs and the EAA. In response to the Act, in July the District prepared a report summarizing potential impacts of the Corps' dredge and fill permit on the schedules and costs of the Act. Monthly updates have been provided to the Joint Legislative Committee. Quarterly and annual financial reports will also be provided.

Supplier Diversity and Outreach

In keeping with District policy to enhance diversity within its procurement practices, the District is seeking Minority/Woman Owned Business Enterprises (M/WBE) to participate in the Everglades Construction Project. The District is actively involved in programs to reach these target groups. An M/WBE Contracting Rule was approved for implementation on October 1, 1996.

The District has identified methods to assure meaningful participation by minority and woman vendors in the Everglades Construction Project. For example, M/WBE participation goals were established for contracts such as STA-1 West and STA-2. Participation goals vary per project based on project opportunities and M/WBE availability.

Another tool identified in the Contracting Rule is outreach to M/WBE firms. The District hosted two Everglades Construction Project forums — one each in Miami and West Palm Beach — in 1996 and 1997 to inform contractors of engineering and construction opportunities. Special efforts were made to identify M/WBE firms. Information about procurement opportunities was disseminated at workshops, symposiums, trade and exhibition shows throughout the year.

Of the Everglades design contracts awarded to date with M/WBE goals, M/WBE participation has been 6.9%. Of the Everglades construction contracts awarded with M/WBE goals, M/WBE participation has been 16%. Over a three-year period, minority and woman-owned businesses were awarded $19.8 million or 13.6% of the total District awards of nearly $146 million.

Displaced Workers to be Hired

The Act requires that the District give preferential consideration to hire agricultural workers displaced due to the Everglades Construction Project. The Governing Board adopted a policy for this program. Job Service of Florida offices in Belle Glade and West Palm Beach have agreed to screen applicants, and the District ran radio and print advertisements in Belle Glade announcing this policy. Few workers, however, were displaced due to the Everglades Construction Project through late 1997.

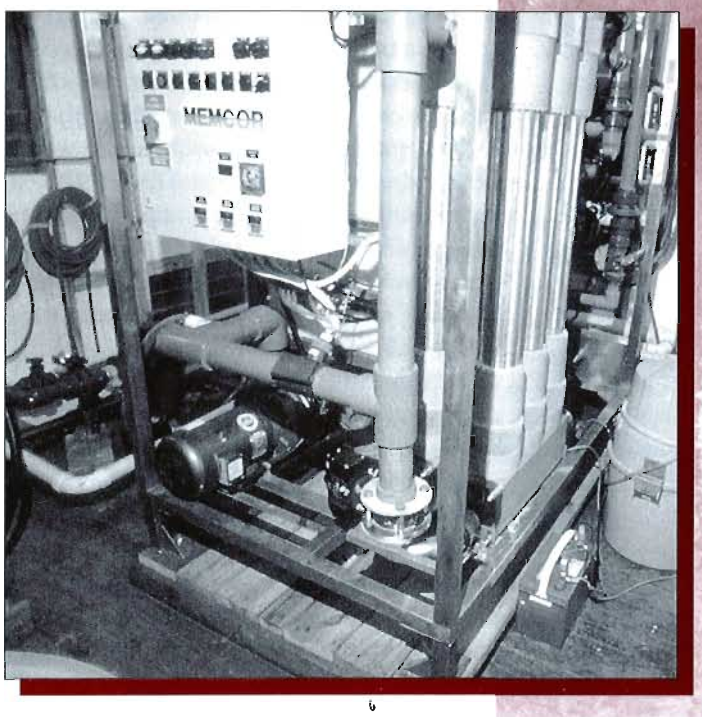
Supplemental Technologies Examined

Phase 1 of the Everglades Program encompasses activities designed to reduce phosphorus concentrations to approximately 50 parts per billion, and includes the Everglades Construction Project and agricultural BMPs. The goal of Phase 2 is to implement the optimal combination of solutions through design, construction, operation and regulation to ensure that all waters discharged to the Everglades Protection Area meet water quality and hydropattern restoration goals by December 31, 2006.

In passing the Everglades Forever Act, the Legislature concluded that STAs and BMPs are the best available treatment technologies to reduce nutrients in agricultural runoff to meet the interim target of 50 parts per billion total phosphorus. However, the Act also recognized that supplemental technologies, whether used alone, or in combination with the STAs, would be needed to achieve the additional nutrient removal that will be needed to meet final Phase 2 phosphorus limits. Therefore, the Act directed the District to conduct research to identify these technologies.

In 1996 the District engaged an engineering consulting firm to reevaluate the use of all proven nutrient-removal treatment technologies, promising new treatments, and combinations that potentially could be used to reduce total phosphorus in agricultural runoff to a concentration ranging from 50 to 10 parts per billion. Evaluation criteria of 50 to 10 parts per billion were selected for this study since the Act identifies 10 parts per billion as the default phosphorus concentration for Phase 2 of the Everglades Construction Project. The firm also considered a number of other criteria such as construction and start-up costs,

Phosphorus particles are filtered out of stormwater under high pressure, in one of several "supplemental technology" experiments under way in 1997.



long-term operating and maintenance costs, potential adverse impacts to the surrounding environment, issues dealing with waste generation and disposal, and general public acceptance to using the technology as part of efforts to restore and protect the Everglades.

Seven different technologies were identified that potentially could meet the phosphorus removal goals either on their own or coupled with other treatments. These seven were also highly ranked for the other evaluation criteria. These included four approaches based on chemical addition technology, two technologies that combined STAs with some level of pre-treating the water with chemicals (low-intensity chemical dosing and managed wetlands), and a promising technology that is based on passing the water from an STA through beds of submerged aquatic vegetation and limerock for final nutrient removal.

The Corps of Engineers' dredge and fill permit for construction of the STAs requires the District to conduct demonstration projects of the seven technologies mentioned above, and an additional technology based on treatment wetlands managed for periphyton dominance. The District refers to all these treatment technologies collectively as "supplemental technologies." In cooperation with federal and state authorities and agricultural interests, the District developed a research program to conduct demonstration projects for each technology. Most of this work will be accomplished by engineering and environmental consulting firms or universities under contract to the District.

A number of supplemental technology demonstration projects are under way, with many initiated in 1997. The District, DEP and the Everglades Protection District shared the costs of a pilot study of microfiltration, one of the chemical addition technologies. This project, started in 1996, was concluded this year. In 1997 the District began constructing a pilot plant and initiated fieldwork as part of a larger demonstration study designed to continue investigating microfiltration and other chemical addition technologies. A contract was awarded for a study of the submerged aquatic vegetation/limerock technology, with work on this project to begin in 1998. The District also has started discussions with the Seminole Indian Tribe on cooperating in a study of a managed wetlands technology. A work plan has been drafted for a study on the periphyton STA technology and some preliminary fieldwork started. Current plans call for conducting many of these studies at the ENR Project. The District has received federal matching funds to help offset the costs associated with conducting several of these studies and will continue to pursue outside funding in the future. In addition, the EAA Environmental Protection District — an entity created by the Florida Legislature to conduct scientific research on environmental matters — funded a pilot study of the low-intensity chemical dosing technology to be conducted by Duke University. Work on all of the supplemental technologies will continue in 1998.

HYDROPATTERN RESTORATION

Delivery of natural water flows through the Everglades is critical for Everglades restoration. The term *hydropattern* refers to the depth, duration of flooding, timing, and distribution of freshwater flow. It includes the concept of *hydroperiod,* which is the amount of time each year that the ground is covered with water, as well as the spatial distribution of this water.

The state Legislature, through the Everglades Forever Act, identified the need for programs that would restore Everglades hydroperiods. These programs broadly fall into categories of construction, research and planning. These efforts are designed to help begin restoration of the Everglades by providing natural patterns of freshwater flows and by improving the timing, quantity and quality of water deliveries without diminishing flood protection and water storage capabilities.

Historically, the fresh water that nourished the Everglades began its journey hundreds of miles north in the Upper Kissimmee Chain of Lakes and moved slowly south through the winding Kissimmee River to Lake Okeechobee. Water periodically overflowed the swampy banks to nourish the vast Everglades wetlands south of the lake. Florida's summer rains and occasional hurricanes filled the Everglades wetlands from June to October. Water then receded during the drier winter and spring months. This seasonal cycle varied considerably from year to year in its extent, depth and timing.

This natural cycle of water delivery was permanently changed by development in south Florida. The regional system of canals, pump stations and levees was built to regulate the natural cycle by lowering water levels, providing capacity to capture and discharge excess flood waters, and creating reservoirs to store water for use during dry periods. Today with manmade water deliveries, many parts of the remaining Everglades receive too much or too little water in the wrong places and at the wrong times.

Changes in timing and flow of water also impacted other aspects of the ecosystem, causing declines in wading bird populations, increases in non-native plants, and undesirable changes in natural plant and animal communities. Coastal groundwater levels and groundwater storage have greatly declined and flows out of the Everglades have greatly increased. During very dry years, such as 1989 and 1990, muck soils of the Everglades dry out and burn over large areas. During very wet years, such as 1994, extreme high water levels pose threats to terrestrial animals and tree islands.

Structural and Operational Changes Improve Water Flow

The Everglades Construction Project includes structural and operational improvements to address hydropattern restoration. Water from Lake Okeechobee, some stormwater runoff, and water from special drainage

Water is the lifeblood of the Everglades. One of the goals of the Everglades Forever Act is to restore the historic timing, flow and quantity of fresh water to the ecosystem.

districts will be routed south for treatment in STAs and eventual discharge to the Everglades. These changes will provide more capacity to control extreme events, allow more fresh water to flow into Everglades wetlands during dry periods, and help reduce the harmful effects of excess fresh water discharges to estuaries. In addition, the Restudy, of which the District is local sponsor, will re-evaluate the entire C&SF Project for this and other purposes.

The Act requires that water lost within the EAA, due to implementation of BMPs, be replaced for flow into the Everglades. A model was developed to estimate how much water must be replaced, based on a 12-month period beginning each October. This water will then be delivered over a five-month period from October to February during the following year. No additional water will be delivered if the Everglades is above flood stage. Deliveries may also not be made if Lake Okeechobee levels are low, or if there is a chance that the deliveries may harm the Park. These planned deliveries are already occurring.

Lower East Coast Plan Will Guide Decision-Making

Water supply planning is essential for restoring Everglades hydropatterns and helping south Florida accommodate rapid growth. The District is preparing plans for watershed areas within its 16-county region, to guide District and local government decisions for the protection and development of freshwater resources through the year 2020.

A draft plan was completed in March 1997. The District will develop an interim version of the Lower East Coast plan in 1998, which will begin to address the future needs of the Everglades, the urbanized southeast coast, and other areas that depend on Lake Okeechobee for water supply. A final Lower East Coast Plan will address new legislative requirements and coordinate with ongoing local, state and federal planning efforts.

Minimum Flows and Levels to be Established

The Lower East Coast Plan also will provide recommendations for determining environmental water supply requirements including the establishment of initial minimum flows and levels of the remaining Everglades. A draft report describing the scientific and technical basis for establishing minimum water levels in Lake Okeechobee, the Everglades and the Biscayne aquifer was completed in August 1997 and submitted for technical

review. These criteria were based primarily on historical data and scientific evidence. The report also includes a definition of how and when "significant harm" occurs to water resources. Rulemaking will begin after the final minimum flows and levels criteria have been reviewed and accepted.

C&SF Restudy Is Huge Link in Overall Hydropattern Restoration

The purpose of the Restudy is to reexamine the C&SF Project and determine the feasibility of modifications that can be made to improve the environment and provide for other water resource needs such as water supply and flood protection. The Restudy will identify and evaluate long-range options, including Everglades hydropattern restoration. The Restudy will also consider Everglades hydropatterns as part of its overall mission of ecosystem restoration. The lead agencies in the effort are the Corps of Engineers and the District. A multi-disciplinary, multi-agency team is conducting and managing the various required studies and preparing the documentation. Future updates of the Lower East Coast Regional Water Supply Plan will incorporate recommendations of the Restudy into the District's planning process.

The overall comprehensive plan draft will be completed in October 1998 and the final version must be submitted to Congress in July 1999. To date, the screening phase of comprehensive plan development has been completed. Evaluation of Restudy planning alternatives began in the fall of 1997 and will continue through April 1998. In addition, more detailed feasibility studies regarding possible modifications to the L-28 facilities along the western side of Water Conservation Area-3A, and the development of Water Preserve Areas in central Dade, Broward and Palm Beach counties are under way.

Guidance Provided By Governor's Commission

The Governor's Commission for a Sustainable South Florida is a consensus-building organization established by Governor Chiles and representing the region's diverse interests. On October 1, 1995, this commission published a report called the Conceptual Plan which describes the present condition of south Florida and offers numerous recommendations to achieve sustainability of the region's water resources. The Governor's Commission also developed a Conceptual Plan for the Restudy in August 1996. The Governor's Commission is working cooperatively to provide guidance to, and review progress made by, the Corps of Engineers and the District as they proceed with the Restudy and the Lower East Coast Plan.

Lake Okeechobee Schedule to be Reviewed

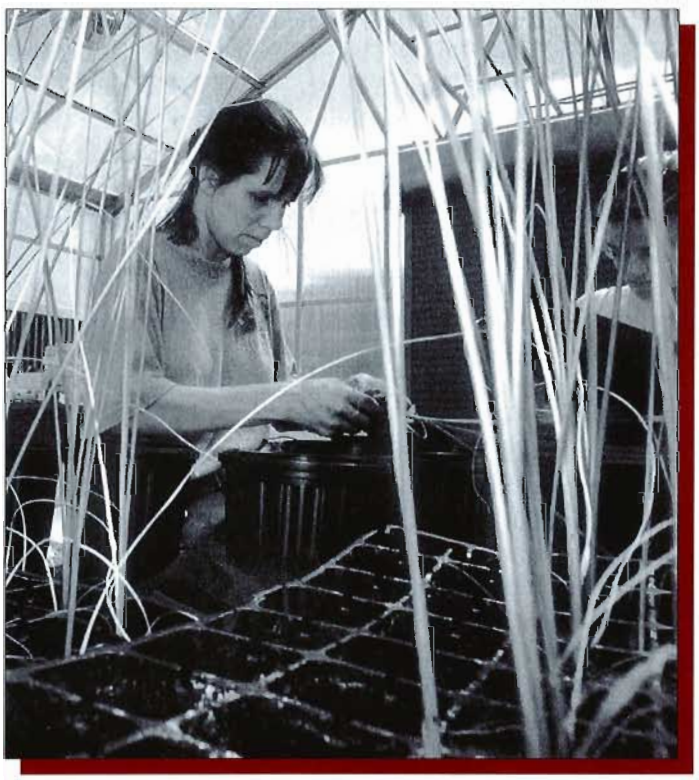
In 1994 the District requested that the federal government review the timing, location and quantities of regulatory water releases as part of its evaluation of alternative Lake Okeechobee water level schedules. The intent is to facilitate releases of water for hydropattern improvements in the Everglades and improve management of Lake Okeechobee. The District also recommended that the study should be based on the same computer models as are being used in the Lower East Coast Plan and that the study include alternative schedules developed by the District as part of that plan. An agreement initiating this study was finalized in 1995 and the Corps of Engineers began a review of the Lake Okeechobee water level schedule. The Corps of Engineers and the District have agreed on an appropriate modeling approach. Performance measures have been developed to determine how the lake is affected by changes made to the schedule. The Corps of Engineers is expected to complete a draft environmental impact statement in 1998.

Extensive improvements are planned to south Florida's regional water management system to benefit the Everglades. Pump station S-6 in Palm Beach County, which sends water to the Loxahatchee Refuge, is pictured.

RESEARCH AND MONITORING

Research and monitoring are essential activities to ensure that relevant and current information is available to decision-makers to protect and restore the Everglades ecosystem. Wise adaptive management of the remaining Everglades requires tracking the success of ecosystem restoration efforts through monitoring, and developing an understanding of the ecosystem through applied research. The Act requires research and monitoring to evaluate the effectiveness of restoration efforts in improving water quality, hydropattern, and other key aspects of ecosystem health. Long- and short-term projects will evaluate Everglades ecology through laboratory studies and field monitoring at multiple sites. Data will be analyzed to evaluate and revise program design and operation.

Seven focal areas are integrated within the research and monitoring projects: 1) describing existing water quality in the Everglades and tributary waters and the effectiveness of existing water quality standards in protecting those waters, 2) understanding and predicting ecological and hydrological needs of the Everglades, 3) conducting research to determine nutrient threshold levels that do not cause or contribute to an imbalance of native flora and fauna, 4) optimization of STAs and research of supplemental technologies for improving water quality, 5) documenting ecological changes that take place as a result of restoration activities, 6) conducting research and monitoring to understand mercury buildup in the Everglades, and 7) developing an integrated plan and annual reports.



Michelle Rau oversees an experiment at the District's botanical research complex to better understand how vegetation reacts to different water and nutrient conditions.

1) Describing Existing Water Quality

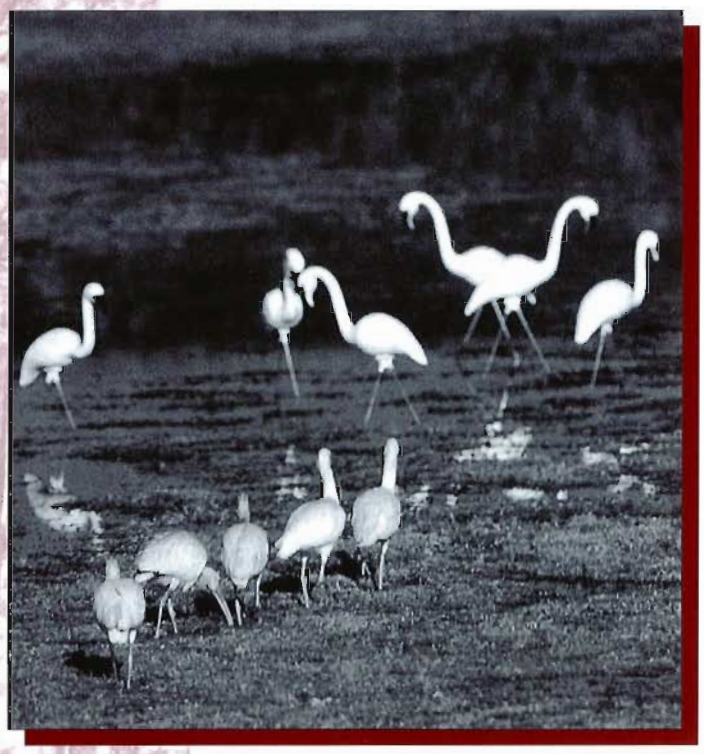
Water quality data in the Everglades and tributaries have been synthesized, checked to assure quality, and compared against existing state water quality standards. A report describing the results of these analyses was issued in September 1995 and revealed several areas of concern where state criteria were exceeded. In the Everglades, values exceeding the state criteria were found for dissolved oxygen levels and specific conductance. In EAA canals, dissolved oxygen was frequently lower than state criteria, and specific conductance was less often a concern. Ammonia was problematic in some EAA basins and the herbicide atrazine was a concern for all of the basins for which data were available. Continuing cooperative data analysis between the DEP and District will determine causes of these problems, whether they are naturally occurring, and whether additional research and monitoring is necessary.

Projects to evaluate water quality standards for the Everglades and EAA canals are defining relationships between water discharges and the resulting water quality in the Everglades Protection Area. The DEP evaluation will review antidegradation standards and classifications of EAA canals. The intent is to assure the water quality is adequate for protection of the Everglades. This review will consider the designated uses of these canals as recreation; propagation and maintenance of a healthy, well-balanced population of fish and wildlife; and existing beneficial uses including flood control, water conveyance for urban and agricultural supply, Everglades hydropattern restoration, water conveyance to STAs, and navigation.

2) Understanding Ecological and Hydrological Needs

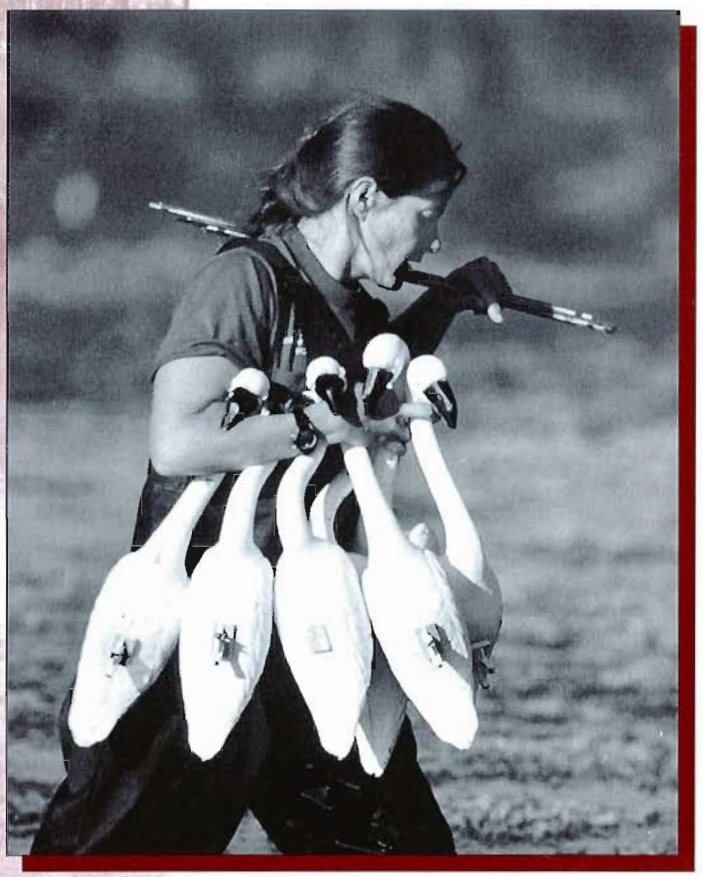
The Act requires the District and DEP to implement a research and monitoring program to evaluate the ecological and hydrologic needs of the Everglades Protection Area including minimum flows and levels. The DEP and District will complete this research by December 31, 2001. This requirement is being met through coordination with the Lower East Coast Regional Water Supply Plan and Restudy efforts. Modeling and experimental research play a large role in evaluating the ecological and hydrologic needs of the Everglades, as described below:

Developing Computer Models. Computer models are integrative tools to bridge gaps between research elements. They are designed to improve management decisions, enhance understanding of mechanisms that govern how the system reacts to natural and human influences, and guide decisions regarding selection of



Do birds of a feather really flock together? Experiments are being conducted to determine the influence of depth, fish abundance and behavioral cues on wading bird foraging. Plastic decoys are used to elicit a response.

Lisa Borgia carries decoys to the ENR test cells. White ibises (above) respond to the decoys.



monitoring and research projects. The District is developing and utilizing six such models including those that simulate the natural system, water management actions, and impacts to wetlands.

Field and Laboratory Studies. Wading bird foraging success studies are being conducted in large, replicated ponds, where water levels and fish abundance can be manipulated experimentally. Results to date suggest that optimal water depths and prey abundance conditions can be identified for wading birds in general, as well as individual species. This information will be useful for Restudy modeling efforts, as well as for understanding the effects of hydropatterns that result from the determination of minimum flows and levels.

Hydroperiod and nutrient effects on Everglades vegetation have been studied in field mesocosms and in 1997, additional studies were initiated as part of a cooperative botanical research program with Florida Atlantic University in Boca Raton. Studies have shown that cattail, which has grown to nuisance proportions in the Everglades, out-competes sawgrass under conditions of elevated nutrients and altered hydroperiod. This finding implies that restoration efforts must reduce external nutrient loads and re-create more natural hydroperiods. This research will not only assist determinations of minimum flows and level, and safe nutrient levels for the Everglades, but will also provide valuable information for the Everglades landscape model.

3) Conducting Nutrient-Threshold Research and Establishing a Phosphorus Criterion

The Everglades developed under very low nutrient conditions, with rainfall and overland flow being its primary source of phosphorus. The Act requires that the District and DEP conduct research to define "no imbalance" nutrient levels for flora and fauna of the Everglades, with emphasis on phosphorus. An extensive peer-reviewed monitoring and research program has been under way in Water Conservation Area-2A for more than two years and Water Conservation Area-1 for more than one year. In addition, carefully controlled and replicated studies of nutrient and hydrologic effects on Everglades vegetation communities will be conducted in the botanical research complex.

Research in Water Conservation Area-1 and Water Conservation Area-2A is conducted along a nutrient gradient transect in which native vegetation (sawgrass and spike rush sloughs) has given way to undesirable vegetation (cattail) at high phosphorus concentrations. At some point along the transect, the biological community will be judged sufficiently unaffected to conclude that ambient phosphorus concentrations are at a level which create no imbalance in native communities of aquatic plants or animals.

Additional research on phosphorus concentrations is being conducted in Water Conservation Area-1 and Water

Conservation Area-2A using numerous 5-foot diameter dosing chambers. Dosing chambers enable researchers to isolate the effects of individual factors, in this case phosphorus loads, in the Everglades. These chambers and experimental controls enclose representative sections of Everglades wetland and are injected with various phosphorus loads on a weekly basis. Clear differences in vegetation responses to phosphorus loads have been documented by District researchers, confirming the utility of the chamber technique. In addition, the District and federal agencies are jointly sponsoring research by Florida International University to quantify the response of natural Everglades flora and fauna to increased concentrations of phosphorus. These results, and those of the transect, mesocosm and greenhouse studies, should provide sound recommendations for setting phosphorus threshold criteria at a level which create no imbalance of natural Everglades flora or fauna.

The DEP, District and agricultural interests have initiated extensive peer-review of the monitoring and research program to determine the phosphorus criterion. By no later than December 31, 2001, the DEP is required to file a notice of rulemaking to establish a phosphorus criterion in the Everglades Protection Area. If the DEP has not adopted a criterion within two years from that date, by law the criterion will be set at 10 parts per billion total phosphorus.

4) Optimization of STAs and Research of Supplemental Technologies for Improving Water Quality

The Act requires that the District determine ways to optimize phosphorus removal in the STAs, while at the same time investigate new technologies to remove phosphorus. The District initiated a research program in the ENR Project which will provide information to refine the design and operation of the STAs. Frequent monitoring of water quality at numerous stations throughout the project will allow the District to track its performance in improving water quality as plant and algal communities mature and water levels fluctuate within the project.

The ENR Project has been extremely successful in reducing nutrient concentrations and loads. District researchers are developing a wetlands water quality model to predict the movement of phosphorus through the STAs and Everglades marshes. This model will project the STA phosphorus removal efficiencies under various management and operational scenarios.

Vegetation coverage and competition in the ENR continues to be monitored semi-annually using low altitude, infrared aerial photography. Additionally, the wetland research test cells located inside the ENR Project are undergoing improvements and will be ready for STA optimization research and alternative technology demonstrations in early 1998.

5) Documenting Ecological Changes from Restoration Activities

Three programs are under way to document ecological changes taking place as a result of restoration activities:

Mapping. A program to map vegetation has been under way for several years to detect changes that occur due to natural phenomena and human activities. Of particular interest is the need to assess the effects of nutrient and hydropattern restoration efforts on the spread of cattail and other invasive species through the Everglades. Maps of Water Conservation Area-2A vegetation in 1991 have been constructed using satellite imagery. Using this map and other techniques, the history of vegetation in Water Conservation Area-2A back to 1973 has been reconstructed. Maps of Water Conservation Area-2A cattail acreage have been made for 1991 and 1995 using color infrared aerial photography and photo-interpretation techniques. Comparison of these maps shows that cattail has expanded significantly during this period. Maps of Water Conservation Area-3A are also being constructed using photo-interpretation techniques and color infrared aerial photography.

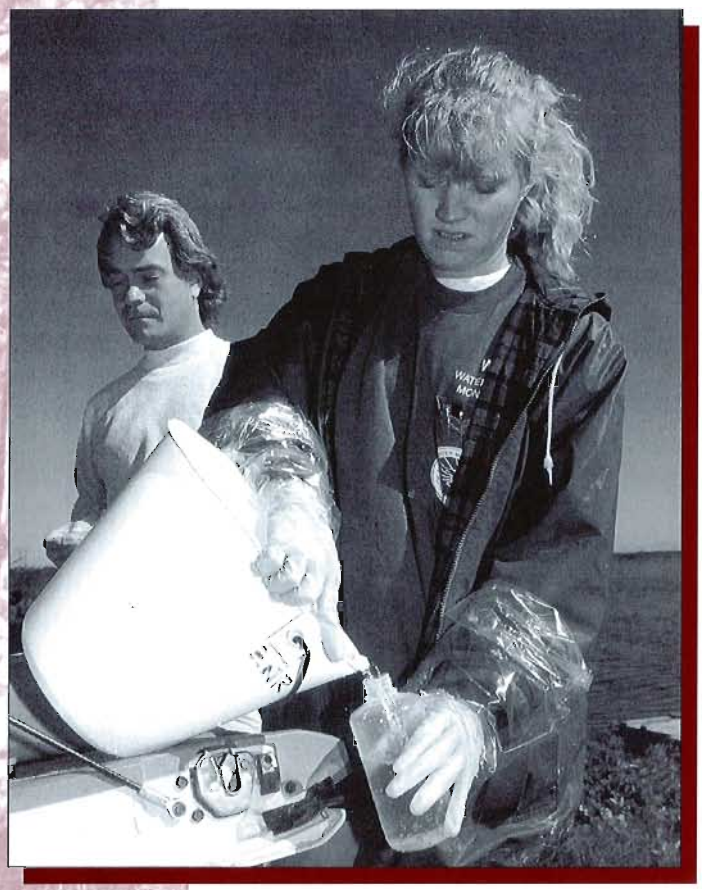
Field Monitoring. Water quality stations have been set up downstream of locations where STA effluent will be discharged to detect trends in water quality and biota associated with restoration efforts.

Bird Surveys. Ongoing surveys of wading birds and their food web will also aid in evaluating the effects of restoration efforts.

6) Research and Monitoring to Understand Mercury

Mercury concentrations in a number of sport fish species remain above the state's "limited consumption" advisory in all remnant Everglades, and above the "no consumption" advisory in all but the Refuge. Eastern Florida Bay is also under a limited fish consumption advisory. Methylmercury is the culprit. It is extremely toxic and bio-accumulates in top predator fish up to 10 million times the concentration in the water. The obvious result is a serious or deadly health risk to larger animals eating the contaminated mammals and fish, such as the endangered panther and humans.

Unraveling the Mercury Mystery. Why mercury is so readily methylated under Everglades conditions remains a mystery. But the Everglades is yielding some mercury secrets after three years of intensive study conducted by scientists from local, state and federal agencies and academic institutions through the South Florida Mercury Science Program. Monitoring, research, modeling and assessment projects have been completed or are ongoing. Mathematical models of mercury sources, transport,



Jennifer Cornwell and Ben Harkinson collect water samples for mercury testing in the ENR Project.

transformation and bioaccumulation are being developed. These models will be used to evaluate the effects of possible changes in local versus global mercury emissions and routing of water through the Everglades. Progress of mercury research is summarized below:

Mercury Sources. Three important studies concluded recently: the Florida Atmospheric Mercury Study, the District Structures Mercury Study, and Phase 1 of the Regional Environmental Monitoring and Assessment Program. These studies indicate that more than 95% of the modern mercury entering the Everglades is coming from the air. However, the significance of the historical accumulation of mercury in the Everglades is still under investigation. Completed in 1995, the South Florida Atmospheric Monitoring Study focused on incinerator sources in Dade and Broward counties, and found surprisingly high emissions rates of mercury that could be readily rained onto the Everglades. Based on these results, the USEPA and DEP are investigating local air sources and mercury in incinerator plumes to determine whether this highly soluble form of mercury persists long enough to impact the Everglades.

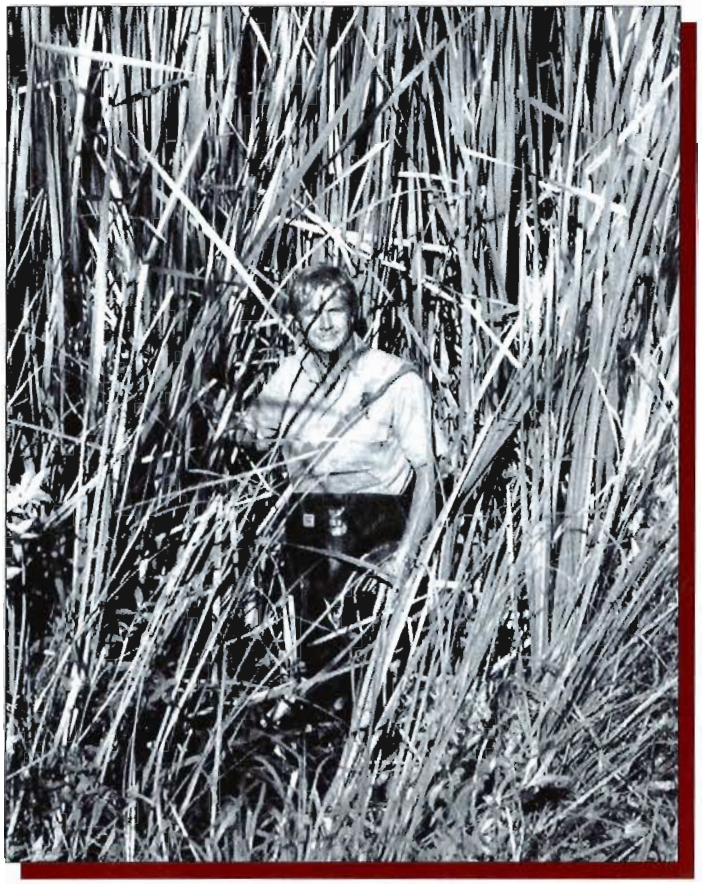
Mercury Contamination Trends and Susceptibility. Several studies have concluded or are on-going to spot trends. The USEPA concluded an examination of water, sediment, periphyton, and mosquitofish at 50 canal sites and 500 interior marsh sites over a period of four years. The Florida Game and Fresh Water Fish Commission is continuing its annual studies of largemouth bass begun in 1989. A United States Geological Survey project is focusing on the underlying processes that govern mercury accumulation in aquatic species, studies which have been expanded south into Taylor Slough and the Park. The Department of Energy is conducting studies of elemental mercury evasion from open water and vegetated Everglades surfaces. Other studies are under way to clarify the complex food web structure of the Everglades.

Mercury Impacts. Studies conducted by the District on the ENR have demonstrated that the project removes mercury. In addition, fish in the ENR are less contaminated than in the downstream Everglades and water discharged from the ENR does not violate Florida's Class III water quality standard. Therefore, it appears the ENR Project or constructed wetlands will not add to the mercury problem in the Everglades.

Criteria Development. The DEP and the District are involved in the evaluation of existing and new water quality criteria to protect animals within the Everglades such as the alligator, woodstork, and the Florida panther. District studies suggest that the Florida panther is at risk when feeding on raccoons in the Park and that the existing state water quality standard may not adequately protect Florida panthers. Future studies to be carried out by the Game and Fresh Water Fish Commission and U.S. Fish and Wildlife Service will refine earlier estimates and evaluate alternative explanations for the Florida panther health problems. This evaluation includes exposure to persistent toxic organics such as DDT and PCBs. In addition, the DEP continues to fund mercury epidemiology, toxicity, and bioaccumulation studies using the great egret as the model bird species.

Management Response. The District has provided state and federal authorities with reasonable assurance that the Everglades Construction Project will not create new or exacerbate existing mercury risks. The DEP and USEPA are now focusing on air source studies to reduce the most significant mercury loadings to the Everglades. Nevertheless, federal and state permits for the construction and operation of the project contain mercury monitoring requirements to assure that adverse impacts, no matter how remote, will not occur.

Although 95% of the new mercury entering the Everglades is now believed to originate with rainfall, monitoring at the construction project will allow the District to track mercury concentrations and trends in the STAs, canals, and interior marshes, to ensure that



Too many nutrients can cause cattail to become a dense stand, pushing out other vegetation and wildlife. Steve Davis is pictured.

other mercury runoff sources into the central and southern portions are not missed. The mercury study has expanded to include the supplemental technologies to ensure that they, too, will not exacerbate the downstream mercury problem.

7) Developing an Integrated Plan and Annual Reports

In 1996 the District developed an Integrated Plan outlining the many efforts under way to achieve Everglades water quality goals by December 31, 2006. The plan summarizes collaborative efforts of private landowners, federal and state agencies, the District, and other stakeholders to accomplish goals of Everglades restoration.

Annual Reports. Results of these multiple research and monitoring activities and related Everglades restoration efforts will be presented in annual, peer-reviewed reports to the Governor, President of the Senate, and Speaker of the House of Representatives. These will be prepared in coordination with the DEP, and will begin with an interim report January 1, 1999. Beginning January 1, 2000, peer-reviewed reports will be submitted annually. These reports will include current research and monitoring efforts, and will identify water quality parameters in addition to phosphorus which exceed state standards or are causing or contributing to adverse effects to the Everglades.

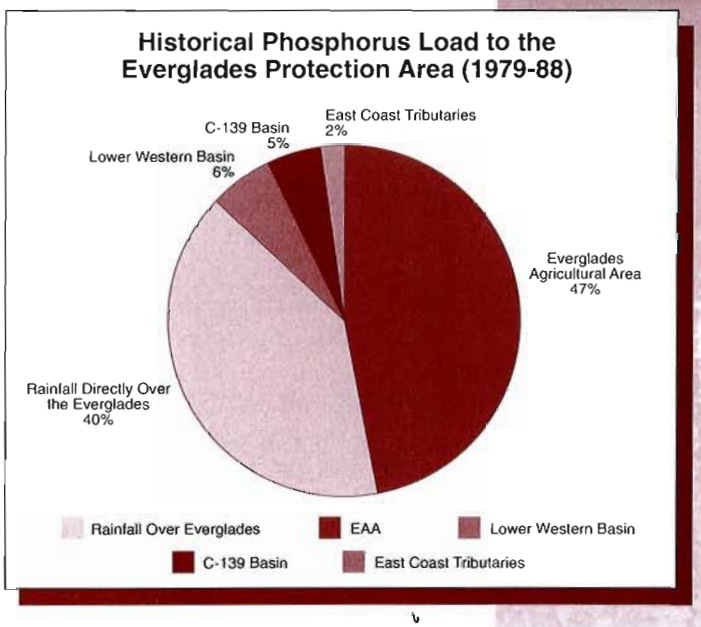
REGULATORY PROGRAM

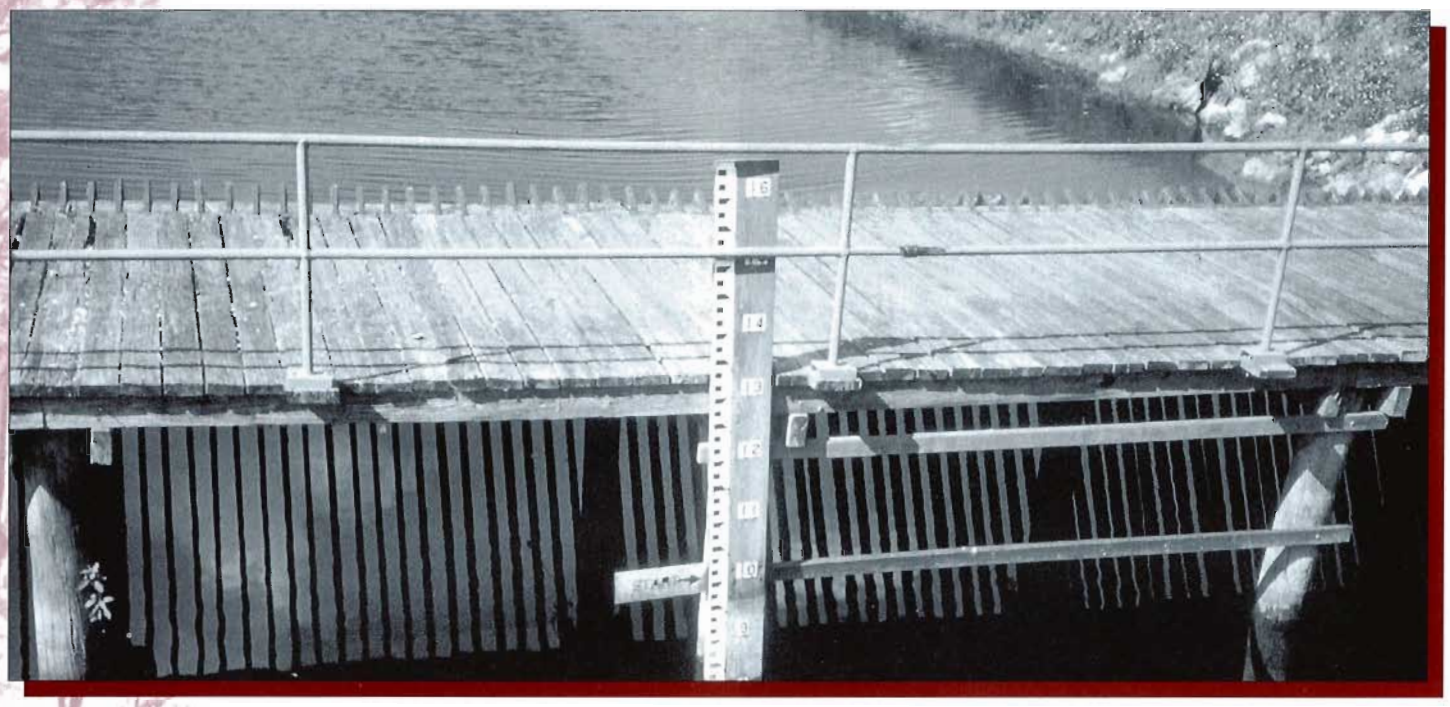
An effective regulatory program is essential to protect the Everglades. The Act outlines a comprehensive program to assure that by December 31, 2006, all state water quality standards are met and that no waters entering the Everglades Protection Area cause an imbalance in the natural populations of aquatic flora or fauna. For areas that are already impacted, the Act requires a net improvement be provided. To meet this ambitious goal, the District has started a number of regulatory efforts simultaneously. These include a BMP program to reduce phosphorus load by at least 25% in the EAA, a BMP program to prevent historical phosphorus levels from increasing in the C-139 basin, regulating five small Lake Okeechobee drainage districts, adopting phosphorus standards, and complying with applicable state and federal regulations. A synopsis follows:

Best Management Practices in EAA Reduce Phosphorus at the Source

The EAA is a fertile region south of Lake Okeechobee which once was historic Everglades. Many years ago the state and federal government drained this land to encourage agricultural development in its rich muck soils, and designed the C&SF Project to provide water supply and flood control for this area. Agricultural development ensued, and today the EAA is one of the most productive regions of the state with 505,000 acres under production. Of this, 82% is sugar cane, 9% vegetables, 6% sod, 2% livestock, and 1% rice and other crops.

While the EAA is an important economic resource to south Florida, it is also the largest single source of phosphorus to the Everglades, providing 47% of the historical load during the 1979-88 baseline period. Farming practices, fertilizer application and other activities and existing conditions contribute to this nutrient, which ultimately leaves the basin in stormwater runoff.





Growers in the EAA are reducing phosphorus leaving the basin by implementing "best management practices." Some are quite simple, such as this gauge which tells growers at what water level to stop irrigating.

The Act requires the District develop a regulatory program to reduce nutrients leaving this basin by 25% compared with the 10-year baseline period. This program relies on the implementation of best management practices, and has been under way for three years. Initial results are extremely promising.

BMPs are farming practices designed to reduce the phosphorus load leaving growers' property. The three basic techniques involve water detention, fertilizer application and sediment controls. Growers are using other effective ways to reduce phosphorus as well. All EAA entities — including non-agricultural users such as cities and businesses — must receive a District permit showing they have a BMP plan.

The BMP program for the EAA was developed over a number of years, with input from growers and other local residents taken at public workshops and meetings. The District completed rulemaking in 1992, and today all EAA landowners have a District permit. The goal is to achieve a collective 25% phosphorus reduction for the entire basin — not from each individual farm. The District determines if this reduction has occurred by comparing phosphorus discharges from 12-month periods with the base 10-year period of record from 1979-88. Phosphorus amounts are measured at 15 District structures surrounding the EAA. Financial incentives are provided to growers who exceed the 25% minimum.

Phosphorus load in runoff from the EAA has shown a trend reduction of 51% in the first three years of monitoring. Because 1996 and 1997 represent the program's first two water years, it is too early to predict the long-term reductions of phosphorus to the Everglades which may result from BMPs, however initial results are very encouraging. District staff routinely visit EAA growers to verify implementation of these farming practices, with 164 visits occurring in the past two years covering 427,542 acres.

Approximately 45% of the growers have chosen an option called "early baseline." They must demonstrate a phosphorus reduction rate of 25% at the farm level if the overall basin average does not meet the required minimum. These growers need not make additional BMP changes if they can show 25% reductions have been met at their individual farms. Early baseline permittees began providing water quality monitoring data to the District in 1993.

In 1997 the District released its second annual report on this BMP program. The report covers the water years from May 1, 1995 to April 30, 1997, and includes information about permitting and post-permit compliance. The District will release future reports each fall.

Regulating C-139 Basin

The District is developing a similar BMP program for the C-139 basin, however the goal is for phosphorus load leaving the basin not to exceed the historical average. This 163,000-acre basin contributed 5% of the phosphorus load to the Everglades during the 10-year baseline period of record. Today it is a rural area primarily used as pasture land for cattle grazing, with increasing amounts being converted for citrus and sugar cane production. Landowners collectively cannot exceed the annual average phosphorus loading observed from the 10-year period of record. The basin average is adjusted annually based upon rainfall, so a direct comparison with the historical period can be made.

Other Tributaries Examined

Regulatory programs may also be developed for other tributaries which discharge to the Everglades Protection Area. These include three basins south of C-139 which comprise the "lower" western basins. These basins are located in Hendry and Collier counties and include the Big Cypress Seminole Indian Reservation and Miccosukee Tribe of Indians of Florida. The lower western basins contribute a combined 6% of historical phosphorus to the Everglades.

Several east coast urban areas contribute approximately 2% of the phosphorus load: the town of Wellington in Palm Beach County, and the North Springs Improvement District and C-11 West basin in western Broward County. The District is analyzing data and collecting water quality samples to determine if regulatory programs will be required.

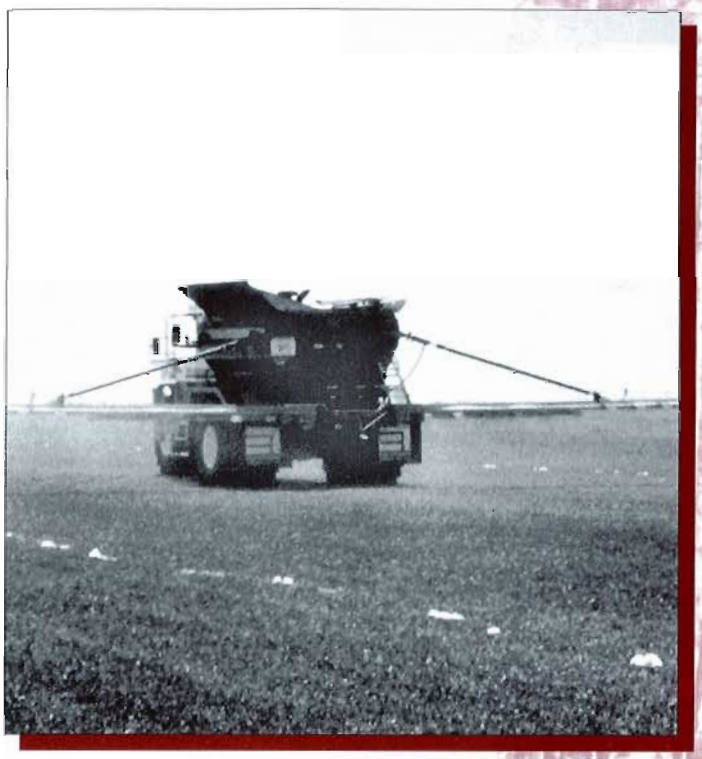
Lake Okeechobee Drainage Districts Also Reducing Their Phosphorus Load

Five special drainage districts which ring the south shore of Lake Okeechobee have programs to reduce phosphorus load. These entities are known as the four "298" districts and Closter Farms. They discharge stormwater to the lake and are required to implement BMPs to reduce nutrients. These BMPs are currently in operation, and are resulting in a 10-ton annual reduction in phosphorus load.

In addition, these districts are required to divert the majority of their stormwater discharge to one of the six cleanup wetlands, once the STAs are completed. This will improve Lake Okeechobee's local water quality and send additional treated water south to the Everglades. The first applicable wetland (STA-2) is scheduled for completion in 1999.

Addressing All Water Quality Issues

The Act requires that *all applicable water quality parameters* be addressed through the combination of STAs and BMPs. In September 1996 the District amended rules 40E-61 and 40E-63 (Florida Administrative Code) to require the EAA Environmental Protection District to sponsor a BMP research program for other water quality parameters including phosphorus (dissolved and particulate), specific conductance (chlorides), and the herbicides atrazine and ametryn. The amended rules were the result of several well-attended public workshops held from April through July 1996. The BMP research program, defined by a scope-of-work approved by the District, was initiated in August 1997. The research program is designed to field-test BMPs in a sufficient number of representative sites in the EAA to reflect soil and crop types and other factors that influence BMP design and effectiveness. Once other water quality parameters are known, appropriate regulatory programs can be considered.



Improved fertilizer application methods also can reduce nutrients leaving the Everglades Agricultural Area.

Complying with State and Federal Regulations

Not only will the District develop and oversee regulatory programs for Everglades restoration, but it also must obtain state and federal permits for cleanup efforts. Some are required by the Act, and others by federal law.

Other State Permits Required. The District also must apply for a permit to operate and maintain discharge structures within the control of the District which discharge into, within, and from the Everglades Protection Area and were not included in the Act permit application for the Everglades Construction Project. The District submitted such a permit application and DEP issued a "notice of intent" to issue the permit in May 1996. The proposed permit includes schedules and strategies for restoring the Everglades, and a comprehensive monitoring program for structures located throughout the Everglades. However, the Miccosukee Indians and Friends of the Everglades challenged the issuance of the permit, and an administrative hearing was held from September 22 to October 8, 1997 for this. The District expects a ruling on the validity of this permit in early 1998.

EXOTIC SPECIES CONTROL

Florida is home to dozens of exotic plant species, with at least 25% of all species of plants and trees in the state being non-native introductions. Some new arrivals pose no threat, but others are wreaking havoc on natural areas. Melaleuca, Brazilian pepper, hydrilla, water hyacinth and others have become entrenched and are costing millions to keep in check. Non-native pest-plants are one of the largest environmental threats to Florida, infesting portions of the greater Everglades ecosystem. Exotic plants degrade the natural environment, interfere with flood control and recreation, and cause other problems.

The Act directs the District to establish a program to control the expansion of and to remove unwanted exotic plants from the Everglades Protection Area, giving highest priority to species affecting the largest area. The Act requires the District to coordinate its efforts with federal, state and other governmental entities. The District has considered exotic species control a priority for years, so the Act enhances already on-going efforts. A brief explanation of District control efforts in the Everglades follows:

Melaleuca Most Widespread Unwanted Plant

Melaleuca covers the largest area within the Everglades, infesting thousands of acres. It is very persistent and hard to eradicate. Largest infestations occur in portions of the Water Conservation Areas.

The District launched an aggressive melaleuca control program in 1990. The primary control method is manual herbicide application — a time-consuming and expensive process. However, a number of promising alternative control methods are under development and are being fine-tuned. In 1997 the District treated 700 acres in the Water Conservation Areas-2B and 3A North by aerial herbicide application. The District also supports U.S. Department of Agriculture research into insects for melaleuca control, including the melaleuca weevil released in April 1997, the BP sawfly, and other insects. The Refuge has an ongoing melaleuca treatment program supported by $100,000 of U.S. Fish and Wildlife Agency and $75,000 of District funds. The Park is controlling melaleuca within its borders, with the most serious infestations near Taylor Slough. The District is providing $60,000 in cost-sharing funds to the Park.

It appears District efforts, supported by those of other governments and private agencies, have turned the tide on its expansion. Melaleuca has been completely cleared from all of Water Conservation Area-3B, and the part of Water Conservation Area-3A south of Alligator Alley, and now these areas are under maintenance control to prevent future infestation. Today its range is no longer increasing and is even being reduced. With the use of new biological controls, the District expects to further decrease its infestation.

Brazilian Pepper Poses Great Threat

Brazilian pepper has infested approximately 100,000 acres of the Park. Like melaleuca, it will form a dense stand — or virtually impenetrable barrier — if allowed to spread. The primary removal methods are herbicide application, burning and flooding. The District and DEP are providing $125,000 to co-sponsor research with the University of Florida for biological control with insects from its native range. Two species have been imported for research and are in quarantine in Gainesville. Research has been completed for the first Brazilian pepper biocontrol, the BP sawfly. Final approvals are for general release are expected in 1998.

Aquatic Exotics Less Prevalent, but Still a Problem

Aquatic and submerged exotic weeds present a larger problem in central Florida and Lake Okeechobee, but are being watched carefully in the Everglades. Today hydrilla, water hyacinth and water lettuce are largely confined to canals in the Everglades, and their spread is kept in check by the District. Primary control methods are herbicide application and mechanical harvesting. However, floating and submerged water weeds are a threat, and their spread is being carefully monitored.

Vines and Kudzu Threaten

A multitude of invasive vine species plague south Florida. Particularly alarming is the Old World climbing fern *(Lygodium)*. This species appears to be rapidly expanding its range in south Florida's wetlands. Old World climbing fern threatens Everglades tree islands and the region's cypress forests. Certain portions of the Refuge are heavily infested. In 1997 a cooperative agreement with the University of Florida Center for Aquatic Plants was made to research best management practices for this vine. Biocontrol funds are budgeted in 1998 to initiate an overseas search for potential insect controls.

A small amount of kudzu, an invasive vine characteristic of the "deep South," was spotted along a Water Conservation Area levee in Broward County in 1993. This species was planted on Broward canal levees by the Soil Conservation Service in the 1950s as a vegetative cover for limestone levees. In spite of repeated mowings over 40 years, a number of small patches persisted. In the 1990s, mowing decreased and remnant plantings appeared. District staff quickly treated the small kudzu infestations with herbicides and today are monitoring the area. Kudzu also has been spotted in Homestead. Presently no funds are available to control vines.

Other Unwanted Species Identified Each Year

Many other plants pose threats in Florida, although none are as widespread or well-known as hydrilla or melaleuca. In fact, many potential threats are sold commercially. The Australian carrotwood tree for example, has only been in Florida since 1980. It is already invading

many coastal natural areas, including mangrove communities. Early detection and treatment — before they cover hundreds of thousands of acres — is essential in winning the war with exotic plants. The District works closely with groups including the Florida Exotic Pest Plant Council to identify potential pest-plants throughout the state. The Florida Department of Agriculture and Consumer Services is studying this plant to determine if it should be added to the state's noxious weed list to prohibit further sale and cultivation.

Controlling Vegetation in the Frog Pond

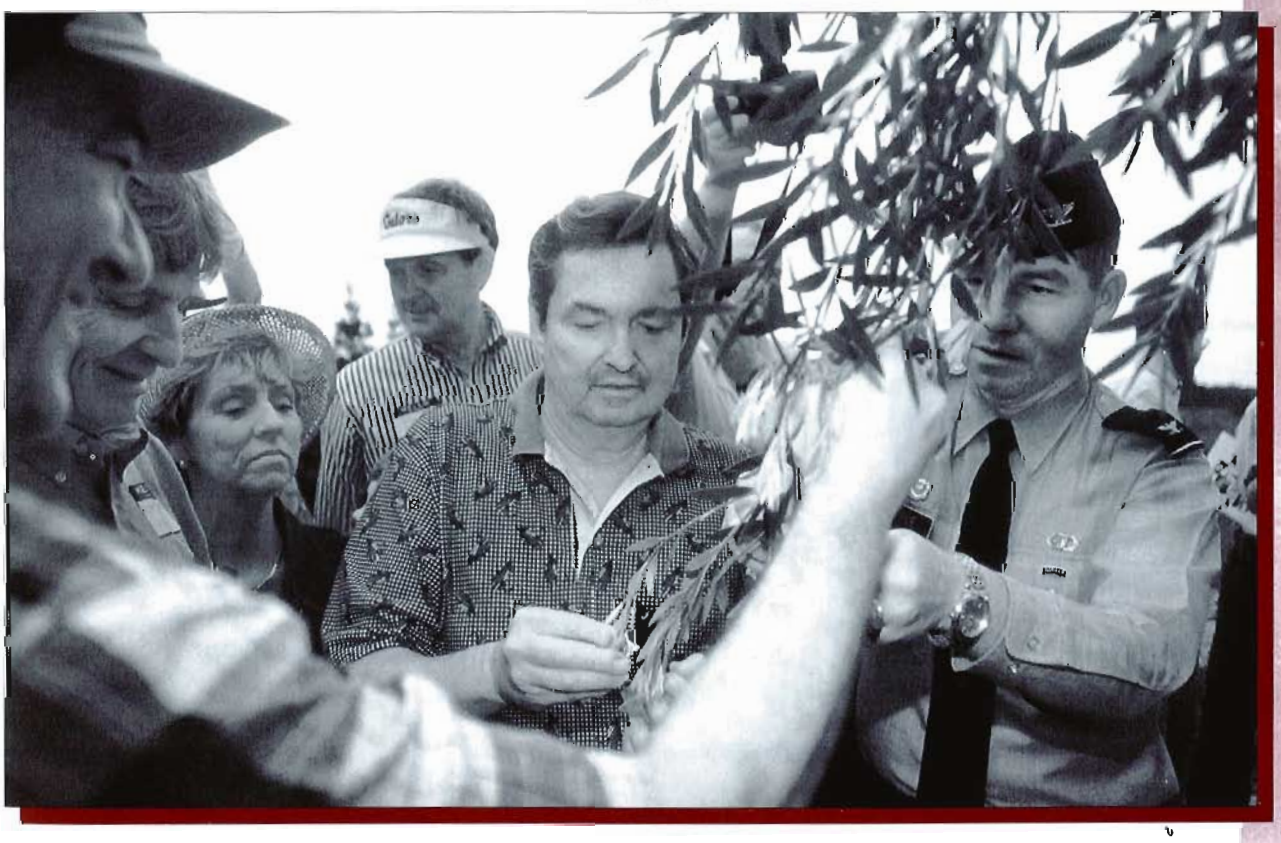
The Frog Pond is a 5,200-acre parcel of land bordering the Park, which the District purchased to improve the hydrology and ecology of the area. Previously, the land was farmed intensively, which prevented the spread of exotic species. After the District purchased the land and these activities ended, the spread of exotics became a concern on the now vacant land. To prevent unwanted plant infestations, the District implemented a land lease program in 1995 allowing local interests to farm or otherwise use Frog Pond land. Many stipulations are attached to leases to protect the environment. Three years after the program started, it is considered very successful, with the spread of exotics under control. Leases cover a total of 3,025 acres. Current contracts will expire in 1998, and the District expects to continue this program.

Interagency Steering Committee Coordinates Control Efforts

In 1995 a steering committee composed of federal, state, and local government agencies was created. The committee will provide guidance in ranking species for control in the Everglades and will review District vegetation management plans and procedures. The committee met again in 1996 and 1997, and is ranking species and coordinating management efforts.

The tiny snout-nosed beetle was released in April in an effort to battle melaleuca.

Pictured from right at the release ceremony are Col. Terry Rice of the Army Corps of Engineers, U.S. Representative Clay Shaw, District Executive Director Sam Poole, Everglades activist Patti Webster, and other supporters.



FUNDING

A dedicated funding source is essential to carry out Everglades and Florida Bay protection and restoration programs. The Everglades Construction Project is one of the largest public works projects in the nation for environmental restoration, estimated to cost more than $685 million over 20 years. Restoration activities for Florida Bay will require additional millions of dollars and take years to implement.

The Everglades Forever Act directed the District to separately account for all monies used to fund the Everglades Construction Project. This was called the Everglades Fund. In November 1996, the citizens of Florida voted in favor of a constitutionally-created Everglades Trust Fund. The legislation which passed in 1997 (Ch. 97-258, Laws of Florida) references the Everglades Trust Fund, and requires specific identified funds to be placed in it. Multiple funding sources are contemplated for the Everglades Program:

Ad Valorem Taxes Provide $24.9 Million in FY 97

The Act gives the District the authority to levy ad valorem taxes of up to 0.1 mill within the Okeechobee basin for design, acquisition, and construction of the Everglades Construction Project. As required by the Act, this will be the sole direct contribution of ad valorem taxes for the construction project. For fiscal year 1996-97, actual ad valorem tax revenue was $24.9 million (unaudited).

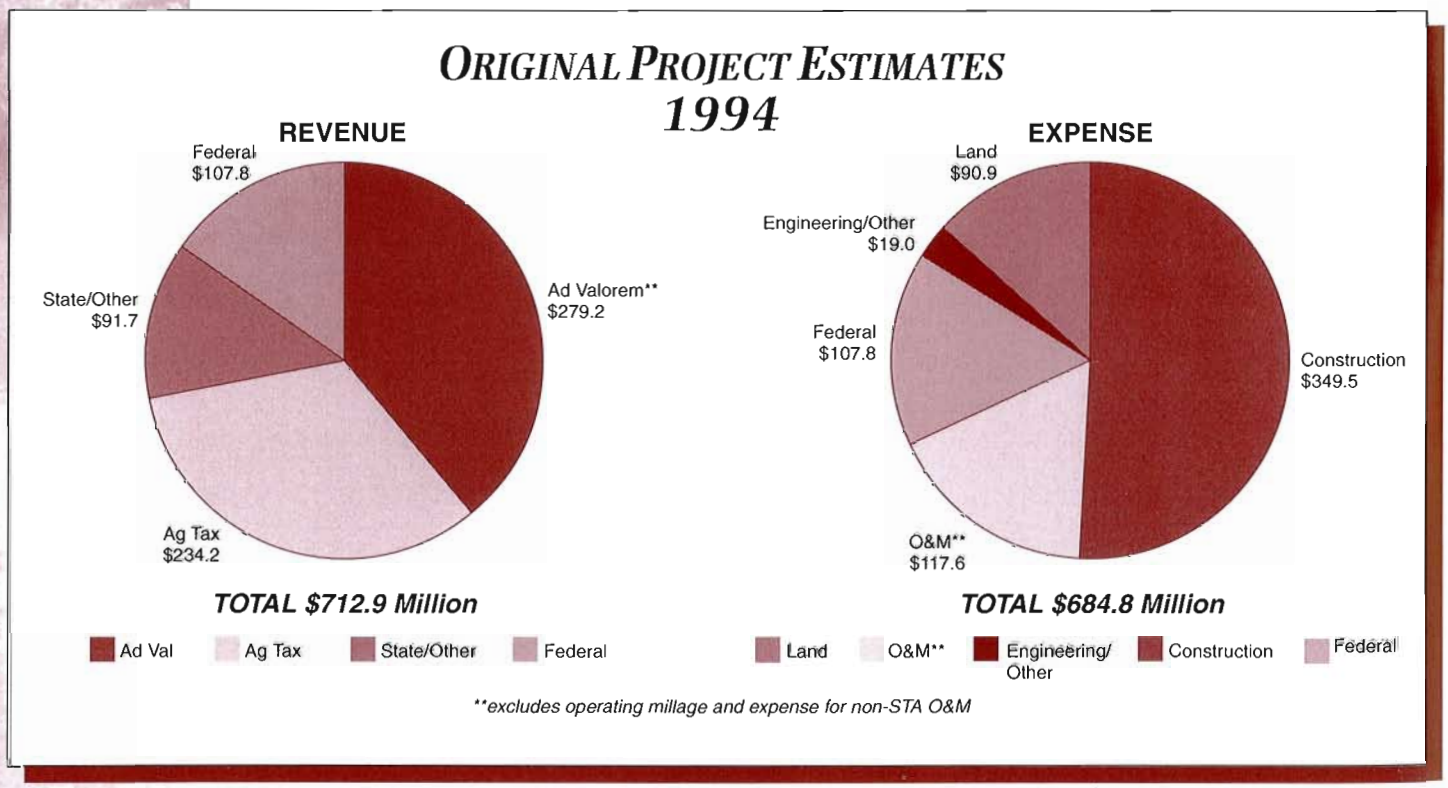
Agricultural Privilege Taxes Established for EAA and C-139 Basins

To fund the first phase of the Everglades restoration programs, the Act imposes an annual tax for the privilege of conducting an agricultural trade or business within the EAA and C-139 basins. The Act specifies that the annual per acre tax be collected through the normal county tax collection process.

EAA Agricultural Privilege Tax Raises $12.6 Million in FY 97. The EAA agricultural privilege tax ranges from a minimum of $24.89 per acre in 1994-97 to a potential maximum of $35 per acre in 2006-13. Actual agricultural privilege tax revenue in FY 96-97 totalled $12.6 million (unaudited). After the year 2013, the tax rate will decrease to $10 per acre for maintenance and operations of the STAs.

The amount of taxes collected each year is reduced by early payment discounts provided by each county. These discounts can range from 1 to 4% depending on the timeliness of the payment. The amount of revenue available to fund the Everglades Construction Project is further reduced by county processing/collection fees and commissions.

The Act includes financial incentives in the form of reduced tax rates for phosphorus load reductions that exceed the 25% EAA basin requirement. It also provides individual growers incentive credits for meeting phosphorus load or phosphorus concentration reduction targets. Incentive credits will not reduce the agricultural privilege tax below the $24.89 per acre minimum.



EAA Vegetable Acreage. The Act recognizes that vegetable farming is subject to both volatile market conditions and to crop loss from freezes, floods and droughts. If the Governor, President, or U.S. Department of Agriculture declares a state of emergency or disaster due to natural conditions, payment of the agricultural privilege tax will be deferred for one year. This situation occurred in 1997, as a result of a widespread freeze January 18 and 19. The U.S. Department of Agriculture issued a disaster declaration on February 13 for numerous Florida counties, including Palm Beach and Hendry which are subject to the agricultural privilege tax. As a result, the Governing Board of the District adopted a resolution in September 1997 that defers $385,268 in agricultural privilege taxes for vegetable growers. The deferral applies to growers who obtained a vegetable classification the previous year. This is the first instance since the tax was enacted that this provision was applied.

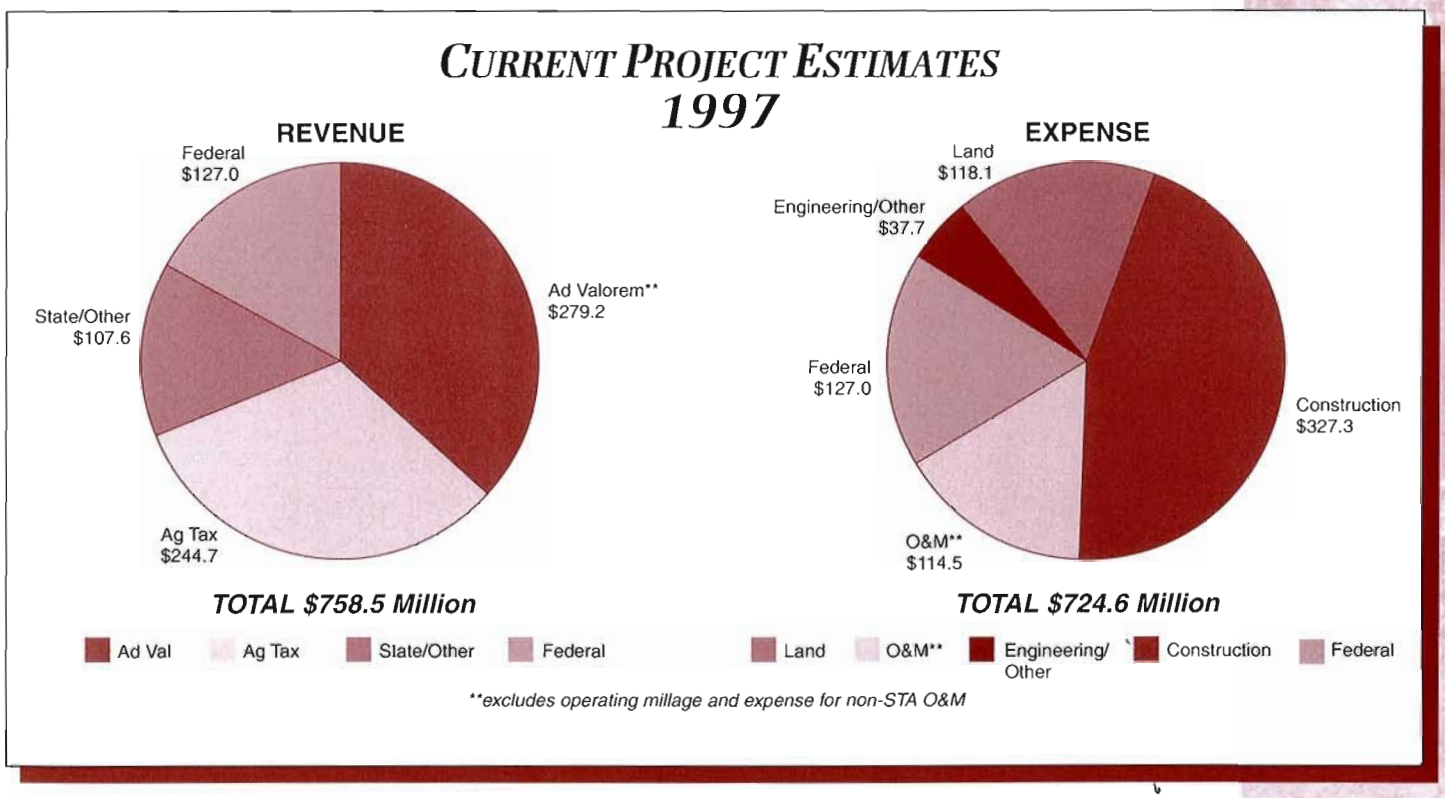
C-139 Basin Agricultural Privilege Tax to Raise $654,656 Per Year. The C-139 basin agricultural privilege tax was certified by the Governing Board for 1996-97 at $4.39 per acre. The amount paid by an individual property owner may change from year to year depending on the number of agriculturally classified acres within the basin. The total amount of tax to be assessed will not exceed $654,656, as specified in the Act. After 20 years, the per acre tax will be $1.80.

Alligator Alley Toll Revenues Could Provide $27 Million

The Act includes the legislative finding that Alligator Alley, designated as State Highway 84 and U.S. Interstate Highway 75, contributed to the alteration of water flows in the Everglades and affected ecological patterns of the historical southern Everglades. The Legislature determined that it is in the public interest to establish a system of tolls for Alligator Alley to raise money to help restore the natural values lost by the highway's construction.

Toll revenue must be split equally between the Everglades and Florida Bay. Projects that qualify for these funds include the Everglades Construction Project; land acquisition to move STA-3/4 out of the Toe-of-the-Boot (an Everglades remnant area in the EAA); water conveyance projects which enable more water resources to reach Florida Bay; engineering design plans for wastewater treatment facilities for Florida Bay marine waters; and highway redesign to improve sheetflow of water across the southern Everglades.

In 1996 the District and Florida Department of Transportation received federal authorization to re-direct the use of Alligator Alley tolls for these projects. The Department of Transportation and District entered into a Memorandum of Understanding in 1997 setting out the basis for depositing the funds in the Everglades Fund. This was quickly followed with the transfer and deposit of $17 million in excess toll moneys representing the first transfer. These funds will be allocated based on



the Act requirements. As such, these funds will be split equally, at $8.5 million each, between the Everglades Construction Project and Florida Bay projects.

Project Estimates and Cashflow Updated for Phase 1

Fiscal year 1996-97 proved to be a pivotal year in Everglades Construction Project funding. Action turned from planning, design and land acquisition to construction. Project estimates and cashflow underwent a rigorous review and validation. Current cashflow estimates reflect a $1.1 million deficit at the conclusion of Phase 1 construction. This is substantially reduced from project deficits that were forecasted early in the fiscal year. Current estimates reflect adjustments made based on engineering changes, schedule optimization, and alleviating substantial borrowing expense.

Everglades Trust Fund Created

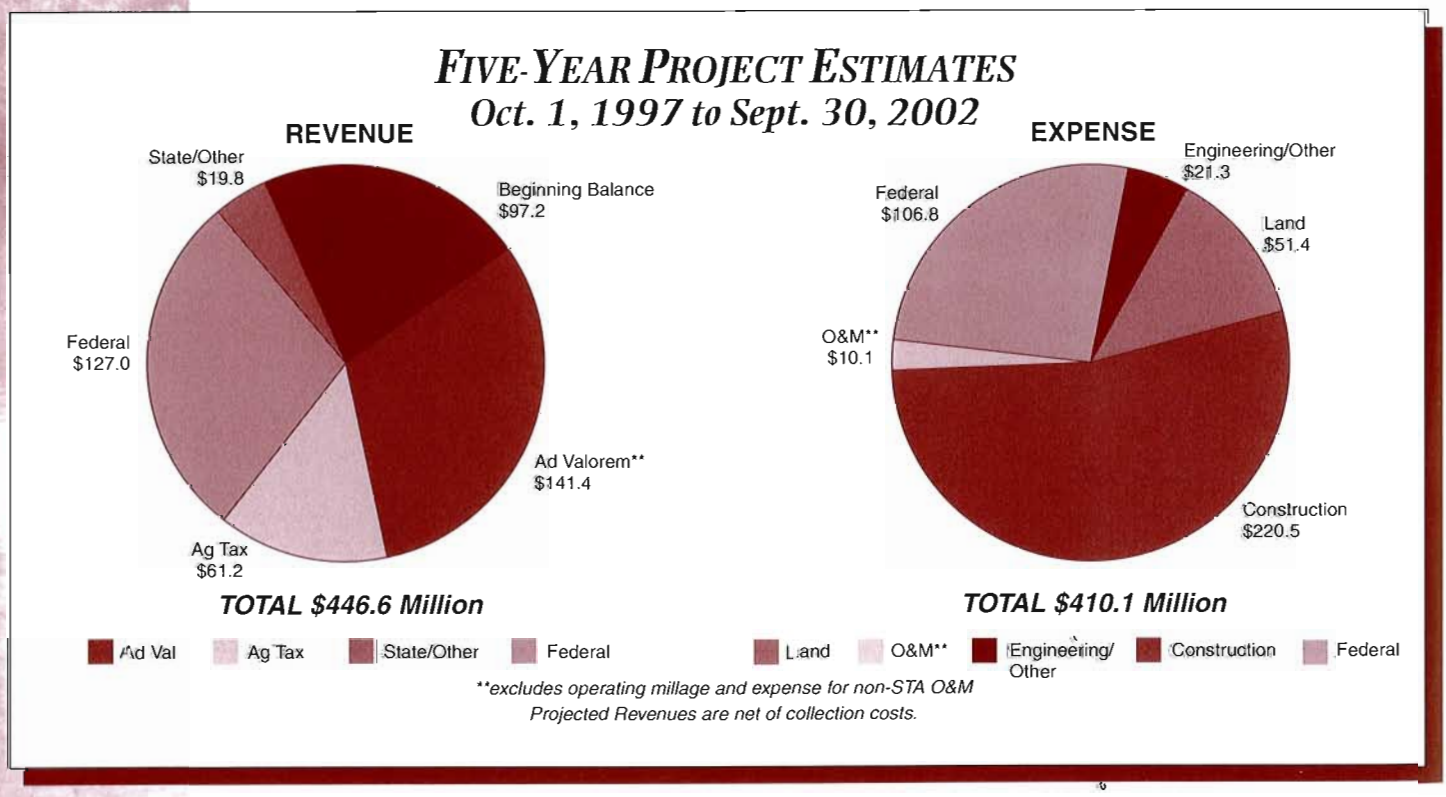
The District established the Everglades Trust Fund that was created by an amendment to the Florida Constitution approved by the citizens of Florida in November 1996. This trust fund is referenced in 1997 law which strengthened Everglades oversight. This fund will be used to account for all revenues and expenses associated with the Everglades Construction Project, as outlined in Ch. 97-258, Laws of Florida. The District has developed a proposed format for reporting financial information in a clear and concise manner. The Joint Legislative Committee on Everglades Oversight is required to approve the format the District uses when submitting its quarterly expenditure reports to the Governor, the Legislature, and the public.

Amendment 5 Decision

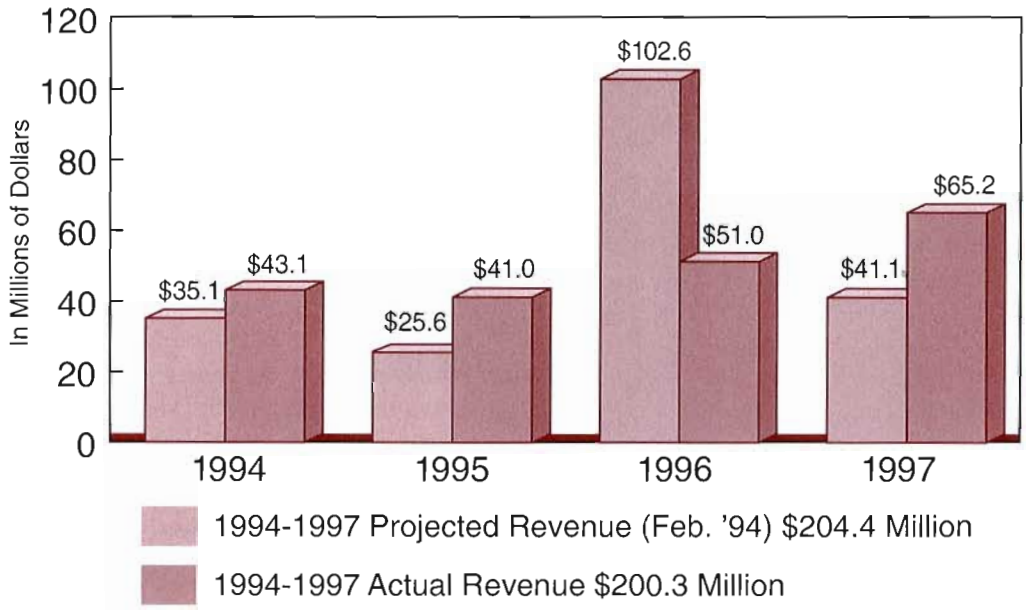
The other constitutional amendment passed in November 1996 also involves a funding issue. Amendment 5 makes those in the Everglades Agricultural Area who cause water pollution in the EAA and the Everglades Protection Area primarily responsible for paying the costs of abating that pollution. In an advisory opinion to the Governor, the Supreme Court interpreted this to mean that those who are responsible for pollution in the EAA must pay "their share of the costs of abating the pollution attributable to them," and that "primarily responsible" should not be given limited meanings such as "entirely" or "substantially" or "more than half." The Court also concluded that "the voters expected the Legislature to enact supplementary legislation to make [Amendment 5] effective."

Federal Government to Provide Funding

Both President Clinton and Congress have been extremely supportive of Everglades restoration, and consider this a "test-case" for other regional environmental restoration programs across the nation. As a result, much federal interest and support has been directed towards Everglades restoration recently. The federal 1996 Water Resources Development Act provides cost-share funding for some programs related to Everglades restoration. In particular, the Water Resources



ACTUAL VS. PROJECTED REVENUE
Through September 30, 1997



Development Act authorizes the Corps of Engineers to move ahead with C-51/STA-1 East, C-111 land acquisition, construction and water quality improvement projects, and the Restudy.

Preservation 2000 Provides up to $33 Million.

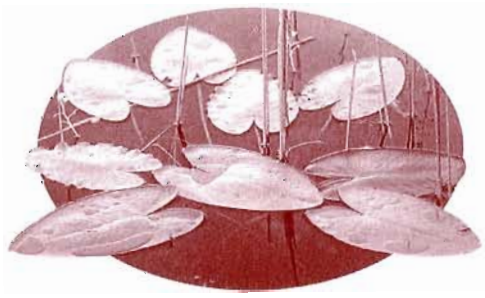
Up to $33 million of P-2000 funds was re-directed for land acquisition for the Everglades Construction Project. Of this amount, in fiscal year 1996 the District committed approximately $9.5 million for proposed land acquisition projects. The balance is anticipated to be expended for this purpose in FY 97 and FY 98.

FPL Mitigation Funds Available.

Funding anticipated for the Everglades Construction Project in the Act included $14 million in Florida Power & Light mitigation funds. In fiscal year 1997 the District used the balance of these funds ($12.9 million) to meet Everglades Construction Project requirements. This completes the expenditure of funds from this source.

Unfunded Act Mandates Total $78 Million.

In addition to the Everglades Construction Project, the Act requires significant research, regulatory program development and implementation, exotic species control and other activities, totaling approximately $78 million through the year 2005. No funding source was designated for any activities beyond land acquisition, design and construction of the Everglades Construction Project. Therefore, the District is relying almost exclusively on ad valorem funds to cover these mandates.



Florida Bay Restoration

Located between the Florida mainland and Florida Keys, Florida Bay is the Everglades watershed's largest estuarine system. Historically, this subtropical estuary was noted for clear water, lush seagrass beds and outstanding fishing, but recently has shown marked deterioration. Hypotheses to explain the deterioration suggest that altered hydropattern, excess nutrient loading, changed circulation patterns, and lack of hurricane-induced mixing may all play a role. The bay is the terminus of the Kissimmee-Okeechobee-Everglades watershed. Fresh surface water moves into Florida Bay from sheetflow across the prairies of the southern Everglades. Fresh water also enters from 20 creek systems that receive water from Taylor Slough and the C-111 Canal. Water from Shark River Slough drains into Whitewater Bay, Cape Sable and Florida Bay.

Water temperature, salinity and chemistry — which must remain within tolerance levels to sustain developing organisms — depend on rainfall, freshwater flow, evaporation, circulation and tidal exchange. All elements are carefully taken into consideration with the implementation of the two major upstream restoration projects: the C-111 South Dade Project and Modified Water Deliveries. In addition, an effort known as the Experimental Program of Water Deliveries provides a testing mechanism for new hydrologic ideas and improvements. Research and monitoring has been initiated to determine the response of the Everglades periphyton in Taylor Slough to experimental water delivery programs. Similar programs have been initiated in 1997 to quantify the benefits and impacts of restoration efforts in the C-111 basin.

The District program for Florida Bay attempts to combine the best possible science with the most effective management program available to address the needs of this critical estuary. Key components follow:

Research Will Define Restoration Goals

It is generally perceived that Florida Bay is changing drastically. This perception is largely based on visual observations and documentations of the widespread mortality of seagrass, turbid water associated with this die-off, and the occurrence of large and sustained phytoplankton blooms. Another change has also been the decline in the commercial and recreational fisheries yield. It is assumed that a cause of this apparent decline is the decrease in freshwater inputs to the bay, which has occurred over the past 50 years. In order to effectively "restore" the environmental and ecological characteristics of Florida Bay, environmental managers must have a sound, quantitative understanding of 1) the historical characteristics and variability of the bay, 2) the extent to which current characteristics differ from historical characteristics, and 3) the mechanisms that caused these changes and control the nature of the ecosystem.

Historical Studies Show Past Characteristics

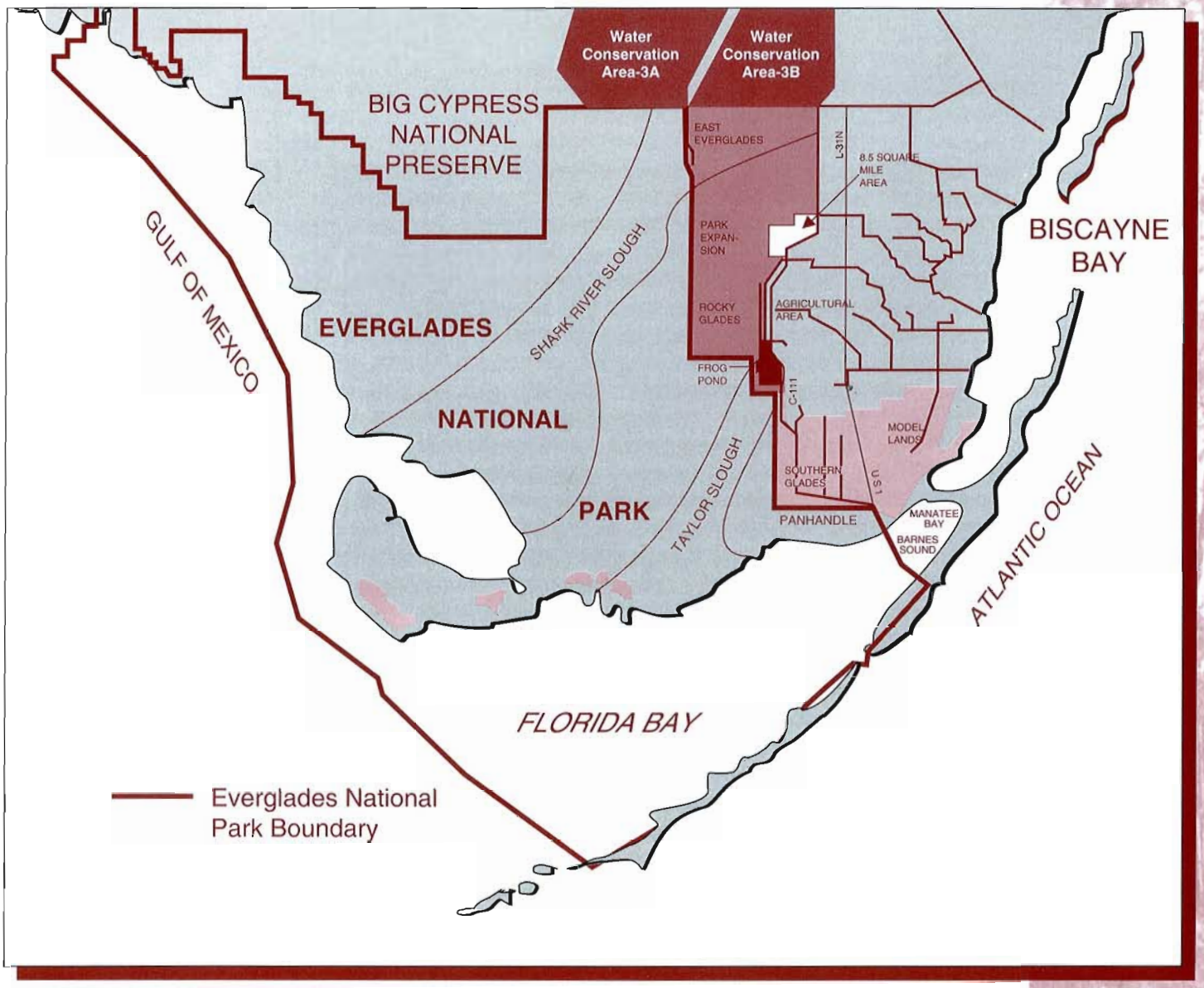
Three studies of the history of Florida Bay and adjacent wetlands of the C-111 basin are under way or now complete. Two studies have shown that significant changes in salinity conditions occurred when the Flagler Railroad Bridge and the C&SF Project were constructed. The former would affect bay water exchange with the Atlantic Ocean, while the latter would affect the timing and quantity of upstream freshwater delivery. With this information, collaborating interagency scientists and engineers on the Florida Bay Program Management Committee should be able to determine operational and physical changes to the C&SF system that will improve salinity conditions.

Water Quality and Monitoring Document Long-term Conditions

One of the most important questions the District and other participating agencies must answer is: how do the bay's water quality and biological resources change as a function of upstream changes in freshwater flow and pollutant loads? Long-term monitoring allows scientists to describe what has happened and offer possible explanations, but research currently investigating nutrient cycling and seagrass growth as affected by salinity will help explain why the changes have happened.

Transition Zone Focus of Research Projects

Attention should be directed on the geographic areas most likely to be affected by water management actions. To that end, the District's focus is on northern Florida Bay and the mangrove-dominated salinity transition zone between the Everglades and bay. This region is where the greatest range of salinities is found, and where direct and indirect effects of salinity change are most evident. These changes affect the availability of nutrients, and the habitat



structure and food web dynamics for important species affected by the bay's decline. This area has enormous ecological importance and will undergo dramatic changes from programs mandated in the Everglades Forever Act and Florida Bay Restoration Act. It is the nursery of many important fish species, and the feeding and breeding ground of wading bird populations.

Cooperative Research Projects Under Way

Cooperative research projects are designed to determine the effect of changing the quantity, quality, timing and distribution of freshwater flow on nutrient cycles, and submerged plant and fish communities. These cooperative projects are being conducted by University of Florida, Florida International University, Louisiana State University, U.S. Geological Survey, and District, DEP and Park researchers. Information gathered will be synthesized into computer models to predict the consequences of water management alternatives on this region.

Water Management Actions Essential to Bay's Health

Attention to science alone is not sufficient to ensure that appropriate water management policies are being implemented in the most expeditious fashion. To that end, a series of initiatives, in conjunction with the Corps of Engineers and Park, have begun. Expansion of the Experimental Program of Water Deliveries to Everglades National Park to include structural modifications and increased pumping of available flows into Taylor Slough in the wet season is one such initiative begun in 1996. Construction began on a pump station referred to as S-332D in January 1997 to allow implementation of a rainfall-based flow regime for Taylor Slough, that will be a more natural delivery method. However, it is clear that stabilized surface flow is only the beginning of a true restoration effort for Taylor and Shark River sloughs. The District is a participant in the Interagency Ecological Monitoring Program to evaluate impacts of Test 7 (defined later in this section) of the experimental program.

Jerome Lorenz samples for fish in dwarf mangroves in Florida Bay, in a project to understand effects of hydrology on fish, birds and other wildlife.

Additional initiatives include progress on the Modified Water Deliveries Project that will better balance flows between northeastern and western Shark River Slough. Construction began on two water control structures in January 1997 designed to pump 1,000 cubic feet per second each. The combined flow capacity is more than 1 billion gallons per day. This is an important step in the balancing of flows between the excessively wet western side of Shark Slough and the excessively dry northeastern portion. Additional land acquisition is planned including some of the western portions of the 8.5 Square Mile Area which lies north of the Rocky Glades and south of the Everglades Expansion area.

C-111 South Dade Project Benefits Southern Everglades

This project will restore Taylor Slough's hydropattern, and enhance flood protection for protected areas east of the L-31N levee. Taylor Slough is one of two primary sloughs through the Park. The other is Shark River Slough to the west. Both deliver fresh water through the Park ecosystem. The C-111 Project is a cooperative effort of the District and Corps of Engineers. Taylor Slough's hydropattern will be improved through a series of construction projects designed to send more fresh water to the slough, eastern Park and Florida Bay. Activities in 1997 continued the effort initiated in 1996. The first is removal of spoil mounds impeding sheetflow in the eastern panhandle of the Park. The second is design of the S-332D pump station. This pump station, adjacent to two existing pump stations, will allow water managers to implement a rainfall-driven formula for the L-31W Canal, which is at the headwaters of Taylor Slough. Construction will constitute the second and final phase of the Emergency Interim Plan, which the Legislature authorized in 1994 to provide additional flows to Taylor Slough. Construction of the S-332D pump station began in October 1996, and should be completed in February 1998.

Modified Water Deliveries Sent to Shark River Slough

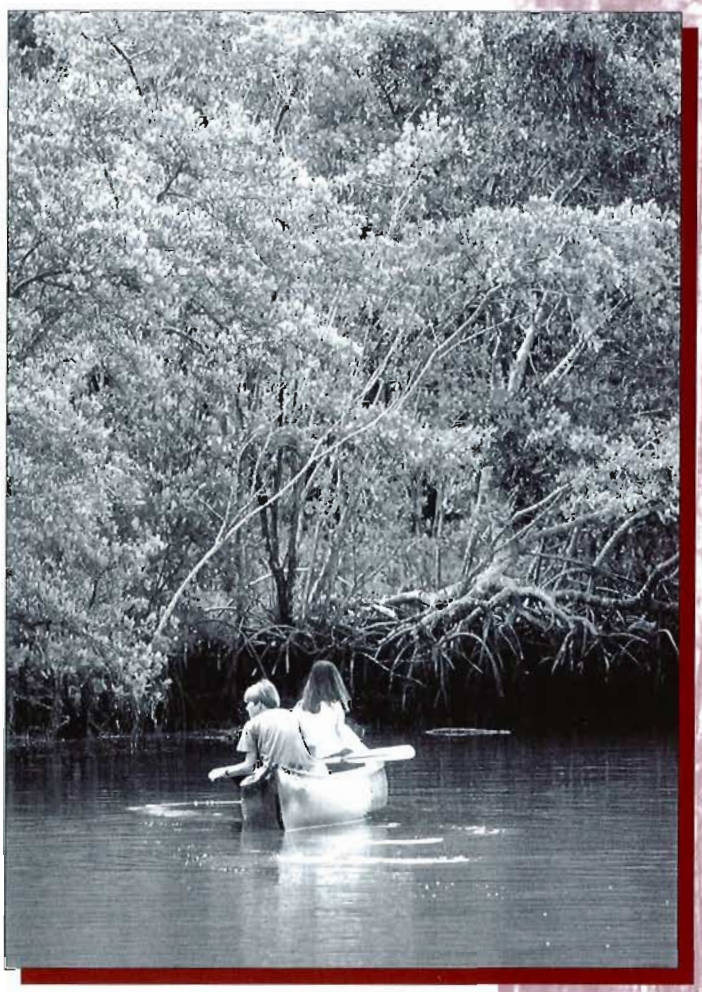
In 1989 Congress passed the Everglades National Park Protection and Expansion Act (Public Law 101-229), authorizing the Secretary of the Army to modify the C&SF Project. The goal is to improve water deliveries to Shark River Slough in the northern region of the Park, restore the Park's natural hydrologic conditions, and enhance and restore its ecological values. A plan was developed on the basis of expected environmental benefits derived from a modified water delivery schedule. A

rainfall-driven water delivery plan was developed and implemented in place of the minimum delivery schedule authorized in Public Law 91-282. This plan today is known as the Modified Water Deliveries to Everglades National Park Project, the purpose of which is to deliver water in a more natural way mimicking the sheetflow of the historic Everglades. The plan involves the modification of S-334, raising a portion of the Tamiami Trail, degrading the existing L-67 extension and filling the accompanying borrow canal. Construction of three gated culvert structures, three gated concrete headwall structures, and two spillway structures is planned.

The Department of Interior is funding this project, which is anticipated to cost $110 million including land acquisition. The original plan included monitoring for the endangered snail kite. Construction was initiated on the S-355 A&B water control structures in January 1997. One of the requirements at both construction sites was blasting to create a flow collection area upstream of the structures. Because of nesting of several endangered species (notably the wood stork) adjacent to the structure, this work was postponed for four months. It is unclear what the impact in terms of time and money will be on the Modified Water Deliveries Project. A critical component of the Modified Water Deliveries Project rests in assessing how to mitigate for additional flows in northeast Shark Slough affecting the 8.5 Square Mile Area. To assist with that effort, the District entered into a contract with Peer Consultants to develop and model a series of alternatives designed to ensure effective flood mitigation, as well as water quality protection to the Park. The work on this contract was completed in December 1997. The next step will be to complete environmental requirements of the federal government in order to implement appropriate changes.

Experimental Program Tests Water Delivery Plans

The Experimental Program of Water Deliveries provides a mechanism to field test water delivery methods to assess potential impacts on the Park and other parts of the Everglades ecosystem, as well as on the authorized C&SF Project functions of flood control and water supply. It consists of a series of iterative tests, each building on the results of the previous ones. To the extent practicable, these tests are aimed at furthering the goal of restoring and maintaining the natural abundance, diversity and ecological integrity of the native plants and animals within the Park through water management practices. The objective of test iteration 7 of this program is to optimize ecological restoration of the Park while maintaining other authorized project purposes. Test 7 began in November 1995, and will continue until the year 2000. The first five iterations implemented and fine-tuned a rainfall driven water delivery plan for Shark River Slough. The sixth iteration added criteria changes for operations delivering water to Taylor Slough.



A peaceful day among the mangroves in Florida Bay.

The seventh test iteration implements a rainfall-based operating schedule for the L-31 West Canal which is the headwaters of Taylor Slough. It also allows more natural water levels in Taylor Slough which change with rainfall and eliminated harmful drawdowns which unnaturally drained the Slough. Hydrologic and ecological monitoring of each test will improve management practices to lead to more natural hydrology and ecological systems in the Park. As ecological models are developed, they will become an increasingly important tool in restoration planning.

Summary of Water Conditions

Rainfall and Water Flow Slightly Below Normal

Average rainfall in the Everglades Protection Area from June 1, 1996 through May 31, 1997 was 43.6 inches or 16% less than the historical average of 52 inches.

The amount of water discharged through the District's structures to the Everglades Protection Area from June 1, 1996 through May 31, 1997 reflected the below-average rainfall. Water Conservation Areas received a daily average inflow of 1,702 cubic feet per second or 1.2 million acre-feet per year compared to the historical average inflow of 2,068 cubic feet per second or 1.5 million acre-feet per year, a 17.7% decrease. However, programs designed to provide more natural flows to the Park and the coastal basins were effective during this dryer period resulting in a daily average inflow of 1,403 cubic feet per second (1 million acre-feet per year) which is 4.5% greater than the historical average of 1,343 cubic feet per second (973,000 acre-feet per year).

Phosphorus Concentrations in Loxahatchee Refuge Reflect Water Level Changes

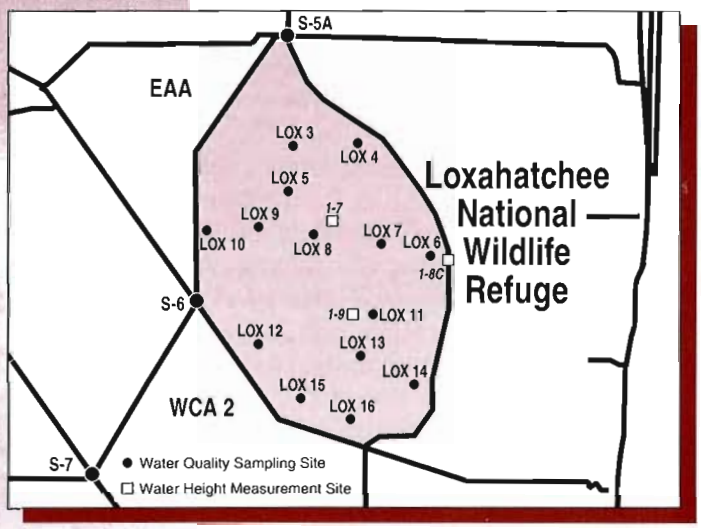
The District regularly monitors phosphorus concentrations in the Loxahatchee Refuge. The 1992 Settlement Agreement stipulates "interim" and "long-term" phosphorus concentrations for the Refuge. These limits change from month to month because they take into account the water level variations measured at three gauging stations within the Refuge.

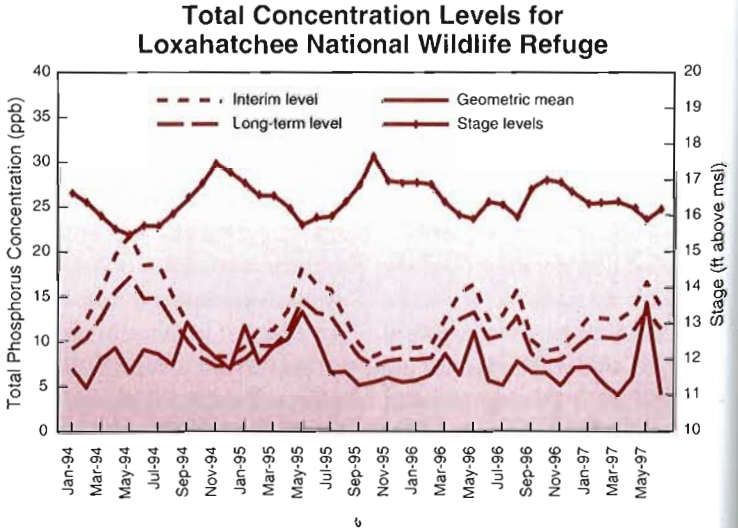
For this reporting year, the interim limits varied between 8.9 and 16.3 parts per billion while the long-term limits varied between 7.7 and 13.4 parts per billion. Since January 1995, the average (or geometric mean) of total phosphorus concentrations measured at 14 sites within the Refuge was below the interim and long-term limits. In May 1997, an average concentration of 14.3 parts per billion exceeded the long-term limit of 13.7 parts per billion. Increases in total phosphorus concentrations have occurred in previous years during periods of low water levels. This fluctuating inverse water level-total phosphorus concentration relationship masks any longer-term trend that may be present.

Phosphorus Discharges into Park Remain Below Prescribed Limits

The District also measures phosphorus concentrations entering the Park through Shark River and Taylor Sloughs and C-111 canal. The Settlement Agreement has set interim and long-term limits for this area as well. For this reporting period, the flow-weighted mean concentrations in Shark River Slough ranged from 6.5 to 8.5 parts per billion while the range for Taylor Slough was 4.5 to

Phosphorus is measured at 14 sites within the Refuge; water level is measured at three sites. The chart to the right shows phosphorus concentration levels for the past 3½ years.





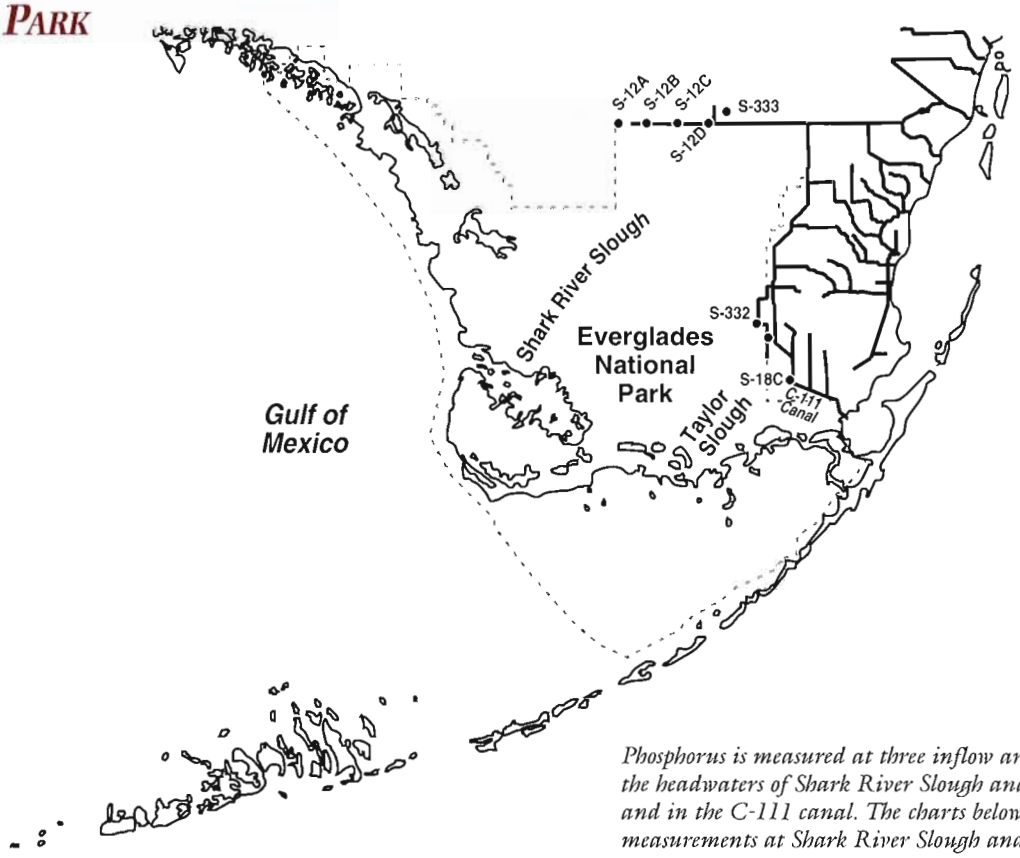
7.9 parts per billion. These data are encouraging because they were lower than the interim and long-term limits — as stipulated in the Settlement Agreement — during a dryer than normal year. This is the result of supplemental water additions to the headwaters of the sloughs.

Pesticides Monitored Regularly

Pesticides have been monitored for more than a decade in surface water and sediment at numerous sites on a quarterly and semi-annual basis, respectively, throughout the District's 16-county area. Eighteen of these sites are considered monitoring locations for the Everglades. This report summarizes the data collected during the sampling events from July 1996 to May 1997.

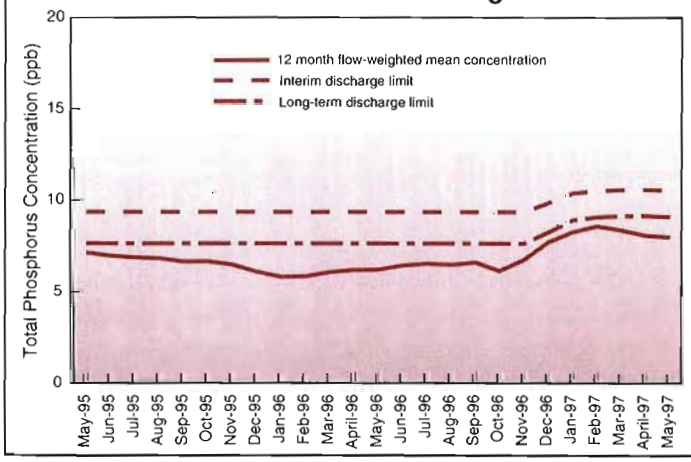
The majority of detections in water are herbicides. Most of the detected concentrations for ametryn and atrazine were low, less than 0.1 and 1 µg/L (microgram per liter), respectively. The highest value detected was 0.35 and 4.6 µg/L for ametryn and atrazine, respectively. Most of the other detected herbicides had concentrations of less than 0.1 µg/L. The insecticide endosulfan, and its metabolite, endosulfan sulfate, were found at structures near the Park during three of four sampling events, but the water actually entering the Park was free of endosulfan.

PHOSPHORUS MEASUREMENT AT THE PARK

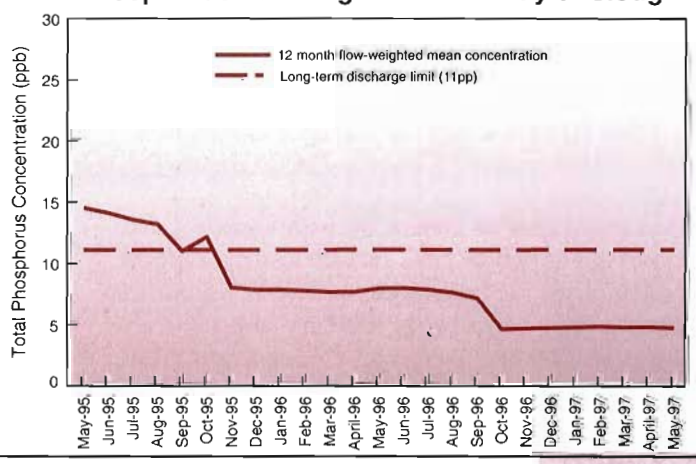


Phosphorus is measured at three inflow areas to the Park: the headwaters of Shark River Slough and Taylor Slough, and in the C-111 canal. The charts below show phosphorus measurements at Shark River Slough and Taylor Slough.

Phosphorus Discharge Limits for Shark River Slough



Phosphorus Discharge Limits for Taylor Slough



The levels and frequency of endosulfan detections were less than those reported in the previous year. No exceedances of the Florida numerical water quality standard for Class III (0.056 µg/L) recreational/fish and wildlife waters occurred at any of the five structures.

Sediment residues have consisted primarily of degradation products of DDT, although DDT was banned in 1973 by the USEPA. DDT, used widely prior to 1973, degrades slowly and binds readily to soil organic matter, which could account for these detections. Other compounds detected include the herbicide ametryn, as well as the insecticide endosulfan and its metabolite endosulfan sulfate.

From the more than 60 pesticides tested for, approximately 2.5% and 2.4% of the surface water and sediment residues, respectively, were above measurable levels. However, significant increases of pesticide concentrations in water and sediment between this and the previous year were not evident.

Mercury Monitoring in the ENR

Nearly three years of mercury monitoring and mass balance studies in the ENR Project support the following observations:

- outflow concentrations of total mercury and methylmercury are less than inflow concentrations and upstream reference site concentrations, and total mercury concentrations are less than the Class III water quality standard of 12 parts per trillion;
- outflow concentrations in largemouth bass are much less than the reference site and much less than the Florida "limited consumption" action level of 0.5 parts per million;
- between 50 and 75% of the total mercury and methylmercury entering through the inflow pump are removed on an annual average basis prior to discharge to the Refuge, but mercury is not accumulating to hazardous concentrations in accreting peat;
- unlike Water Conservation Area-2A, no inverse relationship between total phosphorus in the water column and methylmercury in mosquitofish has been observed along the total phosphorus gradient in the ENR Project; the cause of this difference is being carefully studied to understand what factors other than total phosphorus affect mercury bioaccumulation; and
- a modeling analysis conducted with a scoping-level model developed by USEPA with District support indicates that the biodilution or inverse relationship effect is likely offset by the mercury load reduction anticipated for the Everglades Construction Project if each of the STAs functions like the ENR Project.

Mercury Monitoring in the Everglades

No statistically significant upward or downward trends in annual average mercury species concentrations in water, sediment or fish have emerged over the last five years of study in the Everglades canals or interior marshes. To determine whether the decrease in mercury deposition rates observed in the northern U.S and Canada are occurring in the Everglades, the DEP will initiate a follow-up in 1988 to the sediment radio-dating study conducted in 1991-93.

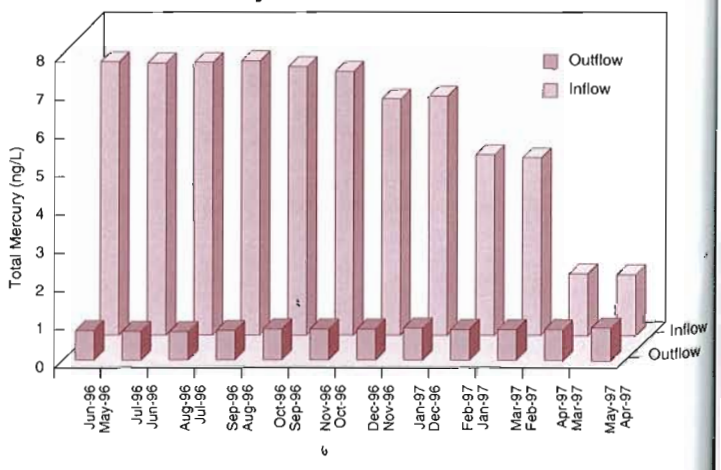
Florida Bay Salinity and Chlorophyll

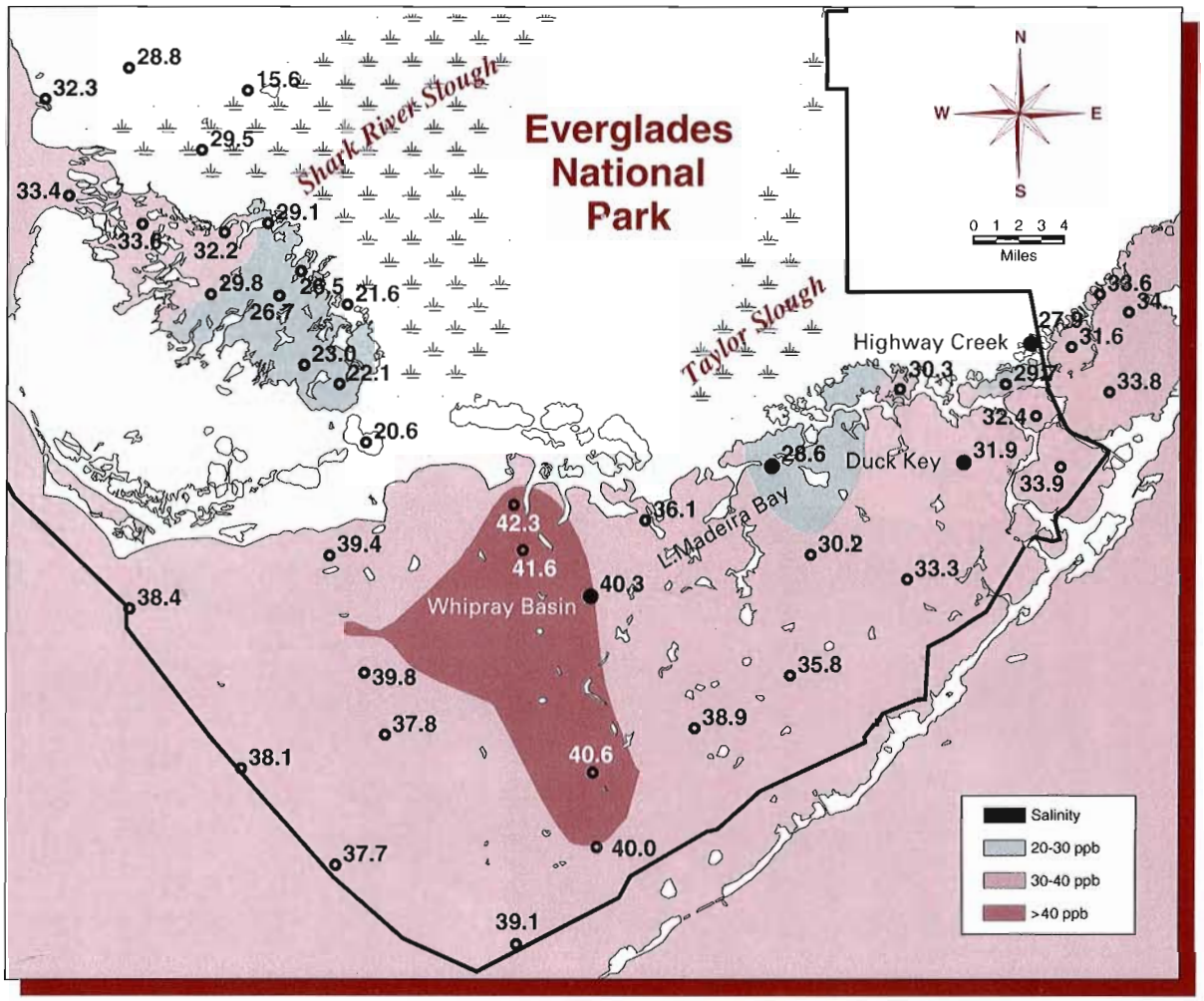
As part of the Everglades Forever Act, the District, in collaboration with the Park and Florida International University, is required to monitor water quality in Florida Bay. Salinity and chlorophyll "a" are used as indicators of water quality within Florida Bay.

Salinity. Salinity can be defined as the amount of salt dissolved in a kilogram of water and is expressed in units of parts per thousand. As an estuary, Florida Bay requires a properly maintained salinity regime for the overall ecological health of the bay. Within Florida Bay, salinity is affected by freshwater input, in the form of rainfall and surface water runoff from the Everglades, and tidal inflow that introduces saltwater into the bay from the Gulf of Mexico. Because the bay is a shallow and wide lagoon, evaporation also affects salinity. When evaporation exceeds freshwater input, portions of the bay can become hypersaline. Water conditions in the bay are considered hypersaline when salinity exceeds 35 parts per thousand, which is the approximate salinity of the Gulf of Mexico. The central portion of Florida Bay contains small basins surrounded by shallow seagrass banks and is, as a result, especially vulnerable to hypersaline conditions.

Salinity measurements have been made during the last five years at monitoring sites throughout Florida Bay including in Highway Creek, Duck Key, Lake Madeira Bay and Whipray Basin. During the first half of 1997, average salinities in Florida Bay appeared to be

Total Mercury Concentrations in the ENR





Salinity is measured at numerous sites in Florida Bay and waters along the western coast of the Park. This figure for May 1997 shows elevated salinity for the central bay.

comparable to salinities reported for the previous years of monitoring.

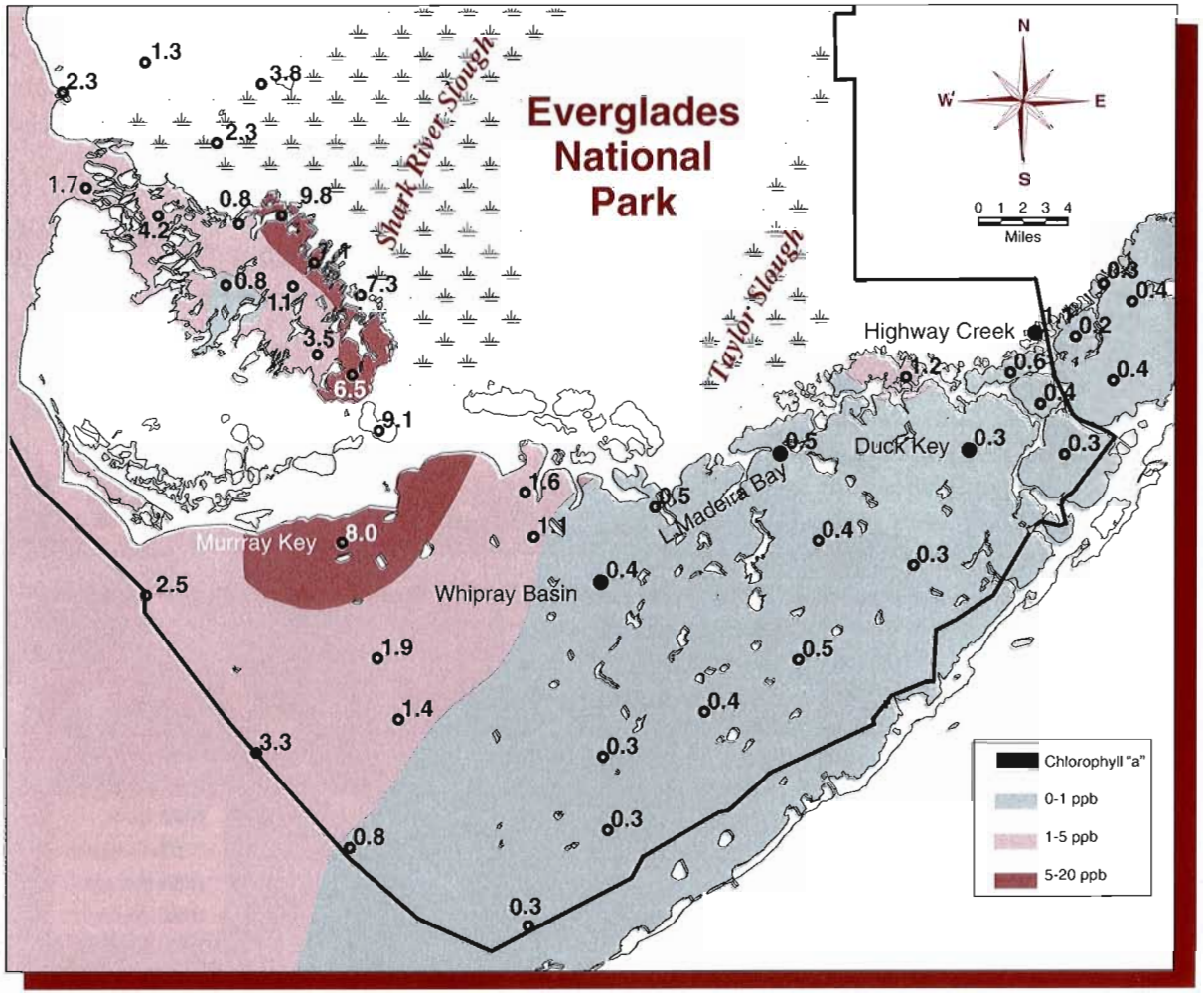
During April, salinities within the bay ranged from 26 to 39 parts per thousand with hypersaline conditions generally exhibited in the central (Whipray Bay) and western portions of the bay. Hypersaline levels were also observed within the central portions of Florida Bay during May. Overall, salinities ranged from approximately 28 to 42 parts per thousand during the May 1997 monitoring period. As freshwater input to Florida Bay increased during June, salinity decreased baywide with no evident hypersaline conditions being observed.

Salinities were observed to increase at the four monitoring sites from March through May. The most pronounced increase was observed during May in the Whipray Basin. Increased salinities observed during this monitoring period reflect reduced freshwater input and increased evaporation in Florida Bay during the dry season. By June, lower salinities were recorded at the four monitoring sites. The most significant reduction in salinity was observed at the Highway Creek site due to its proximity to a freshwater source.

Chlorophyll. Large areas of dense algal communities can affect the overall health of the Florida Bay ecosystem. Chlorophyll "a" concentrations measured in the bay are an indicator of algae (phytoplankton) biomass. Chlorophyll "a" concentrations have been measured at more than two dozen sampling stations in Florida Bay over the past five years. Overall, average chlorophyll "a" levels appear to be lower during the first six months of 1997 compared to those reported for the previous years of monitoring.

Typically, higher chlorophyll "a" levels occur during the summer months when productivity is high. During this portion of the year, water temperatures and nutrient inputs are at their peak. Chlorophyll "a" levels will decrease through the fall with lowest levels generally reported during winter months when productivity is at its lowest.

Within the past year of monitoring, seasonal variations were observed for chlorophyll "a" levels in Florida Bay. In September 1996, chlorophyll "a" levels in the bay ranged to 5.5 parts per billion in Whipray Basin. Lower chlorophyll "a" levels were observed in Florida Bay at the beginning of the winter season with concentrations ranging

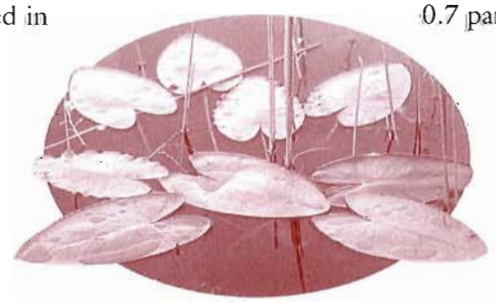


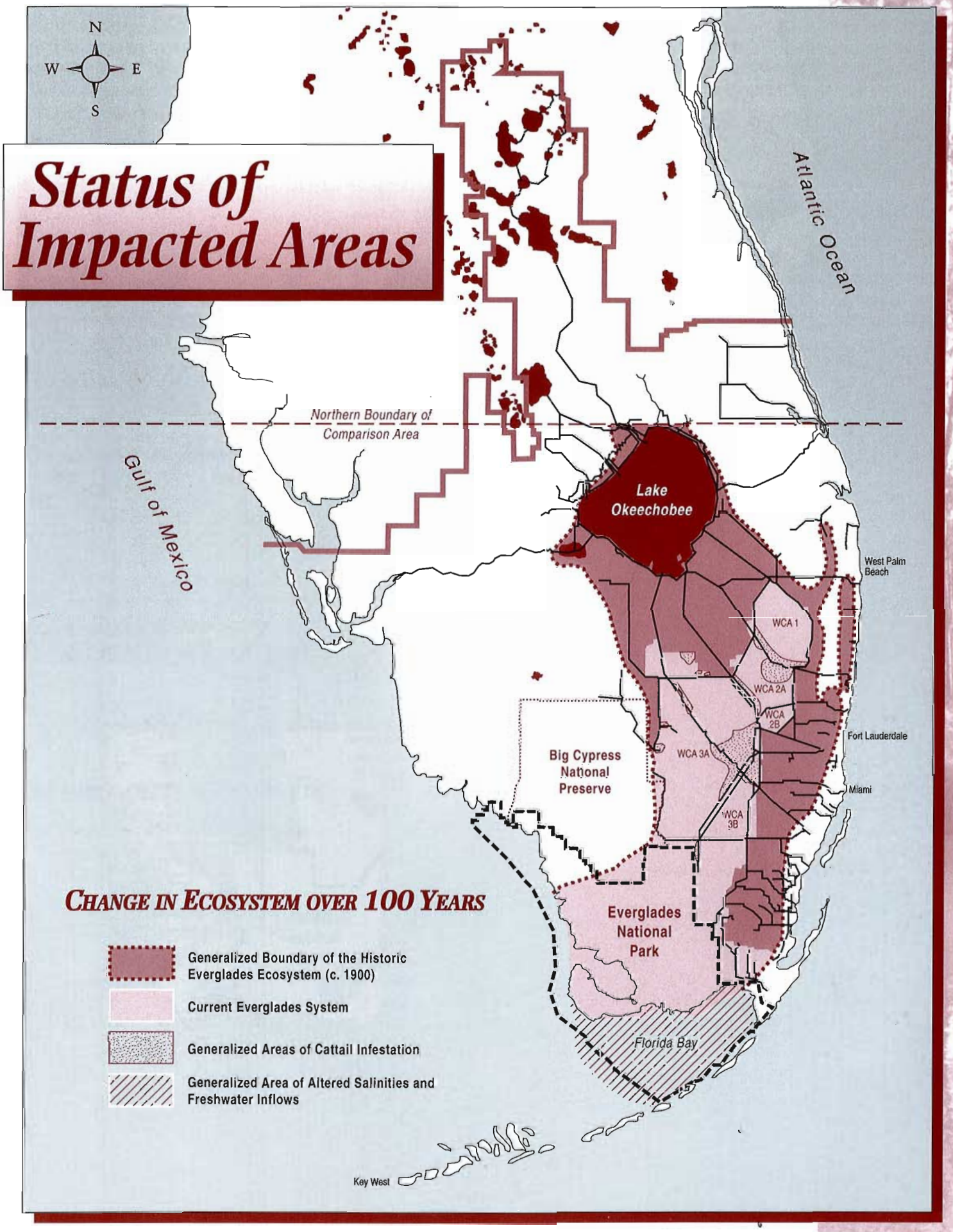
Concentrations of chlorophyll "a" are measured in Florida Bay and along the western coast of the Park. This figure for April 1997 shows a small area of high elevation in the western Park.

from 0.1 to 3.0 parts per billion. By the end of the winter season, chlorophyll "a" levels in the bay ranged from 0.1 to 2.5 parts per billion.

From April to June 1997, chlorophyll "a" concentrations throughout the bay were predominantly less than 1.0 part per billion. The maximum concentration of chlorophyll "a" observed was approximately 8.0 parts per billion within Murray Key during the April 1997 monitoring event. However, stations located near Murray Key exhibited chlorophyll "a" concentrations less than 2.5 parts per billion. In May, chlorophyll "a" ranged from 0.2 to 2.3 parts per billion with the highest concentration recorded in Garfield Bight. By June, chlorophyll "a" concentrations had increased slightly compared with those measured in May. In general, higher chlorophyll "a" levels were recorded for stations located in the western portion of the bay throughout this quarter. In addition, the eastern portion of Florida Bay consistently had chlorophyll "a" concentrations less than 1.0 part per billion.

Duck Key exhibited similar chlorophyll "a" concentrations from March to June, 1997. A decrease in chlorophyll "a" levels was observed at the Highway Creek monitoring site during the same time period. Lake Madeira Bay had relatively constant chlorophyll "a" concentrations from March through May. However, chlorophyll "a" levels were observed to increase slightly in June at this site. In contrast, chlorophyll "a" concentrations oscillated between approximately 0.4 and 0.7 parts per billion from March through June.

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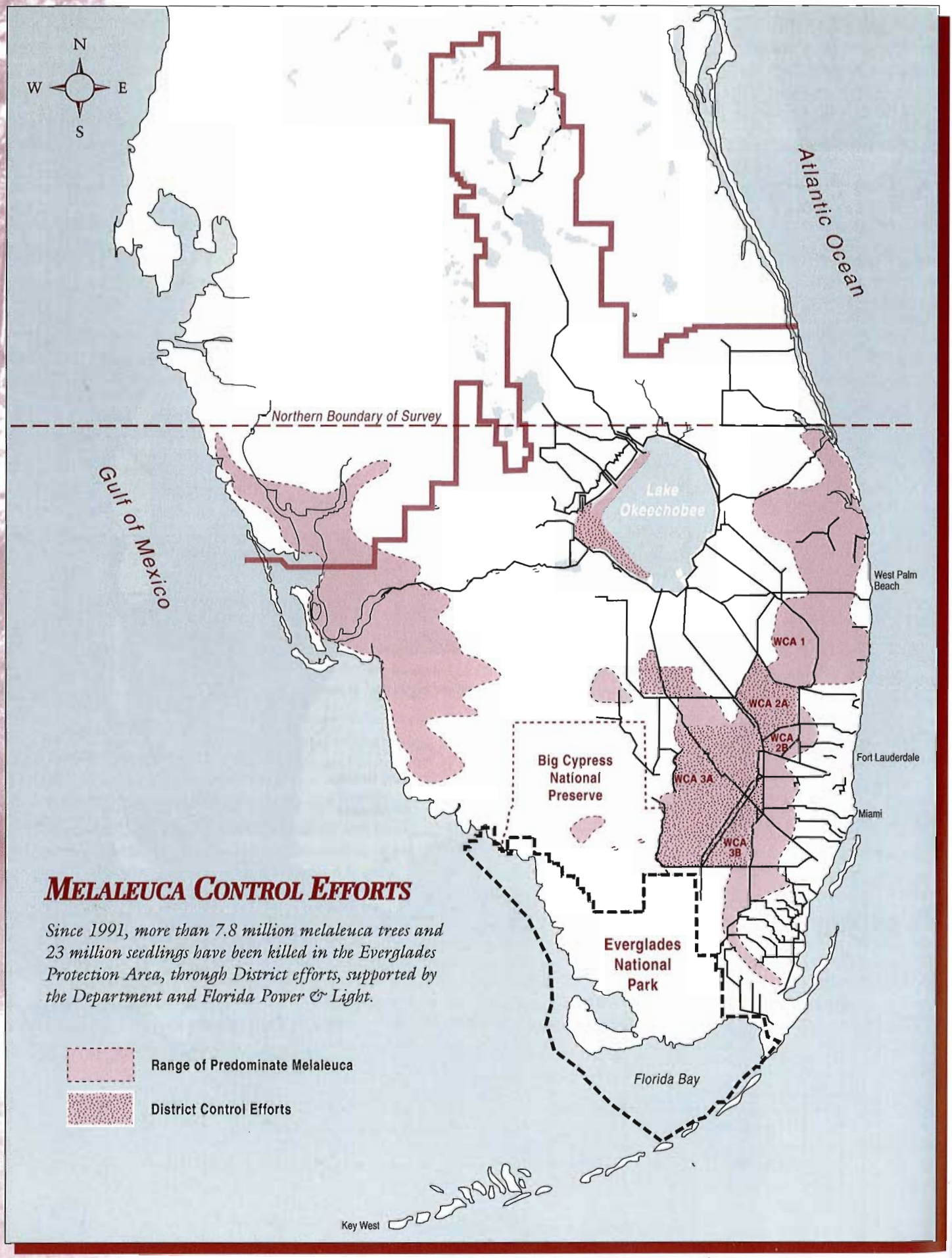
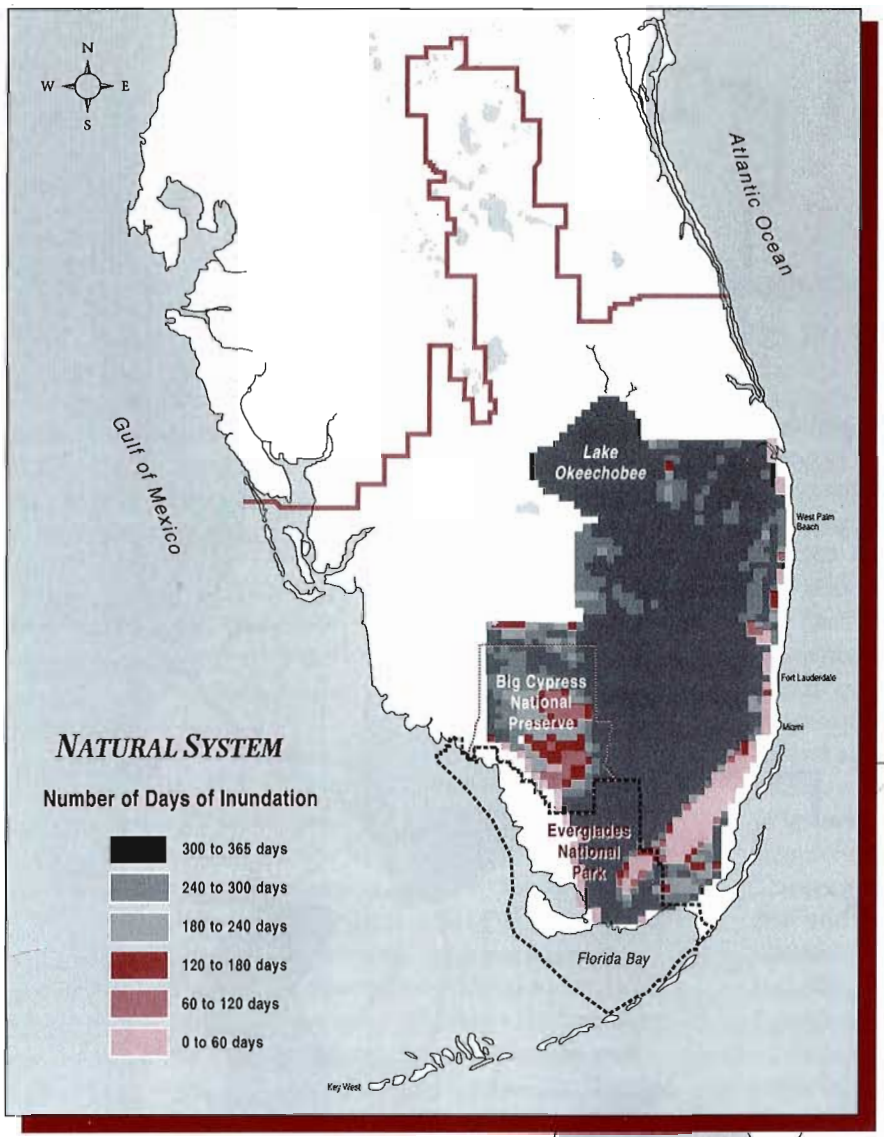
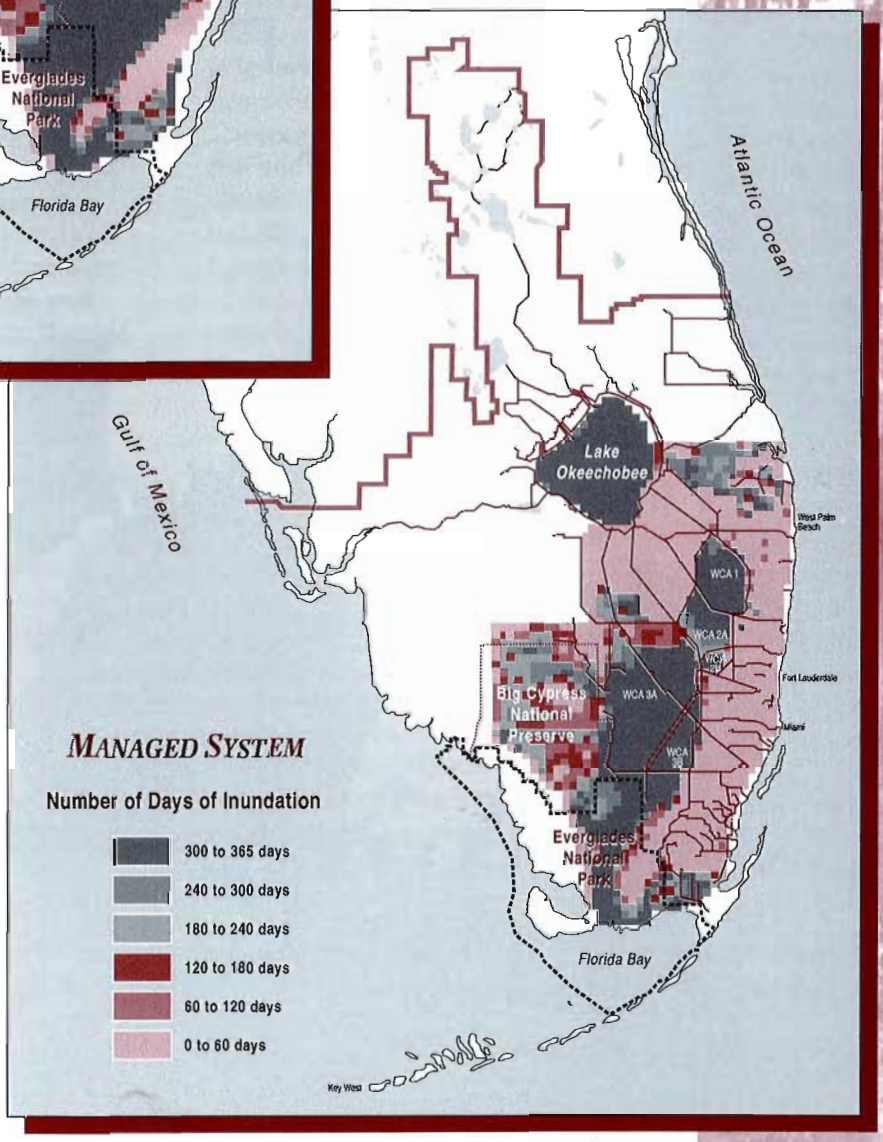
Status of Impacted Areas
Atlantic Ocean
Northern Boundary of Comparison Area
Gulf of Mexico
Lake Okeechobee
West Palm Beach
WCA 1
WCA 2A
WCA 2B
Fort Lauderdale
Big Cypress National Preserve
WCA 3A
Miami
WCA 3B
Everglades National Park
Florida Bay
Key West
CHANGE IN ECOSYSTEM OVER 100 YEARS
Generalized Boundary of the Historic Everglades Ecosystem (c. 1900)
Current Everglades System
Generalized Areas of Cattail Infestation
Generalized Area of Altered Salinities and Freshwater Inflows



MELALEUCA CONTROL EFFORTS

Since 1991, more than 7.8 million melaleuca trees and 23 million seedlings have been killed in the Everglades Protection Area, through District efforts, supported by the Department and Florida Power & Light.

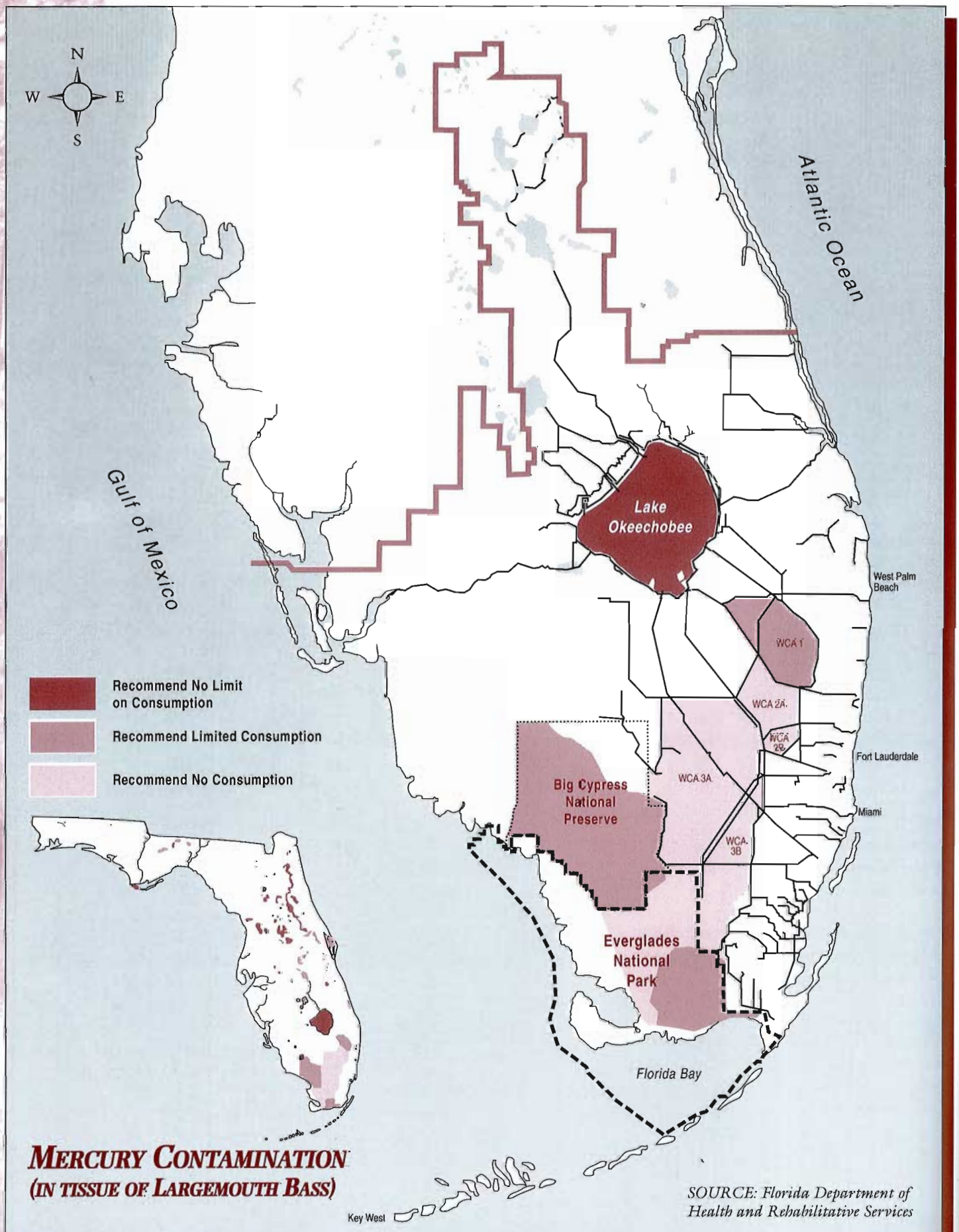




HYDROLOGY COMPARISON

Shown above — a computer simulation of the "natural" system as it could have existed historically.

On the right — the managed system today. Both maps reflect water levels of 1986, an "average" rainfall year.



MERCURY CONTAMINATION (IN TISSUE OF LARGEMOUTH BASS)

SOURCE: Florida Department of Health and Rehabilitative Services

Appendix

Summary of Design Refinements to the 1994 Conceptual Design

Introduction

Engineering Design Process

The February 15, 1994 Conceptual Design document for the Everglades Protection Project (Burns & McDonnell) was cited in the Everglades Forever Act as the technical plan for the Everglades Construction Project. The subsequent phase of engineering reports, the general design memoranda, was completed in 1995 for STA-1 (1 East and 1 West), STA-2, STA-3/4, Upper L-8 Basin Improvements, S-5A Basin Diversion, and Pumping Stations G-310 (STA-1 West) and G-335 (STA-2). After addressing design issues raised by third parties, the general design memorandum for the western projects (STA-5, STA-6, Rotenberger Restoration and West Water Conservation Area-3A Hydropattern Restoration project) was completed in 1996. Following the general design memoranda, efforts immediately transitioned to the final design phase, where plans and specifications for construction of the STAs were developed. Detailed designs were completed during 1996 for STA-6 Section 1. The detailed designs of STA-1 Inflow and Distribution Works, STA-1 West, STA-2, STA-5 and the outflow pump stations for STA-1 West and STA-2 were completed in 1997.

Design refinements to the 1994 Conceptual Design were fully contemplated by the Everglades Forever Act:

Nothing in this section shall prohibit the district from refining or modifying the final design of the project based on the February 14, 1994, conceptual design document in accordance with standard engineering practices. (reference: Section 9(j)(3)).

Additional refinements to the 1994 Conceptual Design were made in accordance with the direction of the Everglades Forever Act, including design modifications to "minimize wetland impact, to the extent practicable" (Sec.9(e)(3)); to add "areas to be used by the public for recreational purposes" (Sec. 4(a)); to potentially modify STA-3/4 to remove the Toe of the Boot (Sec. 4(c)); and to potentially treat the "addition of C-139 Annex flow into the C-139 Basin" (Sec. 16(b)).

Refinements to the Conceptual Design have been made in accordance with the above directions through a very open and collaborative design review process that included input from several review groups. The STA Design Group contains representatives of state, federal and tribal agencies, environmental groups and agricultural interests, many of whom have been involved continuously in design issues since the 1991 Everglades Protection Act. This review group has met dozens of times since the Everglades Forever Act was passed and has contributed information and critical review on every STA-design. In early 1997, the District convened two additional review groups that examined specific design issues and recommended several design refinements. The Everglades Construction Project Partnership included technical representatives of state and federal agencies, the tribes, environmental and agricultural interests, and focused on specific engineering issues such as levee design. The Program Oversight Team contained representatives from the Florida Department of Transportation, the DEP, the Corps of Engineers, District staff and its consultants. The Program Oversight Team focused primarily on construction management issues, including validating the STA-designs as directed by the Everglades Forever Act, and construction techniques.

Consensus was not always reached on all design refinements, but through these external review forums, the District heard a balance of diverse, and sometimes conflicting, perspectives on each issue. The final designs could not satisfy all the different perspectives, but the District was able to integrate the best available information into the final design documents.

In addition to the design reviews discussed above, contract peer-reviews were conducted by qualified engineering consulting firms for STA-1 West, STA-2, STA-5, STA-6 Section 1 and the major outflow pump stations. Throughout the various design phases, a continual vigorous review was provided by staff from multiple District departments, particularly Ecosystem Restoration, Operations and Maintenance, and Construction and Land Management.

Many design refinements have been discussed at various District Governing Board workshops, beginning as early as May 1994. At workshops in February and April 1997, the fiscal impacts of many significant design refinements were presented to the Governing Board and the public. In May 1997, an interim report detailing the recommendations for each of the STAs from the Program Oversight Team was distributed to the Governing Board and members of the public, followed in August 1997 with the presentation of the final report. These workshops have provided many opportunities for open discussions and guidance. In

addition, the Corps of Engineers construction permit was developed through a very public process and resulted in several refinements to the scope and time frame of the Everglades Construction Project.

The cumulative result of these diverse reviews is a cost effective Everglades Construction Project which achieves the original restoration objectives of the Everglades Forever Act. There may be further refinements during construction activities as a result of on-going value engineering, and these will be brought to the Governing Board's attention during future updates.

Summary of Major Design Refinements

Several modifications of the STAs conceptual design are worthy of note and are summarized below. Additional details can be found in the respective final design memoranda for each Everglades Construction Project component. Changes to the Everglades Construction Project, other than those for standard engineering practices, are subject to DEP review through the STA permitting process.

STA-1 East Design Refinements

The general design of STA-1, including STA-1 East, was completed in 1995, however, the final design is currently in progress by the Jacksonville District Corps of Engineers. Refinements during the final design will be communicated and coordinated with the interested parties through the STA Design Group.

STA-1 West Design Refinements

STA-1 Inflow & Distribution (construction currently under way).

1. The Conceptual Design for the Everglades Construction Project anticipated that fill for the separation levee would come from two parallel borrow canals. During subsequent design, an initial layer of geofabric and geogrid with non-organic sandy fill material obtained offsite was specified for the construction of this levee. Presently, the District and the contractor for this project are conducting value engineering on this component to verify the most cost-effective technique.
2. Water control structure G-301 was changed from a two-bay to a three-bay gated spillway to match the capacity of the L-7 Borrow Canal.

STA-1 West Works (construction currently under way)

3. The Conceptual Design contemplated that the 4,800-cubic feet per second (cfs) discharge from pumping station S-5A would be accommodated by sending 3,600 cfs to STA-1 West and 1,200 cfs to STA-1 East. During the general design, the inflow control structure for STA-1 West was reduced to 3,250 cfs and the inflow structure to STA-1 East was increased to 1,550 cfs. The Conceptual Design further assumed that the combined outflow pumping capacity for STA-1 West would be 3,650 cfs, roughly equal to the 3,600 cfs inflow capacity. This capacity would be achieved by the existing 450-cfs pump at the ENR Project and a new pump station with 3,200 cfs capacity. When the inflow structure was reduced to 3,250 cfs, the required capacity for the new outflow pump (G-310) was also reduced, to 2,800 cfs. In addition, the pump station was relocated 1,700 feet to the northeast to avoid interference with an existing overhead electrical transmission line.
4. Structure G-327A was added after the Conceptual Design to allow the recirculation of treated discharge from Cell 5 back into the STA-1 West inflow facilities. This structure will be located at the northwest corner of Cell 5 connecting the discharge canal with the seepage collection canal. In addition, a fill pad was added to accommodate a temporary pump if needed to recirculate discharges.
5. In accordance with the direction of the Everglades Forever Act, public access facilities are proposed on the north side of STA-1 West. The public access facility, located along the northern boundary of STA-1 West, is not required for operation of the STA, but is included in the construction in accordance with the Act to promote acceptable public access for recreational uses. However, no mandated completion date is established for these facilities in the Act. Under STA-1 West construction activities, the public access site, which is approximately 2 acres in size, will be modified to include only that fill necessary for the eventual construction of the facility. The balance of construction of the public access facility will be delayed until a future date. The site is located 500 feet south of State Road 880. The facilities include a picnic pavilion, observation tower, boardwalk and landscaping.
6. Modifications to the existing interior levees, canals and water control structures within the ENR Project were necessitated to ensure the treatment area could accommodate the increased flows expected when STA-1 West becomes operational. For example, the north, south and west interior levees are to be degraded to elevation 11 feet NGVD and Distribution Canal D-1 is to be extended along the north end of Cell 2. (Additional details are contained in the final design memoranda.)
7. Modifications were made to the levee profiles during a value engineering review of STA-1 West. Levee profile grades are controlled by the high water stages

produced by the Standard Project Storm and Probable Maximum Storm. The resulting stages, plus an allowance for wind set-up and wave runup allowed for a reduction in levee top elevations as contemplated by the Conceptual Design. In addition, the slopes of the structural fill core of the levees were increased. These modifications will not impact the objectives of the conceptual design.

8. The STA-1 West Cell 5 outflow structures, the G-306 series, will be motorized for improved operations. In addition, the access walkways to G-304 (Cell 5 inflow control structures) and G-306 were modified for operational efficiency. Any modifications to the walkways are structural in nature and will not impact the treatment capacity of STA-1 West.

STA-2 Design Refinements (construction currently under way)

S-6 Diversion and Supply Canal

1. The proposed control structure for water supply to Water Conservation Area 1 was relocated from the north end of the Water Conservation Area-2A Hydropattern Restoration Works to immediately downstream of the S-6 Pump Station. The reason for the modification was that there would be little, if any, treated water available during the periods that would require bypass of water to the Lower East Coast. Relocation of this structure also enabled deletion of the associated water supply canal in its entirety.

2. A bypass structure, G-339, in the east supply canal levee was added during the final design. This structure will accommodate emergency bypass during and following extreme storm events.

3. The Conceptual Design contemplated a combined secondary drainage pump and seepage pump station to be located in the supply canal. This was modified to a secondary pump station to be designed and constructed by Flo-Sun, Inc., and a separate seepage pump station. This modification was made because Flo-Sun, Inc., the owner and operator of the secondary pump station, will be relocating the station. The separate seepage pump station will be located at the transition between the supply canal and the inflow canal.

STA-2 Inflow, Interior and Discharge Works

4. The 26 manually operated inflow control structures were converted to 16 remotely controlled structures to reduce operation and maintenance expenditures. Different types of remote operation are currently being evaluated to determine the most appropriate for the STA. The increased operational control of the structures will allow additional flexibility to achieve balanced flows into the treatment cells.

5. The proposed FPL access bridge was removed. Alternate access routes were available which eliminated the need for the new bridge.

6. The layout of STA-2 was modified to create a shorter and wider flow path for greater treatment efficiency. As a result, the southern boundary was moved north to the south boundary of the Brown's Farm area, and an equivalent acreage added on the western boundary of the project. The interior levee separating treatment cells 2 and 3 was relocated slightly to accommodate the change.

7. The 26 discharge control structures were replaced with 8 structures for Treatment Cell 1 and with two higher capacity structures, G-332 and G-334, for Treatment Cells 2 and 3. These changes were made to ensure more uniform sheetflow through the treatment cells.

8. The capacity of the outflow pump station (G-310) was reduced from 3,370 cfs to 3,040 cfs based on detailed hydraulic and hydrologic analyses of extreme storm events and 30-year period of record flows. This resulted in a projected cost saving of almost $3 million without compromising the design requirements.

S-5A Basin Runoff Diversion Works

Refinements to the Conceptual Design made during the final design will be communicated and coordinated with the interested parties through the STA Design Group.

STA-3/4 Design Refinements

The general design of STA-3/4 was completed in 1995, however, the final design will not begin until 1999. Refinements during the final design will be communicated and coordinated with the interested parties through the STA Design Group.

STA-5 Design Refinements (construction currently under way)

1. The Conceptual Design contemplated an inflow pump station for STA-5. Based on hydraulic analyses conducted during the general design phase, it was concluded that it would be possible to introduce flows into STA-5 by gravity structures from the L-3 borrow canal without increasing historic stage-discharge relationships in the L-3 and tributary canals. In the absence of the inflow pump station, it will be necessary to construct a diversion structure (G-406) in the L-3 borrow canal to enable STA-5 to capture 100% of the C-139 basin runoff by gravity.

2. The final design includes four (4) gravity control structures (G-342 A-D) to convey inflows into STA-5 treatment cells, a reduction from 16 in the Conceptual Design.

3. The Conceptual Design called for a total effective treatment area of 4,530 acres achieved by the construction of three (3) parallel east-to-west treatment cells. The Conceptual Design contemplated the incorporation of Sections 28 and 33, Township 46 South, Range 34 East into the treatment cells. Subsequent surveys revealed that the land surface elevations in these sections rise markedly above those in the balance of the STA-5 effective treatment area. It was determined that incorporating sections 28 and 33 into STA-5 effective treatment area would require the construction of an inflow pump station, which would otherwise not be necessary. The final design requires the construction of two (2) parallel treatment cells, totaling 4,118 acres of effective area. To promote longer treatment times on the sloping ground in the west portion of STA-5, internal north-to-south levees with water control structures separate each treatment cell into 2 smaller treatment units. The inflow and distribution canals were reconfigured to carry inflows from the L-3 borrow canal through the western portions of sections 28 and 33, into the treatment cells.

4. The final design recognizes that the final configuration of STA-5 is likely sufficient for treatment of 100% of the agricultural runoff from the C-139 basin. However, it may be necessary to construct an additional 1,410-acre treatment area, referred to as STA-6 Section 2 if STA-5 cannot treat the entire C-139 basin runoff sufficiently. Should Section 2 be necessary, STA-6 Section 1 would also treat the runoff from the C-139 Annex basin located west of the L-3 borrow canal south of the Deer Fence canal. This runoff currently is discharged to the L-28 borrow canal.

5. The number of outflow structures was reduced from 16 in the Conceptual Design to 4 in the final design.

6. The Conceptual Design contemplated that the entire discharge from STA-5 would be routed into the Rotenberger Wildlife Management Area (WMA) from structures to be located along the common boundary of STA-5 and Rotenberger. The basic premise was that all STA-5 discharges would be carried through the Rotenberger WMA via sheetflow from north to south and eventually would be released to the northerly perimeter of Water Conservation Area 3A west of the Miami Canal. Furthermore the Conceptual Design assumed a maximum stage of 1.5 feet in the wet season and 2 feet in the dry season. The Conceptual Design did not include any hydrologic modeling to verify these critical assumptions, and during the general design, modeling indicated that maximum depths would significantly exceed these assumed depths. To ensure the habitat within Rotenberger was not adversely impacted by these higher depths of water, the design of STA-5 was revised by adding discharge and outlet canals to direct the treated water around the north end of Rotenberger to the Miami Canal. Outflows from STA-5 will be routed to the Miami Canal via the discharge canal located along the northern and northeastern boundaries of Rotenberger. The discharge canal will terminate at the Miami Canal with an open channel connection. Discharge to the Rotenberger WMA from the STA-5 discharge canal is currently contemplated to occur through a 240-cfs pump station located near the southeast corner of STA-5.

7. Concurrent with the start-up of STA-3/4, an outlet canal will extend from the discharge canal approximately 3 miles downstream of the northeastern corner of Rotenberger and terminate with an open channel connection to the Miami Canal. This feature is necessary in order to discharge STA-5 water into the Miami Canal independently from STA-3/4 inflows.

8. Additional water control structures were added to re-direct the treated water back to the vicinity of where it is discharged untreated today. This water is vital as water supply for the Seminole Indian Reservation, the Miccosukee Indian Reservation, local landowners, and for the hydroperiod of northwest Water Conservation Area 3A. These structures include:

   a. modification of an existing gated structure (G-357) and a new pumping station (G-404) at the confluence of the Miami Canal and the L-4 borrow canal,

   b. a new pumping station (G-409) will be located just upstream of G-88 at the western terminus of the L-4 borrow canal,

   c. a breach in the L-4 southern levee directly north of the point where the L-3 canal extension turns south at the northwest corner of Water Conservation Area 3A, and associated connection to the L-3 extension.

9. Necessary seepage, recirculation and water supply pump stations were added to the project. In addition, a bridge over the discharge canal and an agricultural roadway were required to preserve existing access rights.

Many changes to STA-5 and the Rotenberger Hydropattern Restoration components have been necessitated by U.S. Army Corp of Engineers' construction permit, special condition number 2. It is important to note that these changes do not affect the overall Everglades Construction Project restoration objective for the STAs to achieve the interim goal of a long-term, annual average total phosphorus discharge concentration of 50 parts per billion.

Rotenberger Wildlife Management Area Restoration

1. The 1994 Conceptual Design contemplated numerous inflow culverts to convey the entire treated discharge

from STA-5 into the Rotenberger WMA. To ensure the habitat within Rotenberger was not adversely impacted by the higher water depths resulting from the discharge of the entire STA-5 of water, the design was revised by adding discharge and outlet canals to direct the treated water around the north end of Rotenberger to the Miami Canal. Discharge to the Rotenberger WMA from the STA-5 discharge canal is currently contemplated to occur through a new 240-cfs pump station to be located near the southeast corner of STA-5.

2. Topographic data obtained after the Conceptual Design indicated surface flow is likely to occur from west-to-east, as opposed to north-to-south as contemplated in the Conceptual Design. As a result, discharge culverts will be placed in the east levee (L-23) of Rotenberger to route water into the Miami Canal.

3. The Conceptual Design included a perimeter levee and seepage collection canal on the west side of the Rotenberger WMA. In lieu of these components, the general design calls for the use of an existing U.S. Sugar Corporation levee between the northeast corner of STA-6 and the southeast corner of STA-5.

4. The northern perimeter levee associated with the STA-5 discharge canal will serve to replace the Rotenberger northern perimeter levee called for in the Conceptual Design.

5. As a result of lower water levels than assumed in the Conceptual Design, it will not be necessary to make the extensive modifications to the FPL access road located in the southern portion of Rotenberger.

STA-6 Design Refinements (construction completed October 31, 1997)

1. Only minor modifications to project canals, levees and structures occurred to the design of STA-6 as contemplated in the Conceptual Design. However, it may be necessary to construct an additional 1,410-acre treatment area, referred to as STA-6 Section 2 if STA-5 cannot treat the entire C-139 basin runoff sufficiently. Should Section 2 be necessary, STA-6 Section 1 would also treat the runoff from the C-139 Annex basin located west of the L-3 borrow canal south of the Deer Fence canal. This runoff currently is discharged to the L-28 borrow canal.

2. A small bridge was required as part of STA-6 Section 1 to preserve existing access rights across the L-4 borrow canal.

3. Construction for STA-6 Section 1 was substantially completed on October 31, 1997.

4. Should STA-6 Section 2 be necessary, final designs will be prepared and reviewed through the STA Design Group and other peer-review processes.

Improvements to Chapter 298 Districts and Lease 3420

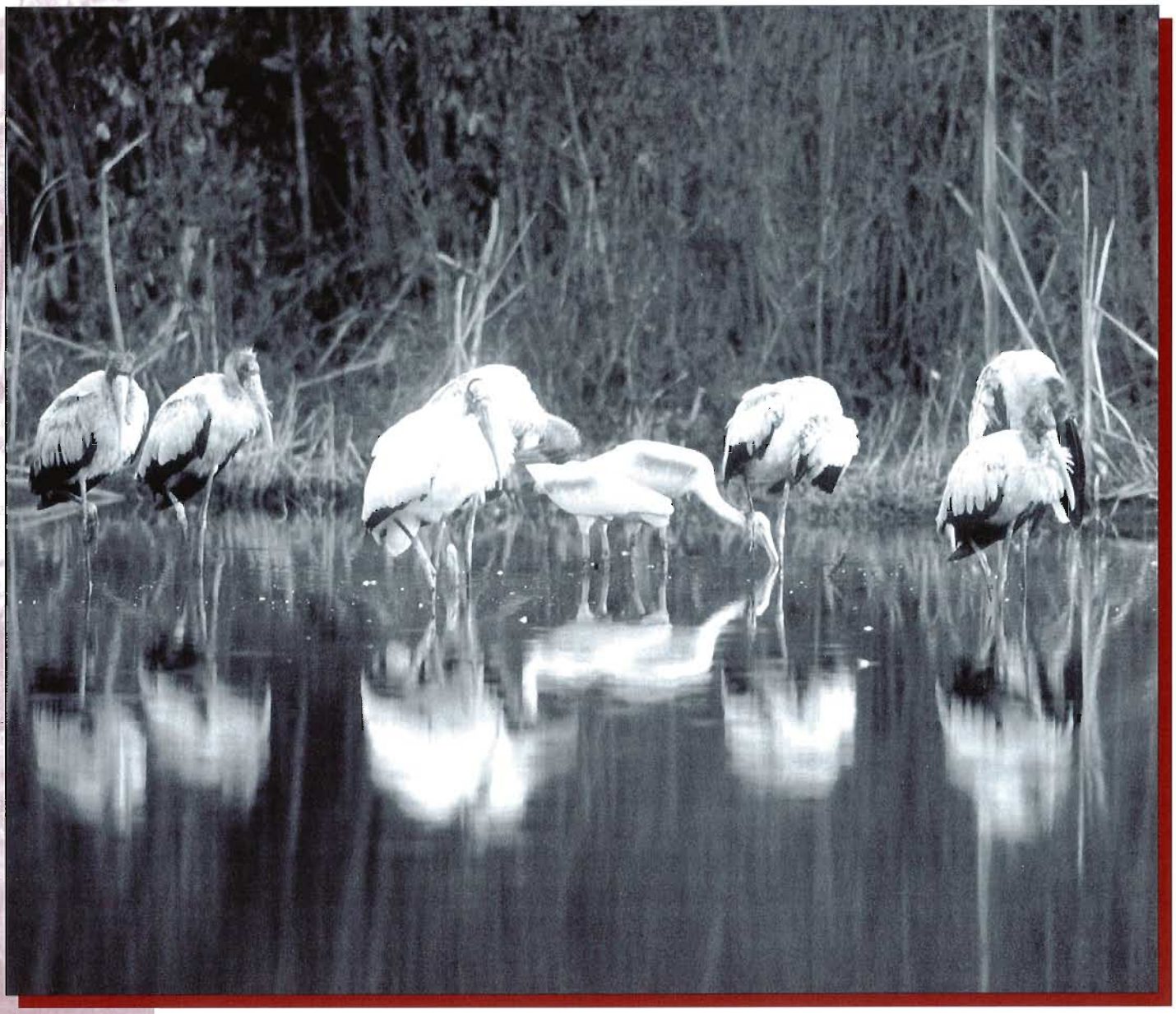
Others are currently designing these projects. It is intended that refinements to the Conceptual Design made during the final design will be communicated and coordinated with the interested parties through the STA Design Group.

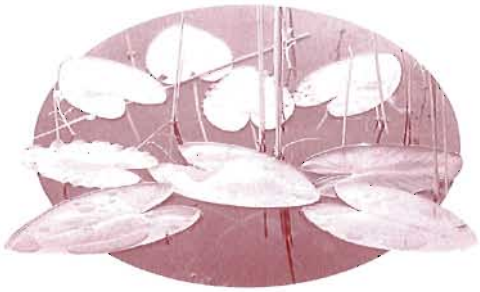
Northern L-8 Basin Improvements

The general design of the Northern L-8 Basin Improvements was completed in 1995, however, the final design has not yet begun. Refinements during the final design will be communicated and coordinated with the interested parties through the STA Design Group.

Other Refinements

Other refinements to the Everglades Construction Project that occur after the issuance of the state permit for the Everglades Construction Project shall be submitted to DEP for determination as to whether permit modification is needed.





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