

***A RATIONALE FOR SUPPORTING
THE COMPREHENSIVE
EVERGLADES RESTORATION
PLAN
(C&SF RESTUDY)***

**Broward County Staff Report
to the
Water Advisory Board
through the
Technical Advisory Committee**

January 2000

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EXECUTIVE SUMMARY

The Everglades ecosystem is unique in all the world. This fact was recognized decades ago when the federal government created Everglades National Park. A fifty year old federal public works project intended to aid in water management for the benefit of man and the environment has been unable to meet the changing needs of the South Florida urban and natural ecosystem. Today, governments at the federal, state and local level need to work together to restore this national treasure.

South Florida is facing some tough decisions regarding this restoration effort. A growing population has dramatically impacted a once lush sub tropical wetland ecosystem and its coastal resources and has strained the system's ability to provide adequate flood protection and water supplies. An improved water management system may hold the key to preventing further degradation of the environment and the South Florida community. The \$7.8 billion Comprehensive Everglades Restoration Plan (CERP), describes the framework for Everglades restoration and provides adequate water supplies for the future population of South Florida and Broward County. We are at a critical juncture in the restoration process. The Feasibility Study has been completed and we must now establish support and create a funding mechanism for project implementation. We must take action now. All levels of government in Broward County will be called upon to make difficult economic and policy choices related to the implementation of ecosystem restoration. The intent of this document is to provide a rationale for supporting the principles of the CERP and to aid elected officials in Broward County in making decisions concerning funding and implementation of the project.

The Central and Southern Florida (C&SF) Project, South Florida's system of primary canals, was authorized by Congress in 1948. The project's purpose was to provide flood control and regional water supply for agriculture, urban, and natural areas and to prevent salt water intrusion. For half a century, the C&SF Project has performed its primary function of flood control well but the altered hydrology has had unintended, adverse effects on the natural and urban areas of South Florida. After thorough review of the water resources issues by a myriad of agencies, a conceptual plan for South Florida ecosystem restoration, the CERP, was developed to enhance the natural environment while recognizing the inextricable link to the water needs of the urban area. The CERP was sent to Congress for adoption in July, 1999.

The CERP is the blue print for refitting the region's outdated water management infrastructure. By addressing the needs of the natural system with those of the urban areas and agriculture, the plan renders considerable benefits throughout the system and is a first step towards a sustainable South Florida. Comprised of sixty principal components, the CERP is intended to capture, store, or convey water now lost to tide making it available for all users and yielding benefits for both the regional system and local partners.

While the overarching purpose of the CERP is to restore the world's only Everglades ecosystem, Broward County is the recipient of significant local water resource benefits. In addition to their regional ecosystem improvements, six of the components described in the CERP are located in or near Broward County and will have significant impact on the County's water budget.

- ! The ***Secondary Canal System Enhancements*** will increase recharge to public water supply wellfields in central and southern portions of the county, improve Broward's ability to maintain groundwater levels in urban wetlands, maintain existing levels of flood protection, stabilize saltwater intrusion, and reduce stormwater discharges to tide.
- ! The ***Water Preserve Areas*** will capture water that seeps out of the Water Conservation Areas, increase groundwater supplies by recharging the aquifer, and improve surface water quality, provide a buffer between the Everglades and the urbanized areas, and maintain existing levels of flood protection for the urbanized area. The Hillsboro (Site 1) Impoundment, C-9 Improvements, C-11 Improvements, and North Lake Belt Storage Area are within the footprint of the Water Preserve Area.
- ! The ***Hillsboro (Site 1) Impoundment*** and associated ***Aquifer Storage and Recovery (ASR)*** wells, located in south Palm Beach County, will help maintain water levels in the Hillsboro Canal Basin and increase water availability for north Broward County during the dry season.
- ! The ***C-11 Improvements*** include water control structures to aid in redistribution of flows and a stormwater treatment area/impoundment east of the levees. The primary purpose is to capture stormwater runoff from the C-11 Basin. The improvements will also control water seepage from Water Conservation Areas 3A and 3B by improving groundwater elevations. Wetland habitat may be incorporated into the impoundment design.
- ! The ***C-9 Improvements*** will provide water quality treatment for stormwater runoff, enhance groundwater recharge in the C-9 basin and control seepage from Water Conservation Area 3A. Water from the C-9 impoundment will be directed toward the North Lake Belt Storage Area for storage.

- ! The ***North Lake Belt Storage*** component includes the construction of canals, pumps, water control structures and an in-ground storage reservoir in northwestern Miami-Dade County. This project will capture and store stormwater runoff and maintain water levels in the C-9 Canal in Broward County and other canals in Miami-Dade County during the dry season.

These six components enhance the regional water budget in a way which will help Broward County meet its current and future daily potable water needs which are expected to increase by 150 million gallons over the next twenty years. If the CERP is not funded, the citizens of Broward County will bear the whole cost of capital improvements related to increased water demand. In addition, Broward County will likely lose coastal wellfields to salt water intrusion and urban wetlands to lowered water tables. These losses will result in significant negative impacts to quality of life, regional natural areas, and tourism. By funding the CERP, we increase water supplies, sustain our quality of life, and maintain the viability of significant natural areas east and west of the levees. While full cost accounting of quality of life and ecosystem restoration is difficult, the CERP appears to be a good investment for Broward County at its current cost estimates.

In addition to an implementation cost of approximately \$7.8 billion, another \$182 million per year for operation, maintenance and monitoring is required. Construction of the projects will be spread out over 20 years, resulting in total annual costs of \$400 million. Because the CERP will be funded pursuant to a 50/50 cost share with the federal government, adequate funding at the state level is a major stepping stone to begin the restoration efforts. While local governments will be called upon to support a portion of the CERP costs, substantial funding must come from the state. To achieve a fair and equitable distribution of the cost, Broward County governments should be unified in their request that the State provide a dedicated source of funding for their share.

South Florida must decide whether or not to make the CERP a reality. Since the state of Florida's economy and our local quality of life and water supply are inextricably linked to the C&SF Project and the Everglades ecosystem, the CERP appears to be a good investment toward a sustainable future for Broward County.

I. INTRODUCTION

Water supply and flood control were the key challenges in the early development of South Florida. In the 1940's, cyclical flooding, droughts, and wildfires threatened early settlers. The Central and Southern Florida (C&SF) Project, authorized by Congress in 1948, was designed to overcome these challenges by providing flood control and adequate water supplies for agriculture, urban, and natural areas. Today, the economy and quality of life in South Florida is inextricably linked to the C&SF Project and the Everglades ecosystem.

For close to fifty years, the C&SF Project has performed its primary function of flood control well but has had unintended adverse effects. The Project's network of regional canals, levees, storage areas and water control structures has fundamentally altered the historic water flows and levels of the system, changing the hydrology, water quality, and ecological patterns of the region. The project has substantially and irreversibly reduced the total water storage, flow capacities and spatial extent of the Everglades and other natural areas. These systems will not recover under current conditions and will not be sustained into the future unless corrective actions are taken.

II. OVERVIEW OF THE RESTUDY AND THE COMPREHENSIVE EVERGLADES RESTORATION PLAN (CERP)

In 1992, Congress authorized the review and reevaluation of the C&SF Project. Objectives of the "Restudy" included restoring the Everglades ecosystem, continuing to provide safe and reliable water supplies, and enhancing flood protection. The Restudy process was jointly funded by the U.S. Army Corps of Engineers and the South Florida Water Management District, and was accomplished by an interdisciplinary, multi-agency team including Broward County staff.. After formulation and evaluation of ten alternative plans, the team selected the CERP as their recommended plan, with an estimated cost of \$7.8 billion and an annual operation and maintenance cost of \$182 million. The primary focus of the CERP is to "get the water right" by providing the right quantity, quality, timing, and distribution of water throughout the system.. Implementation of the CERP's principal features (see Table 1) will capture and store much of the water that is now lost to tide and make it available for the ecosystem, urban users, and agriculture, yielding benefits for both the regional system and local partners.

III. CERP PROJECTS AFFECTING BROWARD COUNTY

Broward County has actively participated in the Restudy process since its inception and has provided valuable input to ensure that the urban users and natural systems of Broward County receive equitable and adequate water deliveries.

Table 1. PRINCIPAL FEATURES OF THE CERP

<i>Surface Water Impoundments/ Water Preserve Areas</i>	Water impoundments encompassing approximately 185,000 acres with a storage capacity of 1.5 million acre-feet of water. These areas will have the ability to treat urban runoff, reduce seepage from the west, capture and redistribute water and improve existing wetland areas.
<i>Aquifer Storage and Recovery</i>	Wells and associated infrastructure will be built to provide long term storage in the upper Floridan aquifer. As much as 1.6 billion gallons per day may be pumped down the wells into underground storage zones. The injected fresh water, which does not mix with the brackish aquifer water, is stored in a “bubble” and can be pumped out during dry periods. Since water does not evaporate when stored underground, and less land is required for storage, aquifer storage and recovery has some advantages over surface storage.
<i>Stormwater Treatment Areas</i>	Approximately 35,600 acres of manmade wetlands, known as stormwater treatment areas (STA’s) will be built to treat urban and agricultural runoff water before it is discharged to the natural areas throughout the system. These STA’s are in addition to the 44,000 acres of stormwater treatment areas already being constructed pursuant to the Everglades Forever Act to treat water from the Everglades Agricultural Area.
<i>Remove Barriers to Sheetflow</i>	More than 240 miles of canals and internal levees within the Everglades will be removed to reestablish the natural sheetflow of water through the Everglades. The Tamiami Trail will be rebuilt with bridges and culverts to allow water to flow more naturally into the Everglades National Park.
<i>Operational Changes</i>	Changes in water delivery schedules will alleviate extreme fluctuations in Lake Okeechobee. Timing of water flows will be enhanced throughout the system.
<i>Reuse Wastewater</i>	Two advanced wastewater treatment plants will be built in Miami-Dade County to make wastewater clean enough to discharge into wetlands along Biscayne Bay and for recharging the Biscayne aquifer.
<i>Pilot Projects</i>	A number of technologies proposed in the Plan have uncertainties associated with them - either in the technology itself, its application, or in the scale of implementation. The pilot projects, which include wastewater reuse, seepage management, lake belt technology, and three aquifer storage and recovery projects, are recommended to address uncertainties prior to full implementation of these components.

The following specific components of the CERP will directly affect the quantity and quality of water available to Broward County residents in future years. Cost estimates listed encompass the entire project including land acquisition, design, construction and operation. For some components, significant dollars have already been spent for land acquisition (see Section VI for more cost information).

Aquifer Storage and Recovery(ASR)/Hillsboro (Site 1) Impoundment
(\$141 Million)

This project consists of a 2,460 acre impoundment located west of Boca Raton and State Road 441, just north of the Palm Beach/Broward County line. The impoundment will be surrounded by a fifteen(15) -foot high levee and will contain water depths of up to six (6) feet above ground. The impoundment will be filled during the wet season with water from the Hillsboro Canal which currently is lost to the ocean. The second phase of the project is the construction of thirty (30) ASR wells having a total capacity of 150 million gallons per day. The concept of ASR is that excess fresh water pumped into the Floridan aquifer will displace brackish groundwater, creating a fresh water bubble which can be withdrawn during the dry season when it is needed. Water from the impoundment will be injected into the ASR wells when water levels in the impoundment exceed 12.0 feet National Geodetic Vertical Datum (NGVD). Water will be recovered from the wells when levels in the Canal are less than 7.0 feet NGVD. This system, located in southern Palm Beach County, will help maintain water levels in the Hillsboro Canal Basin and increase water availability for north Broward County during the dry season.

Secondary Canal System (\$13 Million)

This plan component includes the installation of water control structures, pumps, and canal improvements in the C-9, C-12, and C-13 basins and in the east basin of the North New River Canal in central and southern Broward County. These improvements will enhance the interconnectedness of Broward's waterways and increase the flow of water from the primary canals to the coastal areas. The purpose of the project is to recharge public water supply wellfields along the coast in central and southern Broward County, stabilize the saltwater interface, and reduce stormwater discharges to tide. In addition, these enhancements will improve Broward's ability to maintain groundwater levels in urban wetlands and maintain existing levels of flood protection.

Land Acquisition for Water Preserve Areas

The Water Preserve Areas (WPA) are a series of wetlands, reservoirs, and groundwater recharge areas located along the western urban limits of Palm Beach, Broward and Miami-Dade Counties. These reservoirs will (1) provide a buffer between the Everglades and the urbanized areas; (2) capture water which now seeps out of the Water Conservation Areas; (3) maintain existing levels of flood protection for the urbanized area; (4) increase drinking water supplies by recharging the aquifer; and (5) improve surface water quality. The primary purpose of the Broward's WPA is to reduce water seepage coming from Water Conservation Areas 3A and 3B. The portion of the WPA located in Broward County will consist of approximately 15,000 acres located adjacent to Levees 37 and 33 in the Cities of Weston, Pembroke Pines and Miramar. Of the 15,000 acres, approximately 7,527 have been purchased at an estimated cost of \$90 million. In total, more than 75% of the WPA lands in Broward County have been acquired through easements, agreements, and fee simple purchase.

C-9 Improvements (\$89 Million)

This feature includes the construction of canals, levees, water control structures and a stormwater treatment area/impoundment in the C-9 Basin in southwest Broward County. The impoundment will encompass approximately 2,500 acres and hold a maximum water depth of 4 feet. The purpose of the C-9 improvements is to provide water quality treatment for stormwater runoff, enhance groundwater recharge in the C-9 basin, and control seepage from Water Conservation Area 3A.

C-11 Improvements (\$225 Million)

This element includes the construction of canals, levees, water control structures and a stormwater treatment area/impoundment in the western portion of urbanized Broward County, directly adjacent to and north of the C-11 Canal. The impoundment will encompass approximately 1,600 acres and hold a maximum water depth of 4 feet. The primary purpose of the C-11 improvements is to capture stormwater runoff from the C-11 drainage basin, which encompasses approximately 81 square miles in western Broward County including all or parts of Weston, Davie, Sunrise, Cooper City, and unincorporated Broward County. The improvements will also control water seepage from Water Conservation Areas 3A and 3B by improving groundwater elevations and may incorporate wetland habitat into the impoundment design.

North Lake Belt Storage Area (\$536 Million)

This component includes the construction of canals, pumps, water control structures and an in-ground storage reservoir in northwestern Miami-Dade County. The reservoir will have a storage capacity of over 29.3 billion gallons of water and will encompass approximately 4,500 acres. An underground seepage barrier around the reservoir's perimeter will enable drawdown during dry periods and prevent seepage losses. The purpose of this project is to capture and store stormwater runoff from western C-11 and C-9 Basins in Broward County and from the C-6 basin in Miami-Dade County. This will help maintain water levels in the C-9 Canal in Broward County and other canals in Miami-Dade County during the dry season.

IV. BENEFITS OF THE CERP

The CERP is a system-wide plan for ecosystem restoration, water supply, and flood damage reduction. Implementation of the Plan will benefit both the regional system and local partners.

Improved Water Supplies

Urban water supply demands in South Florida are expected to nearly double by 2050 as the region's population continues to increase. Implementation of the recommended Plan will expand the storage capability of the C&SF project by 1.7 billion gallons of water per day, twenty percent of which will be used to enhance urban and agricultural supplies and reduce shortages. The increased storage will improve recharge to the Biscayne Aquifer, Broward's primary source of drinking water. Recharging Broward's public water supply wellfields and stabilizing the saltwater interface will reduce the number and severity of forecasted local water restrictions.

Restoration of Natural Areas East and West of the Levees

The CERP will improve the habitat and functional quality of the Everglades by modifying water flows and levels so that they more closely match natural hydropatterns. Extreme water level fluctuations in Lake Okeechobee will be moderated, stormwater discharges to the estuaries will be reduced by storing runoff in reservoirs and impoundments, and water deliveries to the Everglades National Park, Florida Bay and Biscayne Bay will be modified to better sustain those systems. The plan will support the return of nesting wading birds, the recovery of several threatened and endangered species, and an increase in the number and distribution of plant and animal species. In addition to improving conditions in the Water Conservation Areas, the CERP will provide more water to urban Broward County, enabling recharge of the aquifer and increased groundwater levels. Higher levels and the improved connectivity of Broward's secondary canal system will aid in making water available to the thousands of acres of natural areas east of the levees which are currently impacted by abnormal "dry-out" conditions.

Flood Protection

For nearly fifty years, the C&SF Project has provided the region with flood protection. However, agriculture and urban development have continued to grow, increasing the volume, duration, and frequency of floodwaters in some areas. Through operational and structural changes proposed in the CERP, current levels of flood protection will be maintained, and may be enhanced.

Water Quality

The CERP will help improve water quality by capturing runoff in 181,250 acres of new surface storage impoundments. These areas will provide treatment of urban and agricultural runoff through attenuation of flows, settling, and biological uptake. The impoundments will decrease fresh water discharged to estuaries, reducing coastal impacts. Other components of the plan, such as ASR and wastewater reuse include water quality treatment requirements which will improve or prevent degradation of water quality. Broward County can expect to see water quality improvements including the prevention of groundwater degradation from saltwater intrusion, attenuation of pollutant loads to coastal canals and estuaries, reduced bacteriological levels, and higher dissolved oxygen conditions.

Economic Benefits

The drainage, flood control and water supply provided by the C&SF project have allowed the population and economy of south Florida to grow. The Everglades alone support a recreation and eco-tourism industry of \$400 million per year with six million people visiting the Park and its preserves. This activity fuels Broward's economy with direct fiscal benefits tied to tourism. To maintain this activity and enable continued population growth, implementation of the CERP is necessary to sustain the health of the Everglades and to maintain adequate water supplies.

V. LOCAL IMPACTS WITHOUT THE CERP

Without the CERP, the benefits listed above will be lost and local governments alone will have to make significant investments to meet their water needs. By 2050, an additional 150 million gallons per day will be required to meet the urban water demands of Broward County. As demand exceeds the limits of readily available resources, water restrictions are predicted to occur on an annual basis and conflicts over allocation will intensify. Without the CERP, local utilities may be required to augment water supplies using more expensive methods such reverse osmosis treatment, ASR, and/or advanced wastewater treatment. These alternative water supplies will require substantial capital investment, as shown in Table 2.

Other impacts of a future without the CERP include a continued decline of the Everglades ecosystem.. Future demands on Lake Okeechobee will harm the Lake's littoral zone; continued excess freshwater discharges to estuaries will cause harm to fisheries; the Everglades National Park will not receive enough fresh water; and low flows to Florida and Biscayne Bays will disrupt fragile aquatic habitats.

Table 2.
ESTIMATED COSTS OF ALTERNATIVE WATER SUPPLIES

Technology	Unit Cost*	Annual cost to meet 150 MGD Demand**
<i>Aquifer Storage and Recovery (ASR)***</i>	\$1.66/1,000 gal	\$ 90.9 million
<i>Current Treatment Methods</i>	\$2.34/1,000 gal	\$128.1 million
<i>Reverse Osmosis</i>	\$2.88/1,000 gal	\$155.5 million
<i>Advanced Wastewater Treatment</i>	\$3.75/1,000 gal	\$205.3 million

* Source: Broward County Office of Environmental Services.
Includes capital recovery, operation, and maintenance

** Expected unmet needs

***Does not include treatment

VI. COSTS OF IMPLEMENTING THE CERP

The cost of implementing the CERP is estimated at \$7.8 billion. Pursuant to the Water Resources Development Act, these costs will be shared equally between federal and state interests. Significant dollars have already been spent on land acquisition for some components. Construction of the projects will be spread out over 20 years, resulting in total annual costs of \$400 million from the state and federal partners. An additional \$182 million per year is required for operation, maintenance and monitoring of the system.. South Florida taxpayers within the 16 county jurisdiction of the SFWMD may bear the entire cost of operation and management. While the exact funding structure has yet to be determined, Broward County can reasonably expect to be impacted by increased ad-valorem taxes levied by the SFWMD and may be requested to participate in cost sharing of projects which provide direct benefits to the County.

Over the past year, the State Legislature has been considering ways to meet the State's financial commitment but as of yet, no method has been adopted. While the final funding formula may include a variety of sources, state and local sources being discussed include the following:

Full Use of Existing SFWMD Tax Authority

Under its existing authority, the SFWMD can raise total millage to 0.8 mils. With legislative authorization, the Florida Constitution allows a millage rates increase to 1 mil.

Fees and Assessments

Fees and assessments may be levied for projects which benefit specific entities or property, such as the Broward Secondary Canal System.

Cost Sharing Agreements With Other Public Entities

Cost sharing opportunities may be considered for CERP projects which are of common or mutual interest to both the SFWMD and local governments, including municipalities and drainage districts. All of the projects affecting Broward County are potential candidates for cost sharing consideration.

Assistance from the State for Land Acquisition

Additional allocations from state land acquisition funds such as the Florida Forever Trust Fund, the Conservation and Recreation Lands Trust Fund, and the Water Management Lands Trust Fund will be pursued. Creation of the Everglades Land Acquisition Trust Fund may also be considered. Revenue bonds issued by the State or bonds payable from lease purchase agreements could also be used.

Additional Taxing Authority or Dedicated Funding Source

Options include levying parcel property taxes to fund facilities that provide services to specific areas; dedication of state revenue from selected sources for funding specific projects that are of statewide benefit i.e. documentary stamp taxes; dedication of state sales tax revenues to fund specific project components; levying annual fees for consumptive use permits or irrigation withdrawals to fund water management related activities; use of

Florida Department of Transportation (DOT) funds for projects that require state highway improvements and; public utility fees generated through the creation of a Public Water Supply Authority or Wastewater Reuse Authority.

Bonds

Because the spending needs of the CERP will be spread out over more than 20 years, the benefits of bonding are limited unless bonds are repaid beyond that period. The SFWMD has the existing statutory power to issue bonds payable from revenues of the District other than ad valorem taxes without the general approval of the electorate.

VII. A TIME OF CRITICAL DECISIONS

Upcoming state and federal legislation are key to moving the plan forward. On the federal front, legislation is necessary to authorize the CERP in the Water Resources Development Act of 2000 and appropriate adequate and continued funding for the project. On the state level, passage of a dedicated funding source during the 2000 legislative session which will fulfill the state's commitment to the project is of critical importance. Without significant financial support from the state, a negative message could be sent to federal legislators and seriously jeopardize the project. Without state funding, South Florida taxpayers could be unduly burdened with costs of restoration. State and federal legislators are facing tough decisions that will impact Broward County residents for years to come. Influencing policy makers during the upcoming congressional and state legislative sessions is of paramount importance to Broward County. A strong advocacy role by Broward County during the session, including the coalescing of similar interests, will go a long way toward making implementation of the CERP a reality.