SOUTH FLORIDA ECOSYSTEM RESTORATION

TASK FORCE

DRAFT REPORT

January 2002

COORDINATING SUCCESS:

Strategy for Restoration of the South Florida Ecosystem

and

TRACKING SUCCESS:

Biennial Report for FY 1999-2001

This document describes a coordination strategy consistent with the authorities Congress gave to the South Florida Ecosystem Restoration Task Force. It combines information from federal, state, tribal, and local agencies and therefore does not strictly follow any single agency's format.

SOUTH FLORIDA ECOSYSTEM RESTORATION TASK FORCE MEMBERS*

Clarence Anthony
Mayor, City of South Bay

Michael Collins
Chairman, South Florida Water Management District Governing Board

J. Allison DeFoor, II
State of Florida Representative

Dexter Lehtinen
Special Assistant for Everglades Issues to the Miccosukee Tribe of Indians of Florida

Terrence "Rock" Salt
Executive Director, South Florida Ecosystem Restoration Task Force

Jim Shore
General Counsel to the Seminole Tribe of Florida

David B. Struhs
Secretary, Florida Department of Environmental Protection

Vacant
National Oceanic and Atmospheric Administration
State of Florida
U.S. Department of Agriculture
U.S. Department of the Army
U.S. Department of the Interior
U.S. Department of Justice
U.S. Department of Transportation
U.S. Environmental Protection Agency

*As of January 2002

TASK FORCE WORKING GROUP MEMBERS*

Charles (Chuck) Aller
Florida Department of Agriculture and Consumer Services

Ernest (Ernie) Barnett
Florida Department of Environmental Protection

G. Ronnie Best
U.S. Geological Survey

Bradford E. (Brad) Brown
National Marine Fisheries Service

Billy D. Causey
Florida Keys National Marine Sanctuary

Wayne E. Daltry**
Southwest Florida Regional Planning Council

Henry Dean
South Florida Water Management District

Frank M. Duke
Palm Beach County Planning Department

Truman Eugene (Gene) Duncan
Miccosukee Tribe of Indians of Florida

Maureen Finnerty
Everglades National Park

George Hadley
Federal Highway Administration

Thaddeus Hamilton
U.S. Department of Agriculture

Richard Harvey
U.S. Environmental Protection Agency

Ronald D. Jones
Florida International University

Barbara Junge
U.S. Attorney's Office

Neal McAliley
U.S. Department of Justice

Col. James G. May****
U.S. Army Corps of Engineers

Ken Metcalf
Florida Department of Community Affairs

Peter B. Ortner
National Oceanic and Atmospheric Administration

Donna Pope
Florida Department of Transportation

Fred Rapach
Palm Beach County Water Utilities Department

Terry Rice
Miccosukee Tribe of Indians of Florida

Jay Slack
U.S. Fish and Wildlife Service

Richard (Rick) Smith
Office of the Governor of Florida

Ron Smola
U.S. Department of Agriculture

Steve Somerville
Broward County Department of Planning and Environmental Protection

Craig D. Tepper
Seminole Tribe of Florida

Joseph T. Walsh
Florida Fish and Wildlife Conservation Commission

Vacant
Bureau of Indian Affairs

State of Florida Local Government Representative

Special Advisors

Julio Fanjul
Water Resources Advisory Commission

Terrence "Rock" Salt
South Florida Ecosystem Restoration Task Force

*As of January 2002
**Chair
***Vice-Chair

CONTENTS

TABLES

GLOSSARY

Terms

Acre-foot: The volume of water, 43,560 cubic feet, that will cover an area of one acre to a depth of one foot.

Adaptive assessment: A process for learning and incorporating new information into the planning and evaluation phases of the restoration program. This process ensures that the scientific information produced for this effort is converted into products that are continuously used in management decision-making.

Best management practices: Agricultural and other industrial management activities designed to achieve an important goal, such as reducing farm runoff or optimizing water use.

Economic equity: The fair treatment of all persons regardless of color, creed, or belief in aspects of opportunities and/or diseconomies regarding economic or environmental activities.

Ecosystem: A community of organisms, including humans, interacting with one another and the environment in which they live.

El niño/la niña: Warming and cooling patterns in the Pacific Ocean that affect the earth's atmosphere.

Environmental justice: The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

Goal: Something to be achieved. Goals can be established for outcomes (results) or outputs (efforts).

Objective: A goal expressed in specific, directly measurable terms.

Outcome: An end result. For purposes of this report, a quality of the restored South Florida ecosystem.

Output: Levels of work and effort. For purposes of this report, the products or services produced by a project or program.

Performance measure: A desired result stated in quantifiable terms to allow for an assessment of how well the desired result has been achieved.

Restoration: For purposes of this report, the recovery of a natural system's vitality and biological and hydrological integrity to the extent that that the health and ecological functions are self-sustaining over time.

South Florida ecosystem / Greater Everglades ecosystem: An area consisting of the lands and waters within the boundaries of the South Florida Water Management District and the Multi-Species Recovery Plan, including the Everglades, the Florida Keys, and the contiguous nearshore coastal waters of South Florida.

Stormwater: Surface water resulting from rainfall that does not percolate into the ground or evaporate.

Subsidence. The lowering of the soil level caused by shrinkage of organic layers. This shrinkage is due to desiccation, consolidation, and biological oxidation.

Success indicator: A subset of performance measures selected as a good representation of overall performance.

Sustainability. The state of having met the needs of the present without endangering the ability of future generations to be able to meet their own needs.

Vision. An aspiration for the future. In this case the results that the task force members intend to achieve in terms of ecosystem health and quality of life for South Florida residents and visitors.

Wetlands. Areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of vegetative or aquatic life that require saturated or seasonally saturated soil conditions for growth and reproduction.

Acronyms

ASR	Aquifer storage and recovery
BMP	Best management practice
C&SF Project	Central and Southern Florida Project
CARL	Conservation and Recreational Lands
CERP	*Comprehensive Everglades Restoration Plan*
DEP	Florida Department of Environmental Protection

EAA	Everglades Agricultural Area
EPA	U.S. Environmental Protection Agency
FWS	U.S. Fish and Wildlife Service
GAO	U.S. General Accounting Office
GPD	Gallons per day
MERIT	Multi-Species/Ecosystem Recovery Implementation Team
NEWTT	Noxious Exotic Weed Task Team
PPB	Parts per billion
RECOVER	Restoration Coordination and Verification Team
SFWMD	South Florida Water Management District
SOR	Save Our Rivers
SWIM	Surface Water Improvement and Management
STA	Stormwater treatment area
TMDL	Total maximum daily load
WCA	Water conservation area
WRDA	Water Resources Development Act

EXECUTIVE SUMMARY

Introduction

The South Florida ecosystem is an 18,000-square-mile region of subtropical uplands, wetlands, and coral reefs that extends from the Chain of Lakes south of Orlando through the reefs southwest of the Florida Keys. This ecosystem not only supports the economy and the quality of life of the Floridians and the Native American Indians who live there, but also enriches the legacy of all Americans. It encompasses many nationally significant conservation areas, including Everglades and Biscayne National Parks, Big Cypress National Preserve, the Arthur R. Marshall Loxahatchee National Wildlife Refuge, and the Florida Keys National Marine Sanctuary.

This ecosystem is sustained by water, and it has been seriously degraded by disruptions to the natural hydrology. Engineered flood control and water distribution systems for agriculture and urban development have dewatered large areas and greatly altered the quantity, timing, and distribution of water flows in other locations. Agricultural runoff and urban stormwater have introduced phosphorus and other contaminants into the water systems, polluting lakes, rivers, and wetlands. Discharges of stormwater into estuaries and coastal waters have severely degraded aquatic habitats. Groundwater is threatened by saltwater intrusion and other pollutants. These impacts have stressed the natural system, as evidenced by

- Fifty percent reduction in the original extent of the Everglades
- Ninety percent reduction in wading bird populations
- Sixty-eight species on the federal endangered or threatened list
- Declines in commercial fisheries in Biscayne and Florida Bays
- Nineteen percent decline in living corals in the last decade

Purpose

The purpose of this document is to describe the existing federal and nonfederal programs designed to restore and sustain the imperiled South Florida ecosystem. Many federal, state, tribal, and local entities are working to address the deteriorating ecological conditions in South Florida. The South

Florida Ecosystem Restoration Task Force (the task force) coordinates and tracks the work. Congress directed the task force to produce a restoration strategy. Additional reporting requirements include a biennial report on accomplishments and a total cost report. This document provides the information needed to coordinate and integrate the restoration effort, fulfilling all three of these requirements. This document is for planning purposes only, is subject to modification, and is not legally binding on any of the task force members. Each task force member and the interest they represent retain all of their sovereign rights, authorities, and jurisdiction for implementation of the projects contained within this document.

Deleted: ¶

Who Is Involved: The South Florida Ecosystem Restoration Task Force

Six federal departments (twelve agencies), seven Florida state agencies or commissions, two American Indian tribes, sixteen counties, scores of municipal governments, and interested groups and businesses from throughout South Florida are participating in the restoration effort. Four sovereign entities (federal, state, and two tribes) are represented. The task force sought extensive involvement from local agencies, citizen groups, nonprofit organizations, and other interested parties as part of its assessment for this strategy.

The task force was created in 1993 as a federal interagency partnership, with informal participation by the State of Florida, the Seminole Tribe of Florida, and the Miccosukee Tribe of Indians of Florida. The Water Resources Development Act of 1996 authorized the operation of the task force and provided for specific membership and duties. Pursuant to its statutory duties, a task force working group of agency and tribal representatives (the working group) works to resolve conflicts among participants, coordinate research, assist participants, prepare an integrated financial plan, and report to Congress.

The task force does not have any oversight or project authority, and participating agencies are responsible for meeting their own targeted accomplishments. The task force's role as a forum in which ideas are shared and consensus is sought enhances the productivity of each member government or agency effort.

Restoration Strategy

The task force provides a forum for consensus building and issue engagement among the entities involved in restoring the South Florida ecosystem. This is a collaborative role, not one in which the task force can dictate to its members. Because on-the-ground restoration is accomplished through the efforts of the individual task force member agencies, they are the ones that are ultimately responsible for their particular programs, projects, and associated funding. This is an important distinction. The task force has no overriding authority to direct its members. Instead, the members are accountable individually to their appropriate authorities and to each other for the success of the restoration.

The task force will meet regularly to report on progress, coordinate consensus, and identify opportunities for improvement. The task force and its members coordinate and track the restoration effort as follows:

Focus on goals. This document establishes specific goals and measures that define the scope of the restoration initiative and answer these fundamental questions: What will the restoration partners accomplish? When will the restoration effort be done? What key indicators will signal progress and success?

Coordinate projects. To be effective, individual projects should contribute to the vision and goals, be timely, and support rather than duplicate other efforts. This document includes a master list of restoration projects and includes information about goals and objectives, start and finish dates, lead agencies, and funding.

Track and assess progress. The task force will facilitate the implementation of the individual entities' *adaptive assessment* processes to track and assess progress. The ability to anticipate problems early helps to minimize their effect on the total restoration effort. Because each participating agency is responsible for its particular programs, projects, and funding, adaptive assessment decisions are made by the entities involved.

Facilitate the resolution of issues and conflicts. Disagreements and conflict are to be expected given the scope, complexity, and large number of sponsors and interests involved in ecosystem restoration. The task force will facilitate the prevention and resolution of conflict to the extent

possible by clarifying the issue(s), identifying stakeholder concerns, obtaining and analyzing relevant information, and identifying solutions.

Vision and Goals

The participants in the task force share the vision of a restored South Florida ecosystem that supports diverse and sustainable communities of plants, animals, and people. To this end, hundreds of different entities have been working for over a decade to restore and preserve more natural hydrology in the ecosystem, to protect the spatial extent and quality of remaining habitat, to promote the return of abundant populations of native plants and animals, and to foster human development compatible with sustaining a healthy ecosystem. The past, current, and future efforts of governmental entities in South Florida involve more than 200 projects related to three primary work goals. Subgoals and objectives have been established for each of these work goals, as follows:

GOAL 1: GET THE WATER RIGHT
- Subgoal 1-A: Get the hydrology right
  - Objective 1-A.1: Provide 1.6 million acre-feet of surface water storage by 2037
  - Objective 1-A.2: Develop aquifer storage and recovery systems capable of storing 1.6 billion gallons per day by 2020
  - Objective 1-A.3: Modify 279 miles of impediments to flow by 2019
- Subgoal 1-B: Get the water quality right
  - Objective 1-B.1: Construct 80,000 acres of stormwater treatment areas by 2036
  - Objective 1-B.2: Prepare plans, with strategies and schedules for implementation, to comply with TMDLs *(total maximum daily loads)* for 100 percent of impaired water bodies by 2011

GOAL 2: RESTORE, PRESERVE, AND PROTECT NATURAL HABITATS AND SPECIES
- Subgoal 2-A: Restore, preserve, and protect natural habitats
  - Objective 2-A.1: Acquire 1,900,000 acres of land for habitat protection by 2015.
  - Objective 2-A.2: Protect 20 percent of the coral reefs by 2020.
  - Objective 2-A.3: Improve habitat quality for 80 percent of the 2.7 million acres of natural areas in South Florida.
- Subgoal 2-B: Control invasive exotic plants
  - Objective 2-B.1: Prepare management plans for the top twenty South Florida invasive exotic plant species by 2010
  - Objective 2-B.2: Achieve maintenance control status for Brazilian pepper, melaleuca, Australian pine, and Old World climbing fern in all natural areas statewide by 2020
  - Objective 2-B.3: Complete an invasive exotic plant prevention, early detection, and eradication plan by 2005

GOAL 3: FOSTER COMPATIBILITY OF THE BUILT AND NATURAL SYSTEMS
- Subgoal 3-A: Use and manage land in a manner that is compatible with ecosystem restoration

Objective 3-A.1:Increase the number of acres designated as part of the state's Greenways and Trails System by X by DATE.
Objective 3-A.2: Develop a program to track the rate open and agricultural lands are converted to other uses by DATE
Objective 3-A.3: Achieve a 25 percent reduction in phosphorus load from the Everglades Agricultural Area (EAA)
Subgoal 3-B: Maintain or improve flood protection in a manner compatible with ecosystem restoration
Objective 3-B.1: Modify and/or upgrade X percent of the C&SF system by DATE
Subgoal 3-C: Provide sufficient water resources for built and natural systems
Objective 3-C.1: Implement water conservations strategies to achieve a XX percent reduction in per capita average annual water consumption.
Objective 3-C.2:Increase adoption of local wellfield/wellhead protection ordinances that protect surface and groundwater resources to 100 percent by DATE.
Subgoal 3-D: Achieve economic equity and environmental justice
Objective 3-D.1: Increase restoration projects awarded to minority businesses by X percent by DATE
Objective 3-D.2: Complete two or three brownfield rehabilitation and redevelopment projects per year between 2002 and 2006

The task force members believe through accomplishing these objectives they will achieve the restoration of the ecosystem. The region's rich and varied habitats will become healthy and productive. Imperiled species will recover, and the large nesting rookeries of wading birds will return.

The appropriate agencies will track progress toward restoring the ecosystem through approximately 200 performance measures developed as part of the *Comprehensive Everglades Restoration Plan*, plus additional measures for areas not covered by the CERP, such as the *South Florida Multi-Species Recovery Plan*. These measures, which range from the number of acres of periphyton in Everglades marshes to the frequency of water supply restrictions in urban and agricultural areas, represent the myriad physical, biological, and human elements that interrelate as parts of the ecosystem and are important to ecosystem health. The agencies will provide data to the task force, which will provide data to the task force, which will update this document for transmittal to Congress, the state legislature, and the councils of the tribes.

The following measures are a representative subset of a broader list of indicators for tracking success. Many of these represent end results that may take up to fifty years to realize. Interim targets, which focus on earlier indications of successional change, will allow assessment of incremental progress.

- Improved status for fourteen federally listed threatened or endangered species, and no declines in status for those additional species listed by the state, by 2020
- An annual average of 10,000 nesting pairs of great egrets, 15,000 pairs of snowy egrets and tricolored herons combined, 25,000 pairs of white ibis, and 5,000 pairs of wood storks
- Urban and agricultural water supply needs met in all years up to and including those years with droughts with a one-in-ten-year return frequency
- 40,000 acres of healthy submerged aquatic vegetation around the shoreline of Lake Okeechobee on an ongoing basis
- Approximately 900 acres of healthy oyster beds in the St. Lucie Estuary
- A 90 percent recovery of the 1940 acreage and number of tree islands in water conservation areas 2 and 3, and a health index of 0.90
- A nesting population of roseate spoonbills of at least 1,000 pairs annually distributed throughout Florida Bay, and some level of nesting by spoonbills in the coastal zone of the southwestern gulf coast
- A 65-75 percent coverage of Florida Bay with high-quality seagrass beds
- A long-term commercial harvest of pink shrimp on the Dry Tortugas fishing grounds that equals or exceeds the 600 pounds per vessel-day that occurred during the seasons 1961-62 to 1982-83; and an amount of large shrimp in the long-term average catch exceeding 500 pounds per vessel

Overview of Major Programs and Costs

The best estimate for the total cost to restore the South Florida ecosystem is $14.8 billion. Of the total restoration cost, $7.8 billion represents the cost of implementing the *Comprehensive Everglades Restoration Plan* (CERP), which will be shared equally by the federal government and the state. The CERP outlines 68 projects that will take more than 30 years to construct. Because ongoing congressional authorization is required for the proposed projects included in the CERP, and because individual projects must undergo additional site-specific studies and analyses, the overall cost to implement this significant component of the restoration effort could be lower or higher, depending upon future analyses and site-specific studies.

The CERP builds on other plans and projects that were authorized by Congress or the Florida Legislature prior to and independent of the CERP. Taken together, these programs and projects

represent an additional $7 billion investment, of which $2.55 billion are federal costs and $4.48 billion are state costs.

The project schedules and the projections of outputs included in this report span multiple decades and depend upon certain assumptions about state and federal budget requests and funding levels, optimized construction schedules, willing sellers, and other contingencies. These assumptions are likely to change as the project progresses, and appropriate revisions to this document will be necessary. Therefore, this document does not represent a commitment by the federal, state, or local governments or the tribes to seek appropriations for specific projects and activities at the funding levels laid out in this document.

Major Accomplishments of 1999-2001

The years 1999-2000 saw the development and approval of the task force's restoration strategy, the vision and indicators of success, and the work goals and objectives articulated above. It also saw the start of more detailed program-level and project-level planning. A number of work teams were maintained or created to oversee this work, which included

- A master program management plan for CERP implementation
- A comprehensive strategy for federal land acquisition projects
- Strategies for recovery of threatened and endangered species and for management of invasive exotic plants
- Coordinated agency plans for protection and public use of coral reefs within Florida Keys National Marine Sanctuary and Dry Tortugas National Park
- Recommendations for sustainable agriculture
- Regional water supply plans
- Strategies for community outreach and for achieving environmental and economic equity
- Project plans for pilot aquifer storage and recovery projects
- Plans and specifications for a number of the critical projects authorized under WRDA 1996

By the end of the reporting period the Kissimmee River Restoration Project was under construction. Construction was completed on three additional stormwater treatment areas (STAs), bringing the

total effective treatment area in operation to over 18,000 acres in four STAs. Two additional STAs were under construction. Construction work had also started on the Modified Water Deliveries Project.

By the end of the reporting period the following lands had been acquired for habitat conservation:

Funding Source	Amount ($ millions)	Acres

Another highlight from 1999-2001 included a partnership agreement with the Museum of Discovery and Science to inform the public about restoration activities. Indoor and outdoor exhibits and museum-based and school-based educational programs were underway.

In 2001 the Restoration Coordination and Verification (RECOVER) Team finished a management plan to guide ecosystem monitoring and adaptive assessment of CERP programs and projects. The team developed performance measures for the CERP that make it possible for the first time to include quantifiable targets and measures of ecosystem health in the task force's biennial reports. The current grades for these indicators are illustrated on the following map.

COORDINATING SUCCESS:

STRATEGY FOR THE RESTORATION OF THE SOUTH FLORIDA ECOSYSTEM

REPORT PURPOSE AND BACKGROUND

Purpose

The purpose of this document is to describe the existing federal and nonfederal programs designed to restore and sustain the imperiled South Florida ecosystem. The American people have a strong national as well as local interest in preserving this 18,000-square-mile region of subtropical uplands, wetlands, and coral reefs that extends from the Chain of Lakes south of Orlando through the reefs southwest of the Florida Keys. The South Florida ecosystem not only supports the economy and the distinctive quality of life of the Floridians and the Native American Indians who live there, but also greatly enriches the shared legacy of all Americans. It encompasses many nationally significant conservation areas, including Everglades and Biscayne National Parks, Big Cypress National Preserve, the Arthur R. Marshall Loxahatchee National Wildlife Refuge, and the Florida Keys National Marine Sanctuary.

Many federal, state, tribal, and local entities are working to address the deteriorating ecological conditions in South Florida. The South Florida Ecosystem Restoration Task Force (the task force) coordinates and tracks the work. Congress directed the task force to produce a restoration strategy. This document provides the information needed to coordinate and integrate the restoration effort.

Congress identified four elements to be included in this document. They wanted it to outline how the restoration effort will occur, identify the resources needed, establish responsibility for accomplishing actions, and link the strategic goals established by the participants to outcome-oriented goals (see appendix A). This document describes how the restoration effort is being coordinated: The task force members have agreed upon a vision for the results to be achieved; they have established three broad goals and measurable objectives for the work needed to achieve the vision; they have identified the projects needed to achieve the objectives; they are coordinating those projects so that they are mutually supportive and nonduplicative; and they are tracking progress toward both the work-oriented goals and the results-oriented vision. This strategy, along with the vision, goals, objectives, performance measures, and individual project data (including cost, responsible agency, and targeted completion dates) are all included in this document.

This strategy document is for planning purposes only, is subject to modification, and is not legally binding on any of the task force members. Each task force member and the interests they represent retain all of their sovereign rights, authorities, and jurisdiction for implementation of the projects contained within this document.

Who Is Involved: The South Florida Ecosystem Restoration Task Force

Six federal departments (twelve agencies), seven Florida state agencies or commissions, two American Indian tribes, sixteen counties, scores of municipal governments, and interested groups and businesses from throughout South Florida participate in the restoration effort. Four sovereign entities (federal, state, and two tribes) are represented. The task force sought extensive involvement from local agencies, citizen groups, nonprofit organizations, and other interested parties as part of its assessment for this strategy.

The task force was created in 1993 as a federal interagency partnership, with informal participation by the State of Florida, the Seminole Tribe of Florida, and the Miccosukee Tribe of Indians of Florida. The Water Resources Development Act of 1996 (WRDA 1996) authorized the operation of the task force and provided for specific membership and duties (see appendix B). The act expanded the role of the task force to include the following duties:

- Facilitate the resolution of interagency and intergovernmental conflicts associated with the restoration of the South Florida ecosystem among agencies and entities represented on the task force.
- Coordinate research associated with the restoration.
- Provide assistance and support to agencies and entities represented.
- Prepare an integrated financial plan and recommendations for coordinated budget requests to be expended by agencies and entities on the task force.
- Submit a biennial report to Congress that summarizes the restoration activities.

Pursuant to its statutory duties, a task force working group of agency and tribal representatives (the working group) works to resolve conflicts among participants, coordinate research, assist participants, prepare an integrated financial plan, and report to Congress.

The task force does not have any oversight or project authority, and participating agencies are responsible for meeting their own targeted accomplishments. The task force's role as a forum in which ideas are shared and consensus is sought enhances the productivity of each member government or agency effort.

Brief History of South Florida Ecosystem Management

Early land developers viewed the Everglades and related habitats as worthless swamps. By the late 1800s efforts were underway to "reclaim" these swamplands for productive use. These initial efforts were encouraging, and more wetlands were drained for agriculture and for residential and commercial development. Little by little, canals, roads, and buildings began to displace native habitats.

In 1934 national concern about the degradation of the South Florida Everglades led to the creation of Everglades National Park. The portion of the Everglades included in the park was to be permanently reserved as a wilderness with no development that would interfere with preserving the unique flora and fauna and the essential primitive character existing at the date of enactment. This mandate to preserve wilderness is one of the strongest in the National Park System. The park was authorized by Congress in 1934 and opened to the public in 1947.

Meanwhile the region was plagued with both hurricanes and droughts. A 1928 hurricane caused Lake Okeechobee to overflow, drowning approximately 2,400 people. Droughts from 1931 to 1945 lowered groundwater levels, creating serious threats of saltwater intrusion into wells. In 1947 successive storms left 90 percent of South Florida—more than 16,000 square miles from south of Orlando to the Keys—under water.

In 1948 the ongoing efforts to drain the Everglades, protect the region from hurricanes, and make the region habitable culminated in the congressional authorization of the Central & Southern Florida

(C&SF) Project, a flood control project jointly built and managed by the U.S. Army Corps of Engineers (the Corps) and the South Florida Water Management District (SFWMD). The primary project goal was to provide water and flood control for urban and agricultural lands. Another goal was to ensure a water supply for Everglades National Park. The first goal was achieved. The project succeeded in draining half of the original Everglades and allowing for expansion of the cities on the lower east coast of Florida and the farming area south of Lake Okeechobee known as the Everglades Agricultural Area (EAA). The second goal has not yet been accomplished. The correct quantity, quality, timing, and distribution of water to the Greater Everglades ecosystem have been the subject of much study. Many projects have been undertaken to restore natural water flows to this region.

The C&SF Project significantly altered the region's hydrology (quantity, timing, and distribution of water). Whereas historically most rainwater had soaked into the region's wetlands, the C&SF canal system, comprised of over 1,800 miles of canals and levees and 200 water control structures, drained an average of approximately 1.7 billion gallons of water per day into the ocean and the gulf. As a result, not enough water was available for the natural functioning of the Everglades or for the communities in the region. Water quality also was degraded. Phosphorus runoff from agriculture and other sources polluted much of the northern Everglades and Lake Okeechobee and caused key changes to the food chain.

During the 1970s and 1980s public policy, in line with predominant public opinion, moved in the direction of environmental protection and restoration in South Florida. For example, in 1972 the Florida Legislature passed the Florida Water Resources Act to balance human and natural system water resource needs. In the same year, the Florida Land Conservation Act was enacted to protect lands for environmental protection and recreation. In 1983, under the leadership of Governor Bob Graham, the Save Our Everglades program was initiated to protect and restore the Kissimmee River Basin, Lake Okeechobee, the state-managed water conservation areas, Big Cypress Swamp, Everglades National Park, Florida Bay, and endangered wildlife. In 1987 the Florida Legislature passed the Surface Water Improvement and Management Act (SWIM) to clean up all waters affected by Florida water management districts. In l989 Congress passed the Everglades Expansion and Protection Act, which added 107,600 acres to Everglades National Park and called for increased and improved water flows to the park.

Despite progress toward restoration in the 1980s, dramatic growth in the population and development of South Florida kept pressure on the environment. Research at this time detected declines in many native plant and animal species and heightened phosphorus pollution of the Everglades. Of particular alarm was evidence of the decline of Florida Bay, indicated by dramatic losses in seagrass habitat, algae blooms, reductions in shrimp and many fish species, and a decline in water clarity.

In 1988 the federal government sued the State of Florida over its failure to protect the Everglades from pollution. After three years and much additional litigation no settlement had been reached. In 1991 the newly elected governor, Lawton Chiles, agreed to reach a settlement. For several years mediation efforts led to a reduction in the range of conflict between the state and federal governments and between agricultural and environmental interests. In February 1992 a court settlement was achieved to reduce the level of phosphorus entering Everglades National Park and the Arthur R. Marshall Loxahatchee National Wildlife Refuge by creating artificial wetlands to filter polluted agricultural wastewater. In 1993 the sugar cane industry agreed to adopt the best management practices available and to pay for approximately one-third of the costs of the artificial wetlands to help reduce the phosphorous pollution in the Everglades. The settlement also called for additional measures to be implemented over the long term to meet final numeric water quality standards. In 1994 the agreements developed as a result of litigation and mediation were reflected in the Everglades Forever Act adopted by the Florida Legislature.

The mid-1990s saw the establishment of two important consensus building forums for Everglades issues. In 1993 the South Florida Ecosystem Restoration Task Force was established through an interagency agreement. (Refer to the discussion of the task force on page 12). The task force was formalized and expanded to include tribal, state, and local governments by WRDA 1996. In 1994 the governor of Florida established the Governor's Commission for a Sustainable South Florida "to develop recommendations and public support for regaining a healthy Everglades ecosystem with sustainable economies and quality communities." The task force and the governor's commission have been instrumental in formulating consensus for Everglades restoration.

In 1996 two significant pieces of legislation were approved by the U.S. Congress. The Farm Bill provided $200 million to conduct restoration activities in the Everglades ecosystem including land acquisition, resource protection, and resource maintenance. WRDA 1996 clarified congressional guidance to the Army Corps of Engineers to develop a comprehensive review study for restoring the

hydrology of South Florida. This study, commonly referred to as the Restudy, has resulted in the *Comprehensive Everglades Restoration Plan* (CERP), a consensus plan that was approved by Congress and signed by the president as part of WRDA 2000. The CERP is designed to reverse unintended consequences resulting from the operation of the Central & Southern Florida Project. The physical limitations of the existing water management system can exacerbate resource conflicts. Implementation of the CERP should increase flexibility for water managers to help avoid such conflicts.

The growing body of federal and nonfederal legislation and regulatory approvals directed at managing growth and protecting the natural environment is summarized in table 1.

Table 1. Milestones in South Florida Ecosystem Management

1947	*Everglades National Park* created.
1972	*Florida Water Resources Act* established fundamental water policy for Florida, attempting to meet human needs and sustain natural systems; put in place a comprehensive strategic program to preserve and restore the Everglades ecosystem.
1972	*Florida Land Conservation Act* authorized the issuance of bonds to purchase environmentally endangered and recreation lands.
1974	*Big Cypress National Preserve* created.
1983	*Governor's Save Our Everglades Program* recognized that the entire ecosystem should be restored and protected; initiated Kissimmee River Restoration Project.
1984	*Florida Warren Henderson Act* authorized the Department of Environmental Regulation (now the Department of Environmental Protection) to protect the state's wetlands and surface waters for public interest.
1985	*Florida Local Government Comprehensive Planning and Land Development Regulation Act* required the development and coordination of local land use plans.
1987	*Compact amongst the Seminole Tribe of Florida, the State of Florida and the South Florida Water Management District* completed.

1987 *Florida Surface Water Improvement and Management Act* required the five Florida water management districts to develop plans to clean up and preserve Florida lakes, bays, estuaries, and rivers.

1988 *Land Settlement Act of 1987* transferred acreage in water conservation area 3 (WCA-3) and the Rotenberger tract to the State of Florida for Everglades restoration.

1988 *Big Cypress National Preserve Addition Act* expanded the preserve.

1989 *Everglades National Park Expansion Act* added the East Everglades addition.

1990 *Florida Preservation 2000 Act* established a coordinated land acquisition program at $300 million per year for ten years to protect the integrity of ecological systems and to provide multiple benefits, including the preservation of fish and wildlife habitat, recreation space, and water recharge areas.

1990 *Florida Keys National Marine Sanctuary and Protection Act* established a 2,800 square-nautical-mile marine sanctuary and authorized a water quality protection program.

1991 *Florida Everglades Protection Act* provided the SFWMD with clear tools for ecosystem restoration.

1992 *Water Resources Development Act* (WRDA 1992) authorized the Kissimmee River Restoration Project and the Central and Southern Florida Project Restudy; also provided for a fifty-fifty cost share between the federal government and the project sponsor, the SFWMD.

1993 *Federal South Florida Ecosystem Restoration Task Force* established to coordinate ecosystem restoration efforts in South Florida.

1993 *Seminole Tribe* approved by EPA to establish water quality standards for reservation lands in accordance with section 518 of the Clean Water Act.

1994 *Florida Everglades Forever Act* established and required implementation of a comprehensive plan to restore significant portions of the South Florida ecosystem through construction, research, and regulation.

1994 *Governor's Commission for a Sustainable South Florida* established to make recommendations for achieving a healthy South Florida ecosystem that can coexist with and mutually support a sustainable economy and quality communities.

1994 *Miccosukee Tribe* approved by EPA to establish water quality standards for reservation lands in accordance with section 518 of the Clean Water Act.

1996 *Water Resources Development Act* (WRDA 1996) authorized a comprehensive review study for restoring the hydrology of South Florida; expanded the South Florida Ecosystem Restoration Task Force to include tribal, state, and local governments; mandated extensive public involvement; and allowed the task force to address the full scope of restoration needs (natural and built).

1996 *Section 390 of the Farm Bill* directly appropriated $200 million to conduct restoration activities in the Everglades ecosystem in South Florida.

1997 *Seminole Tribe of Florida's water quality standards* for the Big Cypress Reservation approved by U.S. Environmental Protection Agency (EPA).

1997 *Miccosukee Tribe water quality standards* established for tribal lands located in WCA-3A. Standards established 10 parts per billion criteria for total phosphorus in tribal waters.

1997-2000 *1997, 1998, 1999, and 2000 Interior Appropriations Acts* provided for land acquisition by the National Park Service and the U.S. Fish and Wildlife Service in the Everglades ecosystem.

1998 *Seminole Tribe of Florida's water quality standards* for the Brighton Reservation approved by the EPA.

1999 *Comprehensive Everglades Restoration Plan* (CERP) submitted to Congress, outlining sixty-eight infrastructure projects to modify the current water delivery system and improve the quantity, quality, timing, and distribution of water to the natural system; estimated total cost of $7.8 billion to be shared on a fifty-fifty basis by the federal and nonfederal sponsors.

1999 *Water Resources Development Act* (WRDA 1999) extended Critical Restoration Project authority until 2003; authorized two pilot infrastructure projects proposed in CERP.

1999 *Governor's Commission for the Everglades* appointed to advise the South Florida Ecosystem Restoration Task Force on issues relating to Everglades protection and restoration, environmental justice, and water resource protection, among other issues.

1999 *Miccosukee water quality standards* approved by the EPA.

1999 *Miccosukee Reserved Area Act* directed Miccosukee Tribe to establish water quality standards for the Miccosukee Reserved Area (inflow points to Everglades National Park).

1999 *Miccosukee Tribe water quality standards* established for water passing through the Miccosukee Reserved Area, into Everglades National Park.

1999 *Florida Forever Act* improved and continued the coordinated land acquisition program initiated by the Florida Preservation 2000 Act of 1990; committed $300 million per year for ten years.

2000 *Florida Everglades Restoration Investment Act* created a funding and accountability plan to help implement the CERP; committed an estimated $2 billion in state funding to Everglades restoration over ten years.

2000 *Water Resources Development Act* (WRDA 2000) included $1.4 billion in authorizations for ten initial Everglades infrastructure projects, four pilot projects, and an adaptive assessment and monitoring program; also granted programmatic authority for projects with immediate and substantial restoration benefits at a total cost of $206 million. A 50 percent federal cost share was established for implementation of CERP and for operation and maintenance.

What Is at Stake

Current efforts to restore the South Florida ecosystem must address a century of changes to the environment that have put the ecosystem in jeopardy. Evidence of the seriousness of the problem includes

- Fifty percent reduction in the original extent of the Everglades, including important habitat and groundwater recharge areas
- Ninety percent reductions in wading bird populations
- Sixty-eight species on the federal endangered or threatened list
- Declines in commercial fisheries in Biscayne and Florida Bays
- Loss of over five feet of organic soil in the Everglades Agricultural Area
- Fifty percent decline in the clarity of water in the Florida Keys
- Infestations of exotic plant species on over 1.5 million acres
- Damaging freshwater releases into the St. Lucie and Caloosahatchee Estuaries

- Loss of 40,000 acres of grass beds in Lake Okeechobee
- Loss of tree islands and damaging ecological effects in the state-managed water conservation areas
- Nineteen percent decline in living corals in the last decade

Today South Florida is home to 6.5 million people, and the population is expected to double by 2050. The region also receives more than 37 million tourists annually. The quality of life in South Florida and the region's $200 billion economy depend on the health and vitality of the natural system. If the coral reefs, estuaries, and shallow waters of Florida Bay cannot support populations of aquatic species, South Florida's tourism industry and associated economy will decline. The loss of fertile soil and conversion of land to nonagricultural uses will make farming and ranching harder to maintain and less profitable.

The stakes are high. The South Florida ecosystem once supported some of the greatest biodiversity on earth. The biological abundance and the aesthetic values of the natural system warrant regional, national, and even international interest and concern. In addition to numerous local parks and private conservation areas, South Florida encompasses thirty state parks, seventeen state aquatic preserves, eleven federal wildlife refuges, four national parks, a national marine sanctuary, and a national estuarine research reserve. Everglades National Park has been designated a World Heritage Site, a Wetland of International Significance, and an International Biosphere Reserve. Biosphere reserves are protected examples of the world's major ecosystem types, which are intended to serve as standards for measuring human impacts on the environment worldwide.

RESTORATION STRATEGY

Guiding Principles

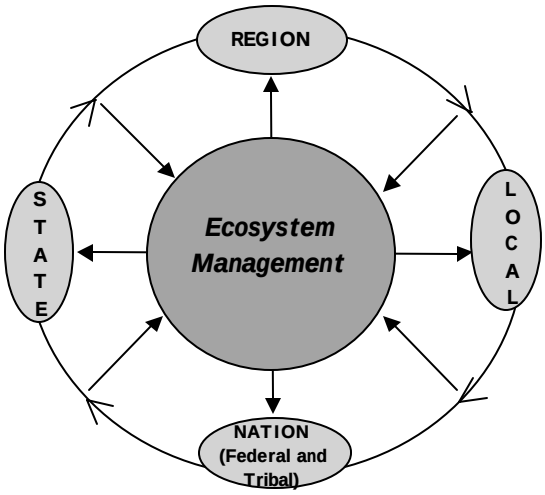
The following principles will guide all aspects of ecosystem restoration and management:

The natural and built environments are inextricably linked in the ecosystem. This is the overall premise that must drive ecosystem planning and management. Until recently the term ecosystem meant the natural environment. However, the ecosystem is also home to people and their built environment. All of these aspects are inextricably linked. Not only can events in the built environment have catastrophic consequences in the natural environment, such as the destruction of wetlands when they are drained for development, but disruptions in the natural environment can have catastrophic consequences in the built environment, such as the unnaturally severe flooding that occurs when natural wetlands are gone.

The task force recognizes that the restoration of a healthy hydrologic regime and the improvement of habitat will not be enough to achieve the long-term sustainability of the South Florida ecosystem if subsequent decisions about the built environment are not consistent with ecosystem health. The billions of dollars spent to restore the South Florida ecosystem could be wasted if, in 100 years, the built environment was once again allowed to dominate the natural environment. At the same time, the solutions to restore ecosystem health must be supportive of human needs for water supply, flood control, and recreation. This link makes it critical that decision makers for both the natural and the built environments be involved in the restoration effort.

The ecosystem must be managed as a whole. Understanding the complexities of the South Florida ecosystem is daunting. It forces managers, scientists, and the public to view the natural and the built environments and the resources needed to support them as parts of a single larger system. Rather than dealing with issues independently, the challenge is to seek out the interrelationships and mutual dependencies that exist between the components of the ecosystem.

The challenges faced in South Florida must be solved collaboratively and be based on a sound understanding of the interconnected variables. The task force advocates a systemwide approach that fosters coordination and addresses issues holistically. This approach requires broad-based partnerships, coordinated management, and public outreach and communication.



- **Authorities and responsibilities remain intact; revisions made to the process.**
- **Intergovernmental coordination improved.**
- **Planning and implementation become an integrated process.**

Broad-based partnerships: It is critical that federal, state, local, and tribal governments and other interested and affected parties work together in broad-based partnerships. Maintaining open communications and examining their different views and needs will form the basis for the respect and trust needed to work together.

Formatted
Formatted
Formatted

Coordinated management: To be successful, governmental entities will need to coordinate their ecosystem restoration activities and to develop cooperative programs. The task force will foster this cooperation and facilitate the resolution of conflicts and disputes among the diverse participants.

Public outreach and communication: Innovative partnerships and coordinated management will not be possible without the understanding, trust, and support of the public. Therefore, public outreach and communication will be an important part of the ecosystem restoration efforts. Outreach strategies will seek two-way communication with the public to broaden understanding and to instill a sense of stewardship among all parties involved, including private citizens.

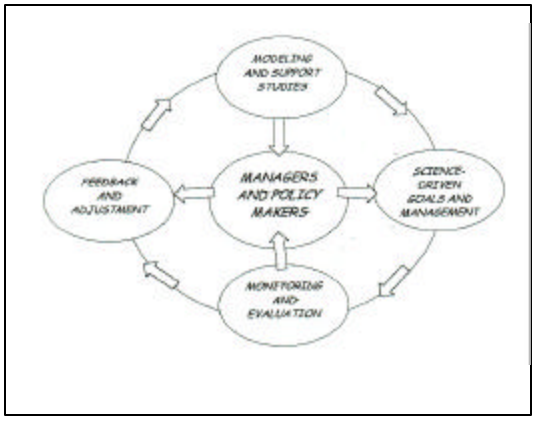
Formatted

Decisions must be based on sound science. Science plays two major roles in the restoration process. One is to facilitate and promote the application of existing scientific information to planning and decision making. The other is to acquire critical missing information that can improve the probability that restoration objectives will be met.

The task force members have adopted an *adaptive assessment* process to continuously provide managers with updated scientific information, which they can use to guide critical decisions. In this process, scientific models provide a conceptual framework and identify critical support studies. Support studies provide data and interpretation that lead to a better understanding of the problem and then to the development of a series of alternative solutions. Once an alternative is selected and implemented, monitoring is used to assess the effectiveness of the action and to provide feedback on ways to modify it (if warranted). Similarly, monitoring data can be used to revise and refine the original model, thereby completing and continuing the interactive feedback loop of decision making, implementation, and assessment.

Formatted

A framework for promoting the application of sound science is included in appendix C. The framework describes the tools and methods for building scientific knowledge and applying it to ecosystem restoration.



SCIENCE DRIVEN ADAPTIVE ASSESSMENT

Coordination of the Restoration Effort

The role of the task force is not to manage the South Florida restoration, but to coordinate the restoration, provide a forum for the managing agencies to share information on their restoration projects, and report on progress. Congress and other stakeholders are particularly interested in how each individual agency's efforts contribute to the larger framework of total ecosystem restoration. This document provides that information.

The task force provides a forum for consensus building and issue engagement among the entities involved in restoring the South Florida ecosystem. This is a collaborative role, not one in which the task force can dictate to its members. Because on-the-ground restoration is accomplished through the efforts of the individual task force member agencies, they are the ones that are ultimately responsible for their particular programs, projects, and associated funding. This is an important distinction. The task force has no overriding authority to direct its members. Instead, the members are accountable individually to their appropriate authorities and to each other for the success of the restoration.

The task force members coordinate and track the restoration effort as follows:

Focus on goals. This document establishes specific goals and measures that define the scope of the restoration initiative and answer these fundamental questions: What will the restoration partners accomplish? When will the restoration effort be done? What key indicators will signal progress and success?

Coordinate projects. To be effective, individual projects should contribute to the vision and goals, be timely, and support rather than duplicate other efforts. This document includes a master list of restoration projects and includes information about goals and objectives, start and finish dates, lead agencies, and funding.

Track and assess progress. The task force will facilitate the implementation of the individual entities' adaptive assessment processes to track and assess progress. Adaptive assessment involves constantly monitoring project contributions and indicators of success to determine the actual versus expected results of various actions. This process acknowledges that not all the data needed to restore the South Florida ecosystem are available now. As project managers track incremental progress in achieving objectives they may raise "red flags" alerting the task force members that a project (1) is not on schedule or (2) is not producing the projected outputs or anticipated results. The ability to anticipate problems early helps to minimize their effect on the total restoration effort. Management responses may involve revising the project design, evaluating changing resource needs, or working collaboratively on projects that fall behind. Projects that are not proving effective may be replaced with new projects. Because each participating agency is responsible for its particular programs, projects, and funding, such decisions are made by the entities involved.

Facilitate the resolution of issues and conflicts. Disagreements and conflict are to be expected given the scope, complexity, and large number of sponsors and interests involved in ecosystem restoration. In particular, the ability to resolve existing conflicts is complicated by (1) the large number of governmental entities involved at the federal, state, tribal and local levels; (2) the differing, and sometimes conflicting, legal mandates and agency missions among the entities involved; and (3) the diverse stakeholder interests represented by the member agencies, which include environmental, agricultural, Native American, urban, and commercial values.

The task force will facilitate the prevention and resolution of conflict to the extent possible by clarifying the issue(s), identifying stakeholder concerns, obtaining and analyzing relevant information, and identifying solutions. The working group will regularly track issues in dispute and report to the task force when there are unresolved issues. Although these efforts are intended to facilitate conflict resolution, opportunities will always exist for parties to pursue conflicts through litigation. Litigation, however, is time consuming, costly, and uncertain, and it diverts resources from restoration efforts. Unfortunately, judicial resolution of legal claims does not always resolve the underlying conflict to the satisfaction of every party.

The task force will meet regularly to report on progress, coordinate consensus, and identify opportunities for improvement.

VISION AND INDICATORS OF SUCCESS

Vision

The participants in the South Florida Ecosystem Restoration Task Force share a vision:

> *A healthy South Florida ecosystem that supports diverse and sustainable communities of plants, animals, and people*

To this end, hundreds of different entities have been working for over a decade to restore and preserve more natural hydrology in the ecosystem, to protect the spatial extent and quality of remaining habitat, to promote the return of abundant populations of native plants and animals, and to foster human development compatible with sustaining a healthy ecosystem. These efforts, which are described in detail in the "Work Goals and Objectives" section of this report, will continue. The results will be continuously analyzed to provide restoration managers with increasingly comprehensive information about what remains to be done to achieve ecosystem restoration. This process, called *adaptive assessment*, is described in the "Restoration Strategy" section of this report.

The task force members believe that the efforts described in this report, managed through an adaptive assessment process, will achieve the restoration of the ecosystem: The region's rich and varied habitats will be restored to health. Lake Okeechobee, the Caloosahatchee, St. Lucie, and other estuaries, the Everglades, the mangroves, the coastal marshes, and the seagrass beds and coral reefs of Florida and Biscayne Bays will become healthy feeding, nesting, and breeding grounds for diverse and abundant fish and wildlife. The American crocodile, manatee, snail kite, Cape Sable seaside sparrow, and other endangered species will recover. The large nesting rookeries of herons, egrets, ibis, and storks will return. Fishermen, farmers, tourism-dependent businesses, and associated economies will benefit from a viable, productive, and aesthetically beautiful resource base.

It is important to understand that the "restored" Everglades of the future will be different from any version of the Everglades that has existed in the past. While it is very likely to be healthier than the current ecosystem, it will not completely match the predrainage system.

The irreversible physical changes made to the ecosystem make a complete match impossible. The restored Everglades will be smaller and somewhat differently arranged than the historic ecosystem. However, it will have recovered those hydrological and biological characteristics that defined the original Everglades and made it unique among the world's wetland systems. It will evoke the wildness and richness of the former Everglades.

Indicators of Ecosystem Health

The appropriate agencies will track progress toward restoring the ecosystem through approximately 200 performance measures developed as part of the *Comprehensive Everglades Restoration Plan*, plus additional measures for areas not covered by the CERP, such as the *South Florida Multi-Species Recovery Plan*. These measures, which range from the number of acres of periphyton in Everglades marshes to the frequency of water supply restrictions in urban and agricultural areas, represent the myriad physical, biological, and human elements that interrelate as parts of the ecosystem and are important to ecosystem health. The agencies will provide data to the task force, which will synthesize the information and report to Congress, the state legislature, and the councils of the tribes.

The following measures are a representative subset of a broader list of indicators for tracking success. Many of these represent end results that may take up to fifty years to realize.

Indicators of Total System Health

Threatened and Endangered Species

Significance and background.

Target. Improved status for fourteen federally listed threatened or endangered species, and no declines in status for those additional species listed by the state, by 20202

Deleted: ¶

Nesting Wading Birds

Significance and background. Another selected indicator of the health of the entire system is the abundance of nesting wading birds and the timing and locations of nesting, which

appears to be a critical factor in reproductive success. For example, storks that delay nesting by several months have often failed to successfully raise young birds as a result.

Large numbers of showy wading birds were a striking feature of the predrainage wetlands of South Florida. Single nesting colonies could contain as many as 50,000 to 100,000 pairs of birds. Although most of these colonies were decimated by plume hunters late in the nineteenth century, protective legislation and good habitat conditions during the early twentieth century allowed most of the nesting species to fully recover. The huge traditional rookery that was located along the extreme upper reaches of Shark River was estimated in 1934 to have been a mile in length and several hundred feet wide. These "bird cities," which contained an estimated 75-95 percent of all wading birds nesting in the predrainage Everglades, had largely disappeared from the southern Everglades wetlands by the 1960s.

It is generally agreed that the total number of wading birds nesting in the region has declined by about 90 percent since the 1930s. This decline was a direct consequence of drainage and water management practices from the 1940s to the 1990s. Substantial reductions in the total area of wetlands, changes in the location, timing, and volumes of flows, and the creation of unnatural water impoundments in the Everglades have been the factors that have combined to disrupt traditional nesting patterns, leading to declines in the total numbers of birds. Colonies that have been forced to relocate to the Everglades water conservation areas have been smaller and less successful than were the colonies in the traditional estuarine rookeries such as Shark River.

It is thought that prior to the reduction in flows into the estuaries, these areas produced much more of the food required to support the former bird cities, and that these large rookeries may only be recovered in the Everglades once natural estuarine flows are recovered.

Target. The measurable target for this indicator is to recover, at a minimum, an annual average of 10,000 nesting pairs of great egrets, 15,000 pairs of snowy egrets and tricolored herons combined, 25,000 pairs of white ibis, and 5,000 pairs of wood storks. As a requirement for meeting these numerical goals , wading birds may need to reoccupy the now largely abandoned estuarine colony sites in southern and western Everglades National Park.

In addition, wood storks must be able to return to more natural timing patterns for nesting (between November and January) than current water management practices allow.

Urban and Agricultural Water Supply

Significance and background: Another indicator of overall ecosystem health is the adequacy of the water supply. A regional water supply system can be evaluated on how well it meets reasonable and beneficial urban and agricultural demands even in drought years. In 1997 Florida established a water supply planning goal to provide water to all users during droughts up to the level of severity of a one-in-ten-year frequency of occurrence. This requirement has been interpreted to mean that the planning goal should assure at least a 90 percent probability that during any given year all of the needs of reasonable, beneficial water uses will be met while also not causing harm to the water resources and related natural environment.

Target: The planned target is to meet urban and agricultural water supply needs in all years up to and including those years with droughts with a one-in-ten-year return frequency.

Indicators of Lake Okeechobee Health

Submerged Aquatic Vegetation

Significance and background. The selected indicator of the overall health of Lake Okeechobee is the extent and health of submerged aquatic vegetation (plants that grow under water). In shallow eutrophic lakes, where organic nutrients tend to be high and to reduce the dissolved oxygen required by fish and other animals, this vegetation plays a critical role in providing habitat for fish, wading birds, and other wildlife. When submerged aquatic vegetation is dense and widespread, water generally is clear and nutrient concentrations are low, reflecting active uptake of nutrients by the plants. Shoreline areas of Lake Okeechobee have supported this type of vegetation in the past, and the plants provided these critical ecosystem functions.

Based on over a decade of scientific research, the amount of submerged aquatic vegetation rises and falls conversely with lake levels, so that a reduction in the occurrence of high lake

levels is expected to cause widespread increases in the submerged aquatic vegetation in Lake Okeechobee. This in turn will give rise to clearer water, help to lower phosphorus concentrations, and provide conditions conducive to a healthy community of fish, wading birds, and other wildlife. The extent to which fish and birds will recover following a sustained recovery of these plants remains to be seen, and is a major focus of ongoing research.

Target. The measurable target for this indicator is to sustain at least 40,000 acres of healthy submerged aquatic vegetation around the shoreline of Lake Okeechobee on an ongoing basis.

Indicators of Estuary Health

Oyster Beds in the St. Lucie Estuary

Significance and background. The selected indicator of the health of the St. Lucie Estuary is the extent of oyster beds. Oysters are ecologically important as filter-feeding primary consumers, as prey for numerous higher consumers, and as habitat formers. The decline in oyster populations has contributed to ecologically damaging algal blooms in the estuary. The inability of the water body to assimilate the overabundance of algae produced by large volumes of nutrient laden discharge is compounded by the low numbers of healthy oysters and other bivalves, which would otherwise help filter the water.

A healthy oyster population in the St. Lucie Estuary is only possible if a more stable salinity regime can be established by restoring a more natural quantity and timing of freshwater flows into the estuary. The range of salinity needed to sustain a healthy oyster population, referred to as the *salinity envelope* varies geographically and seasonally in the estuary.

Target: The measurable target for this indicator is to increase the areal extent of healthy oyster beds in the St. Lucie Estuary to approximately 4.5 times the extent in the base line year 1997, which was 209 acres. This translates into approximately 900 acres of healthy oyster beds. The target is based on an analysis that identified all areas of the estuary with suitable substrate and with potentially appropriate salinity ranges to support healthy oyster

beds, assuming that implementation of the CERP restores more natural quantity and timing of freshwater flows to these areas.

Roseate Spoonbills

Significance and background. The selected indicator of the health for the southern Florida estuaries is the number of nesting roseate spoonbills. The roseate spoonbill is listed as a species of special concern by the Florida Fish and Wildlife Conservation Commission. Although the number of nesting spoonbills in extreme southern Florida increased from 15 pairs in late 1930s to a peak of 1,254 pairs in 1979, numbers in the 1990s have fluctuated between 500 and 750 pairs. The considerable reduction since the late 1970s in the number of nesting birds in once-large nesting colonies in northeastern Florida Bay has been due to deterioration in important feeding grounds in mainland estuaries between lower Taylor Slough and Turkey Point. Recovery of nesting in northeastern Florida Bay may depend on more natural flow volumes and patterns of freshwater into adjacent estuaries. Recovery of long-abandoned spoonbill nesting colonies along the southwestern gulf coast is more problematic, but it may also depend, at least in part, on freshwater flows necessary to recover historical salinity patterns.

Target. Two measurable targets have been set for roseate spoonbills: (1) Recover and stabilize the Florida Bay nesting population to at least 1,000 pairs annually distributed throughout the bay, including doubling of the number of pairs nesting in northeast Florida Bay from the current 125 to 250 pairs. (2) Recover some level of nesting by spoonbills in the coastal zone of the southwestern gulf coast between Lostman's River and the Caloosahatchee River estuary.

Indicators of the Health of the Everglades Ridge and Slough

Tree Islands

Significance and background. The selected indicator for the health of the Everglades ridge and slough is the overall number and health of tree islands. These islands, which occur throughout the Everglades marshes, are small, isolated "high spots," which historically have provided essential habitat for a wide variety of plants and animals. The islands serve as

places of refuge for animals during periods of high water. They are sources of food and cover for wildlife, and provide nesting sites for wading birds and freshwater turtles. Tree islands are highly important to the culture of both the Miccosukee and the Seminole tribes. Hunters, fishermen, and recreational visitors to the Everglades consider tree islands to be symbolic of the health of the entire ecosystem. Because the maximum elevation of the highest tree islands is only slightly above the maximum water levels in the surrounding marshes, tree islands, with their less flood-tolerant vegetation, are very sensitive to unnaturally deep water. Unnaturally deep water can occur in regions where water flow is impeded and dammed, r or it can also occur when the tree islands lose elevation. Elevation loss occurs when the system is too dry for too long and the peat soils become oxidized or burned. Past water management practices have substantially increased how often and how long there is unnaturally deep water in water conservation areas 2 and 3, resulting in the loss or degradation of many tree islands.

Target. The measurable target for this indicator is recovery of 90 percent of the acreage and number of islands present in water conservation areas 2 and 3 in 1940, and a tree island health index of 0.90 in those areas (A health index of 1.0 indicates completely free from stress, while an index of 0 indicates that death is imminent.)

Indicators of Florida Bay Health

Seagrass Beds

Significance and background. The seagrass beds of Florida Bay are the keystone of the entire bay ecosystem. They provide critical food and habitat for shrimp, fish, and other estuarine organisms. The grass beds also stabilize the bay's sediments, thus promoting clear water and helping to minimize ecologically damaging algal blooms.

The first quantitative survey of Florida Bay seagrasses in 1984 revealed that the beds were already adversely impacted by the diversion of freshwater flows from the mainland Everglades and other human activities of the twentieth century. A large-scale die-off of seagrass started in 1987. The judgment of the overall quality of seagrass beds in Florida Bay is based on the diversity of species of grasses in the beds. Areas with only one species of

seagrass or with extremely dense seagrasses are considered to be of lower quality than diverse, moderately dense beds.

Target. The measurable target for this indicator is coverage of 65 percent to 70 percent of Florida Bay with high quality seagrass beds distributed throughout the bay.

Deleted: ¶

Commercial Pink Shrimp Harvests

Significance and background. Another good indicator of Florida Bay health is the commercial pink shrimp harvest. Pink shrimp are important both economically and ecologically in South Florida. Until the decline of the Tortugas fishery, the pink shrimp was Florida's number one fishery species in terms of value, and the bulk of the landings came from the Tortugas. In addition, pink shrimp are a major link in the food chains of many fish such as grey snapper and other game fish species of coastal South Florida. Growth and survival of young pink shrimp are influenced by salinity. Shrimp abundance, as reflected in catch rates per unit of effort, is influenced by the quantity and timing of freshwater inflows to the southwest gulf coast and Florida Bay nursery grounds. Restoration of flows more similar to rainfall-driven flows, which can be predicted by the Natural System Model, should benefit the Tortugas pink shrimp fishery.

Target. A long-term average rate of commercial harvest of pink shrimp on the Dry Tortugas fishing grounds that equals or exceeds the 600 pounds per vessel-day that occurred during the seasons 1961-62 to 1982-83, and an amount of large shrimp (defined as fewer than 68 shrimp per pound) in the long-term average catch exceeding 500 pounds per vessel.

WORK GOALS AND OBJECTIVES

The ultimate result of all the task force members' efforts should be the restoration of the South Florida ecosystem. The direct measures of success for achieving this result are described in the preceding "Vision" section of this document.

Because of the complexity and the long time frame of this initiative, it is also important to measure and track the hundreds of things that must be done (the outputs) to achieve the result of a restored ecosystem. By measuring and tracking the contributions of individual and aggregated work efforts, or projects, the task force members can identify whether restoration activities are being implemented in a timely and effective manner.

To this end, the task force members have identified three goals, related subgoals, and specific measurable objectives for the work that must be done. The three goals recognize that water, habitats and species, and the built environment are inextricably linked in the ecosystem and must be addressed simultaneously if the ecosystem is to be restored and preserved over the long term. The subgoals break the goals into more definitive areas of concern:

GOAL 1: GET THE WATER RIGHT

- Subgoal 1-A: Get the hydrology right
- Subgoal 1-B: Get the water quality right

GOAL 2: RESTORE, PRESERVE, AND PROTECT NATURAL HABITATS AND SPECIES

- Subgoal 2-A: Restore, preserve, and protect natural habitats
- Subgoal 2-B: Control invasive exotic plants

GOAL 3: FOSTER COMPATIBILITY OF THE BUILT AND NATURAL SYSTEMS

- Subgoal 3-A: Use and manage land in a manner compatible with ecosystem restoration
- Subgoal 3-B: Maintain or improve flood protection in a manner compatible with ecosystem restoration
- Subgoal 3-C: Provide sufficient water resources for built and natural systems
- Subgoal 3-D: Achieve economic equity and environmental justice

Specific, measurable objectives for what must be done in order to achieve the subgoals and goals—and ultimately the intended result of a restored ecosystem—were developed using the best information available, gained through models or research. Examples of these objectives include "develop aquifer storage and recovery systems capable of storing 1.6 billion gallons per day (gpd) by 2020" and "protect 20 percent of the coral reefs by 2020."

The objectives included in this document do not comprise the exhaustive list of everything that needs to be done to restore the South Florida ecosystem. Rather they provide an overview of the major restoration work efforts, with the assumption that if those efforts are proceeding on schedule, that is a good indication that the work of the task force members is on track. The objectives, like the projects, are subject to adaptive assessment and may be modified as restoration continues.

The major projects contributing to each objective are listed in this section of the document. If more than one project is required to meet a single objective, then each project's partial contribution is identified. Not all the task force projects are listed in this section. However, all are listed in the master table at the end of this document, and many are described in detail in appended project sheets. (See the Project Summary Table, page 82, and the project data sheets in appendix D, volume 2.)

Goal 1: Get the Water Right

Getting the water right means restoring natural hydrologic functions and water quality in wetland, estuarine, marine, and groundwater systems, while also providing for the water resource needs of urban and agricultural landscapes.

Water is the lifeblood of the South Florida ecosystem. The water flows today, however, have been reduced to less than one-third of those occurring in the historic Everglades. The quality of water that does enter the ecosystem has been seriously degraded. Water does not flow at the same times or durations as it did historically, nor can it move freely through the system. The whole South Florida ecosystem has suffered. The health of Lake Okeechobee is seriously threatened. Many

plants and animals that live in South Florida and the Everglades are in danger of becoming extinct because their habitats have been degraded, reduced, or eliminated. Excessive freshwater discharges in the wet season and inadequate flows in the dry season threaten the estuaries and bays that are critical nurseries and home to many fish and wildlife. Urban and agricultural areas are also adversely affected. Water shortages and water restrictions are occurring more frequently in some parts of South Florida.

Getting the water right must address four interrelated factors: the quantity, quality, timing, and distribution of water. More water is not always better. Alternating periods of flooding and drying were vital to the historical functioning of the Everglades ecosystem. Getting the water right must also recognize the needs of natural systems, urban communities, and agriculture. Waters need to meet applicable water quality standards, including standards to protect the natural functioning of the Everglades and those that ensure the availability of safe drinking water. The goal is that the right quantity of water, of the right quality, gets delivered to the right places and at the right times.

The following statements elaborate on what the task force members agree must be accomplished in order to get the water right. They are the result of a consensus-building exercise that first listed all the goals related to ecosystem restoration included in the planning documents of all the participating agencies, then synthesized that information into a single list of statements that all the task force participants could support. Those statements follow: Natural hydrologic functions must be restored in wetland, estuarine, marine, and groundwater systems, while also providing for the water resource needs of urban and agricultural landscapes. Natural variations in water flows and levels must be restored without diminishing essential levels of water supply or flood control. Compartmentalization must be reduced, and natural patterns of sheet flow must be recovered to the maximum extent possible. Water resources must accommodate the needs of natural systems, communities, and business. Safe drinking water must be available for the people of South Florida. Damage caused to water quality by pollutants and contaminants (such as from agricultural nutrients or urban-related pollutants) must be eliminated. Water levels and the timing of water deliveries must reflect quantities resulting from natural rainfall and must be distributed according to natural hydrologic patterns or patterns modified by scientific consensus. Damage to natural and

human systems caused by flood and drought must be minimized. Groundwater resources must be protected from depletion and contamination.

Subgoal 1-A: Get The Hydrology Right (Water Quantity, Timing, And Distribution)

How This Subgoal Will Be Implemented

On average 1.7 billion gallons per day (gpd) of water that once flowed through the South Florida ecosystem is discharged via canals to the ocean or gulf. The *Comprehensive Everglades Restoration Plan* and other projects include five programs for recapturing most of this water and redirecting it to sustain natural system functioning and to supplement urban and agricultural water supplies:

Surface water storage reservoirs. Surface water storage impoundments and water control structures will allow manipulation of flows in the system to mimic the natural system. A number of water storage facilities are planned north of Lake Okeechobee, in the Caloosahatchee and St. Lucie basins, in the Everglades Agricultural Area, and in Palm Beach, Broward, and Miami-Dade Counties. These areas will encompass approximately 181,300 acres and will have the capacity to store 1.6 million acre-feet of water. Two rock mining areas in Miami-Dade County will be converted to in-ground storage areas.

Aquifer storage and recovery. Subsurface water will be used to meet remaining water supply needs. The limestone platform that underlies Florida is honeycombed with voids and porous layers of sedimentary rock capable of holding water in storage. Water that currently leaves the ecosystem in canals can be captured and injected into these aquifers, and held in storage until the water is needed to augment surface storage supplies. The CERP envisions that more than 300 wells will be built to store water 1,000 feet underground in the upper Floridan Aquifer. Pilot testing of this approach in different geologic areas is ongoing. If proven successful, wells will be located around Lake Okeechobee, in the Caloosahatchee Basin, and along the east coast. As much as 1.6 billion gallons a day may be pumped down the wells into underground storage zones. 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. The stored water will be fed into existing surface water

impoundments for distribution through the existing surface water delivery system. ASR components represent one-fifth of the total CERP costs.

Removing barriers to sheet flow. Canals, internal levees, and other impediments to sheet flow will be removed or modified to reestablish the natural sheet flow of water through the system. The Kissimmee River Restoration Project will restore approximately 40 square miles of free-flowing river floodplain and associated wetlands, and likely will help improve the quality of water flowing into Lake Okeechobee. The Modified Water Deliveries and C-111 projects will restore historic hydrological patterns to the Everglades. Most of the Miami Canal in water conservation area 3 will be removed, and twenty miles of the Tamiami Trail (U.S. Route 41) will be rebuilt with bridges and culverts, allowing water to flow more naturally into Everglades National Park. In the Big Cypress National Preserve, the levee that separates the preserve from the Everglades will be removed to restore more natural overland water flow.

Seepage management. Millions of gallons of groundwater are lost each year as it seeps away from the Everglades towards the east coast. Seepage generally occurs either as underground flow or through levees. Three kinds of projects will reduce unwanted water loss and redirect this flow westward to the water conservation areas, Everglades National Park, and northeast Shark River Slough: (1) adding impervious barriers to the levees to block loss of water; (2) installing pumps near levees to redirect water back into the Everglades; and (3) holding water levels higher in undeveloped areas between the Everglades and Palm Beach, Broward, and Miami-Dade Counties.

Operational changes. Changes in water delivery schedules will be made in some areas to alleviate extreme fluctuations. Lake Okeechobee water levels will be modified to improve the health of the lake. In other areas, rainfall-driven operational plans will enhance the timing of water flows. Water will be delivered, as facilities are constructed, according to schedules that match natural hydrological patterns as closely as possible.

Continued research will improve understanding of the hydrology and how it can be restored while maintaining urban and agricultural water supply and flood control.

Long-Term Operations and Maintenance Needs

Effective management of water storage and delivery will require close coordination among task force members from the Army Corps of Engineers and the South Florida Water Management District. Project sponsors will constantly monitor in-place storage and water flows to ensure that the storage and recovery systems are functioning properly. Wells, wellheads, and pumps will require regular maintenance to operate effectively, and long-term operating plans have been developed to ensure continued service.

Factors Affecting Achievement of this Subgoal

The population of South Florida is expected to double by 2050, greatly increasing demands on water. Urban water supply demands could increase from approximately one billion gallons of water per day to two billion gallons per day, taxing the limited natural and economic resources of the task force participants.

A critical factor is stable and reliable funding for the timely completion of these projects. If the hydrology projects cannot be completed on schedule, the effects can cascade through the restoration effort, blocking successful completion of the water quality subgoal and delaying the habitat restoration and preservation subgoals. Delays can increase costs over the long term and, in some cases, foreclose land acquisition options, thus creating further delays or requiring project design modifications. Increasing demands on the limited natural and financial resources of the task force members may affect their ability to achieve their goals.

Many of the surface storage impoundments will be constructed on lands that have yet to be acquired. In some cases, easements are needed for impoundments and/or for canals to connect the impoundment to the system. Willingness of landowners to sell land, funds to exercise land acquisition options, and community acceptance of projects are factors that can affect completion of the objective.

Severe weather, including *el niño* and *la niña* cycles, and natural disasters such as hurricanes and forest fires will delay completion of the restoration activities. Impoundment dikes are particularly susceptible to severe rainstorm damage during and immediately after construction. Careful construction can minimize but not eliminate project setbacks and delays

due to weather events such as hurricanes and tropical storms. Extreme weather conditions may also affect the ability to manage and maintain aquifer water storage, given the complexity of the limestone geology of Florida.

Specific, Measurable Objectives for Achieving This Subgoal

The objectives established for achieving this subgoal are

- Provide 1.6 million acre-feet of surface water storage by 2039.
- Develop aquifer storage and recovery systems capable of storing 1.6 billion gallons per day (gpd) by 2020.
- Modify 279 miles of impediments to flow by 2019.

The key projects needed to achieve these objectives and the schedule for their implementation are shown in table 2. The outputs listed in tables 2 and 3 and the measures and targets in table 13 reflect strategy goals and are not intended to function as an allocation or reservation of water which must be implemented through applicable law.

Table 2. Subgoal 1-A: Get The Hydrology Right

Objective	Milestone Project (Refer to table 13, p. 82, for more information about specific project schedules, funding, responsible agencies, etc.)		Output	Project Underway or Completed
Objective1-A.1: Provide 1.6 million acre-feet of surface water storage by 2039			acre-feet	
	2001 2004	Allapattah Flats Seminole Critical Project for the West Side of the Big Cypress Water Conservation Project	3,000	
	2007	Acme Basin B Discharge	5,000	
	2007	C-44 Basin Storage Reservoir	40,000	
	2008	Wetland Reserve Program		
	2009	Everglades Agricultural Area Storage Reservoir, Phase 1	360,000	Underway
	2009 2010	Taylor Creek/Nubbin Slough Reservoir and STA C-23/C-24/C-25/Northfork and Southfork Storage Reservoirs	50,000 349,400	
	2010	Seminole Tribe Comprehensive Surface Water Management System for the Brighton Reservation	10,000	
	2011	C-43 Basin Storage, Phase 1	160,000	Underway
	2011	Water Preserve Areas/L-8 Basin	48,000	
	2012	Seminole Tribe Water Conservation Project for Big Cypress Reservation	7,500	
	2013 2014	North of Lake Okeechobee Storage Reservoir Bird Drive Recharge Area	200,000 11,500	
	2014	Site 1 Impoundment	15,000	
	2014	Everglades Agricultural Area Storage Reservoir, Phase 2		
	2016	Palm Beach County Agricultural Reserve Reservoir	20,000	
	2036	North Lake Belt Storage Area	90,000	
	2036	Central Lake Belt Storage Area	190,000	

Table 2. Subgoal 1-A: Get The Hydrology Right

Objective	Milestone Project (Refer to table 13, p. 82, for more information about specific project schedules, funding, responsible agencies, etc.)		Output	Project Underway or Completed
Objective 1-A.2: Develop aquifer storage and recovery systems capable of storing 1.6 billion gpd by 2020	2009	Lake Okeechobee ASR Pilot Project	Billion gpd	Underway
	2014	Site 1 Impoundment and Aquifer Storage and Recovery	150	
	2014	Water Preserve Areas/L-8 Basin	50	
	2018	C-43 Basin Storage Reservoir and ASR	220	Underway
	2019	Palm Beach County Agricultural Reserve Reservoir and ASR	75	
	2020	C-51 Regional Groundwater Aquifer Storage and Recovery	170	
	2026	Lake Okeechobee Aquifer St orage and Recovery	1,000	
Objective 1-A.3: Modify 279 miles of impediments to flow by 2019			(miles modified)	
	1997	Kissimmee Prairie Ecosystem	39	
	2001	Southern CREW Project Addition		
	2003	Modified Water Deliveries Project	240	
	2008	South Dade Wetlands Addition		
	2009	C-111 N Spreader Canal		Underway
	2015	Big Cypress/L-28 Interceptor Modifications		
	2015	WCA-3 Decompartmentalization		

Subgoal 1-B: Get The Water Quality Right

Phosphorus runoff from agriculture and stormwater from urban areas has polluted much of the Everglades and Lake Okeechobee and impaired ecological conditions. The water quality of the Caloosahatchee River, St. Lucie Estuary, Biscayne Bay, Florida Bay, the Florida Keys, and the nearshore waters of the coasts similarly shows significant signs of degradation, largely from pollutants and releases of excess freshwater into estuaries.

How This Subgoal Will Be Implemented

Everglades Forever Act. In 1994 the Florida Legislature passed the Everglades Forever Act, which codified measures to improve water quality. One provision established the Everglades Construction Project, a series of six stormwater treatment areas (STAs) currently under construction between the Everglades Agricultural Area and the natural areas to the south The purpose of these STAs is to reduce the phosphorus loads in waters entering the conservation areas.

Additionally, the state uses regulatory programs and best management practices (BMPs) to reduce phosphorus from urban and agricultural discharges. These programs and practices have reduced the phosphorus loads from the EAA to the Everglades. However, the final goals have not been met. The Urban and Tributary Basins Program is being developed to ensure that all other basins impacting the Everglades meet state water quality standards.

Generally, the STAs and BMPs are expected to reduce overall phosphorus levels to 50 parts per billion (ppb). Additional actions will be needed to meet the state phosphorus standard for natural areas. If the state has not yet adopted this standard by January 2003, the Everglades Forever Act sets a default of 10 ppb. The South Florida Water Management District is researching advanced treatment technologies to enhance the performance of the STAs and potentially expand application to other tributaries of the Everglades. For the STAs, approximately 35,600 acres of manmade wetlands will be built to treat urban and agricultural runoff water before it is discharged to the natural areas throughout the system. STAs are to be located in basins draining to Lake Okeechobee, the Caloosahatchee River basin, the St. Lucie Estuary basin, the Everglades, and the Lower East Coast. These are in addition to over 44,000 acres of areas already being constructed under the Everglades Forever Act. Once completed, these efforts are expected to improve water quality.

Recent water quality standard modifications. In May 1999 the Environmental Protection Agency (EPA) approved the 10 micrograms total phosphorus per liter (10 µg TP/l) water column quality standard adopted by the Miccosukee Tribe of Indians of Florida. The water quality standard applies to class III-A waters within tribal boundaries, defined by the tribe as tribal water bodies used for "fishing, frogging, recreation (including airboating), and the propagation and maintenance of a healthy, well-balanced population of fish and other aquatic life and wildlife…primarily designated for preservation of native plants and animals of the natural Everglades ecosystem." While tribal waters are located within the interior of water conservation area 3A, which has median background total phosphorus concentrations ranging from 4 to 10 µg/l, the EPA determined that at present no data suggest that phosphorus concentrations less than or equal to 10 µg /l cause changes in flora or fauna. Citing peer-reviewed publications and technical reports, the EPA determined that the 10 µg/l standard was a "scientifically defensible value which is not overly protective" and will protect the class III-A designated use. It also states, however, that additional Everglades data are still

being collected and if further studies show that 10 µg /l is not protective of class III-A waters, then the tribe should revise its standard as necessary.

In December 2001 the Florida Department of Environmental Protection issued a proposed standard for water quality in the Everglades Protection Area. This numerical standard quantitatively interprets the narrative standard found in the Everglades Forever Act. The proposal sets forth a phosphorus criterion of 10 parts per billion (10 ppb) for all predominantly freshwater portions of the Everglades Protection Area. This is an ambient standard, meaning it is the typically desirable condition for phosphorous concentrations in the water column for maintaining the natural balance of aquatic flora and fauna in the Everglades. This proposed standard is also the default numeric standard that was established by the Florida Legislature for the Everglades Protection Area in the event a standard was not adopted through normal rulemaking.

Other ongoing projects. Other ongoing projects include the Lake Okeechobee Protection Program, which includes a study that will identify a feasible method for reducing phosphorus loading in the lake, and a multi-agency program for protecting water quality in the Florida Keys National Marine Sanctuary.

Water management plans. Monitoring and research will be required before outlining additional plans for improving water quality in South Florida's lakes, wetlands, estuaries, and bays. Consequently, not all the projects and outputs needed to achieve this goal have been identified.

Section 303(d) of the federal Clean Water Act requires states to submit lists of surface waters that still do not meet applicable water quality standards (impaired waters) after implementation of technology-based effluent limitations, and to establish total maximum daily loads (TMDLs) for these waters on a prioritized schedule. For those waters deemed impaired, the Florida Department of Environmental Protection, in conjunction with the South Florida Water Management District, the Florida Department of Agriculture and Consumer Services, and other appropriate entities, will develop TMDLs. The TMDL will establish the maximum amount of a pollutant that a water body can assimilate without impairing the

designated use. Currently there are 154 water segments listed on the state's 303(d) list within the boundaries of the South Florida Water Management District.

The state is transitioning to a watershed management program that is based on a five-phase cycle. During the first phase, the water quality data for each basin will be assessed, and waters determined to be potentially impaired will be identified. In phase two intensive monitoring will be conducted to supply data needed to either verify a suspected impairment or (in cases where the impairment has previously been verified) to model the impaired waters and generate TMDLs. generated. During the third phase, TMDLs for impaired waters will be calculated and allocated to individual point sources and the major categories of nonpoint sources. After TMDLs are adopted, a consensus-based basin management action plan, which will include a TMDL implementation plan, will be developed during the fourth phase.

The fifth and final phase will involve the implementation of the proposed management options, including securing funding, passing local or state legislation, and writing permits that reflect the limits of the TMDLs. Implementation of TMDLs may involve to any combination of regulatory, nonregulatory, or incentive-based actions that attain the necessary reduction in pollutant loading. Nonregulatory or incentive-based actions may include development and implementation of BMPs, pollution prevention activities, and habitat preservation or restoration. Regulatory actions may include issuance or revision of wastewater, stormwater, or environmental resource permits to include permit conditions consistent with the TMDL. Once these plans have been adopted and implemented, progress will be monitored until waters are eventually certified as meeting water quality standards.

As there are nearly 800 water body segments and 2000 parameters of concern on the current 303(d) list, it will take two rotations through the state to assess all the waters on the list. The first five-year cycle will cover those waters with a high priority, while those with a lower priority will be addressed in the second rotation.

Comprehensive Integrated Water Quality Plan. *The Comprehensive Integrated Water Quality Plan* will serve as a framework for integrating water quality restoration targets for South Florida water bodies into future planning, design, and construction activities included in the *Comprehensive Everglades Restoration Plan.*

Factors Affecting Achievement of the Subgoal

Severe weather, including *el niño* and *la niña* cycles, and natural disasters, such as hurricanes and forest fires, will adversely affect water quality.

Many of the stormwater treatment areas will be constructed on lands that have yet to be acquired. Willing land sellers, funds to exercise land acquisition options, and community acceptance of projects are factors that can affect completion of the objective.

Funding is always a critical factor. If the water quality projects cannot be completed on schedule, the effects can cascade through the restoration effort, delaying the habitat restoration and preservation subgoals.

Specific, Measurable Objectives for Achieving This Subgoal

The objectives established for achieving this subgoal are:

- Construct 80,000 acres of stormwater treatment areas by 2036.
- Prepare plans, with strategies and schedules for implementation, to comply with TMDLs for 100 percent of impaired water bodies by 2011.

The key projects needed to achieve these objectives and the schedule for their implementation are shown in table 3. The outputs listed in tables 2 and 3 and the measures and targets in table 13 reflect strategy goals and are not intended to function as an allocation or reservation of water which must be implemented through applicable law.

Table 3. Subgoal 1-B: Get the Water Quality Right

Objective	Milestone Project (Refer to table 13, p. 82, for more information about specific project schedules, funding, responsible agencies, etc.)		Output (acre feet)	Project Underway or Completed
Objective 1-B.1: Construct 80,000 acres of stormwater treatment areas by 2036	1999	Talisman	8,550	Completed
	2000	STA-2 Works	6,400	Completed
	2000	STA-1 West Works	6,700	Completed
	2002	Miccosukee Tribe Water Management Area	900	
	2002	Lake Okeechobee Water Retention/Phosphorus Removal		
	2002	West Palm Beach Canal (C-51) and STA-1E	6,500	
	2003	STA-5 Works	4,100	
	2003	STA-1 East/C-51 West	5,000	
	2004	STA-3/4		
	2004	STA-6	2,200	

Objective	Milestone Project (Refer to table 13, p. 82, for more information about specific project schedules, funding, responsible agencies, etc.)		Output (acre feet)	Project Underway or Completed
	2006	Western C-11 Diversion Impoundment and WCA	1,600	
	2007	C-9 STA	2,500	
	2009	Taylor Creek / Nubbin Slough Reservoir and STA	5,000	
	2010	C-17 Backpumping and Treatment	550	
	2010	C-51 Backpumping and Treatment	600	
	2013	Lake Okeechobee Watershed Water Quality Treatment Facilities	4,400	
	2013	North of Lake Okeechobee Storage Reservoir	2,500	
	2014	Caloosahatchee Backpumping with Stormwater Treatment	20,000	
	2015	Big Cypress/L-28	1,900	
	2036	Central Lake Belt Storage Area	600	
Objective 1-B.2: Prepare plans, with strategies and schedules for implementation, to comply with TMDLs for 100 percent of impaired water bodies by 2011		TMDL Program: Implementation of the Florida Watershed Restoration Act		

Goal 2: Restore, Preserve, and Protect Natural Habitats and Species

Natural habitats and species will be restored when the diversity, abundance, and behavior of native South Florida animals and plants in terrestrial and aquatic environs are characteristic of predrainage conditions.

Before European settlement the natural habitats of South Florida covered an area of about 18,000 square miles. This enormous space encompassed a rich mosaic of ponds, sloughs, sawgrass marshes, hardwood hammocks, and forested uplands. In and around the estuaries, freshwater mingled with salt to create habitats supporting mangroves and nurseries for wading birds and fish. Beyond, nearshore islands and coral reefs provided shelter for an array of terrestrial and marine life. The vast expanses of habitat were large enough to support far-ranging animals, like the Florida panther, and super colonies of wading birds, such as herons, egrets, roseate spoonbills, ibis, and wood storks. For thousands of years this resilient ecosystem withstood and repeatedly recovered from the effects of hurricanes, fires, severe droughts, and floods, retaining some of the greatest biodiversity found on earth.

Today the Florida panther and sixty-seven other animal or plant species are listed by the U.S. Fish and Wildlife Service (FWS) as threatened or endangered. Many additional species are of special concern to the State of Florida or are imperiled, meaning that they could become listed by the FWS. Super colonies of wading birds no longer nest in the Everglades. The wetland habitats that supported these species have been reduced by half, fragmented by roads, levees, and other structures, dewatered by canals, and degraded by urban and agricultural pollutants. The marine environments of the bays have suffered a similar decline. Altered biological communities are being overrun by invasive exotic plants and animals capable of outcompeting native species and habitats. Exotic plants now make up approximately one-third of the total plant species known in Florida. The Florida Exotic Pest Plant Council has identified 125 of these as serious risks to Florida's natural areas and its threatened and endangered native plants and animals.

The combination of *connectivity* and *spatial extent* created the range of habitats and supported the levels of productivity needed for the diversity and abundance of native plants and animals. The original Everglades and other South Florida environments formed hydrologically integrated systems from boundary to boundary. Restoring natural habitats and species will require reestablishing the hydrological and other conditions conducive to native communities and piecing together enough areas of potential habitat. Exotic species must be managed and the escape of new exotics must be prevented. Then it will require time for native plants and animals to reestablish populations and communities. The intended result will be self-sustaining populations of diverse native animal and plant species. This must take into account that populations that have adapted to current conditions may be impacted.

The following statements elaborate on what the task force members agree must be accomplished in order to restore, preserve, and protect natural habitats and species. They are the result of a consensus-building exercise that first listed all the goals related to ecosystem restoration included in the planning documents of all the participating agencies, then synthesized that information into a single list of statements that all the task force participants could support. Those statements follow: The diversity, abundance, and behavior of native South Florida animals and plants and their terrestrial and aquatic habitats must be characteristic of predrainage conditions. The spatial extent of wetlands and other natural systems must be sufficient to support the historic functions of the greater Everglades

ecosystem. Important wildlife corridors must be identified, enhanced, and preserved. Endangered and other federal and state listed species must recover self-sustaining levels, and sufficient habitats for maintaining healthy numbers must be restored and protected. Invasive exotic plant and animal species must be substantially eliminated or reduced to manageable levels.

Subgoal 2-A: Restore, Preserve, and Protect Natural Habitats

How This Subgoal Will Be Implemented

Land acquisition. Land acquisition is critical to South Florida ecosystem restoration efforts. Land is needed to preserve habitat for native plants and animals and to act as a buffer to existing natural areas. Land is also needed for water quality treatment areas, water storage reservoirs, and aquifer recharge areas that will help restore natural hydrology.

The federal government has played an important role in land acquisition. Over the past several decades, the federal government has acquired title to lands for conservation purposes, such as inclusion in national parks, national preserves, and national wildlife refuges. The federal government also has provided financial support to state land acquisition programs, such as the $200 million provided by the 1996 Farm Bill for acquisition in support of ecosystem restoration. Using existing land use plans and priorities, and based upon the availability of annual appropriations, federal land managers will continue to acquire lands within authorized boundaries of existing national wildlife refuges and national parks and preserves in the South Florida ecosystem. The completion of these areas will provide additional habitat for threatened, endangered, and other species, as well as recreational opportunities for the people of South Florida. Further, based upon the availability of annul appropriations, federal land managers will continue to look for opportunities to assist the State of Florida in acquiring the highest priority areas for implementation of the *Comprehensive Everglades Restoration Plan*.

As of September 1999 the State of Florida had acquired 3.2 million acres in South Florida for habitat conservation purposes and had identified an additional 500,000 acres for acquisition. The Conservation and Recreational Lands (CARL) and Save Our Rivers (SOR) programs have been Florida's primary land acquisition programs. These and the other land acquisition

programs identify and acquire lands from voluntary sellers through a process described under chapters 259 and 373 of the Florida Statutes. The governor and cabinet approve CARL projects, and the South Florida Water Management District Governing Board approves SOR projects. The state also partners with local governments and other entities to identify and jointly acquire conservation lands. These lands are acquired primarily for ecosystem protection and restoration and are managed for those purposes and for water resource protection and recreation.

Both CARL and SOR projects are currently primarily funded by P-2000 funds and will be funded over the next ten years by Florida Forever funds. Florida Forever is a ten-year continuation of the P-2000 Program and will raise approximately $3 billion ($300 million per year) over the next ten-year period.

In recent years, local governments have initiated, voted, and approved land acquisition programs for hundreds of millions of dollars. These existing land acquisition programs protect and restore the South Florida ecosystem, and interest is growing for many counties to undertake similar initiatives. These programs have the potential to complement and support the *Comprehensive Everglades Restoration Plan* as well as to foster compatibility of the built and natural systems.

State CARL and SOR lands, federal parks and preserves, water preserve areas, county and private conservation lands, conservation easements and other agreements with private landowners, and other lands acquired for South Florida ecosystem restoration will help expand and connect a mosaic of upland, wetland, coastal, and marine habitats that will support the recovery of many currently imperiled species. When completed, these efforts will yield a total of approximately 5.1 million acres for habitat protection. These lands also provide opportunities for outdoor recreation and education to the state's residents and visitors.

Protection of critical habitat for threatened and endangered species. The *South Florida Multi-Species Recovery Plan*, prepared by The U.S. Fish and Wildlife Service, addresses the recovery needs of South Florida's sixty-eight federally listed threatened and endangered species. A major section of that plan describes twenty-three of the natural vegetative

communities in South Florida and identifies management actions needed to restore South Florida's ecosystem. Protecting critical habitat for threatened and endangered species will involve major coordination between the aggressive land acquisition programs of the state and the land acquisition plans for the National Wildlife Refuge System and the National Park System. The task force has appointed a Multi-Species/Ecosystem Recovery Implementation Team to prioritize actions included in the recovery plan.

Wetlands enhancement. The *Comprehensive Everglades Restoration Plan* calls for removing impediments to water flow and restoring near natural volumes of water in the remaining wetlands. This will make hydrological connections among large portions of the remaining habitat and substantially enlarge the extent of healthy wetlands, thus greatly enhancing the value of this habitat to wildlife. Modeling efforts regarding improving habitat quality of natural areas in South Florida indicate that completion of CERP will result in the restoration of almost 2.2 million acres. **Restoration and preservation of coral reefs.** Other major efforts to restore and preserve habitat involve the designation of an ecological reserve and a research natural area to protect critical coral reef communities in the western portion of the Florida Keys National Marine Sanctuary and Dry Tortugas National Park. The Tortugas region in the Straits of Florida has near-pristine marine resources, including one of the best-developed tropical coral reef systems on the continent. It is the epicenter of marine productivity for the region. This vast system has recently come under assault from inappropriate fishing practices and other public use. Ensuring its long-term protection and appropriate public use will require cooperation among multiple and overlapping jurisdictions, including the U.S. Departments of Commerce and Interior and the State of Florida. The recently designated Tortugas Ecological Reserve fully protects 151 square nautical miles, or 10 percent, of the reef. When the research/natural area is established at Dry Tortugas National Park, it will add 46 additional nautical square miles to the protected area.

Deleted: ¶
¶

Factors Affecting Achievement of this Objective

The availability of land from willing sellers, land values, the rate of development, and annual legislative appropriations will determine land acquisition progress.

Specific, Measurable Objectives for Achieving This Subgoal

The objectives established for achieving this subgoal are

- Acquire 1.95 million acres of land for habitat protection. (This acreage represents the total acreage of all the habitat-protection land-acquisition projects that have not yet been completed. It does not include the completed projects, which have an additional total acreage of approximately 3.15 million acres. Of the 1.95 million acres in uncompleted projects, approximately 1.4 million acres have already been acquired, leaving approximately 550,000 acres still targeted for acquisition. Of this 550,000 acres, approximately 500,000 acres are projected for acquisition by the State of Florida and local governments, and the remaining 50,000 are projected for acquisition by the federal government.)
- Protect 20 percent of the coral reefs by 2020.
- Improve habitat quality for 80 percent of the 2.7 million acres of natural areas in South Florida.

The key projects needed to achieve these objectives and the schedule for their implementation are shown in table 4.

Table 4. Subgoal 2-A: Restore, Preserve, and Protect Natural Habitats

Objective	Milestone Project (Refer to table 13, p. 82, for more information about specific project schedules, funding, responsible agencies, etc.)		Output (acres)	Project Underway or Completed
Objective 2-A.1: Acquire 1.95 million acres of land for habitat protection[12]	1986-1999	Dupuis Reserve	21,875	
	1986-1999	Nicodemus Slough	2,219	
	1986-1999	South Fork St. Lucie River Land Acquisition	184	
	1986-1999	Kissimmee Prairie Ecosystem	38,282	
	1986-1999	Tibet-Butler Preserve	439	
	1986-1999	Miami-Dade County Archipelago	856	
	1986-1999	Corkscrew Regional Mitigation Bank	661	
	2000	East Everglades Addition to Everglades National Park	109,504	
	2000	Complete Land Acquisition for Biscayne National Park	2,002	
	2001	Loxahatchee River Land Acquisition	1,936	

[1] The 1.95 million-acre objective represents the total acreage of all the unfinished acquisition projects, which are listed in the table. It does not include the completed acquisition projects, which have an additional total acreage of approximately 3.15 million acres.

[2] The state will acquire lands in accordance with Florida laws and protocols. The actual time line and acquisition will be subject to negotiations with private landowners.

Objective	Milestone Project (Refer to table 13, p. 82, for more information about specific project schedules, funding, responsible agencies, etc.)		Output (acres)	Project Underway or Completed
	2001	Twelve Mile Slough	3,300	
	2001	Paradise Run	4,265	
	2002	Loxahatchee Slough Land Acquisition	15,200	
	2002	North Savannas	930	
	2002	Upper Lakes Basin Watershed	43,500	
	2004	Big Cypress National Preserve Addition[3]	6,113	
	2006	C&SF: CERP Restoration of pineland and hardwood hammocks in C-111 Basin	50	
	2010	Big Cypress National Preserve Private Inholdings**	878	
	2010	Multi-Species Recovery Strategy		
	2010	Water Conservation Areas 1,2, and 3	862,800	
	No target date	Six Mile Cypress	1,741	
		South Savannas	6,046	
		Florida Keys Ecosystem	7,611	
		North Key Largo Hammocks	4,508	
		Atlantic Ridge Ecosystem	12,514	
		Rotenberger/Holey Land Tract	79,170	
		Cayo Costa	1,932	
		Charlotte Harbor Flatwoods	44,755	
		Lake Wales Ridge Ecosystem	12,770	
		Barnacle Addition	7	
		Pineland Site Complex	250	
		Osceola Pine Savannas	42,291	
		Barfield Farms	1,367	
		Cypress Creek/Trail Ridge	13,788	
		Estero Bay	16,740	
		Lake Walk-In-Water	4,615	
		Land Adjacent to Dade County Training Jetport	24,000	
		Fisheating Creek	168,360	
		North Fork St Lucie River	3,800	
		Juno Hills	440	
		Belle Meade	27,200	
		Fakahatchee Strand	80,231	
		Rookery Bay	18,532	
		Coupon Bight/ Key Deer Big Pine Key	3,452	
		Allapattah Flats/Ranch	34,221	
		Okaloacoochee Slough	37,210	
		Indian River Lagoon	5,136	
		Pal-Mar	35,435	
		Corkscrew Regional Ecosystem Watershed	59,008	
		Southern Golden Gate Estates	57,200	
		North Key Largo	4,508	
		Catfish Creek	10,609	
		Caloosahatchee Ecoscape	15,391	

[3] Consistent with the Big Cypress Acts of 1974 and 1988.

Objective	Milestone Project (Refer to table 13, p. 82, for more information about specific project schedules, funding, responsible agencies, etc.)		Output (acres)	Project Underway or Completed
Objective 2-A.2 Protect 20 percent of the coral reefs by 2020		Establish an ecological reserve encompassing 192 square nautical miles of coral reefs in the Tortugas region by 2001	10 percent of coral reefs in South Florida	
Objective 2-A.3: Improve habitat quality for 80 percent of the 2.7 million acres of natural areas in South Florida				

Subgoal 2-B: Control Invasive Exotic Plants

The *South Florida Multi-Species Recovery Plan* identifies the control of exotic species as integral to the restoration of the ecosystem and to the recovery of threatened and endangered and other imperiled species. Some invasive exotic plants have spread in natural areas to the extent that the native plants and animals are in danger of being replaced in their entirety. The most widespread and serious exotic plants are listed below, along with the extent of their current infestations:

Terrestrial Species	**Extent of Infestation**
Melaleuca (*Melaleuca quinquenervia*)	400,000 acres
Brazilian pepper (*Schinus terebinthefolius*),	1,000,000 acres
Australian pine (*Casuarina* spp.),	200,000 acres
Old World climbing fern (*Lygodium microphyllum*)	100,000 acres
Aquatic Species	
Hydrilla (*Hydrilla verticillata*)	
Water hyacinth (*Eichornia crassipes*)	
Water lettuce (*Pistia stratiotes*)	

How This Subgoal Will Be Implemented

The Noxious Exotic Weed Task Team established by the task force has developed an assessment and strategy for managing invasive exotic plants. The following three actions included in that strategy should begin immediately as part of the restoration process. Other actions are still being developed and will be incorporated into updates of this document.

Species management plans. Species management plans, when adequately funded and implemented, have provided successful control of invasive exotic plants. These plans offer the advantage of replacing piecemeal efforts of managing exotic plants on individual sites, or controlling a few plants in broader regions, with multiagency programs that integrate statewide invasive plant management activities, organizations, priorities, and resources. More than twenty exotic plants need attention, and developing plans for just the top twenty will take several years.

Six species in Florida (melaleuca, Brazilian pepper, Old World climbing fern, hydrilla, water lettuce, and water hyacinth) have statewide species-based management plans. Plans must be developed for each species because each has species specific characteristics that need to be addressed.

Maintenance control. *Maintenance control* is an approach that applies routine, coordinated management to reduce invasive exotic plant populations and maintain them at the lowest feasible levels. Many techniques are used including mechanical removal, chemical treatment, and predatory biological controls. The three major aquatic species (hydrilla, water hyacinth, and water lettuce) are currently in maintenance control. Achieving maintenance control for melaleuca is well underway; infestations have been reduced from approximately 500,000 to less than 400,000 acres. Additional resources are needed to completely implement the melaleuca plan. Plans for Brazilian pepper and Old World climbing fern have been minimally implemented due to lack of resources. Plans and control programs for other priority species need to be incorporated into the multi-agency management framework and invasive exotic plant strategy.

The South Florida Water Management District and the Southeast Regional Office of the National Park Service are jointly implementing Exotic Plant Control Teams for Florida national parks and natural lands within the water management district. These teams are trained to identify and remove invasive exotic plants. After locating populations of plants for control these teams move in and eradicate them, also helping the individual agency bring the species under maintenance control.

Prevention. The reasons some species become invasive and some ecosystems seem more readily invaded are not well understood. However, if a species becomes widely invasive it is difficult and expensive to manage.

Preventing the introduction of invasive species is the only absolute means to control them, but absolute prohibitions and exclusions are impractical. An early warning program for potentially invasive species, a risk assessment for evaluating possible invasiveness prior to introduction, methods for early detection of incipient populations of new species, predictive tools to assist in determining where plants may invade, and the ability to eradicate incipient populations are needed.

The Federal Interagency Committee for the Management of Noxious Exotic Weeds is planning a national early-warning information system for invasive exotic plants. Florida needs to participate in this national program.

Long-Term Operations and Maintenance Needs

At no time in an exotic species control program, even when the population is under control, should resources drop below the maintenance-level requirement, or the species will expand and reinvade to precontrol levels and the program must start from zero once again. Weed management is like any other long-term program in that sufficient funds must be available on a continuous basis in order to achieve maintenance control. A reduced level of resources may be all that is needed to maintain control. However, discontinuing this funding has been a problem that has continually plagued invasive species management programs nationally.

Factors Affecting Achievement of this Subgoal

The control programs for water hyacinth, water lettuce, and hydrilla have been successful because good management plans were developed for each species that included prioritizing sites for control, assessing the extent of infestations, directing essential research to understand the biology of the species, and specifying proven control techniques. The plans had multi-agency coordination and adequate funding.

To bring the other high priority species under maintenance control, agencies will need to organize formally to implement similarly complex management programs. Any of these factors will adversely affect success: Lack of a comprehensive plan, failure to integrate individual control programs, inadequate interagency coordination, inadequate funding and implementation, or a lack of motivation among the agencies to coordinate on a statewide level. The major impediment to success has not been the ability to control these species but the willingness to do so.

Continuing degradation of the natural environment may enhance the spread or rate of spread of exotic species. Adjacent landowners will impact the success of controlling exotics if these lands remain infested or if the landowners are not interested in land acquisition.

The unregulated importation of new plant species continues to increase the potential for infestations of exotic plants.

Specific, Measurable Objectives for Achieving This Subgoal

The objectives established for achieving this subgoal are

- Prepare management plans for the top twenty South Florida invasive exotic plant species by 2010.
- Achieve maintenance control status for Brazilian pepper, melaleuca, Australian pine, and Old World climbing fern in all natural areas statewide by 2020.
- Complete an invasive exotic plant prevention, early detection, and eradication plan by 2005.

The key projects needed to achieve these objectives and the schedule for their implementation are shown in table 5.

Table 5. Subgoal 2-B: Control Invasive Exotic Plants

Objective	Milestone Project (Refer to table 13, p. 82, for more information about specific project schedules, funding, responsible agencies, etc.)		Output	Project Underway or Completed
Objective 2-B.1: Prepare management plans for the top twenty	2000	Management plans for melaleuca, Brazilian pepper, Old World climbing fern, hydrilla, water lettuce, and water hyacinth Prioritization of remaining plans is underway.		

Objective	Milestone Project (Refer to table 13, p. 82, for more information about specific project schedules, funding, responsible agencies, etc.)		Output	Project Underway or Completed
South Florida invasive exotic plant species by 2010 Objective 2-B.2: Achieve maintenance control status for Brazilian pepper, melaleuca, Australian pine and Old World climbing fern in all natural areas statewide by 2020		Integrated Maintenance Control Program		
Objective 2-B.3: Complete an invasive exotic plant prevention, early detection and eradication plan by 2005		Invasive Exotic Plant Prevention Program		

Goal 3: Foster Compatibility of the Built and Natural Systems

Compatibility of the built and natural systems will be realized when the built environment is compatible with ecosystem restoration and preservation goals.

Balmy weather, vibrant communities, beautiful scenery, and abundant natural habitats at the land/sea interface offer South Florida residents a unique choice of lifestyles and visitors a seemingly endless variety of destinations. The diversity of landscapes, including some of the most intensively developed and densely populated areas in the state, has contributed to the economic success and high quality of life enjoyed by Floridians and experienced by visitors from around the world.

This lifestyle has not come without a price. Tremendous population growth and the subsequent need for public services have resulted in adverse impacts on natural ecological systems. These impacts include loss of fish and wildlife habitat, severe drawdown of freshwater resources, intrusion of saltwater into freshwater aquifers, loss of coastal, upland, wetland, and barrier island habitat, loss of open space, and degradation of water quality.

The rapid rate and volume of growth and the accompanying sprawl development patterns have reduced the spatial extent and vitality of the natural system. Its declining health has

become more apparent as symptoms of stress have developed in the state's most stunning natural features. The imbalance has contributed to a renewed focus by state, local, regional and national decision makers and citizens on addressing the unintended consequences of growth.

The following statements elaborate on what the task force members agree must be accomplished in order to restore, preserve, and protect natural habitats and species. They are the result of a consensus-building exercise that first listed all the goals related to ecosystem restoration included in the planning documents of all the participating agencies, then synthesized that information into a single list of statements that all the task force participants could support. Those statements follow: The people of South Florida must understand the connections between a healthy environment and a healthy community. Development patterns—development, redevelopment, and infrastructure— must be compatible with and complementary to ecosystem restoration. Development practices must support conservation of significant and special natural areas and reduce habitat fragmentation. Flood control must be maintained at existing levels, or augmented where appropriate. The quality of life of people in South Florida must be enhanced through the ability to reside in areas with fishable, drinkable and swimmable water, and clean air. Blueways, greenways, and roadways must be compatible with and complementary to getting the water right and enhancing and preserving the natural system. Land, water, and transportation planning must be coordinated and supportive of ecosystem restoration. Agriculture must be an environmentally and economically sound component of the landscape, consistent with ecosystem restoration. Stormwater and wastewater must be reclaimed when possible. The ecosystem must not be damaged by improper disposal of wastes.

The same issues that are critical to the natural system—getting the water right and restoring, preserving, and protecting diverse habitats and species—are equally critical to maintaining a high quality of life for South Florida's residents. Like the future of South Florida's natural systems, the future of its human communities is utterly dependent on getting the water right. The appropriate quality, timing, and distribution of water is essential to meeting the future water supply needs generated by projected population growth and by continuing economic productivity, most notably in tourism and agriculture (the two largest sectors of the economy). The overriding issue is not who gets the water, the natural system or the built

system, but how to fulfill all water needs by ensuring that what is built can be adequately supported within the parameters of a healthy natural system. Failure to achieve this compatibility would prove catastrophic for both future residents and the environment. Recognizing this relationship, the State of Florida has statutory goals for water supply that specifically charge water managers to ensure an adequate supply of water for protection of the natural system and the needs of the population.

Similarly, in order to maintain a high quality of life for South Florida's residents, the land must be used and managed in a manner that both supports the social and economic needs of communities and is compatible with the restoration, preservation, and protection of natural habitats and species. This will require development patterns, policies, and practices that serve both built and natural systems. Urban, suburban, and rural development utilizes lands that would otherwise be available to support natural system functioning. To the extent that development patterns in these areas are sensitive to the critical needs of natural systems, as well as the needs of community residents, South Florida's communities can be a sustainable part of a healthy ecosystem.

Providing the land base for human habitation will continue to require considerable flood protection, since without such protection most of South Florida would be unsuitable for existing urban and agricultural uses. Given population growth projections for South Florida there will be an ongoing need for monitoring and balancing the flood protection needs of urban, natural, and agricultural lands as part of restoration.

The provision of adequate water resources, land development opportunities, and flood control for the built environment--in ways that are compatible with the restoration of the Greater Everglades ecosystem--are three of the task force's highest priorities. The fourth priority related to this goal is to ensure that this large-scale, intergovernmental ecosystem restoration initiative is sensitive to human health and environmental conditions equitably in all communities. The task force partners are committed to ensuring that the community benefits forthcoming from this initiative, along with the efforts needed to ensure its success, do not discriminate against minority or low-income communities.

Subgoal 3-A: Use and Manage Land in a Manner Compatible with Ecosystem Restoration

How This Subgoal Will Be Implemented

Compatible land use policies and practices. State, regional, and local agencies are using a variety of planning tools to foster increased compatibility of the built and natural systems. Over the past several decades, Florida has enacted several pieces of legislation regarding comprehensive planning and growth management. These laws, including the Local Government Comprehensive Planning and Land Development Regulation Act, provide for an integrated framework of planning at the state, regional, and local levels. However, growth has continued to stress both public infrastructure and the natural environment. The governor's Growth Management Study Commission has reported that although the processes established by the existing growth management laws were well intended, improvements to the process should still be made.

Deleted: ¶

Linked open space and buffers. Conservation areas, agricultural lands, and park systems provide open spaces within and around built communities that are less intense land uses and serve as buffers between the built and natural environments. The Florida Greenways Commission is guiding a statewide initiative to create a system of greenways connecting communities and conservation areas. Greenways, blueways, and trails will multiply the benefits of open spaces to natural systems by linking those spaces together, and they will enrich the quality of life of community residents and visitors by facilitating access to the state's natural and cultural heritage sites and by enhancing people's sense of place.

Protecting and preserving sustainable agriculture. Agriculture is Florida's second leading industry, producing $18 billion in economic value each year. It also comprises a large portion of the open space that benefits the natural system though buffering, augmentation of natural habitats, water storage and filtration, and aquifer recharge.

In the past, some agricultural practices have impaired the functioning of natural systems, sometimes with adverse effects on native plants and animals, and sometimes to the detriment of the ability of the land to sustain agricultural uses over the long term. Several regulatory and voluntary programs are underway in the Everglades ecosystem to enhance environmental quality and the natural resource base upon which the agricultural economy depends. The

SFWMD is required to develop and implement regulatory programs under the 1994 Everglades Forever Act. The goal of the district's Everglades Best Management Practices (BMP) Program is to achieve a 25 percent reduction in the phosphorus load from the Everglades Agricultural Area (EAA). EAA farmers have implemented a variety of BMPs to reduce the levels of phosphorus coming off their farms. The main BMPs include efficient fertilizer application, control of erosion and sediment, and effective stormwater pumping operations. The EAA has been in compliance since the first full year of BMP implementation. Other BMP efforts include the development of a regulatory program for the C-139 basin, the development of a Citrus BMP manual for the Indian River Citrus area, and voluntary federal and state programs for agricultural and urban areas.

It is of great concern that Florida is losing its farms and ranches as a result of declining profitability, land valuation, trade issues, and urban sprawl. Statewide, almost 150,000 acres of productive agricultural land is converted to another land use each year. A new initiative by Florida's Department of Community Affairs will track land use changes in open and agricultural lands as a first step toward reducing the rate at which open space is being converted to other uses.

Factors Affecting Achievement of this Subgoal

Any factors accelerating the rate of growth in South Florida over predicted levels would significantly increase the risk of losing open space to sprawl development. Jurisdictions are preparing long-term plans and setting priorities based on assumptions about levels of growth and demand for services, which if eclipsed would seriously challenge the jurisdictions' ability to respond in ways that adequately protect the natural system.

Fostering development patterns that are compatible with natural systems requires close coordination of multiple jurisdictions with authority over the built environment. Without such coordination, gains in compatibility on lands within one jurisdiction (in habitat connectivity, for example) might be negated by incompatible development in a neighboring jurisdiction. Because many development issues involve corridors such as roads, transit routes, or greenways that cross multiple jurisdictions, unilateral actions by individual communities are often impossible.

Coordination is also required between jurisdictions with authority over the built environment and jurisdictions with authority over natural systems. The goal is compatibility and any efforts that undermine the sustainability of either the built or the natural system will inevitably harm the ecosystem as a whole. Potential regulations on agriculture pose a good example. On the one hand, any federal, state, or local agricultural policy intended to protect natural systems but that does not sufficiently provide for economic stability of the industry will be vigorously opposed and if implemented may result in a long-term reduction in open space and wildlife habitat as agricultural land is converted to urban use. On the other hand, agricultural practices known to degrade the natural environment will also be vigorously opposed and if allowed to continue unabated may result in environmental impacts such as subsidence and dewatering that are ultimately catastrophic to agriculture. If awareness of and respect for these interrelationships lags behind other considerations, the success of ecosystem restoration may be delayed.

Local and regional jurisdictions will need adequate incomes or supplemental funding from the state or federal government to develop plans, enforce regulations, and protect significant natural areas and open space through acquisition of lands or interests in lands. Changes in local, state, or federal economic conditions may change the priorities of projects needed to fulfill this subgoal.

Specific, Measurable Objectives for Achieving This Subgoal

The objectives established for achieving this subgoal are

- Increase the number of acres designated as part of the state's Greenways and Trails System by X by DATE.
- Develop a program to track the rate open and agricultural lands are converted to other uses by DATE
- Achieve a 25 percent reduction in phosphorus load from the Everglades Agricultural Area (EAA)

The key projects needed to achieve these objectives and the schedule for their implementation are shown in table 6.

Table 6. Subgoal 3-A: Use and Manage Land in a Manner Compatible with Ecosystem Restoration

Objective	Milestone Project (Refer to table 13, p. 82, for more information about specific project schedules, funding, responsible agencies, etc.)		Output	Project Underway or Completed
Objective 3-A.1: Increase the number of acres designated as part of the state's Greenways and Trails System by X by DATE				
Objective 3-A.2: Develop a program to track the rate open and agricultural lands are converted to other uses by DATE				
Objective 3-A.3: Achieve a 25 percent reduction in phosphorus load from the Everglades Agricultural Area				

Subgoal 3-B: Maintain or Improve Flood Protection in a Manner Compatible with Ecosystem Restoration

The SFWMD, to the extent possible, provides regional flood protection through operation of the C&SF Project and projects within the Big Cypress basin. These facilities are operated following the regulation schedules and operational guidelines established by the Corps of Engineers.

Larger than predicted population growth and development patterns that have differed from those anticipated in 1948 have, over time, challenged the ability of the C&SF Project to meet its original goals of maintaining flood protection for natural, urban, and agricultural lands.

Maintaining efficiencies in a combination of regional and local drainage systems is needed to achieve flood protection in South Florida. Since the implementation of the broad infrastructure created through the C&SF Project, water managers have constructed, operated, and maintained regional water control facilities and regulated the discharge into a regional

system in an effort to meet planning goals. Modifications, updates, and upgrades are needed in many of these water control facilities in order to support flood protection.

Severe flooding occurred within areas of Miami-Dade County as a result of Hurricane Irene in October 1999 and intense rainfall in October 2000. In response to the October 2000 flood, the executive director of the SFWMD appointed a Recovery Task Force under the auspices of the Emergency Operations Center to develop a list of proposed flood mitigation projects for the impacted areas of Miami-Dade County. The task force has recommended that mitigation projects should be considered on a basin-wide basis and include improvements to both the primary and secondary stormwater conveyance systems. Although none of the recommendations is designed to "flood-proof" the basins in which they are constructed, the projects should provide for increased primary system conveyance, which will then allow flood mitigation benefits from secondary system improvements in local communities.

How This Subgoal Will Be Implemented

Public works construction. Capital improvements, modifications, and repairs to water control and conveyance facilities help maintain and improve flood protection. The CERP consists of numerous projects that may provide incidental improvements to flood protection. Other large-scale projects, such as the C-111 and C-51 projects, consist of structural and nonstructural modifications to existing works in part to maintain flood protection. Opportunities to provide greater levels of flood protection or to provide flood protection in areas where there is currently no flood protection may be considered during implementation of CERP, provided that the greater levels of protection or the provision of new flood protection is consistent with the goals and purposes of CERP and is economically justified.

System maintenance. The SFWMD has an ongoing Canal Conveyance Capacity (CCC) Program to evaluate the maintenance, dredging, and bank stabilization requirements of the C&SF Project. This program is intended to restore the original design capacity of the canals as constructed. Exotic plant control, through the herbicidal, mechanical, and biological control methods, is another means of ensuring conveyance capacity within canals and water bodies.

Nonstructural flood protection. Numerous nonstructural options for flood protection exist for the built environment. These include new construction meeting Federal Emergency Management Agency (FEMA) guidelines and land use planning that guides development away from flood prone areas.

Factors Affecting Achievement of this Subgoal

Population growth and changes in land use, especially if different from what is projected, will continue to affect the capability of state and federal agencies to provide flood protection for natural, urban, and agricultural lands. Land conversions to different uses are particularly stressful to the flood protection system, since the flood protection requirements may vary greatly among different uses.

Continued financial support of Congress and the Florida Legislature will be necessary to complete projects for timely achievement of flood protection goals.

Inadequate and aging infrastructure will continue to challenge the flood protection system.

Specific, Measurable Objectives for Achieving This Subgoal

The objective established for achieving this subgoal is

- Modify and/or upgrade X percent of the C&SF system by DATE.

The key projects needed to achieve these objectives and the schedule for their implementation are shown in table 7.

Table 7. Subgoal 3-B: Maintain or Improve Flood Protection in a Manner Compatible with Ecosystem Restoration

Objective	Milestone Project (Refer to table 13, p. 82, for more information about specific project schedules, funding, responsible agencies, etc.)		Output	Project Underway or Completed
Objective 3-B.1: Modify and/or upgrade X percent of the C&SF system by DATE.		C-111 Project		
		Kissimmee Basin Flood Control and Protection Some CERP components (TBA; ex. Site 1)		
		Canal Conveyance Capacity Program		

Subgoal 3-C: Provide Sufficient Water Resources for Built and Natural Systems

The State of Florida has statutory goals for water supply that specifically charge water managers to ensure an adequate supply of water for protection of the natural system and the needs of the population. The goal associated with the water supply needs of the population is to meet the needs of existing and future "reasonable-beneficial" uses under conditions up to and including a 1-in-10-year drought event, while committing appropriate water resource reservations for the natural system needs as outlined in WRDA 2000.

How This Subgoal Will Be Implemented

As water storage and other water supply related projects and programs are implemented (see subgoal 1-A), consistent sources of water will become available to meet target levels of service on a regular basis. The potential for water shortages will be reduced as projects are completed.

Restoration partners support the state's strong commitment to achieving its water supply goals through a variety of additional state and local efforts. Regional water supply plans with twenty-year planning horizons have been completed for each of the four SFWMD regional water supply planning areas: Lower East Coast, Upper East Coast, Kissimmee Valley, and Lower West Coast. The goal of each plan is to meet the water supply needs of the region during a one-in-ten-year year drought without causing harm to the environment. The water supply plans include strategies for increasing the available water supply, promoting the use of alternative water supply sources and conservation, protecting water quality at the source of supply, accurately reflecting limitations of the available ground water or other available water supplies in plans for future growth and development, and protecting natural systems from significant harm that would otherwise result from water use. Some of these efforts are reflected under other goals and subgoals (for example, planning for growth is addressed under subgoal 3-A). Efforts unique to this subgoal are described below.

Wellfield/wellhead protection. Protection of the lands surrounding wells is an important means of protecting the quality of water resources. The protection of wellfields is publicized

in the 1986 Amendments to the Safe Drinking Water Act. The federal wellhead protection program requires all states to develop a wellhead protection plan and communities to develop local plans to protect their groundwater source of drinking water from contaminants. Local government ordinances can serve to restrict the storage, handling, usage, and production of regulated substances proximate to wellfields.

Improved water conservation and reuse. The SFWMD's regional water supply plans include an account of needed conservation efforts to encourage water conservation through planning and less consumptive practices.

Strategies to improve conservation and reuse incorporate different approaches for public, commercial, landscape, and agriculture consumers. These strategies include limiting the time of day irrigation is allowed, inverted rate structures, xeriscape landscaping utilizing native plants, establishment of mobile irrigation labs, and feasibility analyses of utilizing reclaimed water. A strong public education program supports these strategies.

Factors Affecting Achievement of this Subgoal

If population growth exceeds projections, the supply of water currently being planned for will not be adequate.

Adequate funding will be required to accomplish water storage and other water supply related projects. Likewise, adequate funding of public outreach and education will be critical to achieving water conservation strategies and reduced consumption goals.

Specific, Measurable Objectives for Achieving This Subgoal

The objectives established for achieving this subgoal are

- Implement water conservations strategies to achieve a XX percent reduction in per capita average annual water consumption.
- Increase adoption of local wellfield/wellhead protection ordinances that protect surface and groundwater resources to 100 percent by DATE.

The key projects needed to achieve these objectives and the schedule for their implementation are shown in table 8. The outputs listed in table 8 and the measures and targets in table **13** reflect strategy goals and are not intended to function as an allocation or reservation of water which must be implemented through applicable law.

Table 8. Subgoal 3-C: Provide Sufficient Water Resources for Built and Natural Systems

Objective	Milestone Project (Refer to table 13, p. 82, for more information about specific project schedules, funding, responsible agencies, etc.)		Output	Project Underway or Completed
Objective 3-C.1: Implement water conservations strategies to achieve a XX percent reduction in per capita average annual water consumption.				
Objective 3-C.2:Increase adoption of local wellfield/wellhead protection ordinances that protect surface and groundwater resources to 100 percent by DATE.				

Subgoal 3-D: Achieve Economic Equity and Environmental Justice

All the federal partners participating on the task force are directed by federal law and executive orders to promote *economic equity* and *environmental justice* through fair treatment of all persons, regardless of color, creed, or belief. Fair treatment associated with economic equity includes efforts required to expand opportunities to small business concerns, including those controlled by socially and economically disadvantaged individuals and persons with limited English proficiency. Fair treatment associated with environmental justice means that no group of people, including no racial, ethnic, or socioeconomic group, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, or commercial operations or the execution of federal, state, local, or tribal programs or policies.

The unique diversity of South Florida's population, with its strong representation of cultures from all over the world, will require significant efforts on behalf of the restoration partners to ensure that projects are implemented in ways that do not result in disproportionate impacts.

In its authorization of Everglades restoration Congress recognized the importance of ensuring that small business concerns owned and controlled by socially and economically disadvantaged individuals are provided opportunities to participate. It also recognized the importance of ensuring, to the maximum extent practicable, that public outreach and educational opportunities are provided to all the individuals of South Florida and that socially and economically disadvantaged individuals, including individuals with limited English proficiency, have opportunities to review and comment on the development and implementation of the CERP.

How This Subgoal Will Be Implemented

Outreach, Environmental, and Economic Equity Coordination Team. The task force has established an Outreach, Environmental, and Economic Equity Coordination Team (OEEECT) to develop a comprehensive interagency strategy for outreach and environmental justice. The strategy will seek to optimize interagency collaboration and coordination, discourage duplication of efforts, and encourage cost sharing without infringing on existing missions, authorities, or jurisdictions of the participating agencies. The first phase of this strategy development will include an inventory of governmental and nongovernmental programs. This inventory will build on the work being done by member agencies and the prior work of the working group related to these issues.

CERP economic equity program. Both the Army Corps of Engineers and the South Florida Water Management District are committed to promoting maximum participation in restoration activities by socially and economically disadvantaged businesses. They are working to clarify and align their different (federal and state) selection and award procedures to facilitate the participation of the private sector. Additionally the two agencies will conduct joint business opportunity events throughout South Florida and serve as catalysts for

workforce development through partnerships with universities, community colleges, and skill training organizations.

CERP community outreach program. The Corps and the SFWMD are developing a comprehensive strategy for outreach to minority communities as part of the implementation of the CERP. The strategy will identify goals for minority community outreach efforts, the audiences and audience needs, and the manner in which information should be written, compiled, and disseminated. This strategy will be developed with the participation of community leaders and activists. Community input will be obtained through workshops, small group meetings, individual interviews, and other appropriate processes.

CERP environmental justice program. Environmental justice activities will be a program under the CERP. This program will include the development and maintenance of an up-to-date socioeconomic database to support planning and decision making, development of an environmental justice template, and training for project managers and agency staff to ensure that they are fully familiar with legal requirements, community outreach methods, and analytical tools and processes. Each project manager will be responsible for environmental justice issues associated with his/her project.

Redevelopment of brownfields. Federal EPA, state, regional, and local programs are contributing to the cleanup and redevelopment of contaminated and abandoned or underused sites in urban core areas in South Florida. Actual or perceived environmental contamination in urban infill sites—along with the risks and costs associated with cleanup—is a significant barrier to redevelopment. The remediation of this problem is contributing to the revitalization of South Florida's historic urban areas. This revitalization is expected to lessen development pressure and urban sprawl in areas to the west, needed in order to restore the Everglades ecosystem and ensure future regional water supplies.

The Eastward Ho! Brownfields Partnership, which is active in Miami-Dade, Broward, and Palm Beach Counties, is a good example of how local, regional, state, and federal agencies are working with private nonprofit and community organizations to facilitate the redevelopment of brownfields. The partnership received National Brownfields Showcase Community designation from the U.S. Environmental Protection Agency in 1998. The EPA

also has granted $2 million to capitalize a brownfields cleanup revolving loan fund, which will be used to assist in the cleanup and reuse of brownfields in southeast Florida. More than $1.8 million has been committed by state, regional, local, and private entities for pilot projects through September 2001. The Partnership has also been active in the Florida Brownfields Program, administered and implemented by the Florida Department of Environmental Protection. Miami-Dade County and the Cities of West Palm Beach, Opa-Locka, Miami, Miramar, Pompano Beach, Dania Beach, Miami Beach and Lauderdale Lakes have designated nineteen sites and areas, totaling 46,978 acres, under the Florida Brownfields Program. This accounts for 71 percent of the acreage designated in Florida as brownfields. The Florida Department of Environmental Protection has delegated the administration and implementation of the Florida Brownfields Program in their respective jurisdictions to Miami-Dade and Broward Counties. This results in streamlining of the review and implementation of assessment and cleanup activities. Miami-Dade and Broward Counties are the only counties in the state of Florida to receive this delegation.

Of the approximately 2,100 estimated brownfield sites in the three-county southeast Florida area, some 390 sites have received various levels of environmental assessment review. Approximately 75 sites need no further assessment and will not require remediation. Five sites have undergone remediation activities and are either undergoing redevelopment or will shortly undergo redevelopment.

Factors Affecting Achievement of this Subgoal

Programs such as community outreach are sometimes viewed as ancillary programs and a lower priority for funding than "brick-and-mortar" projects, even though public understanding and support may ultimately mean the difference between project success or project failure. New and continued financial commitments by federal, state, and local partners to incorporate community outreach, including a strong environmental justice component, will be necessary to ensure that minority, low-income, non-English-speaking, and tribal communities may fairly participate in the decision making for restoration efforts.

Environmental justice is not just ensuring that the planning and contracting for individual federal projects complies with federal regulations. Early and sustained participation in

community affairs by all segments of the community is critical. This may not occur unless policies and activities designed to involve all segments of the community are institutionalized so that they may continue beyond the timeline of the working group. Environmental ombudsmen located in the restoration partner agencies would aid in getting community issues to the appropriate person and responsible agency.

Specific, Measurable Objectives for Achieving This Subgoal

The objectives established for achieving this subgoal are

- Increase restoration projects awarded to appropriate representation of all protected classes in minority businesses, either through primary or subcontract status by X percent by DATE.
- Complete two or three brownfield rehabilitation and redevelopment projects per year between 2002 and 2006.

The key projects needed to achieve these objectives and the schedule for their implementation are shown in table 9.

Table 9. Subgoal 3-D: Achieve Economic Equity and Environmental Justice

Objective	Milestone Project (Refer to table 13, p. 82, for more information about specific project schedules, funding, responsible agencies, etc.)		Output	Project Underway or Completed
Subgoal 3-D.1: Increase restoration projects awarded to minority businesses by X percent by DATE.				
Subgoal 3-D.2: Complete two or three brownfield rehabilitation and redevelopment projects per year between 2002 and 2006.	2002-2006 (Specific projects will be prioritized and scheduled to take greatest advantage of opportunities for private sector participation)	Neighborhood Transit Center and Revitalization Project, City of Pompano Beach		
		H&H Dagam Oil, City of Opa-Locka		
		Konover Site, City of Fort Lauderdale		
		Little Haiti Park Site, City of Miami		
		Oakland Park Abandoned Gun Range Site, City of Oakland Park		
		Liberia Area, City of Hollywood		
		Gravity Entertainment Site, City of Lauderdale Lakes		
		Former Palm Beach Lakes Golf Course, City of West Palm Beach		
		Liberty City Area, Unincorporated Miami-Dade County		
		Potential Pahokee Dump Site, Unincorporated Palm Beach County		

LINKAGES BETWEEN WORK EFFORTS AND ECOSYSTEM RESTORATION

The task force members measure progress on two complementary scales: (1) scales that measure the satisfactory completion of work and (2) scales that measure improvements in the ecosystem. With these two scales the task force distinguishes between those things that are within people's capability to manipulate and control (the *work goals, subgoals,* and *objectives*) and those things that are the responses of natural systems to their surroundings (the *indicators of ecosystem health*).

In setting the measurable targets for the various aspects of ecosystem health, the task force members assessed the major stressors on the various components of the ecosystem and considered when the projects designed to eliminate or mitigate those stressors are scheduled for completion. The task force assumes that the natural system will respond with improved health and vigor to efforts to reverse disruptive human influences. The monitoring and evaluations that have been conducted to date support this assumption. For example, wetland vegetation, particularly broadleaf marsh species and buttonbush, is rapidly expanding on the reflooded floodplain in response to the reestablishment of more natural flow characteristics in the Kissimmee River. Recent observations indicate that the reconstructed section of river channel has received increased use by wading bird species, particularly snowy egrets, white ibis, tricolored herons, wood storks, and black crowned night herons. Other notable bird observations in this region include a peregrine falcon, a roseate spoonbill, and a whooping crane. This is one localized and general example of how the ecosystem is slowly responding to work efforts to eliminate or mitigate disruptive human influences.

Generally there is no exclusive linkage between any one work goal or objective and any one indicator of ecosystem health. Efforts on many fronts will be necessary to restore and sustain a healthy ecosystem, which will then be manifested through myriad species and processes. However, positive correlations are expected between individual indicators and groups of projects designed to restore conditions that are beneficial to that indicator. Some of these relationships are charted in table 10, below.

Table 10. Linkages between Work Efforts and Ecosystem Restoration

MEASURES OF ECOSYSTEM HEALTH		LINKAGES		MEASURES OF WORK EFFORTS	
Indicator	**Measurable Target**	**Stressor**	**Restoration Action**	**Major Projects Related To Eliminating/Mitigating Stressor**	**Objective**
Total System: Threatened and endangered species	Improved status for fourteen federally listed T&E species, and no declines in status for those additional species listed by the state, by 2020.	Loss, degradation, and fragmentation of habitat	Acquisition and restoration of critical habitat lands, including linkage corridors, along with restoration of more natural hydrologic functions in wetlands and maintenance control of invasive exotic species, is expected to halt declines in species status and lead to the recovery of healthy populations.		
Total System: Nesting wading birds	Target: Recover, at a minimum, an annual average of 10,000 nesting pairs of great egrets, 15,000 pairs of snowy egrets and tricolored herons combined, 25,000 pairs of white ibis and 5,000 pairs of wood storks.	Disruptions to traditional nesting patterns caused by reduced water flows into the estuaries, which were traditionally the richest rookery sites, substantial reductions in the total area of wetlands throughout the ecosystem, and the creation of unnatural water impoundments in the Everglades	Restoring the location, timing, and volumes of water flows, particularly the flows to the estuaries, is expected to result in more traditional nesting patterns, improved reproductive success, and recovered larger populations of nesting wading birds.	2006: Modified Waters Delivery Project	1-A.3
				2008: C-111 N Spreader Canal	1-A.3
				2009: Everglades Agricultural Area Storage Reservoir, phase 1	1-A.1
				2010: L31N Seepage Management	None
				2015: Everglades Agricultural Area Storage Reservoir, phase 2	1-A.1
				2019: WCA-3 Decompartmentalization	1-A.3
				2020: Lake Okeechobee Aquifer Storage and Recovery)	1-A.2
				2036: Central Lake Belt Storage Area	1-A.1
				Everglades Rain-driven Operations	None
Total System: Urban and Agricultural Water Supply	Target: Water provided to all users during droughts up to the level of severity of a one-in-ten-year frequency of occurrence	Loss of freshwater through discharge and seepage	Surface storage reservoirs, aquifer storage and recovery, and seepage management projects are expected to recapture the water that is currently lost to the ecosystem through unnatural discharges.	Selected reservoir and ASR projects Add Projects from 3-C	

MEASURES OF ECOSYSTEM HEALTH		LINK AGES		MEASURES OF WORK EFFORTS	
Indicator	**Measurable Target**	**Stressor**	**Restoration Action**	**Major Projects Related To Eliminating/Mitigating Stressor**	**Objective**
Estuaries: Oyster beds in the St. Lucie Estuary	Approximately 900 acres of healthy oyster beds.	Unnatural changes in water salinity caused by excessive freshwater flows into the estuary; also changes in water quality caused by discharges of unnaturally nutrient-laden waters	Storage projects and projects that will remove barriers to sheet flow, thus curtailing the unnatural discharges of nutrient laden freshwater into the estuary, are expected to create conditions for oyster recolonization of areas with a suitable substrate.		
Estuaries: Roseate spoonbills	At least 1,000 nesting pairs throughout Florida Bay, and some nesting pairs in the coastal zone of the southwestern gulf coast	Declines in the productivity of estuarine feeding grounds caused by too little freshwater entering the estuaries	Projects that will restore more natural flow volumes and patterns of freshwater entering the Florida Bay and gulf coast estuaries are expected to improve the productivity of feeding grounds used by roseate spoonbills and lead to population increases for this species.		
Lake Okeechobee: Submerged Aquatic Vegetation	Sustain at least 40,000 acres of healthy submerged aquatic vegetation around the shoreline of Lake Okeechobee on an ongoing basis	Unnaturally frequent and prolonged high water levels in the lake	Major surface water and aquifer storage projects in the Lake Okeechobee watershed, along with the watershed water quality treatment project, are expected to result in lower lake levels and to significantly improve the long-term survival of large beds of submerged aquatic vegetation.	2007: C-44 Basin Storage Reservoir	1-A.1
				2009: Lake Okeechobee ASR Pilot Project	1-A.2
				2009: Everglades Agricultural Area Storage Reservoir, Phase 1	1-A.1
				2010: Lake Okeechobee Watershed Water Quality Treatment Facilities	1-B.1
				2012: C-43 Basin Storage Reservoir, Phase 1	1-A.1
				2015: Everglades Agricultural Area Storage Reservoir, Phase 2	1-A.1
				2020: Lake Okeechobee Aquifer Storage and Recovery	1-A.2
Everglades Ridge	Target: A 90 percent recovery	Unnaturally frequent	Major surface water	2009: Everglades Agricultural Area Storage Reservoir, Phase 1	1-A.1

MEASURES OF ECOSYSTEM HEALTH		LINK AGES		MEASURES OF WORK EFFORTS	
Indicator	**Measurable Target**	**Stressor**	**Restoration Action**	**Major Projects Related To Eliminating/Mitigating Stressor**	**Objective**
and Slough: Tree Islands	of the acreage and number of tree islands existing in 1940, and a health index of 0.90	and prolonged flooding of tree islands Unnaturally frequent intense fires	and aquifer storage projects upstream from the Everglades, along with removal of impediments to water flow through the Everglades, are expected to reduce unnatural flooding of tree islands. Rain-driven operations and water use restrictions are expected to reduce intense fires due to severe drought conditions	2010: L31N Seepage Management	None
				2015: Everglades Agricultural Area Storage Reservoir, Phase 2	1-A.1
				2019: WCA-3 Decompartmentalization	1-A.3
				2020: Lake Okeechobee Aquifer Storage and Recovery	1-A.2
				2036: Central Lake Belt Storage Area	1-A.1
				Everglades Rain-driven Operations	NA
				Add any goal 3 water conservation projects	
Florida Bay: Seagrass beds	A 65-70 percent coverage of Florida Bay with high-quality seagrass beds	Disruptions of natural volume and timing of freshwater flows into the southern estuaries	Projects that increase freshwater flows into the bay, such as the projects to improve water management practices in the C-111 and Taylor Slough basin, are expected to improve conditions for seagrass beds.	2009: Everglades Agricultural Area Storage Reservoir, phase 1	1-A.1
				2010: L31N Seepage Management	None
				2015: Everglades Agricultural Area Storage Reservoir, phase 2	1-A.1
				2019: WCA-3 Decompartmentalization	1-A.3
				2020: Lake Okeechobee Aquifer Storage and Recovery)	1-A.2
				2036: Central Lake Belt Storage Area	-A.1
				Everglades Rain-driven Operations	None
Florida Bay: Commercial harvest rates for pink shrimp	A long-term average rate of commercial harvest of pink shrimp on the Dry Tortugas fishing grounds that equals or exceeds 600 pounds per vessel-day, and an amount of large shrimp in the long-term average catch exceeding 500 pounds per vessel	Disruptions of natural volume and timing of freshwater flows into the southern estuaries	Restoration of flows that more closely match natural hydrological patterns should benefit the Tortugas pink shrimp fishery.		

OVERVIEW OF MAJOR PROGRAMS AND COSTS

The best estimate for the total cost to restore the South Florida ecosystem is $14.8 billion (see table 11). Of the total restoration cost, $7.8 billion represents the cost of implementing the *Comprehensive Everglades Restoration Plan*, which will be shared equally by the federal government and the state of Florida. The CERP outlines 68 projects that will take more than 30 years to construct. The CERP was submitted to Congress on July 1, 1999, and is integral to achieving two of the three goals of restoration: get the water right (restore more natural flows to the ecosystem while guaranteeing regional water supplies and flood control), and restore, preserve, and protect natural habitats and species. Because congressional authorization is required for the proposed projects included in the CERP, and because individual projects must undergo additional site-specific studies and analyses, the overall cost to implement this significant component of the restoration effort could be lower or higher, depending upon future analyses and site-specific studies.

The CERP builds on other plans and projects that were authorized by Congress or the Florida Legislature prior to and independent of the CERP. These include the Everglades Construction Project, the C-111 Project, the Modified Water Deliveries to Everglades National Park Project, the Kissimmee River Restoration Project, a number of smaller 'Critical Projects' authorized by the Water Resources Development Act of 1996, the *South Florida Multi-Species Recovery Plan*, state water quality plans, state land acquisitions authorized for Save Our Rivers (SOR) and Conservation and Recreation Lands (CARL) programs, and federal land acquisitions for national parks, preserves, and wildlife refuges. The costs for these programs and projects have been included in the total cost of ecosystem restoration because they actively promote overall restoration goals and establish the base line conditions for the CERP. Taken together, these programs and projects represent an additional $7 billion investment, of which $2.55 billion are federal costs and $4.48 billion are state costs.

State and federal agencies have already acquired 4.7 million acres of land for ecosystem restoration purposes (4.55 million for habitat and 0.15 million for water storage). As of September 1999 the state alone had acquired 3.2 million acres of habitat conservation land in South Florida at a cost of more than $1 billion.

Table 11. Total Estimated Costs of Ecosystem Restoration

Work Goal	Total Costs ($ millions)	Federal Costs ($millions)	State Costs ($ millions)
Goal 1: Get the water right			
Projects in addition to CERP			
CERP projects			
Goal 2: Restore, preserve, and protect natural habitats and species			
Land acquisition			
Other			
Goal 3: Foster compatibility of the built and natural systems			
Total			

*Amount committed to ongoing projects; total cost of future projects to be determined.

The project costs summarized in table 11 are shown in detail in table 13.Table 13, which is found on page 82, is a tracking matrix which identifies individual projects, responsible agencies, targets, and costs.

The conference committee report language accompanying the Department of the Interior and Related Agencies Appropriations Act for fiscal year 2000, Public Law 106-113, requested that the department submit information, to be updated biennially, on the total cost of the effort to restore the South Florida ecosystem. In relevant part, the report language states

> *It would be useful to have a complete estimate of the total costs to restore the South Florida ecosystem. The House and Senate Committees on Appropriations believe that this new estimate will exceed the $7,800,000,000 estimate that has been used over the last five years. This recalculated estimate should include all three goals of this initiative, namely, (1) getting the water right, (2) restoring and enhancing the natural habitat, and (3) transforming the built environment. The Congress and the American people are committed to this project. Over $1,300,000,000 has been appropriated to date, however, and the public deserves to know how much this project will truly cost. This information should be submitted ot the House and Senate Committees on Appropriations no later than February 1, 2000, and should be updated biennially.*

Table 12 shows the total costs of restoration and itemizes the costs exceeding the $7.8 billion estimate for implementing the CERP by individual agency. It also shows which portions of those costs has been allocated through FY2000 and the balance needed to complete restoration.

Table 12. Total Costs by Agency, Through FY00

	Total Cost	Through FY00	Balance to Complete
Federal Government			
CERP			
In Addition to CERP			
Department of the Army			
Department of the Interior			
Department of Commerce			
Environmental Protection Agency			
State of Florida			
CERP			
In Addition to CERP			
Totals			

The project schedules and the projections of outputs included in this report span multiple decades and depend upon certain assumptions about state and federal budget requests and funding levels, optimized construction schedules, willing sellers, and other contingencies. These assumptions are likely to change as the project progresses, and appropriate revisions to this document will be necessary. Therefore, this document does not represent a commitment by the federal, state, or local governments or the tribes to seek appropriations for specific projects and activities at the funding levels laid out in this document.

Project Timeline

Project Summary Table

This section provides detailed information about the restoration projects that contribute to the accomplishment of the vision, goals, subgoals, and objectives described earlier in this document. Table 13 provides a summary listing of projects with information about schedule, cost, and the goals addressed by each project.

Detailed information data sheets, which are included in appendix D in volume 2 of this report, provide further information for each of these projects, including:

- Program name
- Project name
- Project #
- Lead agency
- Authority
- Goal(s) addressed
- Measurable output(s)
- Cost
- Project schedule
- Project synopsis
- Detailed project budget information
- Hyperlink or a point of contact for more detailed project information

Table 13. Project Summary Table

TRACKING SUCCESS:

BIENNIAL REPORT OF THE SOUTH FLORIDA ECOSYSTEM TASK FORCE

REPORT PURPOSE

This *Biennial Report* summarizes the progress made in fiscal years 1999, 2000, and 2001 to restore the South Florida ecosystem. (The first biennial report was published in 1999. Starting with this report, the biennial reports will be presented in July of even-number years. Subsequent reports will summarize information from the two preceding years. This report summarizes information from the three preceding years because of the schedule change.)

The 1996 Water Resources Development Act directs the South Florida Ecosystem Restoration Task Force to report biennially on the following task force activities:

- Policies, strategies, plans, programs, projects, and activities and priorities planned, developed, or implemented for South Florida ecosystem restoration
- Progress made toward restoration

This report satisfies this requirement by providing the following information: First, it summarizes the major accomplishments of the reporting period in terms of policies, strategies, plans, programs, projects, and activities. Second, it tracks the progress made toward restoration during the reporting period in terms of selected measurable indicators of ecosystem health.

This report is intended for four principal audiences:

- United States Congress
- Florida Legislature
- Seminole Tribe of Florida
- Miccosukee Tribe of Indians of Florida

This report is intended to demonstrate to the above authorities that progress is being made and that funds targeted for restoration are being spent in logical and accountable ways. The information included here will also be broadly shared with state and federal agencies, local

governments, regional agencies and industries, private interest groups, and private citizens interested in South Florida ecosystem restoration.

Deleted: ¶

POLICIES, STRATEGIES, PLANS, PROGRAMS, PROJECTS, ACTIVITIES:

MAJOR ACCOMPLISHMENTS OF 1999-2001

A comprehensive discussion of the principles and strategies adopted by the task force, along with the major plans, programs, and projects of the various task force member agencies, is provided in *Coordinating Success: Strategy for Restoration of the South Florida Ecosystem* (the preceding report in this larger document). This biennial report, "Tracking Success," addresses only the task force member agencies' activities during the past three years, and it covers only the highlights of those activities. More complete and detailed discussions of the recently completed and ongoing projects can be found in the annual reports produced by the participating agencies, such as the U.S. Army Corps of Engineers, the South Florida Water Management District (SFWMD), and the Florida Department of Environmental Protection.

Coordination and Adaptive Assessment of the Restoration Effort

An Articulated Strategy for Restoring the South Florida Ecosystem

In July 2000 the South Florida Ecosystem Restoration Task Force submitted *Coordinating Success: Strategy for Restoration of the South Florida Ecosystem* to Congress. The purpose of the strategy document was to describe the more than 200 federal, state, tribal, and local programs designed to restore and sustain the imperiled South Florida ecosystem and to provide the information needed to coordinate the restoration effort. The strategy responded to a need identified by the U.S. General Accounting Office for an overall strategic plan for restoration and a decision-making process for resolving conflicts.

In devising their coordination strategy, the task force members

- Agreed upon a vision of the results to be achieved and how those results would be measured in terms of ecosystem health
- Established three broad goals and measurable objectives for the work they would need to accomplish to achieve their vision (Objectives for two of the goals were included in the July 2000 document; objectives for the third goal were developed in 2001 and included in the current update to the strategy document.)

- Identified the projects needed to meet their work objectives
- Created data bases to help coordinate and track projects and accomplishments
- Considered a protocol to facilitate the resolution of issues and conflicts

Implementation of Analytical Tools to Track Ecosystem Health

The specific, measurable work objectives and indicators of ecosystem health adopted by the task force allow the member agencies to systematically track the progress of the restoration effort. Work has been underway in this reporting period to begin establishing the base lines and monitoring systems that will make this possible.

In May 2001 the Restoration Coordination and Verification (RECOVER) Team finished a management plan to guide ecosystem monitoring and adaptive assessment of CERP programs and projects. Also in 2001 the team developed a conceptual ecological model for the total ecosystem and launched a centralized data base that will enable scientists to quickly access information about multiple agency restoration projects. The team has developed the performance measures for the CERP that will be used to monitor ecosystem health, and scientists have begun gathering the base line data that will be used to assess progress toward recovery. The availability of this information makes it possible for the first time to include quantifiable targets and measures of ecosystem health in the task force's biennial reports (see "Progress Made toward Restoration," page 99).

Goal 1 Accomplishments: Getting the Water Right

Federal and State Funding of the Comprehensive Everglades Restoration Plan

In July 1999, the *Comprehensive Everglades Restoration Plan* was presented to Congress. Through the Water Resources Development Act of 2000 (WRDA 2000), Congress authorized a $1.4 billion package of projects that will begin implementation of the CERP. This authorization included four pilot projects, ten specific project features, an adaptive assessment and monitoring program, and a programmatic authority through which smaller projects can be quickly implemented. Authorization for the remaining features of the plan will be requested in subsequent Water Resources Development Act proposals beginning in 2002.

In 2000 the State of Florida approved legislation authorizing $1 billion of state resources over the next ten years for Everglades restoration. This equates to more than $100 million annually to be matched by an additional $100 million from other South Florida resources, for a total of $200 million each year. To manage these funds, the state has created the Save Our Everglades Trust Fund to help build reserves for restoration.

Deleted: ¶

Pilot Project Implementation

Project management plans for three of the six authorized CERP pilot projects were completed by the end of 2001. These were the Western Hillsboro (Site 1) Impoundment and Aquifer Storage and Recovery (ASR), Lake Okeechobee ASR, and Caloosahatchee River Basin ASR. Aquifer storage and recovery is a significant water resource component of CERP. The pilot projects will address technical and regulatory uncertainties and demonstrate the viability of storing partially treated surface water or groundwater in the brackish Floridan Aquifer for subsequent recovery.

Water Quality Standards and Concerns

In September 2000 the U.S. General Accounting Office (GAO) reported that additional water quality projects, in particular, may be needed, which could increase the cost of implementing CERP. The state government has primary responsibility for achieving water quality standards in Florida. In December 2001 the Florida Department of Environmental Protection issued a proposed standard for phosphorus in the Everglades Protection Area of 10 parts per billion (10 ppb) for all predominantly freshwater portions of the EAA. As the state identifies additional projects to improve water quality, the U.S. Army Corps of Engineers will evaluate whether the projects are essential to the successful implementation of the CERP and whether the federal government should participate in them and share their costs. The participants have agreed that future project authorization proposals will reflect the cumulative changes to the CERP in terms of projects and costs and indicate the progress being made toward implementing the CERP.

Update on Ongoing Projects Predating the CERP

Kissimmee River Restoration Project. The Kissimmee River Restoration Project, authorized in the 1992 Water Resources Development Act , is under construction. The project, which is being jointly implemented and cost-shared by the South Florida Water Management District (SFWMD) and the Corps of Engineers, will restore over 40 square miles of river/floodplain ecosystem including 43 miles of meandering river channel and 27,000 acres of wetlands. To date, over three miles of the C-38 canal have been backfilled, with both the backfilled canal and degraded spoil mounds graded to historic floodplain elevations. A quarter-mile-long section of river channel has been recarved and linked to remnant river channels on the east and west sides of the backfilled canal, thereby restoring flow through more than eight miles of river channel. In addition, the S65B water control structure and boat lock were demolished in June 2000.

The reestablishment of flow resulting from these efforts has begun to restore physical features such as sandbars. Wetland vegetation, particularly broadleaf marsh species and buttonbush, is rapidly expanding on the reflooded floodplain. Recent observations indicate that the reconstructed section of river channel has received increased use by wading bird species, particularly snowy egrets, white ibis, tricolored herons, wood storks, and black crowned night herons. Other notable bird observations in this region include a peregrine falcon, a roseate spoonbill, and a whooping crane.

Everglades Construction Project. In 1999 and 2000 the SFWMD completed construction on three additional stormwater treatment areas (STA-1 West, STA-2, and STA-5), bringing the total effective treatment area in operation to over 18,000 acres in four STAs. Following construction, a start-up process was initiated that included inundation of the areas to target depths and establishment of desired vegetation. Due to exceptional phosphorus removal performance observed in the prototype Everglades Nutrient Removal Project, portions of the new STAs are being managed for submerged aquatic vegetation; the remainder is being managed for cattails and other emergent vegetation. The phosphorus removal performance of the STAs has exceeded expectations, with discharges from STA-1W, STA-2, and STA-6 consistently below 30 parts per billion (ppb). Although still considered a young wetland

system, STA-5 has been able to reduce inflow concentrations of over 300 ppb to below 50 ppb. Construction began on STA-1 East in 2000 and on STA-3/4 (the largest STA) in 2001.

The SFWMD has continued small-scale research on several advanced treatment technologies that will be utilized to lower phosphorus to achieve the long-term Everglades standard. Some of the key technologies evaluated include submerged aquatic vegetation, periphyton-based STAs, chemical treatment, and optimization of the STAs.

Critical Projects. The Florida Keys Carrying Capacity Study is underway. Project cooperative agreements for eight additional projects (all authorized under WRDA 1996) were executed in January 2000. Progress on these projects is as follows:

Formatted

- East Coast Canal Structures. Plans and specifications completed.
- Western C-11 Basin Water Quality Treatment. Plans and specifications underway.
- Tamiami Trail Culverts. Design 90 percent completed.
- Seminole Big Cypress Reservation Water Conservation Plan. Geotechnical and survey work completed; plans and specifications underway.
- Southern CREW Addition/Imperial River Flowway. Real estate acquisition and home removal underway.
- Lake Okeechobee Water Retention/Phosphorus Removal. Real estate acquisition underway for the stormwater treatment areas.
- Ten Mile Creek Water Preservation Area. Plans and specifications underway.
- Lake Trafford Restoration. Plans and specifications underway; boring underway to confirm depth of the material in the lake bottom.

Modified Water Deliveries to the Everglades National Park Project. In June 1999 the Corps of Engineers initiated a *Supplemental Environmental Impact Statement* (SEIS) to review its project plans for the 8.5 Square Mile Area, a very difficult and controversial component of the Modified Water Deliveries to the Everglades National Park Project. This project is funded from a construction account managed by the National Park Service and the Department of the Interior and is designed to restore more natural hydropatterns in WCA-3 and Shark River Slough. This will be accomplished by December 2003 through removal and

modification of existing levees and canals, along with construction of new water control structures and pump stations. The 8.5 Square Mile Area is a flood-prone residential area located on the western side of the East Coast Protective Levee. In June 2000 the SFWMD Governing Board, the local sponsor of the project, recommended to the Corps of Engineers that it adopt alternative 6D—a modified canal and levee alternative—as the federal project. In December 2000, a record of decision was signed approving alternative 6D as the federal project. Work is underway on an accelerated schedule to complete sufficient project features to allow hydropattern restoration by December 2003.

Goal 2 Accomplishments: Restoring, Preserving, and Protecting Natural Habitats and Species

Habitat Acquisition

State and federal agencies have already acquired 4.7 million acres of land for ecosystem restoration purposes (4.55 million acres for habitat and 0.15 million acre for water storage). As of September 1999, the state alone had acquired 3.2 million acres of habitat conservation land in South Florida at a cost of $1 billion.

Calendar years 1999 and 2000 saw the acquisition of 299,505 acres at a price of $495.8 million. The lands were purchased with funding from the Farm Bill, the Florida P-2000 Program and Conservation and Recreation Lands (CARL) Program, the Land and Water Conservation Fund (LWCF), and other federal, state, regional, and local sources.

Land Acquisition Expenditures Summary
Calendar Years 1999-2000

Funding Source	Amount ($ millions)	Acres
Farm Bill 1996*	$178.3	75,102
P-2000/CARL/SOR **	$213.7	207,913
LWCF*** (SFWMD)	$103.8	16,490

* Includes Talisman acquisition completed in 3/99.
** Both CARL and SOR projects are currently primarily funded by P-2000 funds and will be funded over the next ten years by Florida Forever funds. Florida Forever is a ten-year continuation of the P-2000 Program and will raise approximately $3 billion ($300 million per year) over the next ten-year period.
*** Includes Barry Groves acquisition completed in 10/00.

One highlight of the past two years has been the acquisition of the majority of the Southern Golden Gate Estates. To date, the Florida Department of Environmental Protection has acquired a total of 41,605 acres (project size 57,200 acres) of sensitive cypress, wet prairie, pine and hardwood hammock, and swamp communities in south central Collier County at a cost of $52,613,478 using state and federal (Farm Bill) funds.

In April 2000 GAO reported that a land acquisition plan was needed to identify and prioritize the additional lands needed to achieve the restoration goals. The GAO report highlighted the importance of acquiring as much land as possible, and quickly, because undeveloped land in South Florida is becoming increasingly scarce and costly. This concern is being addressed by a Land Acquisition Task Team formed in 2001. The team is developing a comprehensive strategy for all federally funded or partially federally funded land acquisition projects needed for ecosystem restoration.

Highlights of Habitat Management

Strategies for species recovery. In November 1999 a Multi-Species/Ecosystem Recovery Implementation Team (MERIT) was appointed with the purpose of overseeing the implementation of the *South Florida Multi-Species Recovery Plan*. The team is working on implementation strategies that will involve (1) the development and use of scientific knowledge to identify and prioritize the tasks needed for species and community recovery, (2) GIS mapping and analysis to identify landscape conservation needs, and (3) the establishment of incentives for private and public entities to take the actions needed for species recovery. In 2001 a Florida panther subteam completed the mapping and analysis needed to develop a landscape conservation strategy for that species.

Strategy for managing invasive exotic plants. In 2001 the Noxious Exotic Weed Task Team (NEWTT) completed an assessment of invasive exotic plants in Florida and a strategy for managing them.

Exotic species quarantine facility. Congress approved the funding for the Invasive Plant Quarantine Facility to be located in Fort Lauderdale, Florida. A contractor was selected in February 2001.

Melaleuca control program. The fourth revision and update of the *Melaleuca Management Plan for Florida* was completed in 2001. The efforts of many agencies as directed through this comprehensive plan have prioritized the expenditure of over $24 million and removed almost 70 million melaleuca plants (over 100,000 acres) from the Everglades Protection Area. This program was implemented with integrated strategies and long-term systemwide approaches that included the development of biological control agents. Since the release of the first insect, the melaleuca snout beetle (*Oxyops vitiosa*), their populations have increased enormously and in several of the release sites beetle populations have had dramatic effects on the melaleuca.

Formatted
Formatted
Formatted

Goal 3 Accomplishments: Fostering Compatibility of the Built and Natural Systems

Data Compilation and Analysis

South Florida Ecosystem Restoration Task Force Assessment Report. The Strategic Planning Team of the task force spent eighteen months canvassing South Florida governmental entities and nongovernmental organizations for a common vision of their desired future. The team reviewed hundreds of planning, visioning, and other efforts linked to achieving an improved quality of life for the citizens of South Florida, seeking specifically to (1) identify the particular interests and concerns of the many federal, state, tribal, and local participants in the restoration effort and the extent to which those interests and concerns could be synthesized into a shared vision and goals, and (2) identify major problems, if any, that would have to be overcome to ensure the effectiveness of this unprecedented multigovernmental ecosystem restoration effort.

Formatted

The finding that the majority of all the participants in this process share similar goals was important information for the t ask force charged with coordinating the restoration effort.This information formed the basis for articulating a shared vision and goals for the entire South

Florida ecosystem. The other major finding was the broadly shared belief that achieving a common vision and common goals for a sustainable South Florida will require improved coordination of complex issues across jurisdictional boundaries.

Sustainable Agriculture Report. The working group's Sustainable Agriculture Task Team developed a report that details current conditions, concerns, and recommendations related to the conversion of agricultural lands to other land uses. Some 150,000 acres of productive agricultural land statewide are converted to other land uses each year. Growth pressures, rising property values and taxes, and other economic challenges to the agricultural industry have frequently resulted in the development of agricultural lands that could otherwise have been used to sustain the state's water resources, wildlife, open space, and environment. Task force member agencies can use the information in the report to help sustain agriculture.

Formatted

Governor's Commission on Growth. In July 2000 Governor Bush created the Growth Management Study Commission to review the state's planning framework. Recommendations from this Commission were published in February 2001. This report acknowledged that although the processes established by the existing growth management laws were well intended, improvements to the process should still be made.

Formatted

Flood Control and Water Supply

Flood control. Severe flooding occurred within areas of Miami-Dade County as a result of Hurricane Irene in October 1999 and intense rainfall in October 2000. In response to the October 2000 flood, the executive director of the SFWMD appointed a Recovery Task Force under the auspices of the Emergency Operations Center to develop a list of proposed flood mitigation projects for the impacted areas of Miami-Dade County. The task force, comprised of SFWMD staff with expertise in engineering, geographic information systems (GIS), emergency management, operations, planning, and local flooding issues, reviewed previous recommendations contained in Miami-Dade County, SFWMD, and Corps of Engineers reports, and recommended that mitigation projects should be considered on a basin-wide basis and include improvements to both the primary and secondary stormwater conveyance systems. Although none of the recommendations is designed to "flood-proof" the basins in which they are constructed, the projects should provide for increased primary system

Formatted

Formatted

conveyance, which will then allow flood mitigation benefits from secondary system improvements in local communities.

Water supply projects. Regional water supply plans with twenty-year planning horizons were completed for each of the four SFWMD regional water supply planning areas. Lower East Coast, Upper East Coast, Kissimmee Valley, and Lower West Coast. A regional water supply planning advisory committee composed of representatives of all interest groups was convened for each planning region to assist in plan development. Funding and implementation schedules for the projects are included in the plans. All plans will be updated every five years.

Formatted
Formatted
Formatted

The *Lower East Coast Water Supply Plan* is the most complex plan and has the most extensive environmental, economic, and social implications. After nine years of work this plan was adopted by the district's Governing Board in May 2000. This planning effort was closely coordinated with development of the CERP.

Strengthened Public Outreach

Creation of Coordination Team

An Outreach, Environmental, and Economic Equity Coordination Team (OEEECT) was formed to develop a strategy for a systemwide approach for outreach and environmental justice.

CERP Outreach and Regional Coordination

The Corps of Engineers and the SFWMD coordinated an intensive public involvement process during the development of CERP, which culminated in more than 1,500 people attending twelve public meetings in the fall of 1998. The agencies remain committed to involving the public in all aspects of CERP implementation. Their *Public Outreach Program Management Plan*, completed in 2001, defines the general scope, schedules, costs, products, and funding requirements necessary for the first five years of outreach activities.

In 2000 the working group adopted a regional assessment process intended to enhance public/private coordination by focusing on the issues existing within particular regions. In 2001 the working group collaborated with the Corps and the SFWMD to conduct two regional workshops, one in southwest Florida and one in the Kissimmee River basin. Regional Restoration Coordination Teams were formed for these two regions and for Biscayne Bay.

Public/Private Partnership between the Task Force and the Museum of Discovery and Science

On September 30, 1999, the Museum of Discovery and Science and the South Florida Ecosystem Restoration Task Force struck a historic partnership agreement to foster public understanding of the complexities and values of South Florida ecosystem restoration. The agreement was part of the task force's public outreach strategy to form public/private partnerships to acquire expert assistance in disseminating useful and engaging information to the public. The partnership was desired by both the task force and the museum, which has demonstrated success for two decades in educating the public and has demonstrated success in outreach, inclusion, and environmental education of urban, minority, and underserved communities. The Museum of Discovery and Science has the highest visitation of all museums in the state, more than 500,000 people annually, including more than 75,000 children. The museum runs several successful educational programs for schoolchildren, teachers, and the public at large and collaborates with museums worldwide in research, collections, program development, and exhibits. By the end of 2001 some displays and exhibits had been retrofitted, outdoor exhibits were being installed, museum-based and school-based education programs were underway, and information about restoration was being widely communicated through written and electronic media.

Agency Coordination and Public Outreach for the Tortugas Marine Ecological Reserve

Widespread government and public support for the creation of the largest marine ecological reserve in this hemisphere was gained through an intensive agency coordination and public outreach effort. In 2000 the managers of Florida Keys National Marine Sanctuary and Dry

Tortugas National Park drafted coordinated plans for resource protection and public use. While the two managing agencies (the National Oceanic and Atmospheric Administration and the National Park Service) have distinctly different missions, they share common goals for Tortugas ecosystem health. By coordinating science, planning, and public outreach, and through collaboration with state agencies, the coordinated management of a vast area in the Tortugas region has been ensured.

PROGRESS MADE TOWARD RESTORATION, 1999-2001

The ultimate measure of task force success will be the restoration of the South Florida ecosystem. The task force members are tracking progress toward this end by measuring approximately 200 indicators of ecosystem health identified as part of the *Comprehensive Everglades Restoration Plan*, plus additional measures for areas not covered by the CERP, such as the *South Florida Multi-Species Recovery Plan*. These measures, which range from the number of acres of periphyton in Everglades marshes to the frequency of water supply restrictions in urban and agricultural areas, represent the myriad physical, biological, and human elements that interrelate as parts of the ecosystem and are important to ecosystem health. Individual agencies will provide data to the task force, which will synthesize the information and report to Congress, the state legislature, and the councils of the tribes.

The indicators of ecosystem health listed below are a small subset of hundreds of anticipated natural responses. They were selected for inclusion in the biennial report because scientists believe they are among the most indicative of natural system function throughout the region as a whole and because they are among the most understandable and meaningful to the American people and the residents of South Florida. Progress in these indicators and the hundreds of other measures of ecosystem health will reinforce the current scientific judgments about what actions are needed to restore health to the ecosystem. If these indicators do not show incremental progress, the efforts will need to be reevaluated. That is the essential link between the ultimate result of ecosystem restoration and the specific work goals and subgoals established by the task force.

The following scale has been used to grade progress toward targets for the selected indicators of ecosystem health:

- Red = No improvement towards target
- Yellow = Intermediate status
- Green = Reached / close to target

Indicators of Total System Health

Threatened and Endangered Species

Target. Improved status for fourteen federally listed threatened or endangered species, and no declines in status for those additional species listed by the state, by 2020

Recent status and trends.

Grade.

Nesting Wading Birds

Target. A minimum annual average of 10,000 nesting pairs of great egrets, 15,000 pairs of snowy egrets and tricolored herons combined, 25,000 pairs of white ibis, and 5,000 pairs of wood storks.

Recent status and trends. In 2001 the total number of nesting pairs for the five species in the Everglades was

- 5,450 great egret pairs
- 3,600 snowy egret pairs
- 2,200 tricolored heron pairs
- 17,300 white ibis pairs
- 2,050 wood stork pairs
- 30,600 total pairs

The total numbers of nesting birds in the Everglades for the past three years, 1999 – 2001, has been higher than for almost any year from the late 1970s through 1998. The total numbers for these three years were about 40-60 percent of the CERP restoration goal. Nesting success in 2001, however, was poor. Exceptionally dry conditions during the late dry season resulted in high levels of nesting failures in water conservation areas 2 and 3; for example, there were 65 percent and 80 percent failures among ibis and storks. No progress was made in 1999-2001 in recovering the traditional estuarine nesting colonies; only 1.6 to 4 percent of the wading birds that nested in the Greater Everglades used the estuarine sites. No

storks nested at Corkscrew Swamp Sanctuary in 2001, the major stork nesting site in South Florida. Storks in the Everglades in 2001, presumably stimulated by the rapid drying, began nesting in January and February.

Grade Yellow. Although not influenced by CERP, the total number of nesting pairs for the five indicator species in 2001 was substantially higher than the number of pairs during a base line period, 1986-1995. Little progress was made in 2001 towards meeting the goals for colony location and timing patterns for nesting birds.

Urban and Agricultural Water Supply

Target: Meet urban and agricultural water supply needs in all years up to and including those years with droughts with a one-in-ten-year return frequency.

Recent status and trends. For the most recent nineteen-year period, the regional water supply system has been unable to meet all reasonable, beneficial demands, and water use restrictions have been imposed during five of the nineteen years in the Lake Okeechobee and Upper East Coast service areas, and during four of those years in the Lower East Coast service area. Although rainfall deficiencies during some of these years were at levels that were more severe than a one-in-ten-year frequency event, the total number of years with water restrictions was greater than the targeted frequency.

Grade Yellow. Interpretation of the most recent nineteen-year period of years is made uncertain by the fact that some years during the early 1990s experienced very low rainfall amounts, and by the difficulties in determining the level of a drought at large regional scales. Also, a nineteen-year period is insufficient to show the full range of water supply conditions that may exist with current management practices. Nevertheless, the nineteen-year record and the modeling predictions suggest that the current water supply system is not meeting the one-in-ten-year level of service target in some areas. Additional storage is needed.

Indicators of Lake Okeechobee Health

Submerged Aquatic Vegetation

Target. Sustain at least 40,000 acres of healthy submerged aquatic vegetation around the shoreline of Lake Okeechobee on an ongoing basis.

Recent status and trends: When the spatial extent of the submerged aquatic vegetation was measured coincident with a low lake stage and regional drought in 1989-90, over 50,000 acres was found. By 1992 the spatial extent had declined somewhat, and after many years of high lake depths, only 3,000 acres were estimated to occur. A detailed survey in 2000, conducted immediately after a managed lake drawdown, indicated that the community had recovered to near 45,000 acres. Much of the submerged vegetation was lost when an extreme drought in 2001 dried up most of the lakeshore and dropped water levels below nine feet, a historic low for this lake. However, in late summer 2001, approximately six weeks after lake levels increased again to over twelve feet, the community began to recover. At the end of the 2001 summer growing season (September) the lake supported approximately 34,000 acres of submerged plants.

Grade Red. The indicator grade was red until 2000, when the SFWMD lowered the lake in a managed drawdown, allowing the vegetation to recover. Projects are not yet in place to ensure long-term survival of large beds of submerged aquatic vegetation in the lake.

Indicators of Estuary Health

Oyster Beds in the St. Lucie Estuary

Target: Increase the areal extent of healthy oyster beds in the St. Lucie Estuary to approximately 900 acres.

Recent status and trends. A field survey conducted in 1997 identified approximately 209 acres of oyster beds remaining in the St. Lucie Estuary. Large freshwater discharges from the watershed create stressful conditions for the remaining oysters on an almost annual basis. Regulatory releases from Lake Okeechobee, which can turn the estuary into a virtually

freshwater system and kill up to 90 percent of the remaining oyster beds in the mid-estuary, occur on an average of every six to seven years.

Grade Red. No elements of the CERP have been implemented, and no increase in oysters has occurred.

Roseate Spoonbills

Target. (1) Recover and stabilize the Florida Bay nesting population to at least 1,000 pairs annually distributed throughout the bay, including doubling of the number of pairs nesting in northeast Florida Bay from the current 125 to 250 pairs. (2) Recover some level of nesting by spoonbills in the coastal zone of the southwestern gulf coast between Lostman's River and the Caloosahatchee River estuary.

Recent status and trends. While lower than the peak number of nesting spoonbills in the late 1970s, the number of nesting birds in Florida Bay has fluctuated in the range of 500-750 pairs during most of the 1990s, with no obvious trend either of increase or decline. No nesting spoonbills have returned to the southwestern gulf coast.

Grade Red. No elements of the CERP have been implemented, and no improvements in nesting patterns by spoonbills are apparent.

Indicators of the Health of the Everglades Ridge and Slough

Tree Islands

Target. Achieve a tree island health index of 0.90 in water conservation areas 2 and 3, and a recovery of 90 percent of the acreage and number of islands present in those areas in 1940.

Recent status and trends. Comparisons of the number, size, and distribution of tree islands between 1940 and 1995 in WCA-2A show that only four of the original fifty-eight tree islands have survived the past fifty-five years. Three of the four remaining islands are stressed and continue to lose trees. Similar comparisons for WCAs 3A and 3B show a

reduction from 1,041 to 577 tree islands (a 45 percent reduction), and a reduction in total acreage of tree islands from 24,700 to 8,600 acres (a 65 percent reduction).

The relatively high water conditions from 1995 to 1999 were a stress on tree islands. The relatively dry years of 2000 and 2001 could have been catastrophic. However, tree islands did not burn and none were destroyed during the drought. Individual islands appear healthy despite the drought of 2001. This was due to the fact that the dry conditions were good for hardwood seed germination and sapling development. Sapling survival will depend upon the amount of tree island soil oxidation (and hence elevation loss) relative to the return of high waters during the 2001-2002 wet season.

Grade Red. Currently, there is no evidence of recovery of existing tree islands in WCA-2 or -3.

Indicators of Florida Bay Health

Seagrass Beds

Target. Coverage of 65-70 percent of Florida Bay with high quality seagrass beds distributed throughout the bay.

Recent status and trends: Annual seagrass surveys began in 1994. Little improvement occurred until 1998-1999, when the overall health of the seagrass beds was better. During the past two years the baywide coverage has improved to approximately 40 percent. The recent improvement included some recovery from the die-off and was partly due to increased freshwater inflows from the mainland because of high rainfall and to improved water management practices in the C-111 and Taylor Slough basin.

Grade Yellow. Seagrass beds are showing evidence of recovery to 40 percent of the bay.

Commercial Pink Shrimp Harvests

Target. A long-term average rate of commercial harvest of pink shrimp on the Dry Tortugas fishing grounds that equals or exceeds 600 pounds per vessel-day, and an amount of large shrimp in the long-term average catch exceeding 500 pounds per vessel.

Recent Status andTrends: A severe decline in Tortugas pink shrimp catches and catch rates occurred during the 1980s and 1990s. Landings declined sharply beginning in 1985-86 and remained at historic lows through 1992-93. Catch per unit effort was greater than 500 pounds per vessel-day in every year prior to 1983-84, but from 1983-84 through 1991-92, the catch rate was less than 500 pounds per vessel day in five out of nine years. The average pounds of large sized shrimp declined from 480 pounds per vessel-day for the years 1961-1981 to 340 pounds for the years 1985-1995. The shrimp harvest has partially recovered since the mid-1990s, probably in response to several years of above average rainfall.

Grade Yellow. The current status of the pink shrimp harvest on the Tortugas fishing grounds is mid-way between the low harvests of 1984-1991 and the higher harvests prior to 1984. Elements of the CERP expected to affect this status have not yet been implemented.

APPENDIXES

A: REPORT FROM CONGRESS

B: WATER RESOURCES DEVELOPMENT ACT OF 1996

C: INTEGRATED SCIENCE PLAN (Included in volume 2)

D: PROJECT INFORMATION (Included in volume 2)

DOCUMENT PREPARERS

South Florida Ecosystem Restoration Task Force
Marsha Bansee
Kevin Burger
Allyn Childress
Linda Friar
Rock Salt, Executive Director
Gail Slemmer (Contract Writer/Editor)

State of Florida
Office of the Governor

Department of Agriculture and Consumer Services

Department of Community Affairs

Department of Environmental Protection

South Florida Water Management District

Department of Transportation

Miccosukee Tribe

Seminole Tribe

Broward County

Miami-Dade County DERM

Palm Beach County

Southwest Florida Regional Planning Council

Treasure Coast Regional Planning Council

U.S. Department of Agriculture
Natural Resources Conservation Service

U.S. Department of Commerce
National Oceanic and Atmospheric Administration

U.S. Department of Defense
Army Corps of Engineers

U.S. Department of the Interior

National Park Service

U.S. Fish and Wildlife Service

U. S. Geological Survey

U.S. Environmental Protection Agency

For further information on this document please contact:
South Florida Ecosystem Restoration Task Force
Office of the Executive Director
c/o Florida International University
OE Building, Room 148, University Park Campus
Miami, Florida 33199

Phone: (305) 348-1665 Fax: (305) 348-1667

For more information on the South Florida Ecosystem Restoration Program or to view this document on-line please visit
http://www.sfrestore.org