The South Florida Ecosystem Restoration Task Force

Strategy and Biennial Report
July 2008-June 2010

The South Florida Ecosystem Restoration Task Force

Authorized by Congress, the South Florida Ecosystem Restoration Task Force (Task Force) brings together the federal, state, tribal, and local agencies involved in restoring and protecting the Everglades. The role of the intergovernmental Task Force is to facilitate the coordination of the myriad conservation and restoration efforts being planned and implemented. It provides a forum for the participating agencies to share information about their restoration projects, resolve conflicts, and report on progress.

Report Purpose

This document responds to congressional direction to outline how the restoration effort will occur and also satisfies the requirements of the Water Resources Development Act of 1996 to report biennially on Task Force activities and progress made toward restoration. The reporting period is July 2008 – June 2010.

This document is intended for four principal audiences:

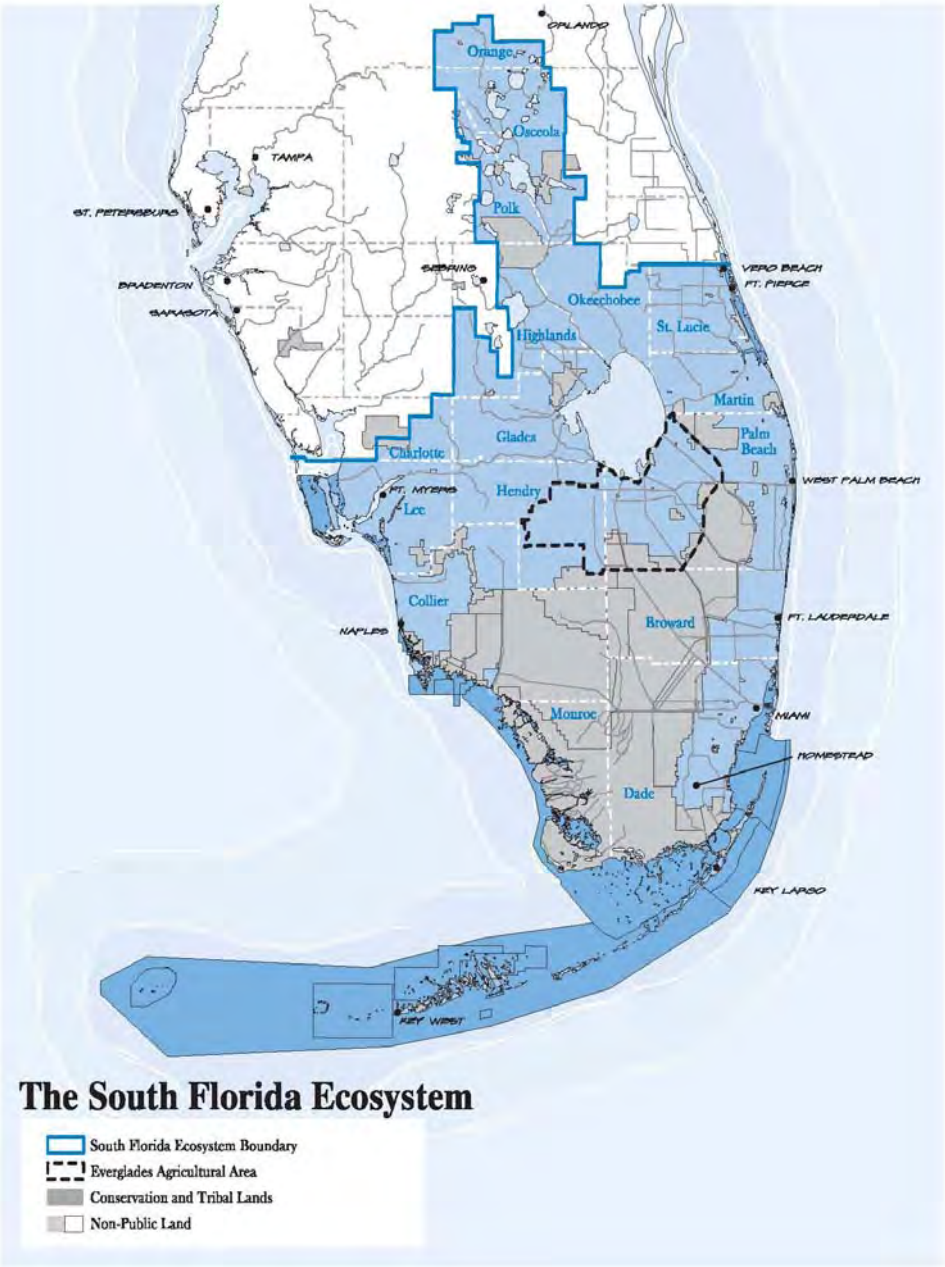
- United States Congress
- Florida Legislature
- Seminole Tribe of Florida
- Miccosukee Tribe of Indians of Florida

This document synthesizes information from the following reports:

Coordinating Success: Strategy for Restoration of the South Florida Ecosystem (2008)	***Tracking Success: Biennial Report of the South Florida Ecosystem Restoration Task Force (2010)***	***Integrated Financial Plan (2010)***
Land Conservation Strategy (2010)	***System-wide Ecological Indicators for Everglades Restoration (2010)***	

To access these reports and for further details on information presented in this document, please visit:

www.sfrestore.org



The South Florida Ecosystem is a unique natural treasure. An 18,000-square-mile region of subtropical uplands, wetlands, and coral reefs, the ecosystem extends from the Kissimmee Chain of Lakes south of Orlando to Florida Bay and the reefs southwest of the Florida Keys.

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Executive Summary

Restoring the Everglades and protecting the natural resources in south Florida cannot be achieved by any single organization but depends upon a strategically coordinated set of federal, state, local, and tribal initiatives, funding, and partnerships. This large interwoven complex of restoration programs and projects requires a long-term process for addressing key technical, management, and policy issues. The intergovernmental South Florida Ecosystem Restoration Task Force was authorized by Congress in 1996 to provide this long-term strategic coordination and incorporation of new information and opportunities over the multi-decade restoration initiative.

Groundbreaking at Picayune Strand, the first CERP project, in January 2010.

Restoration Framework

The Task Force has developed a restoration framework that includes a shared vision, strategic goals, and system-wide ecological indicators to organize and assess this complex intergovernmental effort.

Vision

A healthy South Florida Ecosystem that supports diverse and sustainable communities of plants, animals, and people.

Strategic Goals & Project Implementation

Goal 1. Get the Water Right

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

Goal 3. Foster Compatibility of the Built and Natural Systems

The Task Force organizes and tracks over 200 programs and projects by the three strategic goals (pages 5–24).

System-wide Ecological Indicators & Ecosystem Response. The Task Force uses system-wide ecological indicators to assess the current status of the ecosystem and to track how it will respond to the implementation of the suite of restoration projects and system-wide operational changes over time. The "stoplight" assessment of the system-wide ecological indicators communicates overall ecosystem health (pages 25–48).

Combined, the strategic goals and system-wide ecological indicators provide a means of assessing restoration progress via both project implementation and ecosystem response.

Restoration Highlights

Over the past two years additional funding has been provided, partnerships have been strengthened, key policy differences have been resolved, and increased construction groundbreakings have occurred solidifying the restoration program's transition from planning and design to construction and implementation. The following examples are provided to illustrate these accomplishments.

Additional Restoration Funding. In addition to increased construction appropriations, the American Recovery and Reinvestment Act of 2009 provided $95.4 million to the U.S. Army Corps of Engineers (USACE) and $23.3 million to the U.S. Department of the Interior (DOI) to be expended on Everglades projects (page 49).

Strengthening Partnerships and Moving Forward. The Comprehensive Everglades Restoration Plan (CERP) is the single largest component of the South Florida Ecosystem restoration initiative. The state and federal partners worked closely to resolve policy challenges that had impeded CERP implementation. A Master Agreement was signed in August 2009 that provides the framework for constructing and implementing individual CERP projects. This paved the way for the subsequent signing of new partnership agreements for the first CERP

projects: Picayune Strand Restoration, Site 1, and the L-31 North (L-30) Seepage Management Pilot Project.

Restoring Sheetflow. Several efforts are underway to improve and restore more natural water flow in the southern end of the ecosystem. December 2009 marked an important step to improving the flow of water from the core Everglades to Florida Bay. A groundbreaking ceremony for the Tamiami Trail Modifications portion of the Modified Water Deliveries to Everglades National Park Project began the process of raising and bridging extensive portions of the roadway (page 6). This was quickly followed by the first CERP project groundbreaking, Picayune Strand Restoration, in January 2010. This project will restore 55,000 acres in southwest Florida and provide critical habitat for the Florida panther and many other species (page 12).

Construction of the C-111 Project.

A groundbreaking was held in January 2010 for the C-111 Spreader Canal Western Expedited Project which will help restore the hydrology and habitats of the southern ecosystem (page 12). This was followed by another significant groundbreaking in May 2010 for the first phase of the Biscayne Bay Coastal Wetlands Expedited Restoration Project to help restore and protect Biscayne Bay (page 13).

Retaining Clean Water in the Everglades and Maintaining Flood Protection. The South Florida Water Management District (SFWMD) and the USACE approved another key partnership agreement in June 2010, paving the way for a CERP groundbreaking in late October 2010 for the Site 1 reservoir project. The Site 1 project will reduce the withdrawal of water from the Everglades while also maintaining and even enhancing current water supplies and flood control.

Planning and design was completed for the CERP L-31 North (L-30) Seepage Management Pilot Project, readying the project for construction beginning in 2010. This project will test the effectiveness of various technologies to prevent the loss of water from the natural system while maintaining flood protection for built areas. The results will be utilized for future seepage management projects.

Reviving a River. Restoration of the Kissimmee River has continued with 22 of the planned 43 miles of river restored along with

Restored area of the Kissimmee River, illustrating the resurgence of natural habitat and species following the correction of water flows.

11,000 acres of floodplain. Surrounding habitats have responded to the reestablishment of the historic oxbows and natural flow of the river. Numerous native species are illustrating the immediate benefits of flow restoration, including a marked resurgence in wading birds and numerous fish, duck, and shorebird species (page 7).

Controlling Invasive Exotic Species. Diverse and innovative techniques are being utilized to control invasive exotic plants and animals in the ecosystem. Efforts to control Melaleuca on public lands and to eradicate the Gambian pouch rat from the Florida Keys are examples of successes (page 15).

Why Restoration

The South Florida Ecosystem supports some of the greatest biodiversity on earth. More than a century of changes to the environment have put the ecosystem in jeopardy.

The quality of life in south Florida and the region's economy depend on the health and vitality of the natural system. South Florida's environment provides unique recreational opportunities that draw visitors from around the globe, from freshwater fishing in the north to coral reef snorkeling in the Keys. Fertile soils support the region's agricultural industry. The Seminole and the Miccosukee Tribes live in the Everglades and their cultures and ways of life depend on the health of this ecosystem. Yet the waters, natural habitats, and native species of the South Florida Ecosystem are at risk.

A healthy ecosystem depends upon our ability to reverse the unintended consequences of past changes to the region's waters and habitats. Historically, water flowed slowly across the ecosystem's extremely flat landscape, soaking into wetlands and forming what became known as the "River of Grass." This natural functioning system began to be altered over a century ago.

Altering an Ecosystem

Motivated by the Swamp and Overflowed Lands Act of 1850, efforts began in the late 1800s to "reclaim" the Everglades for agricultural, residential, and commercial development. Wetlands were drained or filled, and canals, roads, and buildings began to displace native habitats and disrupt historical water flows.

In 1948, the ongoing efforts to drain the Everglades, protect the region from hurricanes, and make the region more habitable led to the Central and Southern Florida (C&SF) Project. Authorized by Congress, the C&SF Project significantly altered the region's hydrology. It succeeded in draining half of the original Everglades and allowed for the expansion of coastal cities, particularly in the southeast, as well as interior farming areas such as the Everglades Agricultural Area (EAA) south of Lake Okeechobee.

The C&SF canal system ultimately comprised over 1,800 miles of canals and levees and 200 water control structures and drained approximately 1.7 billion gallons of water per day into the Atlantic Ocean and Gulf of Mexico.

The C&SF Project was joined by other efforts to "tame and control" nature. For example, the Kissimmee Flood Control Project channelized the Kissimmee River in the 1960s for flood protection and navigation. The project ultimately drained two-thirds of the historical floodplain and caused severe declines in wading bird and fish populations.

The cumulative adverse impacts of these water control projects upon water quality, habitats, and species were immense and the ecosystem declined. Extensive growth and development as a result of these projects exacerbated the ecosystem's decline.

Research in the 1970s and 1980s detected declines in the populations of many native plant and animal species and discovered heightened phosphorus pollution in the Everglades. Particularly alarming was evidence of the deterioration of Florida Bay, indicated by frequent algae blooms, dramatic losses in seagrass habitat, reductions in many shrimp and fish species, and a decline in water clarity.

Early Efforts toward Restoration

Public policy, in line with predominant public opinion, began to move in the direction of environmental protection and restoration in south Florida. During the 1970s and 1980s, several key pieces of environmental legislation were passed and conservation programs initiated.

Individual restoration projects were begun, aiming to correct specific environmental concerns in focused areas. However, the complexity and sheer size of the ecosystem limited the ability of these individual efforts to realize restoration at the ecosystem scale. It was soon recognized that a piecemeal approach to restoration was not enough; a comprehensive ecosystem-wide restoration effort was needed.

Establishing a Coordinated & System-wide Restoration Effort

Acknowledging the need for an ecosystem-wide approach to better coordinate the individual efforts, a federal task force on Everglades restoration was established through an interagency agreement in 1993. The following year, the Governor of Florida established the Governor's Commission for a Sustainable South Florida (GCSSF) "to develop recommendations and public support for regaining a healthy Everglades ecosystem with sustainable economies and quality communities." In recognition of the magnitude of the restoration effort and the critical importance of partnerships with state, tribal, and local governments, the current intergovernmental Task Force was established by the Water Resources Development Act (WRDA) of 1996. The Task Force and the GCSSF were instrumental in formulating a forum for consensus building in the early stages of ecosystem restoration.

The WRDA 1996 also called for a comprehensive approach to restoring the hydrology of south Florida. The result was CERP, a consensus plan approved by Congress and signed by the president as part of the WRDA 2000. The CERP is designed to reverse unintended consequences resulting from the construction and operation of the C&SF Project.

While the CERP is the most significant component of the efforts to restore a more natural hydrology, there are other non-CERP projects such as the Kissimmee River Restoration Project and the Modified Water Deliveries to Everglades National Park Project (Mod Waters). The overall South Florida Ecosystem restoration effort also includes projects to improve water quality, restore natural habitats, and protect native species.

The restoration challenges faced in south Florida must be solved collaboratively. Rather than dealing with issues independently, the challenge is to seek out the interrelationships and mutual dependencies that exist among all the components of the ecosystem.

The Task Force advocates a system-wide approach that addresses issues holistically, recognizing that the various levels of government have distinct jurisdictions and responsibilities that can be coordinated but not shared. The Task Force also recognizes the need to incorporate new information into the restoration process.

Key Environmental Legislation & Programs
2000–2010

2000	WRDA (authorized the CERP, 10 initial projects, and 4 pilot projects)
2000	Florida Everglades Restoration Investment Act (state funding for CERP)
2000	Lake Okeechobee Protection Act
2001	State Pollution Standards (numeric water quality criterion of 10 ppb geometric mean proposed by the Florida Department of Environmental Protection in the Everglades Protection Area)
2001	Water Resources Advisory Commission (WRAC) established by the SFWMD Governing Board
2002	Task Force designates the WRAC as an advisory body
2003	Science Coordination Group established
2003	Combined Structural and Operational Plan Advisory Team established
2003	Senate Bill 626 amends the Everglades Forever Act
2003	SFWMD develops the Long-Term Plan for achieving Everglades water quality
2003	Environmental Regulation Commission adopts phosphorus rule for the Everglades Protection Area
2003	Final USACE Programmatic Regulations issued
2003	State of Florida initiates early start on Southern Golden Gate Estates Hydrologic Restoration Project
2004	Indian River Lagoon-South CERP project is approved by the State of Florida
2004	State of Florida unveils plan to accelerate restoration of America's Everglades
2005	U.S. Environmental Protection Agency approves State of Florida's phosphorus rule for the Everglades Protection Area
2005	State of Florida's Water Resource Protection and Sustainability Program (requires higher level of water supply planning and coordination between water management districts and local governments)
2005	Lake Okeechobee Estuary Recovery Plan (State plan to help restore ecological health of Lake Okeechobee and the St. Lucie and Caloosahatchee estuaries)
2007	Lake Okeechobee Protection Act (expanded to include the Kissimmee, Lake Okeechobee, Caloosahatchee, and St. Lucie watersheds)
2007	WRDA (authorized three CERP projects for construction and modified pilot authorizations)
2009	Omnibus Appropriations Act (directs preparation of Tamiami Trail Study to increase sheetflow)

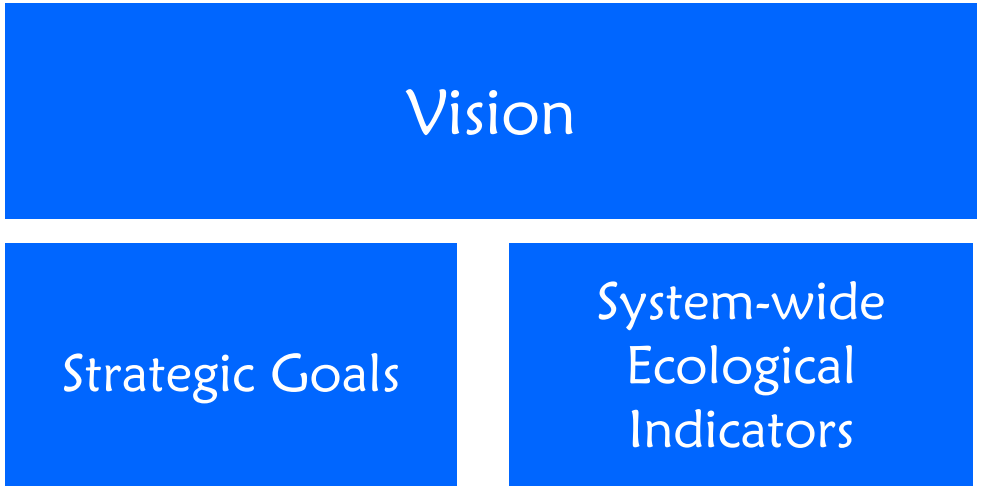
Note: For key environmental legislation and programs prior to 2000, please see pages 50-51.

Restoration Framework

The Task Force has developed a restoration framework that includes a shared vision, strategic goals, and system-wide ecological indicators.

The overall premise of restoration is that the ecosystem must be managed from a system-wide perspective. Rather than dealing with issues independently, the challenge is to understand the interrelationships that exist among all the components of the ecosystem. The same issues that are critical to the natural environment — getting the water right and restoring, preserving, and protecting diverse habitats and species — are equally critical to maintaining a quality environment for south Florida's residents and visitors.

The success of this comprehensive approach depends on the coordination and integration of over 200 individual restoration projects carried out by various agencies at all levels of government, and with input from the public. Each agency brings its own authority, jurisdiction, capabilities, and expertise to this initiative and applies them through its individual programs, projects, and activities. The Task Force organizes, coordinates, and measures the progress of the ecosystem restoration program.



The overarching goal of the Task Force's restoration framework is a common **vision** of the restored ecosystem.

The Task Force tracks progress toward the vision on two paths:

1. The implementation of restoration projects (by **strategic goal**), and
2. How the ecosystem responds to that implementation (via **system-wide ecological indicators**).

Vision

A healthy South Florida Ecosystem that supports diverse and sustainable communities of plants, animals, and people.

The Task Force has established a shared vision that recognizes the linkages between the region's natural and built environments and the need for ecosystem-wide restoration.

The region's rich and varied habitats will become healthy feeding, nesting, and breeding grounds for diverse and abundant fish and wildlife. Endangered species will recover. Commercial fishing, farming, recreation, and tourism dependent businesses and associated economies will benefit from a viable, productive, and aesthetically beautiful resource base. The quality of life enjoyed by residents and visitors will be enhanced by sustainable natural resources and by access to natural areas managed by federal, state, and local governments to provide a great variety of recreational and educational activities.

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. The restored Everglades will be smaller and arranged somewhat differently 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.

Strategic Goals

Goal 1. Get the Water Right

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

Goal 3. Foster Compatibility of the Built and Natural Systems

The three strategic goals recognize that water, habitats, 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.

Because of the complexity and the long timeframe of the restoration initiative, it is important to measure and track the hundreds of activities that must be performed to achieve the result of a restored ecosystem.

The strategic goals and related subgoals organize the myriad projects. Measurable objectives have been established to track project implementation and restoration progress.

The strategic goals, subgoals, and measurable objectives are discussed on pages 5–24. Some of the restoration projects are multipurpose in nature, and provide results for more than one measurable objective. In this report, multipurpose projects are listed once, under their primary measurable objective. Further information on the projects can be found within the Integrated Financial Plan (2010).

System-wide Ecological Indicators

Fish & Macroinvertebrates
Wading Birds (Roseate Spoonbill)
Wading Birds (Wood Stork & White Ibis)
Florida Bay Submersed Aquatic Vegetation
Florida Bay Algal Blooms
Crocodilians (American Alligators & Crocodiles)
American Oysters
Periphyton & Epiphyton
Juvenile Pink Shrimp
Lake Okeechobee Nearshore Zone
Invasive Exotic Species

Eleven system-wide ecological indicators have been carefully selected by the Science Coordination Group (SCG) and independently reviewed to assess the success of the Everglades restoration program from a system-wide perspective. These indicators cover the spatial and temporal scales and features of the ecosystem.

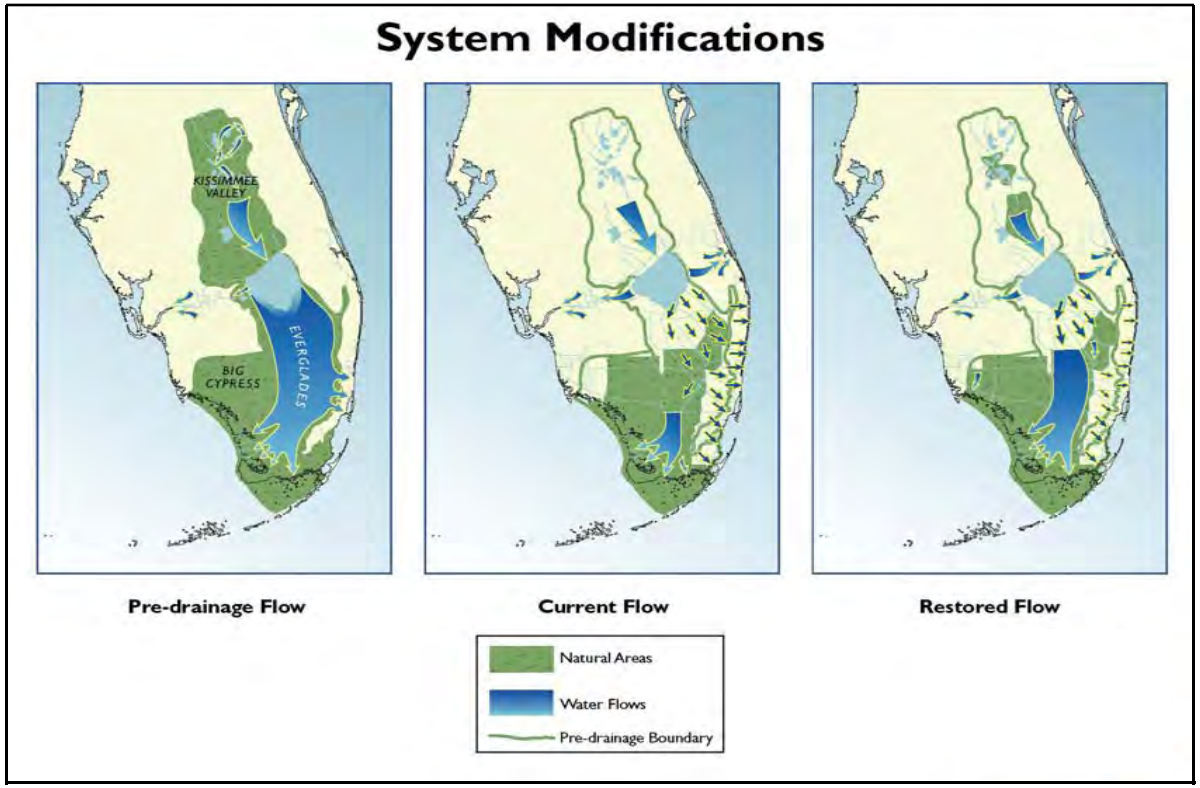
System-wide ecological indicators make understanding an ecosystem possible in terms of management, time, and costs. For example, it would be far too expensive, perhaps even impossible, to count every animal and plant in the Everglades to see if the restoration was a success. Instead, the selected indicator species can be monitored in a relatively few locations to measure the progress of the restoration.

The suite of system-wide ecological indicators is discussed on pages 25–48.

Goal 1: Get the Water Right

Water is the lifeblood of the South Florida Ecosystem, supporting many unique habitats. By the year 2000, historic water flows had been reduced to less than one-third of those that had once flowed through the Everglades. The quality of water that entered the ecosystem had been seriously degraded. Water did not flow at the same times or durations as it had historically, nor could water move freely through the system. The whole South Florida Ecosystem suffered. The health of Lake Okeechobee was seriously threatened. Excessive freshwater discharges in the wet season and inadequate flows in the dry season threatened the estuaries and bays that are critical nurseries and home to many fish and wildlife species.

Getting the water right depends upon restoration of the region's hydrology and water quality. The right quantity of water, of the right quality, needs to be delivered to the right places and at the right times.



Goal 1: Get the Water Right

Subgoal 1-A:	**Get the Hydrology Right**
Objective 1-A.1:	Provide 1.8 million acre-feet of surface water storage by 2036.
Objective 1-A.2:	Develop alternative water storage systems capable of storing 1.7 billion gallons per day by 2030.
Objective 1-A.3:	Modify 361 miles of impediments to flow by 2020.
Subgoal 1-B:	**Get the Water Quality Right**
Objective 1-B.1:	Construct 96,010 acres of stormwater treatment areas by 2035.
Objective 1-B.2:	Prepare locally based plans to reduce pollutants as determined necessary by the total maximum daily loads by 2011.

The System Modifications diagram on the left depicts the historic ecosystem (pre-drainage flow and areal extent), the current flow (resulting from the C&SF Project and construction of extensive canals and levees), and the restored flow (following implementation of the CERP). (Graphic courtesy of the SFWMD and USACE.)

Subgoal 1-A: Get the Hydrology Right

The historic hydrology of the Everglades has been disrupted by flood control projects (e.g., canals and levees), agricultural use, and human development. Water that once slowly flowed across the River of Grass is now quickly diverted, impacting natural habitats including the region's sensitive estuaries.

The CERP and other hydrology projects are being implemented to recapture most of this water and redirect it to sustain natural system functioning and to supplement urban and agricultural water supplies.

Strategy & Restoration Progress

This subgoal consists of three measurable objectives: surface water storage, alternative water storage, and removing impediments to flow. Additional hydrology efforts will help fulfill this subgoal. Progress on the measurable objectives during the reporting period (July 2008–June 2010) is described below and further delineated in the table on page 8.

Surface Water Storage Reservoirs

Strategy. Surface water storage impoundments will provide the ability to retain water until it is needed downstream, avoiding adverse surges to the estuaries and better mimicking flows in the region's core.

Progress. Approximately 9,000 acre-feet of storage and discharge capacity have been made available for interim water management benefits in the L-8 Basin area through the SFWMD-expedited construction of the L-8 Basin Reservoir. In addition, the design and final specifications were completed in 2008 for the state-expedited C-43 West Basin Storage Reservoir. When completed, this reservoir will provide 170,000 acre-feet of storage. Other projects are in various stages of planning and design as detailed in the table on page 8.

Alternative Water Storage

Strategy. Alternative water storage is needed to supplement the region's surface reservoirs. The original proposal in the CERP was utilization of extensive aquifer storage and recovery (ASR). Because of some technical uncertainties, pilot projects are underway to determine the viability of ASR at the extent needed to fulfill this objective.

Progress. Two pilot project facilities within this objective were constructed and are being cycle tested. Although ASR has been used for many years, there are technical uncertainties of using this technology at the regional scale envisioned in the CERP. These uncertainties are being thoroughly researched through the ASR Regional Study and the ASR pilot projects. Modeling of the envisioned CERP ASR (333 wells) operations strategy has begun and will continue through 2011. In addition, phase 2 of the ASR Contingency Study may be conducted after completion of the ASR Regional Study in 2012 to identify alternative storage and water supply options that ASR may not be able to address.

Exploratory wells around Lake Okeechobee provided data for the Lake Okeechobee, Hillsboro, and C-43 ASR pilot projects. Installation of the Kissimmee River ASR facility was completed in 2008; cycle testing began in 2009 and will continue at least through 2011. The Hillsboro ASR facility was completed in 2009; cycle testing began in 2009 and will continue through 2011. A siting evaluation was completed and an exploratory well was constructed at the Seminole Tribe Brighton Reservation ASR well using streamside bank filtration. The Fisheating Creek Feasibility Study is in Phase 2 with evaluation and selection of a preferred plan underway.

Modifying Impediments to Flow

Strategy. Canals, internal levees, and other impediments will be removed or modified to reestablish the natural sheetflow of water through the system.

Progress. A groundbreaking ceremony for the Tamiami Trail Bridge was held in December 2009 for the Tamiami Trail Modifications portion of the Mod Waters project. It will raise (9.7 miles) and bridge (1 mile) portions of Tamiami Trail to accommodate higher water levels in the adjacent L-29 Canal and into Everglades National Park (ENP). Roadwork construction began in March 2010.

Subgoal 1-A: Continued

The National Park Service (NPS) Notice of Availability of the Draft Environmental Impact Statement (DEIS) was published in the Federal Register on May 25, 2010. The preferred plan identified in the DEIS would add 5.5 miles of bridging to the current 1-mile bridge under construction, increasing the total amount of bridge span within the 10.7-mile corridor to 6.5 miles. The final report is anticipated in 2011 and the project will require authorization and funding.

Natural flow has been reestablished for 22 of 43 miles of the historic meandering Kissimmee River, including 4 miles reconnected in 2009. A total of 6,500 acres of floodplain wetlands have been restored and several species, including the ring-necked duck, American avocet, and black-necked stilt, have returned to the Kissimmee River after an absence of 40 years.

Hydropatterns have been restored for approximately 640 acres of wetlands and exotic plants removed from over 2,560 acres for the Southern Corkscrew Regional Ecosystem Watershed (CREW) project.

The C-111 (South Dade) project will ultimately remove almost 5 miles of impediments and restore historic flows in the Taylor Slough and Eastern Panhandle areas of ENP, with downstream benefits for Florida Bay. The Taylor Slough bridge has been replaced, the C-109 canal has been backfilled, and parts of the C-111 spoil mound have been removed.

In addition to these projects currently underway, two projects for this objective, the East Water Conservation Area (WCA) 3A Hydropattern Restoration (Project ID 1304) and Kissimmee Prairie (Project ID 1305) projects, have been completed.

Additional Efforts

Seepage Management. Projects will be implemented to reduce the loss of groundwater through seepage toward the east coast where groundwater levels were lowered by the C&SF Project to allow for development and other uses.

An agreement was signed in June 2010 to initiate the L-31 North (L-30) Seepage Management Pilot Project. This project provides for the testing of various technologies to prevent the loss of water from the natural system.

Operational Changes. Changes in water delivery management schedules will be made to alleviate extreme fluctuations and better match natural hydrological patterns while maintaining urban and agricultural water supply and flood control.

Before and after photos of a restored area of the Kissimmee River (left January 2009; right January 2010).

Subgoal 1-A: Continued

Subgoal 1-A: Get the Hydrology Right Comprehensive Accomplishments July 2008–June 2010		
Objective	**Projects**	**Status**
Surface Water Storage Reservoirs *Objective 1-A.1: Provide 1.8 million acre-feet of surface water storage by 2036.*	C&SF: CERP Indian River Lagoon–South (C-23/C-24/C-25/North Fork and South Fork Storage Reservoirs, and C-44 Basin Storage Reservoir) [Project ID 1101 and 1101A]	**Planning:** Completed **Authorized for Construction:** WRDA 2007 **Construction:** To begin 2011
	C&SF: CERP Everglades Agricultural Area Storage Reservoir [Project ID 1102 and 1102A]	**Planning:** Suspended pending state's River of Grass initiative
	C&SF: CERP Lake Okeechobee Watershed [Project ID 1104]	**Planning:** Draft Project Implementation Report (PIR) underway
	C&SF: CERP Site 1 Impoundment [Project ID 1107 and 1107A]	**Planning:** Completed **Authorized for Construction:** WRDA 2007 **Construction:** To begin September 2010
	C&SF: CERP C-43 Basin Storage Reservoir, Part 1 (Caloosahatchee River (C-43) West Basin Storage Reservoir and Caloosahatchee Watershed) [Project ID 1109 and 1109A]	**Planning:** PIR completed **Reports:** Chief's Report submission to Congress anticipated August 2010
	Everglades and South Florida (E&SF): Critical Projects–Ten Mile Creek [Project ID 1111]	**Planning:** Completed **Construction:** Physically completed **Implementation:** Underway
	C&SF: CERP North Palm Beach County–Part 1 [Project ID 1115]	**Planning:** Underway **Construction:** Completed on several features through the SFWMD expedited program
	C&SF: CERP Broward County Water Preserve Areas [Project ID 1116]	**Planning:** PIR being updated
Alternative Water Storage *Objective 1-A.2: Develop alternative water storage systems capable of storing 1.7 billion gallons per day by 2030.*	C&SF: CERP ASR Regional Study [Project ID 1203]	**Reports:** Interim report completed (June 2008)
	Seminole Tribe Brighton Reservation Aquifer Storage and Recovery (ASR) Pilot Project [Project ID 1206]	**Planning:** Seeking Class V Well Injection Permit from the U.S. Environmental Protection Agency (USEPA) and SFWMD
	Taylor Creek Aquifer Storage and Recovery (ASR) Project [Project ID 1207]	**Planning:** Completed pilot water treatment design studies and design for reactivation components **Construction:** Completed for new Florida aquifer monitoring well
	Fisheating Creek Feasibility Study [Project ID 1208]	**Planning:** Completed Phase I; underway for Phase II (plan selection)
Modifying Impediments to Flow *Objective 1-A.3: Modify 361 miles of impediments to flow by 2020.*	C&SF: C-111 (South Dade) [Project ID 1300]	**Planning:** Completed **Construction:** Completed on several features
	C&SF: CERP WCA-3 Decompartmentalization and Sheetflow Enhancement [Project ID 1301]	**Planning:** Underway
	E&SF: Critical Projects - Southern CREW [Project ID 1303]	**Land Acquisition:** Completed **Planning:** Underway
	Kissimmee River Restoration [Project ID 1306]	**Planning:** Completed **Construction:** Underway; completed for 22 of 43 miles
	Modified Water Deliveries to Everglades National Park [Project ID 1307]	**Planning:** Completed **Construction:** Underway (Tamiami Trail Modification began 2010; 8.5 Square Mile Area features completed)
	Tamiami Trail Modifications: Next Steps [Project ID 1309]	**Planning:** Underway; DEIS noticed for comment June 2010

Subgoal 1-B: Get the Water Quality Right

Runoff from agriculture and stormwater from urban areas has polluted areas of the Everglades and Lake Okeechobee and impaired ecological functions in those critical ecosystems. Excess phosphorus is a major concern, but it is not the only pollution problem. The water quality of the Caloosahatchee River, St. Lucie Estuary, Biscayne Bay, Florida Bay, the Florida Keys, and the nearshore waters off the coasts periodically show signs of significant degradation, including eutrophication, excessive salinity range, and short-term variability and introduction of anthropogenic agricultural or industrial pollutants. Although nitrogen appears to be of particular concern for some marine systems, increased total phosphorus concentrations have led to algal blooms of unprecedented scale in Florida Bay and Biscayne Bay. Mercury is also a concern in both freshwater and marine systems in south Florida. Potentially toxic contaminants, such as trace metals, pesticides, other synthetic organic chemicals, and emerging pollutants of concern (EPOCs), which occur in wastewater, certain soils, and sediments, may occur in alternative sources of water or be present in former agricultural sites that are used in connection with restoration.

Strategy & Restoration Progress

The strategy for this subgoal consists of two measurable objectives: stormwater treatment areas and water management plans. Additional water quality efforts will help fulfill this subgoal. Progress on the measurable objectives during the reporting period (July 2008–June 2010) is described below and further delineated in the table on page 10.

Stormwater Treatment Areas

Strategy. Stormwater treatment areas (STAs) will reduce pollutants, including phosphorus, in waters entering the natural system from urban and agricultural areas.

Progress. Projects currently underway are detailed in the table on page 10. In addition, the following six projects have been completed: STA-1 West Works and Outflow Pump Station (Project ID 1508), STA-2 Works and Outflow Pump Station (Project ID 1509), STA-3/4 Works (Project ID 1510), STA-5 Works (Project ID 1511), STA-6 (Project ID 1512), and LOFT-Nubbin Slough STA Expansion (Project ID 1516). More details can be found in the *South Florida Environmental Report* (2009, 2010) at http://my.sfwmd.gov/portal/page/portal/xweb%20about%20us/agency%20reports.

Water Management Plans

Strategy. 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. Implementation of TMDLs will involve a combination of regulatory, non-regulatory, and incentive-based actions to attain the necessary reduction in pollutant loading.

Progress. Since 2008, the Florida Department of Environmental Protection (FDEP) has completed and adopted by rule TMDLs identifying needed reductions for nutrients and/or to address low dissolved oxygen levels in the St. Lucie Basin, and for nutrients in the estuarine portion of the Caloosahatchee. In addition, six TMDLs were completed for nutrients, dissolved oxygen, or fecal coliforms in the Everglades West Coast Basin. The FDEP has initiated a stakeholder-driven process for developing Basin Management Action Plans (BMAPs) for the Caloosahatchee, Everglades West Coast, and St. Lucie basins that will identify projects and activities needed to restore water quality to meet the designated uses in these watersheds.

Under the Northern Everglades and Estuaries Protection Program (373.4594, F.S.), the SFWMD, in collaboration with FDEP and the Florida Department of Agriculture and Consumer Services, is required to create watershed protection plans for the Lake Okeechobee, Caloosahatchee River, and St. Lucie River watersheds. These plans are to protect and to restore surface water resources by addressing the reduction of pollutant loadings, restoration of natural hydrology, and compliance with applicable state water quality standards. Pollutant load reductions associated with the watershed protection plans are to be based upon TMDLs, which will serve as plan objectives.

Additional Efforts

USEPA Water Quality Standards. The U.S. Environmental Protection Agency (USEPA) initiated proposed rulemaking to set numeric nutrient criteria in January 2010. The USEPA gave an extension of time to set the numeric nutrient criteria for the lakes and flowing waters (including canals) in south Florida to 2012.

Tribal Water Quality Standards. In May 1999 the USEPA approved the 10 micrograms per liter (10 µg/L) total phosphorus water column quality standard adopted by the Miccosukee Tribe of Indians of Florida. The tribe, which is treated as a state for purposes of the Clean Water Act, adopted water quality standards to pro-

tect the tribal Everglades under their jurisdiction on the Federal Reservation.

The Seminole Tribe is working to develop numeric nutrient criteria by 2014 to be approved by the USEPA.

Florida Keys National Marine Sanctuary Water Quality Protection Program. The USEPA and the FDEP conduct a comprehensive water quality monitoring and research program that will correct point and nonpoint sources of water pollution within the Florida Keys National Marine Sanctuary (FKNMS).

In 2009, the FKNMS published a proposed rule that prohibits discharge from any marine sanitation device on boats in federal waters within the sanctuary. In addition, Monroe County and local municipalities have made much progress in replacing septic systems, a source of land-based nutrients in waters of the Florida Keys, with advanced wastewater treatment.

Best Management Practices. Best management practices (BMPs) include structural and management practices on agricultural lands that will improve or maintain the health of natural resources including water quality.

Subgoal 1-B: Get the Water Quality Right
Comprehensive Accomplishments
July 2008–June 2010

Objective	Projects	Status
Stormwater Treatment Areas *Objective 1-B.1: Construct 96,010 acres of stormwater treatment areas by 2035.*	E&SF: Critical Projects Lake Okeechobee Water Retention/ Phosphorus Removal [Project ID 1506]	**Planning:** Completed **Construction:** Nubbin Slough and Taylor Creek portion physically complete in 2006; interim construction and testing underway since 2007
	C&SF: West Palm Beach Canal STA-1E / C-51 West [Project ID 1513]	**Planning:** Completed **Construction:** East basin features constructed and several structures transferred to sponsor for operations (2005) **Implementation:** Field test with periphyton treatment will conclude in 2010
	State Expedited Project: Everglades Agricultural Area (EAA) STAs Built-out Expansion [Project ID 1514A]	**Construction:** Completed for initial Phase EAA Compartment B, Compartment C STAs, and C-139 Annex Pump
	State Expedited Project: Lakeside Ranch STA (part of the Northern Everglades Project) [Project ID 1515]	**Planning:** Completed for Phase I (STA North) **Construction:** Underway for Phase I (STA-N and S-650)
	C-43 Water Quality Treatment Area and Test Facility [Project ID 1519]	**Planning:** Phase I (test facility) will be designed in 2011
	Long-Term Plan for Achieving Everglades Water Quality Goals [Project ID 1520]	**Planning:** Revisions to the plan approved by FDEP
Water Management Plans *Objective 1-B.2: Prepare locally based plans to reduce pollutants as determined necessary by the total maximum daily loads by 2011.*	Total Maximum Daily Load for South Florida [Project ID 1600]	**Planning:** Completed for St. Lucie Basin (nutrients, dissolved oxygen), Caloosahatchee Estuary (nutrients), Everglades West Coast Basin (nutrients, dissolved oxygen, fecal coliforms)
	Hybrid Wetland Treatment [Project ID 1723]	**Planning:** Completed **Construction:** Completed for four sites (Nubbin Slough, Ideal Grove, Mosquito Creek, and Larson 8 Lagoon) **Implementation:** Completed for two sites (Lemkin Creek and Wolf Ditch)
	Local Cost-Share Projects with Martin County [Project ID 1724]	**Planning:** Underway for Phase III Old Palm City Stormwater Quality Improvement **Construction**: Underway for Manatee Pocket Dredging

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

Historically 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, such as 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.

A combination of connectivity and spatial extent created the range of habitats and supported the levels of productivity needed for the historic diversity and abundance of native plants and animals. Restoring natural habitats and species will require reestablishing the hydrologic and other conditions conducive to native communities and piecing together large enough areas of potential habitat. Exotic species must be managed, and the escape of new exotics must be prevented.

The strategy for restoration, project highlights, and a table detailing progress toward the measurable objectives for Goal 2 are on pages 12-16.

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

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

Objective 2-A.1: Complete acquisition of 5.7 million acres of land identified for habitat protection by 2020.

Objective 2-A.2: Protect 20 percent of the coral reefs by 2010.

Objective 2-A.3: Improve habitat quality for 2.4 million acres of natural areas in south Florida.

Subgoal 2-B: Control Invasive Exotic Plants & Animals

Objective 2-B.1: Achieve maintenance control of Brazilian pepper, melaleuca, Australian pine, and Old World climbing fern on south Florida's public conservation lands by 2020.

Objective 2-B.2: Release two biological control insects per year for the control of invasive exotic plants.

Objective 2-B.3: Achieve eradication of Gambian pouch rat by 2012.

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

Currently, the Florida panther and 68 other animal or plant species which inhabit south Florida 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. 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 and coral reefs have suffered a similar decline. Restoration will require land acquisition to protect natural habitats and species, protection of the region's offshore habitats including coral reefs, and the improvement of the quality of these natural areas. Restoration will also depend upon the successful control of invasive exotic plants and animals.

Strategy & Restoration Progress

The strategy for Subgoal 2-A consists of three measurable objectives: land acquisition, coral reef protection, and habitat improvement. Additional efforts will help fulfill this subgoal. Progress on the measurable objectives during the reporting period (July 2008–June 2010) is described in this section and further delineated in the table on page 14.

Land Acquisition

Strategy. Land will be acquired to preserve habitat for native plants and animals and to act as a buffer to existing natural areas. Land will also be acquired for water quality treatment areas, water storage reservoirs, and aquifer recharge areas that will help restore the natural hydrology. Fee-simple acquisition will be coupled with alternative tools to meet restoration land use needs while maximizing the benefits of limited fiscal resources.

Progress. Of the 72 land acquisition projects, 11 are completed and 51 are underway. The Florida Forever Program is Florida's primary land acquisition program. Initially a 10-year program passed in 1999 as an extension of the successful Florida Preservation 2000 Act to raise approximately $3 billion for land acquisition, the Florida Legislature in 2008 extended the Florida Forever program for an additional 10 years. The program identifies and acquires lands from voluntary sellers through a process described under Chapters 259 and 373 of the Florida Statutes. Additionally, local government land acquisition and management programs have spent $605 million for environmentally sensitive land in south Florida in public ownership.

Coral Reef Protection

Strategy. Restoring and preserving offshore habitat involves designation of an ecological reserve and a research natural area to protect critical coral reef communities in the western portion of the FKNMS and Dry Tortugas National Park. Reefs in Biscayne National Park will also be protected and reefs in state parks and other portions of the FKNMS will be managed for conservation.

Progress. Ecological monitoring continues throughout the sanctuary. Results from these monitoring studies and other research programs will be essential to guiding managers in planning for possible future zones. Restoration of degraded or damaged coral reefs is also underway.

Habitat Improvement

Strategy. The CERP calls for removing barriers to sheetflow, restoring more natural hydroperiods to wetlands, and providing natural system water flows to coastal waters. These projects will restore hydrological connections to large portions of the remnant Everglades marsh, improve water quality, and increase the extent of wetlands, thus enhancing fish and wildlife habitat. Wetlands enhancement will also be achieved through voluntary conservation efforts to restore, enhance, and protect degraded wetlands on agricultural lands.

Progress. A groundbreaking was held for the Picayune Strand Restoration Project in January 2010. This project will restore 55,000 acres of hydrology and habitat in southwest Florida. This project was authorized for construction in WRDA 2007. Early work was accomplished by the SFWMD and construction is continuing under the USACE.

A groundbreaking was held for the first phase of the C-111 Spreader Canal Western Pro-

Subgoal 2-A: Continued

ject in January 2010. The completed project will improve hydrology in the southern end of the system with expected benefits for wetlands and Florida Bay from more natural flow patterns. Authorized in WRDA 2000, it became a state expedited project in 2004 and construction is well underway.

Federal efforts on the Lakes Park Restoration Project are being discontinued. The SFWMD and the non-federal sponsor (Lee County) are pursuing this project with non-federal resources to expedite design and construction outside of the CERP.

The SFWMD is working with local interests to expedite design and construction of the Acme Basin B Discharge Project outside of the CERP. The project is currently under construction and will be completed in 2010.

The draft Project Implementation Report (PIR) has been completed and the final PIR is underway for the Biscayne Bay Coastal Wetlands Project. The SFWMD initiated construction on hydrologic improvements on the Deering Estate wetland rehydration component of the project in 2010 and culverts are being installed to distribute water more naturally to coastal wetlands.

Additional Efforts

South Florida Multi-Species Recovery Plan. The South Florida Multi-Species Recovery Plan (MSRP) is a comprehensive, ecosystem-wide strategy to recover threatened and endangered species and to restore and maintain the extremely high biodiversity of native plants and animals in the upland, wetland, estuarine, and marine communities of the South Florida Ecosystem.

Florida panther sightings in the Picayune Strand.

Subgoal 2-A: Restore, Preserve, and Protect Natural Habitats Comprehensive Accomplishments July 2008–June 2010		
Objective	**Projects**	**Status**
Land Acquisition Objective 2-A.1: Complete acquisition of 5.7 million acres of land identified for habitat protection by 2020.	Land Acquisition Projects [Project IDs 2100-2171]	**Real Estate:** 4,877,684 acres of the 5,667,290 acres (86%) have been acquired to date at a cost of $3.8 billion
Coral Reef Protection Objective 2-A.2: Protect 20 percent of the coral reefs by 2010.	Florida Keys National Marine Sanctuary Zoning Action Plan	**Monitoring:** Ecological monitoring underway
Habitat Improvement Objective 2-A.3: Improve habitat quality for 2.4 million acres of natural areas in south Florida.*	C&SF: CERP Lakes Park Restoration [Project ID 2302]	**Planning:** Completed for Phases 1 & 2; design and permitting underway for Phase 3 **Construction:** Two control structures retrofitted to stop saltwater intrusion and detention areas constructed to improve water quality (Phases 1 & 2)
	Arthur R. Marshall Loxahatchee National Wildlife Refuge Prescribed Fire Program [Project ID 2304]	**Implementation:** Ongoing
	C&SF: CERP Acme Basin B Discharge [Project ID 2306 and 2306A]	**Planning:** Completed for Phase 1 and for Phase 2 design of the Section 24 Impoundment and Pump Station #9 **Construction:** Completed for Phase 1 (construction of Pump Station #7 and C-1 canal conveyance improvements)
	C&SF: CERP Picayune Strand Restoration [Project ID 2307]	**Planning:** PIR completed **Construction:** Early work accomplished by SFWMD; construction is continuing under the USACE
	C&SF: CERP Biscayne Bay Coastal Wetlands [Project ID 2309 and 2309A]	**Planning:** PIR being finalized **Construction:** Underway for some features through the SFWMD expedited program
	C&SF: CERP C-111 Spreader Canal [Project ID 2310 and 2310A]	**Planning:** PIR being finalized; design test contract awarded and operation of the 2-year test began February 2010 **Construction:** Underway for some features through the SFWMD expedited program

* The April 1999 USACE *C&SF Project Comprehensive Review Study Final Integrated Feasibility Report and Programmatic Environmental Impact Statement* included an extensive environmental evaluation of the likelihood of CERP in meeting planning objectives for both spatial extent and habitat quality improved through implementation of the CERP projects. Table 7-18 of that publication identifies in detail the anticipated effectiveness of various alternative plans in meeting the CERP planning objectives on a sub-regional basis. The projects included in this table exemplify how this objective will be achieved.

Subgoal 2-B: Control Invasive Exotic Plants & Animals

The control of invasive exotic species is integral to the restoration of the ecosystem and to the recovery of threatened and endangered and other imperiled species. Some invasive exotic plants and animals have spread in natural areas to the extent that the native plant and animal communities are being threatened or replaced.

The unregulated importation of new plant and animal species continues to increase the potential for infestations of exotic species. Continuing degradation of the natural environment may enhance the spread or the rate of spread of exotic species. Although control of exotic plants on public lands is progressing, the success will be impacted if adjacent private lands remain infested. In addition, the level of effort varies from agency to agency (federal, state, and local), therefore continuous coordination between the agencies is required to maximize benefits.

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. Additionally, this must take into account that some populations that have adapted to current conditions may be impacted.

Strategy & Restoration Progress

The strategy for Subgoal 2-B consists of three measurable objectives: invasive exotic plant maintenance control, biological control of invasive exotic plants, and control of invasive exotic animals. Progress on the measurable objectives during the reporting period (July 2008–June 2010) is described below and further delineated in the table on page 16.

Invasive Exotic Plant Maintenance Control

Strategy. Maintenance control is defined as "a method for the control of exotic plants in which control techniques are utilized in a coordinated manner on a continuous basis in order to maintain the plant population at the lowest feasible level" (§369.22, *Florida Statutes*). Many techniques will be used in an integrated approach to achieve maintenance control of invasive exotic plants including mechanical removal, chemical treatment, and biological controls.

Progress. Regional, coordinated efforts have yielded the Everglades Protection Area (EPA) largely free of melaleuca. Much of the remaining population is now found on private lands. In close collaboration with the NPS, the SFWMD continues its invasive species monitoring program for the EPA. Using aerial and ground-based techniques, the SFWMD and the NPS are collecting operationally useful spatial data for priority invasive plant species. There is now detailed information of major infestations throughout the entire 2.4 million-acre Everglades region.

An Adaptive Management Strategy was developed in coordination with the REstoration, COordination, and VERification (RECOVER) interagency team for the Melaleuca Eradication and Other Exotic Plants Project. The final PIR and Environmental Assessment (EA) was finalized in January 2010.

Biological Control of Invasive Exotic Plants

Strategy. Plants are often prevented from becoming serious weeds in their native range by a complex assortment of insects and other herbivorous organisms. "Classical" biological control efforts will locate such insects and import host-specific species to attack and control the plant in regions where it has become a weed.

Progress. The SFWMD continues to support development of biological control agents for melaleuca, Old World climbing fern, and Brazilian pepper. The U.S. Department of Agriculture (USDA) Agricultural Research Service (ARS) is implementing a successful biocontrol program for melaleuca and is seeing success with a new agent for Old World climbing fern.

The SFWMD and the USACE are working on a partnership agreement to build a science facility to raise insects as biological controls. The facility is planned as a 2,700-square-foot annex to the existing USDA/ARS research laboratory.

Control of Invasive Exotic Animals

Strategy. Controlling invasive exotic animals requires a complex suite of prevention, detection, eradication, and monitoring projects. One example is the effort to eradicate the Gambian pouch rat from the Florida Keys and thus prevent the spread of this species throughout the South Florida Ecosystem.

Progress. A female Gambian pouch rat was captured in September 2009, sterilized, fitted with a radio collar, and subsequently released on Grassy Key. This 'judas' specimen remains in the wild in hopes of attracting other wild Gambian pouch rats, and is monitored for its movements. No additional animals have been documented or trapped since this capture.

Additional Efforts

A cooperative interagency effort to manage and control exotics species was formalized in 2008. A memorandum of understanding was signed by the partner agencies of the Everglades Cooperative Invasive Species Management Area (ECISMA): SFWMD, USACE, Florida Fish and Wildlife Conservation Commission (FWC), NPS, and FWS. The ECISMA focuses on early detection and rapid response of emerging threats.

Both the Picayune Strand Restoration and Site 1 Impoundment projects have completed and approved Vegetation Management Plans. The former

began treatment of cogongrass and torpedo grass this fiscal year. In addition, the USACE has received guidance to incorporate invasive species control into the PIRs for CERP projects.

Within the Arthur R. Marshall Loxahatchee National Wildlife Refuge (NWR), treatment programs continue for invasive exotic plants, which include melaleuca, Old World climbing fern, and Brazilian pepper. Currently, Australian pine is in maintenance control. Follow-up surveys will indicate whether treatment has rendered Brazilian pepper in maintenance control as well.

Local governments also eradicate invasive exotic plants on environmentally sensitive lands. In Miami-Dade County, approximately $3 million per year is invested in management of wetland, pine rockland, and hardwood hammock plant communities.

On March 11, 2010, the FWS announced that it would move forward with the official administrative process of banning the importation, export, and interstate transport of nine species of constrictor snakes, the same nine species being considered by the U.S. Congress (SB 373/HR 2811).

The 2010 Florida non-native wildlife bill bans species listed by the FWC as Reptiles of Concern (ROCs). The law adds language to civil and criminal penalties and allows the FWC to levy fines.

The SFWMD continues to support research and development of control tools for Burmese pythons and other giant constrictors in the south Florida ecosystem. The SFWMD is a participating partner on trap development efforts and this year began a cooperative effort with the USDA Wildlife Services focused on trap deployment strategies and visual search methods.

Subgoal 2-B: Control Invasive Exotic Plants and Animals
Comprehensive Accomplishments
July 2008–June 2010

Objective	Projects	Status
Invasive Exotic Plant Maintenance Control Objective 2-B.1: Achieve maintenance control of Brazilian pepper, melaleuca, Australian pine, and Old World climbing fern on south Florida's public conservation lands by 2020.	Monitoring the Effects of Repeated Aerial Herbicide Application on *Lygodium microphyllum* and Native Vegetation [Project ID 2501]	**Implementation:** Ongoing
	Invasive Exotic Plants Control in Terrestrial and Aquatic Natural Systems [Project ID 2502]	**Implementation:** Ongoing; EPA largely free of melaleuca
	Invasive Species Research and Information Exchange [Project ID 2503]	**Implementation:** Ongoing
	Develop and implement a FWS Florida Invasive Species Strike Team [Project ID 2504]	**Implementation:** Ongoing
	C&SF:CERP - Melaleuca Eradication and Other Exotic Plants [Project ID 2505]	**Planning:** PIR being finalized **Construction:** ARRA funds could enable construction in 2010
	Everglades National Park Exotic Control Program [Project ID 2506]	**Implementation:** Ongoing
	Hole-in-the-Donut [Project ID 2507]	**Implementation:** Ongoing
	Aquatic and Upland Invasive Plant Management [Project ID 2508]	**Implementation:** Ongoing
	Exotic Species Removal [Project ID 2509]	**Implementation:** Ongoing
	Exotic Vegetation Control (Critical) Big Cypress National Preserve [Project ID 2510]	**Implementation:** Ongoing
Biological Control of Invasive Exotic Plants Objective 2-B.2: Release two biological control insects per year for the control of invasive exotic plants.	Melaleuca Biological Control Agents [Project ID 2602]	**Implementation:** Ongoing
Control of Invasive Exotic Animals Objective 2-B.3: Achieve eradication of Gambian pouch rat by 2012.	Eradication of Gambian Pouch Rat [Project ID 2700]	**Implementation:** Ongoing

Goal 3: Foster Compatibility of the Built & Natural Systems

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 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, accompanying urban sprawl, and the subsequent need for related infrastructure and public services have resulted in adverse impacts on natural ecological systems. Development patterns have resulted in the loss of natural habitats and connectivity. The region's intensive growth and development have also heightened concerns regarding flood protection and water supply.

The strategy for restoration, project highlights, and a table detailing progress toward the measurable objectives for Goal 3 are on pages 18–24.

Goal 3: Foster Compatibility of the Built & Natural Systems

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

Objective 3-A.1: Prepare a land use analysis for selected restoration projects.

Objective 3-A.2: Designate or acquire an additional 10,000 acres of lands needed for parks, recreation, and open space to complement South Florida Ecosystem restoration through local, state, and federal programs by 2015.

Objective 3-A.3: Increase participation by 350,000 acres in the Grassland Reserve Program, Wetland Reserve Program, Farm and Ranch Land Protection Program, and the Environmental Quality Incentive Program to promote compatibility between agricultural production and South Florida Ecosystem restoration by 2014.

Objective 3-A.4: Increase the number of local governments that adopt into their comprehensive plans (goals, objectives, policies, and related strategies) - concepts compatible with South Florida Ecosystem restoration.

Objective 3-A.5: Increase the use of educational programs and initiatives to further public and local government understanding of the benefits of South Florida Ecosystem restoration.

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

Objective 3-B.1: Objective 3-B.1: Maintain or improve existing levels of flood protection for the urban, agricultural, and natural environments.

Objective 3-B.2: Objective 3-B.2: Rehabilitate the Herbert Hoover Dike to provide adequate levels of flood protection to the communities and lands surrounding Lake Okeechobee.

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

Objective 3-C.1: Plan for regional water supply needs.

Objective 3-C.2: Increase volumes of reuse on a regional basis.

Objective 3-C.3: Increase water made available through the state's Water Protection and Sustainability Program and the SFWMD Alternative Water Supply Development Program.

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

To maintain a high quality of life for south Florida's residents, the built environment must be planned 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 requires development patterns, policies, and practices that serve both the built and natural systems.

Strategy & Restoration Progress

The strategy for Subgoal 3-A consists of five measurable objectives and additional efforts that focus on the compatibility of land use with restoration efforts. Progress during the reporting period (July 2008–June 2010) is described below and further delineated in the table on pages 19–20.

Compatible Land Use

Strategy. Florida has enacted several pieces of legislation regarding comprehensive land use planning and the coordination of growth management and water supply planning. State, regional, and local agencies will use a variety of planning tools to foster increased compatibility of the built and natural systems and to address restoration of the South Florida Ecosystem.

Progress. The Florida Department of Community Affairs (DCA) undertook a land use compatibility analysis for four restoration projects: the C-111 Spreader Canal; the Biscayne Bay Coastal Wetlands; the Indian River Lagoon-South C-23/24 South Reservoir; and the Lake Okeechobee Aquifer Storage Reservoir. This involved a review of existing and future land use designations, including related densities and intensities, adjacent to and surrounding selected ecosystem restoration project footprints to address how current and future land uses impact restoration efforts. The data have been gathered and analyzed and is currently being reviewed by the Task Force and SFWMD prior to its release.

In addition, the DCA identified each local government with a CERP project or projects located within its political boundaries and assessed each local government's comprehensive plan to identify the level of protection afforded South Florida Ecosystem restoration. The results will be put in a database and cross-referenced with each local government's Evaluation and Appraisal Report due date. As those due dates approach, the DCA, in conjunction with the SFWMD, will work with those local governments to strengthen the goals, objectives, and policies in their respective comprehensive plans to help protect the CERP projects and enhance ecosystem restoration.

Parks, Recreation, and Open Space

Strategy. Park, recreation, and other open space lands will protect natural systems and/or serve as buffers between natural and built environments. Greenways, blueways, and trails will multiply the benefits of open spaces by linking them and enhancing public access.

Progress. After public review and comment during spring 2008, the regional conceptual recreation plans were finalized. The CERP Master Recreational Plan (MRP) will be distributed for public review in Fall 2010.

A total of $567.5 million has been spent on acquiring all 26,300 acres of the State's Florida Communities Trust Lands.

Design and construction of the Lake Okeechobee Scenic Trail (LOST) began in 2003. This project will create a 110-mile multi-purpose trail on top of the Herbert Hoover Dike around Lake Okeechobee. LOST is co-managed by Florida's Office of Greenways and Trails (OGT) and the USACE. To date, using $2.5 million of OGT funding, the Florida Department of Transportation (DOT) paved an additional 3 miles of trail along State Road 78 in the Fisheating Creek area, on the west side of lake where there is no levee. Also using OGT funds, DOT has begun design and permitting for construction of an additional 11 miles of paved levee top trail from Moore Haven to the 3 miles of paved trail along State Road 78, and north to Harney Pond Park near Lakeport.

In January of 2010, Palm Beach County completed construction of a trailhead, two kiosk entryways, and other trail amenities for Palm Beach County's "Glades Communities" trail system, which connects with the LOST. Continued construction of paved segments of the LOST trail will provide increased opportunities for public access to Lake Okeechobee and local amenities.

Compatible Agriculture

Strategy. Agriculture is Florida's second leading industry and a large portion of agricultural land can be viewed as open space that benefits the natural system through buffering, augmentation of natural habitats, water storage and filtration, and aquifer recharge. In addition to regulatory programs and best management practices, several voluntary conservation programs will assist landowners in protecting and preserving natural resources on agricultural lands.

Subgoal 3A: Continued

Progress. The 2008 Farm Bill responded to a broad range of emerging natural resource challenges faced by farmers and ranchers, including soil erosion, wetlands, wildlife habitat, and farmland protection. Private landowners will benefit from a portfolio of voluntary assistance, including cost-share, land rental, incentive payments, and technical assistance. The 2008 Farm Bill places a strong emphasis on the conservation of working lands, ensuring that land

Farm Bill Conservation Programs
2008–2010

Program	Acreage Enrolled	Dollar Amount
Wetland Reserve Program (WRP)	51,290	$203,862,168
Environmental Quality Incentive Program (EQIP)	174,693	$13,800,821
Wildlife Habitat Incentives Program (WHIP)	4,638	$243,523
TOTAL	**230,621**	**$217,906,512**

Subgoal 3-A: Use and Manage Land in a Manner Compatible with Ecosystem Restoration
Comprehensive Accomplishments
July 2008—June 2010

Objective	Projects	Status
Compatible Land Use Objective 3-A.1: Prepare a land use analysis for selected restoration projects.	Analysis of Land Use Patterns Surrounding four CERP Projects [Project ID 3100]	**Planning:** Completed and under review
Parks, Recreation, and Open Space Objective 3-A.2: Designate or acquire an additional 10,000 acres of lands needed for parks, recreation, and open space to complement South Florida Ecosystem restoration through local, state, and federal programs by 2015.	Florida Communities Trust Grant Program	**Land Acquisition:** A total of $567.5 million has been spent on acquiring all 26,300 acres of the State's Florida Communities Trust Lands.
	Florida Keys Overseas Heritage Trail [Project ID 3200]	**Planning:** Completed for three new segments; underway for six others **Construction:** Completed for 4.7 miles; underway for 14 miles
	Lake Okeechobee Scenic Trail [Project ID 3201]	**Planning:** Underway for Taylor Creek pedestrian bridge **Construction:** Completed for 62 miles of paved levee-top trail and 2.5 miles of at-grade trail in Fisheating Creek
	Florida Greenways and Trails Program [Project ID 3202]	**Planning:** 2 Blueway systems (Lee County and Charlotte County), Shingle Creek paddling trail, and Shingle Creek Regional Park designated **Land Acquisition:** 5.22 acres in Orange County
Compatible Agriculture Objective 3-A.3: Increase participation by 350,000 acres in the Grassland Reserve Program, Wetland Reserve Program, Farm and Ranch Land Protection Program, and the Environmental Quality Incentive Program to promote compatibility between agricultural production and South Florida Ecosystem restoration by 2014.	Technical Assistance to Indian Reservations [Project ID 3300]	**Implementation:** Ongoing
	2002 Farm Bill Conservation Programs [Project ID 3301]	**Implementation**: Enrolled 211,657 acres at an obligated cost of $187,147,000

remains both healthy and productive. The assistance includes the design, layout, and consultation services associated with the conservation practice application or management guidance provided. Technical assistance is targeted towards nutrient management, water quality, and water conservation concerns associated with animal feeding, livestock grazing operations, and fruit and crop production within the Everglades ecosystem. During 2008–2010, a total of 230,621 acres in the 16-county south Florida region were enrolled in Farm Bill conservation programs at an obligated cost of $217,906,512 (see table on page 19).

Community Understanding

Strategy. Because of the diversity of cultures in south Florida, public outreach and communication form an important cornerstone for ecosystem restoration efforts. Public outreach strategies will instill a broad sense of stewardship, ownership, and responsibility for all parties involved, including private citizens. Efforts include general public awareness, minority community outreach, environmental education, small business outreach, and project-level involvement.

Progress. The USACE and the SFWMD continued to make much progress during this reporting period to raise awareness of central and south Florida's public-at-large and socioeconomically impacted communities about the CERP and overall restoration of the South Florida Ecosystem. They are starting to transition on many projects from planning in the 1990s, to an exciting decade of construction groundbreakings and other ceremonies starting in 2009.

Innovative products, unique delivery methods, and public involvement all helped ensure that CERP and the greater Everglades ecosystem were better understood and that the public had opportunities to participate in decision-making.

Additional Efforts

Brownfield Redevelopment. Brownfields, with their actual or perceived environmental contamination along with the risks and costs associated with cleanup, are a significant barrier to redevelopment in urban areas. Productive reuse of brownfields will help prevent the premature development of farmland, open space, and natural areas, which furthers restoration efforts.

Rural and Family Lands Protection Act. The conversion of rural lands to higher density and more intense uses disrupts the natural hydrological and biological functions that support not only sustainable agriculture and healthy ecosystems, but also the quality of life enjoyed by south Floridians. The 2001 Rural and Family Lands Protection Act authorizes the development of strategies, including conservation easements and incentive programs, that will protect rural, agricultural, and timber lands.

Subgoal 3-A: Use and Manage Land in a Manner Compatible with Ecosystem Restoration
Comprehensive Accomplishments
July 2008–June 2010
Continued

Objective	Projects	Status
Compatible Land Use Objective 3-A.4: Increase the number of local governments that adopt into their comprehensive plans (goals, objectives, policies, and related strategies) - concepts compatible with South Florida Ecosystem restoration.	Consideration of Land Use Policies and Planning by Local Governments with CERP [Project ID 3400]	**Planning:** Completed baseline survey of local governments with CERP projects within or adjoining their jurisdictions and determined how many jurisdictions currently contain Goals, Objectives, or Policies in their local comprehensive plans that reflect CERP. Outreach efforts in conjunction with the SFWMD will begin in December 2010.
Community Understanding Objective 3-A.5: Increase the use of educational programs and initiatives to further public and local government understanding of the benefits of South Florida Ecosystem restoration.	USACE CERP Public Outreach and Assistance [Project ID 3502]	**Implementation:** Ongoing
	SFWMD Outreach Program [Project ID 3503]	**Implementation:** Ongoing

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

Land suitable for development and 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 the 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.

WRDA 2000 clearly states that implementation of the CERP shall not reduce levels of service for flood protection that were in existence on the date that the law was enacted and in accordance with applicable law. The Savings Clause states that CERP projects, including increased canal and groundwater levels, need to be accomplished in a way that does not harm flood protection.

Strategy & Restoration Progress

The strategy for Subgoal 3-B consists of two measurable objectives and additional efforts that focus on flood protection. Progress on the two measurable objectives during the reporting period (July 2008–June 2010) is delineated in the table on page 22.

Public Works Construction

Strategy. Capital improvements, modifications, and repairs to water control and conveyance facilities will help maintain and improve flood protection. The CERP consists of numerous projects that may provide incidental improvements to flood protection while decreasing the loss of freshwater supplies. Other projects, including some partially funded by the Federal Emergency Management Agency (FEMA), also seek to improve or maintain flood protection in the region.

Progress. The C-4 Flood Mitigation Projects include multiple individual projects to provide flood mitigation in the C-4 Basin. These include impoundments, pump stations, gravity walls, and conveyance improvements. Seven projects have been completed with five currently underway.

Herbert Hoover Dike Rehabilitation

Strategy. The Herbert Hoover Dike (HHD) system consists of approximately 143 miles of levee surrounding Lake Okeechobee. Rehabilitation will address seepage, uplift, and stability problems and provide adequate levels of flood protection to adjacent communities.

Progress. The rehabilitation effort covers the entire dike with areas of work defined as Reaches 1–8. Construction activities are ongoing within HHD Reaches 1A, 1B, 1C, and 1D and include full-scale production of a cut-off wall, completion of filling of quarry in Reach 1D, and toe ditch fill in localized areas of Reach 1D. Additional cut-off wall task orders are being prepared for proposal and award in Reaches 1B and 1C.

Design activities are underway for Reach 1 land side design plans and specifications. Field investigations, dam safety risk assessments, and initial land side design options are ongoing in support of the Major Rehabilitation Report and Supplemental Environmental Impact Statement (SEIS) for Reaches 2 and 3.

A draft SEIS for Reach 1A land side design and structural solutions was released in June 2010. A draft SEIS for Reaches 1B, 1C, and 1D land side design and structural solutions is scheduled for release in fall 2010.

Additional Efforts

Non-structural Flood Protection. Numerous non-structural options for flood protection exist for the built environment. These include ensuring that new construction meets FEMA guidelines, land use planning to guide development away from flood-prone areas, and acquiring undeveloped lands from willing sellers.

Subgoal 3-B: Maintain or Improve Flood Protection in a Manner Compatible with Ecosystem Restoration Comprehensive Accomplishments July 2008–June 2010		
Objective	**Projects**	**Status**
Public Works Construction Objective 3-B.1: Maintain or improve existing levels of flood protection for the urban, agricultural, and natural environments.	C-4 Flood Mitigation Projects [Project ID 3600]	**Planning:** Completed **Construction:** Seven projects completed; five projects ongoing
Herbert Hoover Dike Rehabilitation Objective 3-B.2: Rehabilitate the Herbert Hoover Dike to provide adequate levels of flood protection to the communities and lands surrounding Lake Okeechobee.	Herbert Hoover Dike Rehabilitation [Project ID 3700]	**Planning:** Completed for Reach 1; design underway for Reaches 2 and 3 **Construction:** Underway in Reach 1

The restoration effort is being conducted in phases along specific portions (reaches) of the levee (figure on left). A portion of the Herbert Hoover Dike is pictured on the right.

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

The State of Florida independently and both the federal and state partners under the CERP have specific responsibilities regarding existing and future water supply for both the built and natural systems. The State of Florida has statutory goals and responsibilities to ensure an adequate supply of water for protection of the natural system along with existing and future "reasonable-beneficial" potable, industrial, and agricultural uses. The CERP authorization in the WRDA 2000 specifically provides that the CERP serves as a framework for restoring, preserving, and protecting the South Florida Ecosystem while providing for other water related needs of the region, including water supply.

Strategy & Restoration Progress

The strategy for Subgoal 3-C consists of three measurable objectives and additional efforts that focus on water supply. Progress on the three measurable objectives during the reporting period (July 2008–June 2010) is delineated in the table on page 24.

Water Supply Plans

Strategy. Regional water supply plans for each of the four SFWMD planning areas will be updated every five years to reassess base assumptions and current technologies. The goal of each plan is to meet the water supply needs of the region during a one-in-ten year drought while not causing harm to the environment.

Progress. The process to update the plans for the Upper East Coast (UEC) and Lower West Coast (LWC) is underway. Population and demand projections have been developed, public workshops held, presentations made to local governments in the planning regions to inform them of the process, goals, objectives, issues for each region agreed upon, and several chapters drafted. Additional public workshops will be held and the documents completed and reviewed by stakeholders.

Water Conservation and Reuse

Strategy. The SFWMD regional water supply plans outline the planning and permitting efforts that will encourage water conservation and lower consumptive use rates over time. Reuse projects will treat and discharge wastewater for a variety of uses, including ground water recharge, environmental enhancement, and irrigation. CERP contemplates the use of reclaimed water to help meet the freshwater requirements of the southern end of the Everglades system, including Biscayne Bay.

Progress. Due to uncertainties concerning ecological effects of application of reclaimed water to sensitive water bodies, such as tidal waters and coastal wetlands of Biscayne National Park, several assessments and demonstration scale projects are being conducted. Miami-Dade County has conducted a pilot project to assess the use of reclaimed water for recharge of the aquifer upstream of water supply wellfield, and is proceeding with the larger-scale implementation. Additionally, Miami-Dade is developing a separate pilot project and monitoring plan to evaluate the effectiveness of three different treatment technologies in achieving water quality objectives for wetland rehydration. The city of Plantation and the SFWMD conducted an assessment of potential ecological effects of microcontaminants in reclaimed water. These efforts are expected to evaluate the role of large scale reuse in augmenting systemwide water budgets, either by providing additional water or by offsetting existing consumptive uses.

Alternative Water Supply Development

Strategy. Alternative technologies for water supply development can be cost prohibitive for many local governments. The Alternative Water Supply Development Program and the state's Water Protection and Sustainability Program will provide grants and cost-sharing (respectively) for alternative water supply development such as saltwater, brackish water, and reclaimed water projects.

Progress. The Alternative Water Supply (AWS) Program recommended that 35 projects receive funding for Fiscal Year (FY) 2009. The FY 2009 budget included $8.5 million in AWS funding for local government and other partners of which $4.25 million was provided by the State.

Additional Efforts

Water Reservations and Allocations. WRDA 2000 requires that the State of Florida reserve or allocate water for the natural systems associated with implementation of the CERP. Water reservations have been adopted in association with the Picayune Strand Restoration Project and the Indian River Lagoon-South Project and a water reservation associated with the C-43 Reservoir project is underway. Water allocation rules

have been adopted in association with the Site I impoundment project and the Indian River Lagoon-South Project.

2008 Comprehensive Water Conservation Program. In September 2008, the SFWMD Governing Board approved the Comprehensive Water Conservation Program, the compilation of a 2-year collaborative process with over 20 stakeholders representing 14 interest groups. The program is organized into three initiatives: regulatory, voluntary and incentive-based, and education and marketing. The overall program is built on a set of core values identified by the SFWMD's stakeholder group and is designed to be sustainable, science-based, measurable, goal-based, environmentally protective, equitable, wherever possible, and practicable. Staff is currently implementing the program recommendations in an effort to achieve efficient levels of water use and ensure, in conjunction with other initiatives, an adequate and reliable supply of water to both protect the health of the ecosystem and satisfy current and future water demands.

Minimum Flows and Levels. Florida law directs the SFWMD to set minimum flows and levels (MFLs) to prevent significant harm to water resources. The SFMWD will continue to establish MFLs for the ecosystem's priority water bodies. The MFL Priority Water Body List and Schedule is prepared annually. Once adopted, MFLs are implemented through the SFWMD's consumptive use permitting and water supply planning program.

Alternative Water Supply Program, 2009		
Region	**2009 Targets***	**2009 Achievements***
Lower East Coast	13.50	13.50
Lower West Coast	12.34	12.34
Upper East Coast	0.80	0.80
Kissimmee Basin	0.00	0.00
TOTALS	**26.64**	**26.64**

*Millions of gallons per day (mgd).

Subgoal 3-C: Provide Sufficient Water Resources for the Built and Natural Systems
Comprehensive Accomplishments
July 2008–June 2010

Objective	Projects	Status
Water Supply Plans Objective 3-C.1: Plan for regional water supply needs.	Regional Water Supply Plans [Project ID 3800]	**Reports:** LWC and UEC underway for approval in 2011; Lower East Coast (LEC) and Kissimmee Basin (KB) planned for approval in 2012
Water Conservation and Reuse Objective 3-C.2: Increase volumes of reuse on a regional basis.	C&SF: CERP South Miami-Dade County Reuse [Project ID 3900]	**Planning:** The full-scale CERP project has not yet begun; however, local governments are actively evaluating and pursuing reuse
Alternative Water Supply Development Objective 3-C.3: Increase water made available through the state's Water Protection and Sustainability Program and the SFWMD Alternative Water Supply Development Program.	Alternative Water Supply Grant Program [Project ID 4000]	**Implementation:** Ongoing For FY 2010, three projects have been carried over from FY 2009: • City of Doral (J.C. Bermudez Park Reclaimed Graywater Irrigation Project) • City of Hialeah (10 mgd Reverse Osmosis Water Treatment Plant) • City of Miramar (West Water Plant Expansion 2.5 mgd Reverse Osmosis Treatment Plant)

System-wide Ecological Indicators

The Task Force has established a suite of system-wide ecological indicators to assess current ecosystem health and provide a means to track ecosystem response to restoration. This suite of system-wide ecological indicators was developed specifically to provide a big picture view of restoration, and the ecosystem's health and response, for the Task Force and Congress.

How the System-wide Ecological Indicators Relate to other Indicators

The system-wide ecological indicators are organisms that represent key biological responses in the ecosystem. The RECOVER program for CERP monitors many additional aspects of the ecosystem, including such things as: rare and endangered species, mercury, water levels, water flows, storm-water releases, dissolved oxygen, soil accretion and loss, phosphorus concentrations in soil and water, algal blooms in Lake Okeechobee, hydrologic sheet flow, increased spatial extent of flooded areas through land purchases, percent of landscape inundated, tree islands, and salinity. This combination of indicators will provide managers with necessary information for adjusting restoration activities at both large and small scales. The Task Force's system-wide ecological indicators are largely a subset from this larger monitoring and assessment program and are intended to provide a system-wide, big-picture appraisal of restoration.

These indicators will help evaluate the ecological changes resulting from the implementation of the restoration projects. Indicator response will also help determine appropriate system operations necessary for multiple habitat types within the Everglades system.

The Selection Process

The approach used to select these system-wide ecological indicators focused on individual indicators that integrate numerous physical, biological, and ecological properties, scales, processes, and interactions to try to capture the big picture. The indicators were also selected due to the availability of sufficient and suitable information to accurately assess ecological conditions. The goal was to select a suite of indicators that comprehensively cover the range of ecosystem response to change in terms of space and time.

The individual indicators were peer reviewed and the suite of system-wide ecological indicators was independently reviewed by an expert panel.

The Summary Format

The Task Force's SCG, in close cooperation with RECOVER and the broader community of indicator scientists, have established a common format for assessing and communicating key findings from the system-wide ecological indicators. The indicator summaries that follow utilize a 2-page format with traffic light symbols to enhance understanding at a glance. The summaries are based upon a scientific assessment report that includes the detailed data, theory, and analyses. This approach effectively communicates and links the complex underlying science and data in a way that is universally understood.

System-wide Ecological Indicators

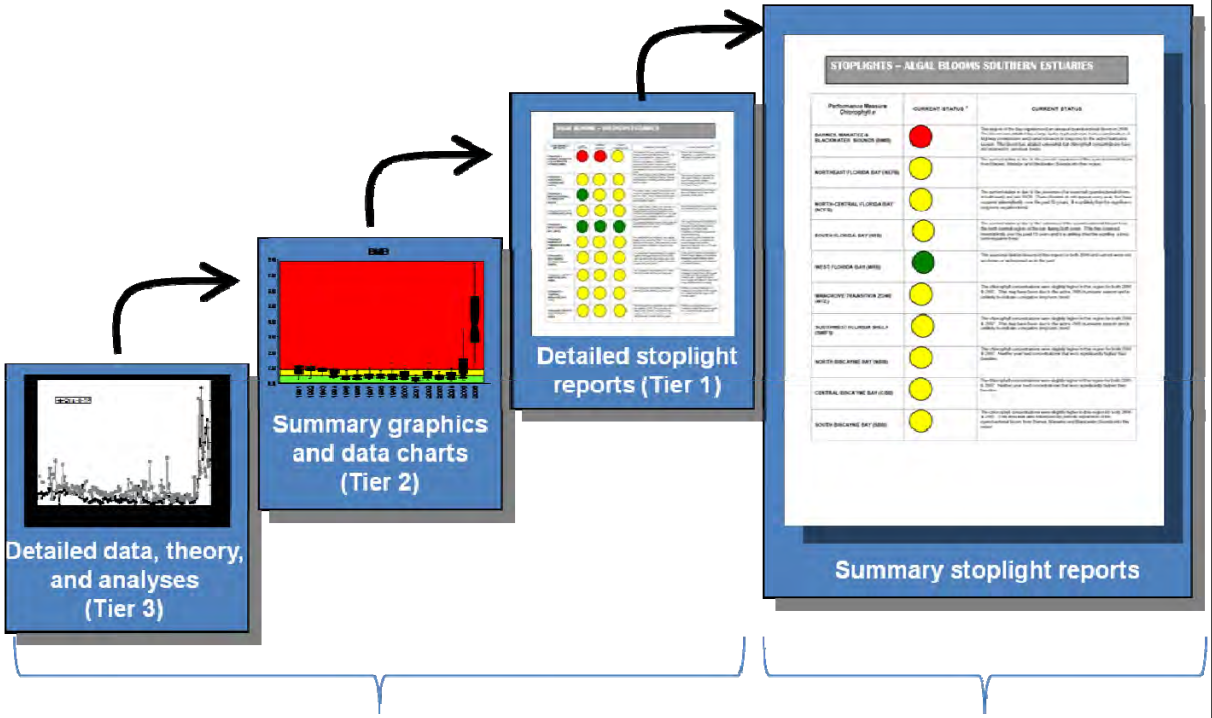
- Fish & Macroinvertebrates
- Wading Birds (Roseate Spoonbill)
- Wading Birds (Wood Stork & White Ibis)
- Florida Bay Submersed Aquatic Vegetation
- Florida Bay Algal Blooms
- Crocodilians (American Alligators & Crocodiles)
- American Oysters
- Periphyton & Epiphyton
- Juvenile Pink Shrimp
- Lake Okeechobee Nearshore Zone
- Invasive Exotic Species

Within the stoplight tables, the "Current Status" column contains the most recent indicator information. The "Last Status" column contains information presented in the 2008 Task Force Biennial Report.

Further Details

More detailed information on these indicators can be found in the *System-wide Ecological Indicators for Everglades Restoration: 2010 Report* available on the Task Force website.

Development of Summary Stoplight Reports

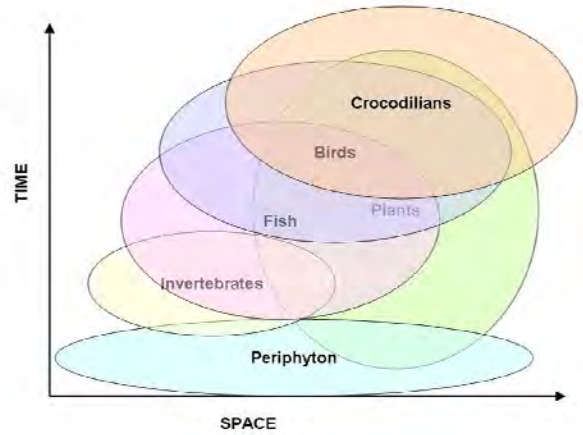


The indicator summaries contained in this document were synthesized from scientific information compiled within the *System-wide Ecological Indicators for Everglades Restoration: 2010 Report*. The assessment report contains detailed data and analyses on each indicator. That information was rolled up into detailed stoplight reports that relate cumulative data on the indicators and provide a framework for seeing trends in restoration for each indicator. These detailed stoplight reports were synthesized into summary stoplight reports for this document to illustrate key findings and the current status of the indicators, and to reflect any changes in indicator status from the last Biennial Report (2008).

Stoplight Color Legend

Red	Substantial deviations from restoration targets creating severe negative condition that merits action.
Yellow	Current situation does not meet restoration targets and merits attention.
Green	Situation is good and restoration goals or trends have been reached. Continuation of management and monitoring effort is essential to maintain and be able to assess "green" status.

Indicator Response to Change over Space and Time



The suite of system-wide ecological indicators was chosen based upon their collective ability to comprehensively reflect ecosystem response in terms of space and time. For example, periphyton responds to change very rapidly at both small and large spatial scales while crocodilians respond more slowly to change and at larger spatial scales. As indicators, they "cover" different aspects of the ecosystem. The system-wide ecological indicators collectively "cover" the ecosystem in terms of response to change over space and time.

This figure is an illustration of how individual indicators may interrelate and respond to restoration in terms of space and time. This figure uses six indicators as an example and is not meant to precisely represent the exact spatial and temporal interactions of the system-wide ecological indicators.

Fish & Macroinvertebrates

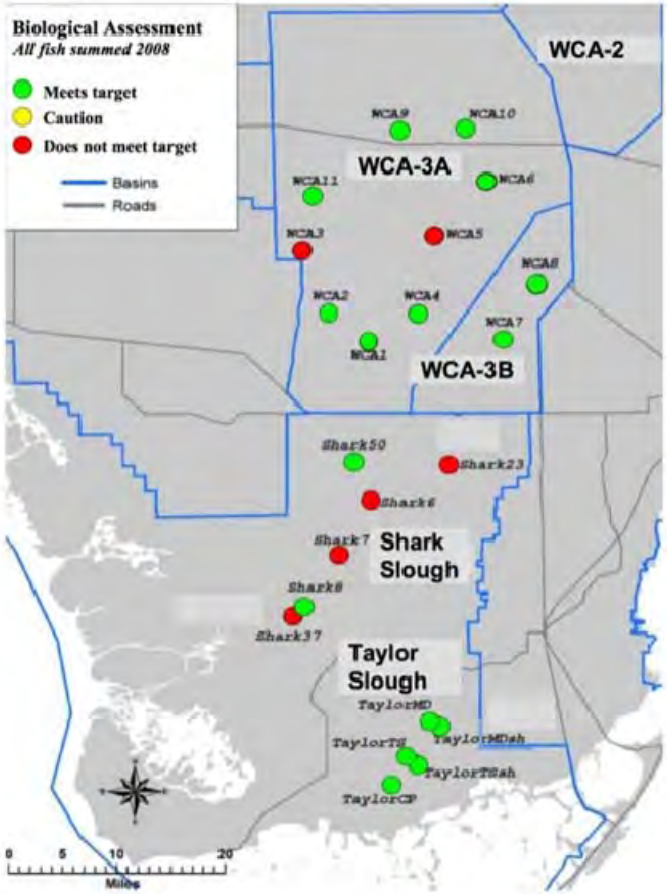
Summary Findings

In 2008, four of six monitoring sites in central Shark River Slough did not meet restoration targets (red) because of drier conditions than expected based on rainfall[1]. The net effect was one of concern (yellow) for the region. These conditions resulted from fewer fish that prefer wetter conditions than expected, but levels of drought-tolerant species were consistent with expectations. Water management is causing drier conditions than would be expected based on the amount of rainfall and water depth patterns in the baseline hydrological period of 1993 through 1999.

After several years of concern in Taylor Slough, all indicators except non-native fish were within desirable ranges. Results were mixed in WCA-3A, where two sites yielded fewer fish than expected based on rainfall, but seven others were within desired ranges, as were both monitoring sites in WCA-3B. This long-term monitoring program indicates that water management was closer to targets in 2007 and 2008 than in years 2001 through 2006. Monitoring data indicate that non-native taxa continue to be most common at edge habitats, though widespread in Everglades marshes, and their frequency may be increasing in Taylor Slough. This trend should receive further attention.

Key Findings

1. All of the sites coded red for fish density resulted from fewer fish than expected based on observed rainfall, and most are in Shark River Slough.
2. Taylor Slough showed an improvement in 2007 and 2008 compared to previous years (2001–2006).
3. Results were mixed in WCA-3A, though the overall assessment is acceptable (green). There was evidence of more frequent drying than expected from observed rainfall in the western area. Everglades crayfish were infrequently collected in WCA-3A in the baseline period and afterwards.
4. There were no systematic deviations from rainfall-based expectations in WCA-3B for all fish summed.
5. Non-native fish are generally 2% or fewer of the fishes collected at all monitoring sites. However, higher numbers, particularly of Mayan cichlids, have been noted at the mangrove edge of Shark River Slough and Taylor Slough, in the Rocky Glades, and in canals in general. In 2008 monitoring sites were added downstream from the C-111 canal in the ENP panhandle, and non-native taxa at times exceeded the 2% cutoff at those sites. There appears to be an increasing trend of non-native taxa in Taylor Slough; several species were present including Mayan cichlids, swamp eels, and spiny eels.



The map above shows the location of long-term monitoring sites and reflects annual assessments for the Total Fish performance measure. The table on the right reflects the average stoplight score within each region for fish and macroinvertebrates.

[1]The target hydrological years for this assessment include 1993–1999. Forecasting models (statistical models derived by cross-validation methodology) that link regional rainfall to surface water-depth at the monitoring sites were used to model hydrology. Alternative hydrological model outputs, such as those derived by the Natural System Model, generally yield longer target hydroperiods than used here leading to more frequent impacts.

Fish & Macroinvertebrates, continued

Zone/Performance Measure	LAST STATUS	CURRENT STATUS	CURRENT STATUS
Shark River Slough			
eastern mosquitofish	Yellow	Yellow	Fewer than expected.
flagfish	Green	Green	At expected levels based on rainfall and target-period hydrology.
bluefin killifish	Yellow	Yellow	Fewer than expected.
total fish	Red	Yellow	Fewer than expected.
Everglades crayfish	Yellow	Green	At expected levels based on rainfall and target-period hydrology.
Non-native fishes	Yellow	Yellow	Present at all monitoring sites. None more than 2% of all fish collected; numbers highest at mangrove boundary.
Taylor Slough			
eastern mosquitofish	Yellow	Green	At expected levels based on rainfall and target-period hydrology.
flagfish		Green	At expected levels based on rainfall and target-period hydrology.
bluefin killifish	Red	Yellow	Near, but below, expected levels based on rainfall and target-period hydrology.
total fish	Red	Green	At expected levels based on rainfall and target-period hydrology.
Everglades crayfish	Yellow	Yellow	Above expected levels based on rainfall and target-period hydrology.
Non-native fishes	Yellow	Yellow	Present at all monitoring sites. None more than 2% of all fish collected; numbers highest at mangrove boundary.
WCA 3A			
eastern mosquitofish	Green	Green	At expected levels based on rainfall and target-period hydrology.
flagfish	Yellow	Green	At expected levels based on rainfall and target-period hydrology.
bluefin killifish	Yellow	Green	At expected levels based on rainfall and target-period hydrology.
total fish	Green	Green	At expected levels based on rainfall and target-period hydrology.
Non-native fishes	Yellow	Yellow	Present at all monitoring sites but no evidence of trends. All less than 2% of total and fewer than in ENP.
WCA 3B			
eastern mosquitofish	Yellow	Green	At expected levels based on rainfall and target-period hydrology.
flagfish	Yellow	Yellow	Tendency for higher values than expected at northern site.
bluefin killifish	Green	Green	At expected levels based on rainfall and target-period hydrology.
total fish	Green	Green	At expected levels based on rainfall and target-period hydrology.
Non-native fishes	Yellow	Green	Not found at either monitoring site within WCA 3B.

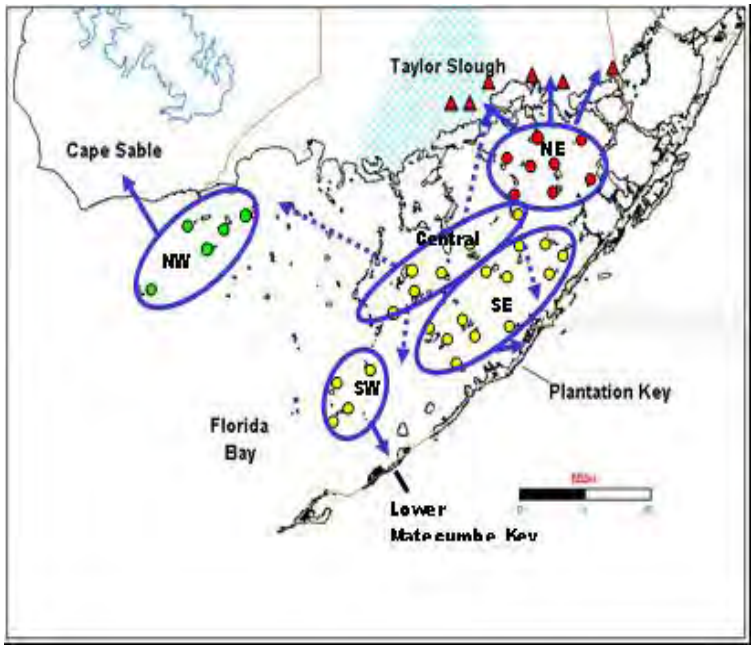
Wading Birds (Roseate Spoonbill)

Summary Findings

Roseate spoonbill nesting results in Florida Bay indicate that conditions in Florida Bay and Taylor Slough are still unable to support colonies with target numbers of spoonbills bay-wide. The colonies in the northwestern portion of the bay seem to be doing well and have been stable both in numbers and nest success for the last 10 years. However, the total numbers in the northwest part of the bay are relatively low and numbers bay-wide are still not meeting targets. Northeastern bay colonies and bay wide numbers continue to decline. There have been improvements, however, in water management operations that have allowed for favorable climatic conditions to result in four consecutive successful nesting cycles for both the northwest and northeast parts of the bay. The chicks hatched in these four nesting cycles should start reaching sexual maturity and this may result in an upturn in the number of nests. The spoonbill performance measures are expected to further improve after proposed changes to the South Dade Conveyance System (SDCS) (i.e., Mod Waters and the C-111 Spreader Canal Phase 1) are completed.

Key Findings

1. Northeastern Florida Bay is in need of immediate action in order keep spoonbill numbers from continuing to decline. Although the northeast colonies have performed well over the last four years, the average productivity in this region is still well below production rates observed in the northwestern colonies. The number of nests in the northeastern bay remained very low in 2007 with only 90 nests out of a target of 688 nests in this region.
2. Taylor Slough and the C-111 basin remain less productive than under historic conditions based on prey fish data.
3. There were 433 nests bay-wide in 2009. This was well below the target of 1258 nests. Bay-wide and northeastern nest numbers continue to decline but might begin to increase in the next few years as chicks hatched during the last four successful cycles reach the age of reproduction.
4. Number of nests and nest production continue to exceed targets in northwestern Florida Bay. Data suggest this is probably because this area is less affected by water management and provides a more stable habitat condition.
5. The northeastern Florida Bay colonies forage in estuaries that rely on water from Taylor Slough (see map). Their continued failure to meet restoration targets indicates that water timing, quantity, and distribution in Taylor Slough and northeastern Florida Bay are not meeting criteria necessary for proper estuary function in these locations.



Location of all known spoonbill nesting colonies within Florida Bay (blue ovals) and prey fish sampling sites in the Taylor Slough and C-111 Basin foraging grounds (red triangles). Colonies are grouped into five regions of the bay based on important foraging grounds for the colonies. Arrows from each region indicate the primary foraging ground. Colors of colonies and prey sampling sites are based on stoplight scores for various performance measures.

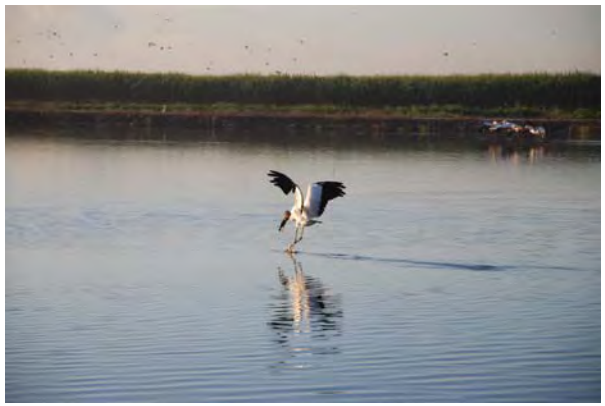
Wading Birds (Roseate Spoonbill), continued

Zone/Performance Measure	LAST STATUS	CURRENT STATUS	CURRENT STATUS
Total Number of Nests			
Number of nests in FL Bay (5-year mean)			The target number of nests for the whole bay is 1,258. The 5-year mean number of nests was 433 or 34% of target. This indicates that the FL Bay spoonbill population is not recovering.
Nesting Location			
Number of nests in NE FL Bay (5-year mean)			The target number of nests is 688. The 5-year mean number of nests was 90 nests or 13% of target, indicating that the NE FL Bay spoonbill population is in jeopardy.
Number of nests in NW FL Bay (5-year mean)			The target for the number of nests in NW FL Bay is 210. The average number of nests for the last five years was 222 exceeding the target.
Number of nests in SW FL Bay (5-year mean)			No data is being collected in the SW estuaries.
Nesting Location Overall			The overall score for nesting location is the lowest of the three component scores. In this case the number of nests in NE FL Bay is red therefore the overall score is red.
Nesting Production and Success			
Chick production in NE FL Bay			The 5-year mean of NE production was 1.22 chicks/nest (c/n). This is above the success threshold of 1c/n but below the overall target of 1.38 c/n based on pre-SDCS conditions.
Chick production in NW FL Bay			Nest production of >1 c/n in NW FL Bay is being maintained. In 2007, the 5-year mean of NW colonies production was 1.50 c/n indicating that the NW continues to perform well and is currently greater than Pre-SDCS NE colonies.
Percent successful years in NE FL Bay			In NE FL Bay, 6 of the last 10 years have been successful at >1 c/n. Current conditions are well below restoration targets.
Percent successful years in NW FL Bay			In NW FL Bay, spoonbills have been successful 8 of the last 10 years.
Overall Nest Production and Success			The overall score for nesting success is the lowest score of the four component metrics. In this case, both the nesting success and nesting production in NE FL Bay are yellow. Therefore the overall score is red.
Prey Fish Community NE FL Bay			
Prey community structure in NE FL Bay			Prey fishes classified as freshwater species made up less than 3% of the total catch at the sampled spoonbill foraging sites in NE FL Bay. The target is 40%, suggesting that the prey base for nesting spoonbills remains very low.

Wading Birds (Wood Stork & White Ibis)

Summary Findings

Conditions for nesting were exceptional for wading birds in 2009, with relatively long hydroperiods and long inter-drying intervals prior to the nesting season, and weather conditions that led to a long, uninterrupted drying pattern throughout early winter through spring. As a result, crayfish biomass was very high and the proportion of the freshwater marsh that was available for foraging was very high in winter/spring 2008/09. Spring 2009 saw the largest nesting event recorded since the early 1940s, with nearly all species responding positively, and both large colonies and large numbers of colonies throughout the system. There were encouraging trends in three of the four indicators in 2009. Storks nested earlier than has been typical (late January and February), a considerably larger proportion of nesting took place in the mangrove ecotone (20%), and it was an ibis supercolony year (over 43,000 nests initiated).



One indicator (ibis supercolony) now consistently exceeds the target. While trends are encouraging for the other three indicators, thresholds for restoration have not been achieved, and remain numerically distant. However, 2009 also showed exceptionally high reproductive success for ibises, great egrets, and wood storks, suggesting that the Everglades in 2009 became a net production site rather than a reproductive sink for these species. In addition, it seems quite likely that the very large increase in numbers of nesting storks and the novel colonies of storks in the coastal zone were both fueled in part by a large cohort of young storks produced in the Everglades and throughout the southeastern United States in 2006. While productivity is not something that can be compared quantitatively with the historical Everglades, it seems very likely that the Everglades did function as a net exporter of birds, and the evidence from 2009 suggests that the ecosystem may be functioning in this capacity again. Taken together, these indicators suggest marked progress towards desired restoration goals. Finally, the very dramatic increases in most indicators in 2009 indicates that wading bird populations have the ability to respond to restored conditions very rapidly.

Key Findings

Conditions preceding the breeding season in 2009 were excellent both for production of crayfish biomass, particularly in the southern Everglades, and for making food available over very large expanses of the Everglades (83% of the landscape). The latter feature was due to a long, uninterrupted drying from November through May. Over 73,000 nests were initiated throughout the Everglades, which is more than in any year since the early 1940s. Increases in nesting compared to recent years were seen in all species except for snowy egrets. Novel nesting locations were found by many species including wood storks in coastal regions of the Everglades.

Indicators:

1. Wood storks inititated nesting earlier than has been typical of the last 20 years, beginning in January in 2009. The nesting date index is numerical, with a 1 (March) being less desirable than a 5 (November). The 5-year running average index in 2009 was 2.0. The restoration target corresponds to nesting dates earlier than December 30th (4 – 5). While the earlier nesting in 2009 is indeed hopeful, the trend is only slightly increasing, and does not meet the restoration target.

2. The proportion of nesting birds occurring in the headwaters/ecotone in 2009 was 21.1%. This is a considerable increase over the average of 8.1% over the last ten years. There were also a number of novel colonies in the coastal zone, which suggests that conditions there were generally favorable, and independent of effects of colony fidelity. This is a considerable uptick in the nearly flat trend of the last 10 years. However, the goal of 70% or greater of the birds nesting in the coastal zone remains distant.

3. The ratio of ibis and stork nests to great egret nests in 2009 (3.5:1) is still far below the 30:1 characteristic of predrainage conditions. In

Wading Birds (Wood Stork & White Ibis), continued

addition, there has been only a slight increase over the average of the last 10 years (2.97), especially compared with the target ratio.

4. The frequency of exceptionally large ibis nesting events has improved dramatically since the late 1990s, and the mean interval between these events has changed from over 40 years to less than 3 in most recent years. The large nesting of ibises in 2009 (43,415 nesting pairs) easily qualified as a supernormal nesting, bringing the 5-year running average to 1.20. Recent research strongly supports the hypothesis that the change is due to increased production and availability of prey, particularly crayfish, to ibises. Restored conditions are expected to result in an average interval of 1.45 years. This indicator of restored conditions therefore appears to have been met.

PERFORMANCE MEASURE	LAST STATUS	CURRENT STATUS	CURRENT STATUS
Wading bird Indicator Summary			Three out of the four Wading Bird Indicators are red based on the most current data available. Overall, wading bird populations and indicators are well below recovery goals.
Ratio of Wood Stork + White Ibis nests to Great Egret nests			Current ratio is well below the 30:1 ratio considered representative of healthy nesting conditions.
Month of Wood Stork nest initiation			2009 initiation was in January, but mean initiation dates in past 5 years are well below the recovery goal of November or December.
Proportion of nesting in headwaters			Proportion nesting in the headwaters was 21.1% in 2009, a considerable uptick.
Mean interval between exceptional ibis nesting years			This interval now consistently exceeds the target for restoration and has shown dramatic improvement in last decade.

Florida Bay Submersed Aquatic Vegetation

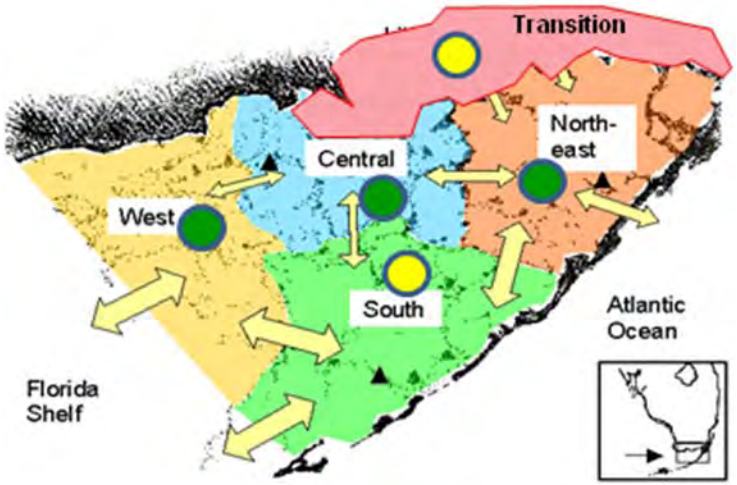
Summary Findings

The Composite Index that summarizes overall system status for submersed aquatic vegetation (SAV) in Florida Bay shows an improvement to good in the Central Zone for water year 2009 (May 2008–April 2009) compared to the 2007 assessment. All other zones had the same overall scores in 2009 as in 2007 despite both positive and negative changes in the underlying indexes. The Composite Index for 2009 was good in the Northeast and Western Zones, and fair in the Transition and Southern Zones.

Key Findings

1. The Abundance Index (combining both spatial coverage of bottom area and average density indicators) were good in the Northeast and Western Zones, fair in the Central and Transition Zones, and poor in the Southern Zone. Underlying indicators reflect good spatial coverage of SAV in almost all basins throughout the bay but mixed results in the density indicator, reducing the overall Index scores for some basins. Notably the abundance was poor in both Madeira Bay and Twin Key Basin.
2. In general, the Target Species Index, which combines indicators for species diversity and presence of desired species, showed continued good status in the Northeast, Central, and Western Zones and improvement from poor to fair in the Southern Zone, reflecting increased community diversity. Only the Transition Zone showed continued weakness, with Target Species Index scores of fair for 2006–2009. Most zones showed scores of good for presence of target species but the Transition Zone had an aggregate score of poor for the lack of community diversity.
3. Basins in the Northeast Zone have generally good SAV density and good spatial coverage scores. In some basins, SAV density is generally low but due to the oligotrophic nutrient character of the region, low productivity is considered normal and these levels qualify for good scores for the Abundance Index. However, Northeast basins that were affected by an algal bloom during 2005–2008 (chiefly Barnes and Blackwater Sounds) were negatively impacted, with reductions in both density and extent of SAV. The affected basins showed some improvement in both indicators toward pre-bloom status in 2009, although not yet enough to be significant. In the Transition Zone it is notable that Little Madeira Bay, at the mouth of Taylor River and which formerly scored consistently in the good range, fell to a poor score for the Target Species Index in 2009, scoring poor in both the underlying target species and species diversity indicators.

Note: Due to the addition of stations in some of the zones and input of new data, some of the indicator and index scores were recalculated for 2006 and 2007, reflecting slight changes from previous reporting. For additional information on SAV indicators see Madden et al. 2009.



Map of Florida Bay SAV indicator zones with current status indicators combining abundance and species indexes.

Madden, C. J., D. T. Rudnick, A. A. McDonald, K. M. Cunniff, J. W. Fourqurean. 2009. Ecological indicators for assessing and communicating seagrass status and trends in Florida Bay. Ecological Indicators 9S (2009) S68–S82.

Florida Bay Submersed Aquatic Vegetation, continued

Zone/Performance Measure	LAST STATUS	CURRENT STATUS	CURRENT STATUS
Northeast Zone			
Abundance	🟢	🟢	The aggregate Abundance Index is in the good range for the Northeast Zone with spatial extent scores increasing to 0.91 and 0.93 for years 2008 and 2009 (max=1). Effects of the 2005–2008 algal bloom continue to impact SAV in basins flanking US-1 resulting in fair scores for the density component in Barnes, L. Blackwater, and Blackwater in '08 and '09.
Target Species	🟢	🟢	Target species scores improved from fair in 2006 to good in 2007–2009 in the Northeast Zone, reflecting increased presence of subdominant species *Halodule* and *Ruppia.*
Transition Zone			
Abundance	🟢	🟡	The aggregate Abundance Index for the Transition Zone was fair in 2009, having decreased each year from '07 through '09 due mostly to reduced seagrass density, with notable declines in Joe Bay and Little Madeira Bay, and improvement in Long Sound. Despite declining density, the spatial extent component of the index is good for most basins except Highway Creek and Joe Bay where it is fair.
Target Species	🔴	🟡	The aggregate Species Index is fair for 2009 in the Transition Zone as in previous years. The target species component is generally good, although in Little Madeira Bay it has declined to poor, while the species dominance component is poor or fair in all Transition Zone basins.
Central Zone			
Abundance	🔴	🟡	Abundance Index in the Central Zone was in the fair range in 2008–2009, an improvement from 2006–2007. Spatial coverage was generally very good but low density reduced the underlying density indicator score for the zone and the overall Index.
Target Species	🟢	🟢	Increasing presence of secondary target species (*Halodule* and *Ruppia*) in the Central Zone has improved the aggregate Species Index in this region to good in 2008–2009 after fair scores in 2006–2007.
Southern Zone			
Abundance	🟡	🔴	The Southern Zone continues to reflect a poor rating in the Abundance Index in 2009 as in previous years. Despite high scores for spatial extent, composite scores were reduced by low scores for density in the poor range.
Target Species	🟡	🟡	The Species Index improved to fair in the Southern Zone for 2009 from poor in the previous 3 years. The species dominance component remains poor although target species improved in 2009, elevating the overall index.
Western Zone			
Abundance	🟢	🟢	The Western Zone had high scores for the Abundance Index, with values in the good range for both extent and density in 2008–2009, an improving trend from the 2006–2007 scores.
Target Species	🟢	🟢	The Western Zone continues to reflect high scores for the Species Index, as the target species component was in the good range during 2006–2009. The underlying species dominance and target species scores show a good mix of desired species for the zone.

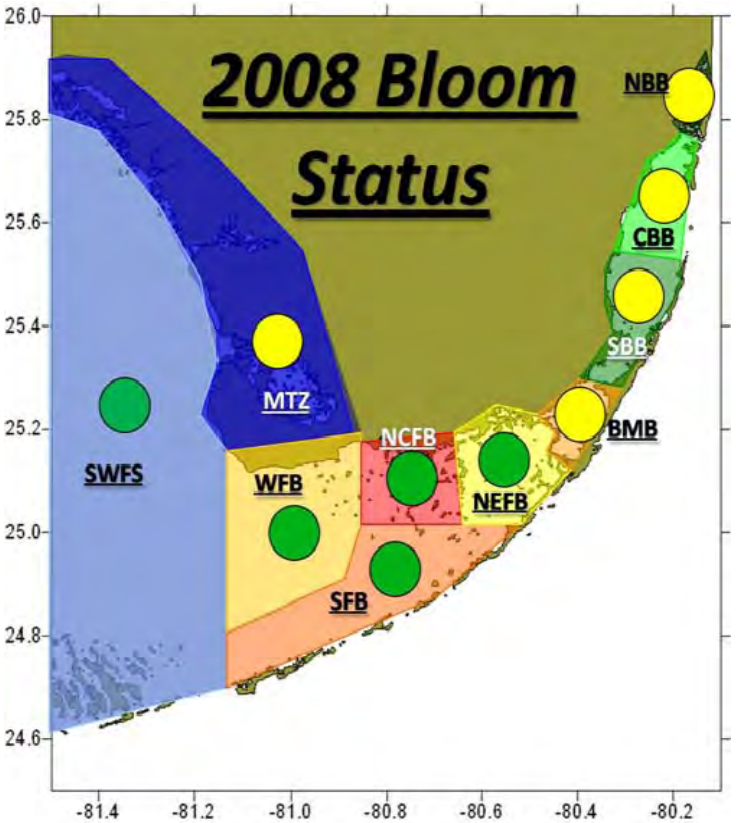
Florida Bay Algal Blooms

Summary Findings

Elevated concentrations of nutrients from the active 2005 hurricane season resulted in algal blooms in many sub-regions of the southern coastal system (SCS) in 2006 and 2007. These blooms have since subsided and many sub-regions returned to green condition in 2008. This may have been in part due to the drought lowering freshwater flow and thus nutrient loading to the SCS during 2008. As the drought lessens and rainfall increases, it is expected that more sub-regions may receive a yellow condition. If water flows to the SCS are improved and there is no significant hurricane activity, this indicator could return to predominantly green for all sub-regions. If water flows do not improve, many areas will be predominantly yellow.

Key Findings

1. The majority of sub-regions assessed had significant algal bloom activity in 2006 that appears to have been predominantly influenced by the active 2005 hurricane season aggravated for eastern Florida Bay by road construction on US-1.
2. The majority of sub-regions assessed had chlorophyll-*a* and algal blooms rated as good (green).
3. The sub-regions assessed where chlorophyll-*a* was higher than the median do not appear to be indicative of long-term negative trends.
4. Overall excess nutrients (eutrophic expressions) were geographically minimal and appear to be explainable from existing phenomenological conditions of hurricane activity exacerbated by road construction along US-1 in Barnes, Manatee, and Blackwater Sounds (BMB).
5. If water flows are improved, the SCS water quality could improve and the magnitude and frequency of algal blooms could diminish.
6. Monitoring of BMB was critical to detect and quantify the impacts of road construction along US-1. This short duration disturbance resulted in a multi-year algal bloom that as of 2008 had not returned to background conditions.
7. Although the BMB algal bloom lasted several years, there is the possibility that its ecological consequences, including the loss of benthic grazers, could last for decades and leave the area more susceptible to future algal blooms.
8. Monitoring long-term consequences of nutrient releases into the SCS from both natural (e.g., hurricanes) and human causes (e.g., road construction) and their interactions with hydrological restoration (e.g., more fresh water flow into the SCS, particularly Florida Bay) are critical to continuing the evaluation and assessment of restoration.



Map of the SCS with stoplight ratings by sub-region.

Florida Bay Algal Blooms, continued

Zone/Performance Measure Chlorophyll *a*	**LAST STATUS**	**CURRENT STATUS**	**CURRENT STATUS**
BARNES, MANATEE & BLACKWATER SOUNDS (BMB)			This sub-region experienced an unusual cyanobacterial bloom in 2006. The bloom was initiated by a large spike in phosphorus from a combination of highway construction and canal releases in response to the active hurricane season. Through 2008, this bloom has decreased, but chlorophyll concentrations have not returned to previous levels.
NORTHEAST FLORIDA BAY (NEFB)			The cyanobacterial bloom from Barnes, Manatee, and Blackwater Sounds no longer propagates into this sub-region, causing this sub-region to remain highly oligotrophic.
NORTH-CENTRAL FLORIDA BAY (NCFB)			The current status is due to the lack of a seasonal cyanobacterial bloom in both 2007 and 2008. These blooms do not appear every year, but have occurred intermittently over the past 15 years.
SOUTH FLORIDA BAY (SFB)			The current status is green and reflects the absence of the cyanobacterical bloom extension from the north-central sub-region during 2008. This has occurred intermittently over the past 15 years and is expected to continue to do so in future, especially after the passage of hurricanes.
WEST FLORIDA BAY (WFB)			Since 2006, the seasonal diatom blooms in this sub-region have not been as dense or widespread as in the past.
MANGROVE TRANSITION ZONE (MTZ)			The chlorophyll concentrations were slightly higher in this sub-region during 2008. This concentration was not significantly above the baseline and is unlikely to indicate a negative long-term trend.
SOUTHWEST FLORIDA SHELF (SWFS)			The chlorophyll concentrations were slightly higher in this sub-region during 2006, but have since decreased likely in part due to the droughts decreasing freshwater flow to the southwest Florida shelf and minimizing the seasonal diatom bloom.
NORTH BISCAYNE BAY (NBB)			The chlorophyll concentrations have been slightly higher in this sub-region since 2006. However, concentrations were not significantly greater than baseline for any of the 3 years.
CENTRAL BISCAYNE BAY (CBB)			The chlorophyll concentrations have been slightly higher in this sub-region since 2006. However, concentrations were not significantly greater than baseline for any of the 3 years.
SOUTH BISCAYNE BAY (SBB)			The chlorophyll concentrations have been slightly higher in this sub-region since 2006. This area was influenced by periodic expansion of the cyanobacterial bloom from Barnes, Manatee, and Blackwater Sounds into this sub-region in 2006. However, concentrations were not significantly greater than baseline for any of the 3 years.

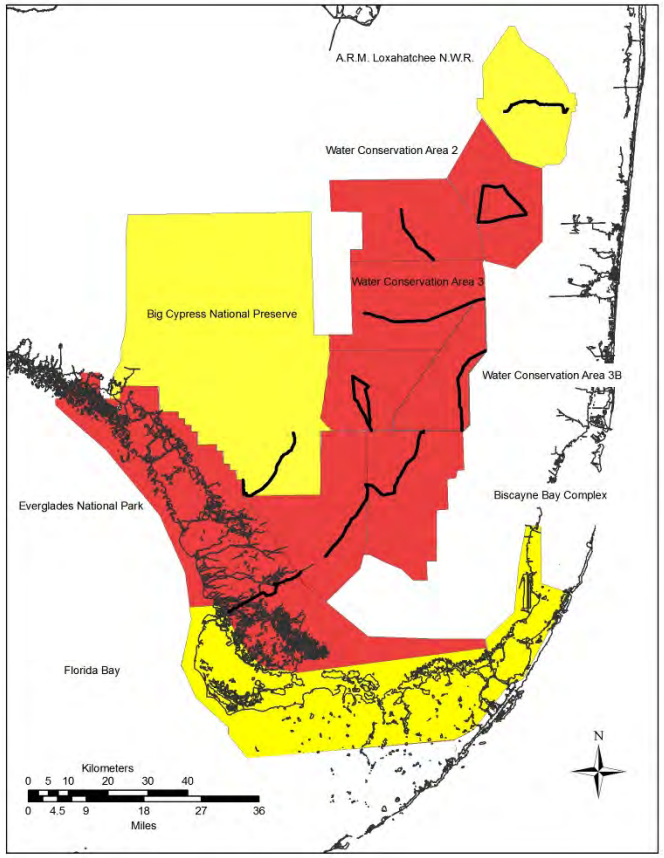
Crocodilians (American Alligators & Crocodiles)

Summary Findings

On the whole, alligator and crocodile status remained constant during 2009, with only one area (Big Cypress National Preserve) showing an increase in status compared to previous years. However, the majority of locations show substantial deviations from restoration targets; therefore, restoration actions are merited. Status of alligators and crocodiles is expected to improve if hydrologic conditions are restored to more natural patterns.

Key Findings

1. Alligator overall status at the A.R.M. Loxahatchee National Wildlife Refuge is the highest in south Florida.
2. Overall status of alligators throughout the Water Conservation Areas is substantially below restoration targets and requires action in order to meet restoration goals.
3. Overall status of alligators throughout ENP is below restoration targets and requires action to meet restoration goals.
4. Growth and survival components for crocodiles, while below restoration targets, appear stable at this time and are expected to improve with restoration of timing and amount of freshwater flow to estuaries.
5. Restoration of patterns of depth and period of inundation and water flow is essential to improving performance of alligators in interior freshwater wetlands.
6. Restoration of patterns of freshwater flow to estuaries will improve conditions for alligators and crocodiles.
7. Continued monitoring of alligators and crocodiles will provide an indication of ecological responses to ecosystem restoration.



Map of Greater Everglades with stoplight ratings by region.

Crocodilians (American Alligators & Crocodiles), continued

Zone/Performance Measure	LAST STATUS	CURRENT STATUS	CURRENT STATUS
American Alligator			
A.R.M. Loxahatchee National Wildlife Refuge			Relative density (component score = 0.67) and body condition (component score = 0.5) combined for a location score of 0.59; therefore, current conditions do not meet restoration criteria, signifying that this area needs further attention.
Water Conservation Area-2A			Relative density (component score = 0) and body condition (component score = 0.5) combined for a location score of 0.25; therefore, current conditions are below restoration criteria.
Water Conservation Area-3A			Relative density in two of the three locations within WCA-3A is low (northern and central areas) and higher (yellow) in the southern area; body condition scores are yellow in all three areas. The combined score of both components for the overall area is 0.39, which is well below restoration criteria.
Water Conservation Area-3B			Relative density (component score = 0.17) and body condition (component score = 0.5) combined for a location score of 0.34; therefore, current conditions are below restoration criteria.
Everglades National Park			Relative density in all three locations within ENP is low (red). Body condition is higher (yellow) in Shark Slough, northeast Shark Slough, and estuarine areas. The combined score of these two components for the overall area, and alligator hole occupancy in the inaccessible areas, is 0.37, which is well below restoration criteria.
Big Cypress National Preserve			Relative density (component score = 0.17) and body condition (component score = 0.67) combined for a location score of 0.42; therefore, current conditions do not meet restoration criteria. The change in status reflects availability of data to detect trends.
American Crocodile			
Everglades National Park			Juvenile growth (component score = 0.5) and survival (component score = 0.5) combined for a location score of 0.5; therefore, current conditions do not meet restoration criteria.
Biscayne Bay Complex			Juvenile survival (component score=0.5) does not meet restoration criteria. Data are not currently available to calculate juvenile growth.

American Oysters

Summary Findings

On the whole, Eastern oyster status remained constant until 2010. It should be cautioned that the duration of monitoring for this species in the estuaries is relatively short (4–9 years) and hence trend data should be treated with caution while inferring status of this indicator. Continuing monitoring will yield data to make trend and status assessments in the coming years and will strengthen the confidence of the status. Current conditions in the Caloosahatchee Estuary show deviations from restoration targets; therefore, restoration actions are merited. For example, relatively dry years during the past 3 years has resulted in higher disease prevalence and increased predation and mortality of juvenile oysters and spat recruitment. Status of oysters is expected to improve if hydrologic conditions are restored to more natural patterns.

Key Findings

1. Preliminary results suggest that oyster status in most of the Northern Estuaries remains stable. It should be cautioned that insufficient data exist for the Southern Estuaries to infer trends and make statistical comparisons.
2. There is too much freshwater inflow into the Caloosahatchee and St. Lucie estuaries in the summer months and too little freshwater inflow into the estuary in the winter months, disrupting natural patterns and estuarine conditions. The oysters in both of these estuaries are still being impacted by this unnatural water delivery pattern. Too much fresh water impacts reproduction, larval recruitment, survival, and growth. Too little fresh water impacts the survival of oysters due to higher disease prevalence and intensity of *Perkinsus marinus* and predation; this appears to be occurring in the Lake Worth Lagoon.
3. Overall status of oysters in all of the Northern Estuaries is below restoration targets and requires action in order to meet restoration goals.
4. Oyster responses and populations in the Northern Estuaries are below targets and may be in danger of declines under current salinity levels. Growth rates and recovery rates for abundances suggest that oyster index scores could be expected to increase given proper hydrologic conditions through restoration.
5. Restoration of natural patterns (less freshwater flows in the summer and more freshwater flows in the winter) along with substrate enhancement (addition of cultch) is essential to improving performance of oysters in the estuaries.

Continued monitoring of oysters in the Northern and Southern Estuaries will provide an indication of ecological responses to ecosystem restoration and the ability to distinguish between responses to restoration and natural variation.

Photos of oysters in the ecosystem.

Zone/Performance Measure	LAST STATUS	CURRENT STATUS	CURRENT STATUS
Eastern Oyster			
Caloosahatchee Estuary			The oysters in the Caloosahatchee Estuary are still being impacted by too much fresh water in summer and too little fresh water in the winter. Too much fresh water impacts reproduction, larval recruitment, survival and growth, while too little fresh water impacts the survival of oysters due to higher disease prevalence and intensity of *Perkinsus marinus* and predation. For example, the past 3 years have been dry years resulting in higher *P. marinus* prevalence values in oysters. Current conditions do not meet restoration criteria, signifying that this area needs further attention.
St. Lucie Estuary - North			The oysters in the St. Lucie River Estuary are being impacted annually by too much freshwater, especially in late summer. Oysters in the North and South Fork are consistently rated as failing. In the central portion of the estuary, densities reached caution level in the last three years. Reduced condition and recruitment are typical. Oysters are capable of growth only during brief periods of improved conditions. Current conditions do not meet restoration criteria, signifying that this area needs further attention.
St. Lucie Estuary - South			
St. Lucie Estuary - Central			
Loxahatchee Estuary - North			The oysters in the Loxahatchee Estuary are still being impacted by some periods of too much fresh water in summer and too little fresh water in the winter. Current conditions do not meet restoration criteria, signifying that this area needs further attention. Although abundances are rising slightly, extended periods of high salinity result in increased prevalence and intensity of disease and reduced condition and reproduction.
Loxahatchee Estuary - South			
Lake Worth Lagoon			The oysters in the Lake Worth Lagoon are still being impacted by some periods of insufficient fresh water, especially during winter months. Current conditions do not meet restoration criteria, signifying that this area needs further attention. Although abundances are rising slightly, extended periods of high salinity result in increased prevalence and intensity of disease and reduced condition and reproduction.
Lostman's River (Southern Estuaries)			

Periphyton & Epiphyton

Summary Findings

Many of the sites coded as “altered” (red) are near the peripheral canals surrounding the wetlands, or in drainages downstream of canal inputs (see map).

In WCA-1, canals deliver above-ambient concentrations of both nutrients and calcium carbonate, causing changes in periphyton quality, including increased Total Phosphorus (TP) from nutrient enrichment and reduced organic content from calcium carbonate inputs.

In WCA-2A, long-term delivery of above-ambient Phosphorus (P) in canal inputs has caused enrichment cascades throughout most of the system. This is most severe in the northeast portion of this wetland, where monospecific cattail stands predominate, precluding periphyton sampling.

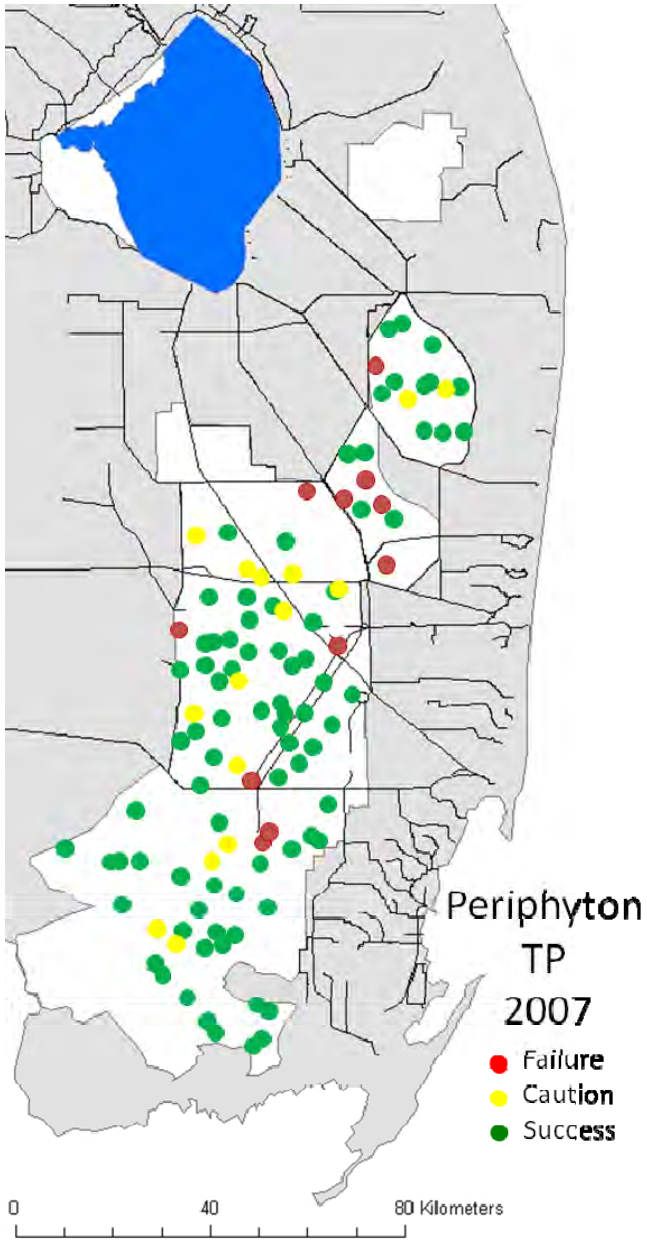
Enrichment in central WCA-3A, noted in 2005 and 2006, was less pronounced in 2007, while signals of enrichment were noted near the peripheral canals.

Shark River and Taylor Sloughs have remained relatively free of enrichment or hydrologic modifications in the sampled areas, although enrichment has been noted downstream of the S-12 structures on the Tamiami Trail (Shark Slough) and near the S-332 structures and C-111 canal (Taylor Slough).

Key Findings

1. A total of 11% of sites had “altered” periphyton TP levels. This was lower than observed in 2006 (26%) and 2005 (25%) due primarily to a reduction in the number of altered sites in WCA-3A. This reduction may be due to depleted canal flows into WCA-3A during this relatively dry year.
2. A total of 14% of sites were coded yellow for periphyton TP, and were located in similar locations to those detected in 2005 and 2006, primarily downstream of canal inputs.
3. A total of 55% and 39% of sites were coded yellow or higher for biomass and species composition (not shown), primarily loss of biomass and native species in response to P enrichment.
4. Continued input of above-ambient P concentrations will both increase severity of enrichment effects near canals and cause these effects to continue to cascade downstream of inputs.
5. Increased input of water through restorative projects may increase periphyton development in areas formerly dry, but if accompanied by above-ambient P concentrations, cascading P effects are expected.

The map shows the location of long-term monitoring sites and reflects annual assessments for the Total Phosphorus (quality) performance measure. The table on the right reflects the average stoplight score within each region for biomass, quality, and composition.



Periphyton & Epiphyton, continued

Zone/Performance Measure[a]	LAST STATUS	CURRENT STATUS	CURRENT STATUS[b]
WCA-1			
Biomass	🟡	🟡	Periphyton shows enrichment near canals and calcareous mat biomass has increased at some sites due to calcite input from canals.
Quality	🟡	🟡	
Composition		🟡	
WCA-2A			
Biomass	🟡	🟡	Periphyton TP and composition continue to reflect high P input to this wetland, particularly downstream of water flow structures.
Quality	🟡	🔴	
Composition		🟡	
WCA-3A			
Biomass	🟡	🟡	This area has received some low-level P enrichment, particularly near canals. Evidence was less pronounced in this drier year.
Quality	🟡	🟡	
Composition		🟡	
Shark River Slough (SRS)			
Biomass	🟡	🟡	Shark River Slough has received low-level P enrichment for decades, reflected in biomass, quality, and composition, particularly downstream of the S-12 structures.
Quality	🟡	🟡	
Composition		🟡	
Taylor Slough (TS)			
Biomass	🟢	🟢	Taylor Slough has remained relatively unimpacted to the interior due to low levels of disturbance and low P inputs, except near the S-332 control structures.
Quality	🟢	🟢	
Composition		🟢	

[a]Each wetland basin is scored with a red, yellow, or green symbol for each indicator, based on the proportion of sites falling within these categories in assessment (yellow if > 25% of sites are coded yellow or red; red if > 50% of the sites are red). Biomass = ash-free dry mass (gmS2), quality = total phosphorus content (mg gS1), and community composition = diatom similarity (%).
[b]Data in the Current Status column for the periphyton indicator reflect data inclusive of calendar year 2007.

Juvenile Pink Shrimp

Summary Findings

The six strategically located assessment areas of the Monitoring and Assessment Plan's (MAP) Fish and Invertebrate Assessment Network (FIAN) allow documentation of the status of pink shrimp populations during the critical period when they are on their nursery grounds. Abundance metrics vary in magnitude and are consistently highest in Johnson Key Basin and lowest in eastern Florida Bay (historical means of 12.98 vs. 0.13, and 2.55 vs. 0.05, shrimp/m^2 for Fall and Spring, respectively). The historical record used to create assessment thresholds for green, yellow, and red scores consists of only 2 years for all areas except Johnson Key Basin and South Biscayne (18 and 5 years, respectively), suggesting caution in interpreting scores. Five MAP years provide a good start toward a representative view of temporal and spatial variability.

Key Findings

1. Overall, there were no improvements in pink shrimp abundance through the 5-year period of MAP sampling by the FIAN, and only the South Biscayne assessment area was consistently green.
2. Fall 2008 conditions were apparently relatively favorable for pink shrimp (based on the historical record) in Whitewater Bay and South Biscayne assessment areas and nowhere else.
3. Low abundances based on very short historical records apparently did not set thresholds unrealistically low in eastern, north-central, and south-central Florida Bay, since pink shrimp abundance performed even more poorly in subsequent years.
4. Historical data series for areas other than Johnson Key Basin and South Biscayne are too short to provide reliable thresholds for evaluating CERP effects. MAP data currently being collected will be used to update the thresholds before significant CERP implementation.

Key Recommendations

1. Continue monitoring pink shrimp abundance in the six assessment areas to expand baseline datasets using the same sampling design.
2. Compare temporal patterns of change in pink shrimp abundance in the six areas to determine whether or not they change in synchrony suggesting a common forcing function.
3. Examine salinity patterns prior to the faunal collections to look for potential causality.

The six pink shrimp assessment areas (open yellow circles) in relation to the 19 FIAN sampling locations (green). Each assessment area is composed of either a single sampling location (Johson Key Basin, South Biscayne) or aggregates of two (Whitewater, North-Central Florida Bay, South-Central Florida Bay, and Eastern Florida Bay).

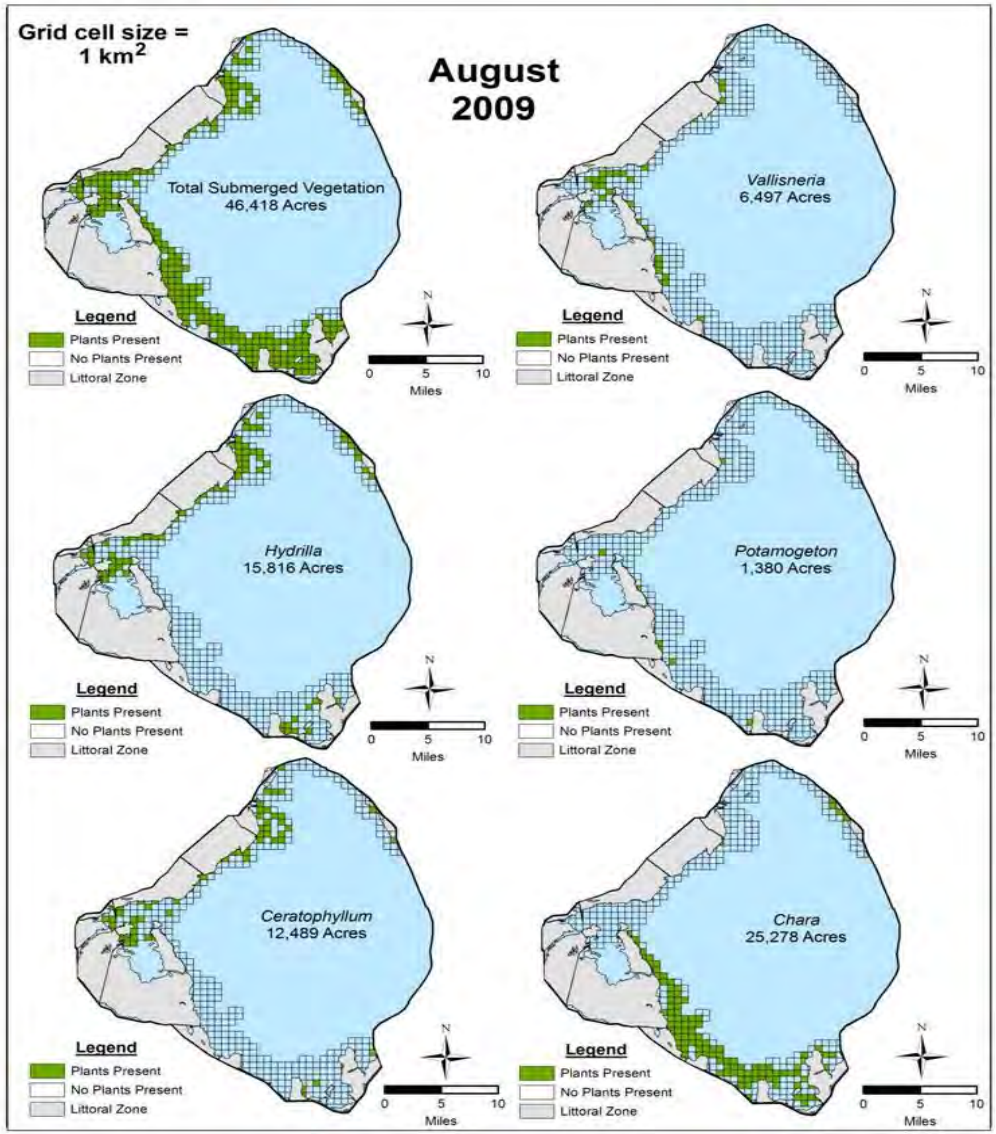
Juvenile Pink Shrimp, continued

Zone/Performance Measure	LAST STATUS	CURRENT STATUS	CURRENT STATUS
Spring			
South Biscayne	🔴	🟡	Overall this is the best performing of six areas in spring.
Eastern Florida Bay	🔴	🟢	This area achieved positive status for the first time in 2009.
North-Central Florida Bay	🔴	🔴	5-year MAP record suggests declining trend.
South-Central Florida Bay	🔴	🔴	This area has performed poorly versus its historical record.
Johnson Key Basin	🟡	🔴	2009 was the poorest year versus 18-year historical period of record.
Whitewater Bay	🔴	🟢	Spring status continues to be good in 2009.
Fall			
South Biscayne	🟢	🟢	5-year historic criteria have proven easy to exceed.
Eastern Florida Bay	🔴	🔴	Status was poor in 2009 versus the historical record.
North-Central Florida Bay	🔴	🔴	Poor performance exhibited in four of five MAP years.
South-Central Florida Bay	🔴	🔴	This is the worst performing of six areas in fall.
Johnson Key Basin	🔴	🔴	Poor performance exhibited in 2009 versus 18-year historical period of record .
Whitewater Bay	🔴	🔴	This area performed poorly in fall, unlike spring.

Lake Okeechobee Nearshore Zone

Summary Findings

A prolonged drought during 2007–2008 resulted in historically low lake stages and dry conditions across most of the near-shore region that previously contained vascular SAV. During this period when lake stage was significantly lower than the long-term mean stage over the past several decades, previously SAV-dominated areas inshore became dominated by emergent and terrestrial plants. Lake stage then increased during the fall of 2008 and was within the desired stage envelope during 2009. SAV responded by recolonizing these areas, increasing in areal coverage relative to that in 2007, with total acres increasing by approximately 64%, from 28,180 acres in 2007 to roughly 46,418 acres in 2009. The vascular SAV taxa which saw dramatic increases in areal coverage during this reporting period were coontail (*Ceratophyllum demersum*), Hydrilla (*Hydrilla verticillata*), and southern naiad (*Najas guadalupensis*). Each of these SAV taxa increased in areal coverage by >1000% from 2008 to 2009. The increase in peppergrass (*Potamogeton illinoensis*) was more modest (459%) from 2008 to 2009, while eelgrass (*Vallisneria americana*) areal coverage decreased by 31%. The target of at least 40,000 acres of SAV with ≥50% coverage by vascular SAV was achieved during summer 2009, as vascular SAV accounted for approximately 66% of the total SAV coverage. *Chara* areal coverage was similar over the past two



Map of Lake Okeechobee with SAV densities in the nearshore region for 2009.

years, ranging from 28,515 acres in 2008 to 25,278 acres in 2009 and thus has remained similar to pre-hurricane coverage observed during the summer of 2004. As the terrestrial and emergent plants in the inshore portion of the nearshore region become less dominant under lake stages which currently are higher than those observed during 2007–2008, SAV may continue to recolonize these areas if a viable SAV seed bank is still present and the lake remains in the desired lake stage envelope of 12.5 – 15.5 feet above mean sea level.

Key Findings

1. Total SAV coverage increased by approximately 64% from 2007 to 2009. If the lake continues to remain in the stage envelope considered favorable for SAV growth, and disturbance events such as hurricanes and droughts are infrequent, SAV coverage may continue to increase.
2. *Chara spp.* areal coverage has remained at approximately pre-hurricane levels although the location of beds is offshore relative to its previous distribution prior to the prolonged drought of 2007–08. *Chara* probably will not recolonize its previous range until emergent and terrestrial plant densities markedly decrease.
3. Dramatic increases in areal coverage were observed for several vascular SAV taxa during this reporting period. Coontail increased from 477 acres in 2008 to 12,489 acres in 2009, while Hydrilla increased from 1,150 acres to 15,816 acres, and southern naiad increased from 1,208 acres to 13,500 acres. Peppergrass increased from 247 acres to 1,380 acres during the past 2 years, while eelgrass coverage changed little (9,405 acres in 2008 to 6,497 acres in 2009) and remained similar to that prior to the 2004 hurricanes (roughly 8,200 acres). Hydrilla and peppergrass areal coverage are still somewhat lower than they were during the summer of 2004 (Hydrilla – 24,500 acres, peppergrass – 6,700 acres), although at their present rate of expansion, they may exceed 2004 coverage during summer, 2010.
4. Seedbank studies were conducted to assess whether viable vascular SAV seeds existed in the nearshore region but farther offshore from where vascular plants typically have been observed over the past decade. The areas where sediment was collected for these seedbank studies were located just offshore from where the inshore emergent and terrestrial plants became dominant in 2007. The study results suggested that very few viable seeds were located further offshore relative to where SAV had been found prior to the hurricanes in 2004.
5. Maintaining the lake within the recommended stage envelope as often as possible, which the current lake operating schedule should assist in doing, is important for the continued reestablishment and maintenance of the vascular SAV community. Maintaining this range of lake stages also should continue to reduce the densities of emergent and terrestrial vegetation in the inshore areas of the lake, thereby enabling SAV to recolonize areas where it previously was found.

Zone/Performance Measure	LAST STATUS	CURRENT STATUS	CURRENT STATUS
Submersed Aquatic Vegetation Areal Coverage NEARSHORE REGION			SAV coverage, especially vascular plant coverage, has increased since 2007. *Chara spp.* coverage has remained relatively constant over the past 2 years. Vascular plant coverage dramatically increased for *Ceratophyllum*, *Hydrilla*, *Najas,* and *Potamogeton* over the past 2 years, *Vallisneria* coverage decreased slightly. Vascular SAV accounted for approximately 27,931 total acres or 66% of total SAV.

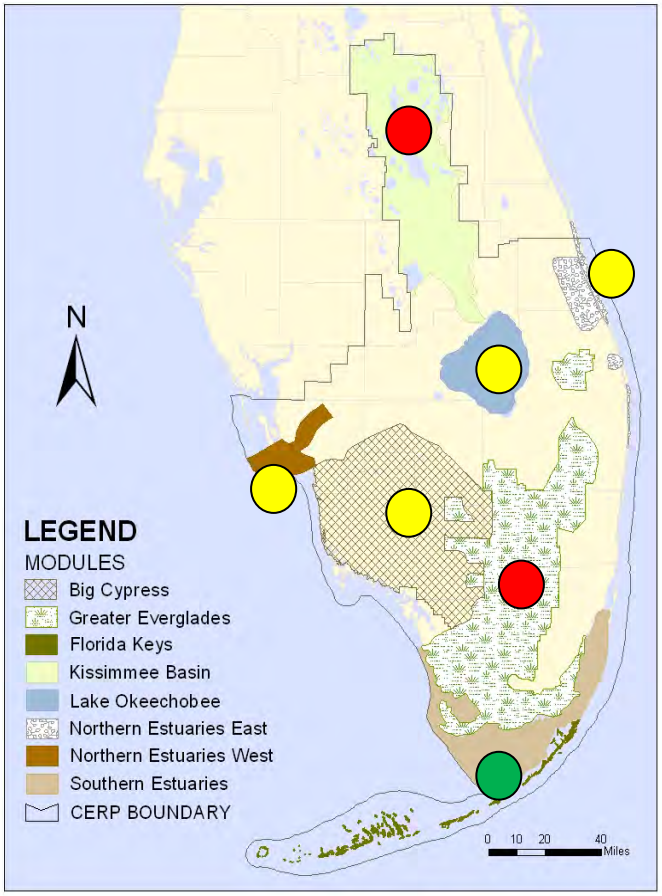
Invasive Exotic Species

Summary Findings

All modules have control programs for high priority invasive species on public lands, where progress continues for some species such as melaleuca. Brazilian pepper and Old World climbing fern continue to be serious invaders in most modules, although some localized progress is documented. However, decreasing funding trends threaten to reverse progress as maintained areas become re-infested. Land managers continue to detect new non-indigenous species, and often lack information on distribution and control methods. Invasive plant management on private lands remains deficient in all modules, ensuring continued invasion vulnerability to conservation lands. The Greater Everglades Module remains the only region with a systematic monitoring program for established species and there is some progress toward developing an early detection monitoring network there. Other modules have insufficient monitoring programs for tracking invasive species.

Key Findings

1. Control of invasive plants is successful for a few species, but only on public lands.
2. Biological control of melaleuca continues to be an important component of integrated pest management for this species. Three agents are now well-established and melaleuca reduction is documented.
3. New insects have been released for several other serious invasive plants, and other agents are in development for release within 1-2 years. Significant progress towards implementation of the CERP biological control project is likely to further successes in biological control throughout south Florida.
4. Most of the modules have significant invasive exotic plant problems, which are affecting natural areas and altering natural habitats and processes. In most cases, invasive plant populations are not being systematically monitored.
5. Reduced funding for control is a serious threat to management success to date. Land managers are concerned that previously restored areas may become re-infested if resources limit active maintenance control.
6. Monitoring programs to assess the trends in invasive exotic plants only cover the Greater Everglades Module and for only six high-priority species.
7. Monitoring that would identify new species or new distributions for existing species only covers portions of the Greater Everglades module, the other modules are not sufficiently monitored. Therefore, the ability to determine where and when new species arrive and establish is very limited.
8. Due to the scale of the problem, new species are becoming established, leaving the overall control picture mixed.
9. While good progress has been made with a number of species, we are still unable to control many exotic plant species faster than they are invading and spreading. It is important to get ahead of the exotic plant invasion rate. Control and prevention programs would have to be expanded in order to do that.



Invasive Exotic Species, continued

Zone/Performance Measure	LAST STATUS	CURRENT STATUS	CURRENT STATUS
KISSIMMEE RIVER			**The Good:** Many priority invasive species are successfully managed, although some difficult-to-control species continue to threaten restoration goals. Successful control programs for water hyacinth, water lettuce, and melaleuca. A new biological control agent for water hyacinth becoming established. **The Bad:** Old World climbing fern distribution is expanding, and it is proving difficult to stay ahead of its spread. Many non-indigenous species occur in this region, for which little is known about their control, distribution, and potential invasiveness.
LAKE OKEECHOBEE			**The Good:** Existing control programs provide sustained maintenance control for many species, including melaleuca, and floating aquatic weeds, which is key in restoration efforts. **The Bad:** New arrivals to Florida, such as tropical water grass and Wright's nutrush, will likely continue to appear and pose new management problems; continued disturbance of littoral zone may increase chances of new invasions.
NORTHERN ESTUARIES—EAST COAST			**The Good:** Progress with melaleuca, Brazilian pepper, and Australian pine, but infestations remain on adjacent private lands; a second biocontrol release for Old World climbing fern is showing promise. **The Bad:** Other species increasing, most not included in indicator monitoring programs; little known about many invaders.
NORTHERN ESTUARIES—WEST COAST			**The Good:** Much progress made with melaleuca, Brazilian pepper, and Australian pine, but significant infestations remain on private lands. **The Bad:** Other species gaining foothold and most not included in any indicator monitoring program; little known about many invaders and not able to assess their status in an objective or repetitive way.
BIG CYPRESS			**The Good:** Good control of melaleuca and Australian pine; aggressive control program for Brazilian pepper and Old World climbing fern underway. Systematic monitoring program in place. **The Bad:** Two potentially serious invaders, crested floating heart and cogongrass, are present in module; control efforts for cogongrass ineffective.
GREATER EVERGLADES			**The Good:** Integrated control of melaleuca, Brazilian pepper, Old World climbing fern, and other species continue in Water Conservation Areas. Systematic monitoring program underway. No new serious invaders detected. **The Bad:** Brazilian pepper and Old World climbing fern still widespread in other areas and appear to be expanding; still several other species present with little or no control effort or efficacy.
SOUTHERN ESTUARIES			**The Good:** Control programs under way for many years; significant control achieved for Australian pine. Successful early detection and rapid response of a newly detected mangrove invader. **The Bad:** Several new species invasions and possible effects unclear; most of Florida Bay not included in any monitoring program. Latherleaf, a serious invader of rare habitats along the southern coast of the park, continues to expand.
FLORIDA KEYS			**The Good:** Much progress made on Australian pine, sickle bush, laurel fig, and other priority species. Well-developed management programs in place. Progress in developing region-wide early detection/rapid response network. **The Bad:** Populations of some priority species on private lands remain uncontrolled; continued use of some invasive species in private landscapes; potential expansion of Guinea grass a concern.

USACE American Recovery and Reinvestment Act

The American Recovery and Reinvestment Act (ARRA) (P.L. 111-5), enacted on February 17, 2009, funds a total of $4.6 billion for various USACE construction and operations projects nationwide. Up to $96 million is provided for overall south Florida. Several South Florida Ecosystem restoration project efforts or features (including funds for non-CERP or pre-existing authorized Foundation Projects) were identified for these funds in April 2009.

Funds made available under ARRA are outside the general FY 2009/FY 2010 budget process. ARRA funds combined with the President's FY 2009 budget of $124 million infused a total of more than $220 million in FY 2009 – the largest amount in any single year since Congress authorized the CERP in 2000.

Among those features having an accelerated construction schedule due to this funding are:

- Picayune Strand Restoration – complete the Merritt Pump Station construction, perform road removal and plug Merritt Canal
- Site 1 Impoundment – construct the L-40 Levee reinforcement and upgrading, install dam safety instrumentation, and construct an auxiliary spillway (S-530)
- Kissimmee River Restoration – widen the C-37
- Melaleuca Eradication and Other Exotics – construct a mass rearing lab annex for growing and storing bio-controls adjacent to an existing facility in Davie, Florida
- Adaptive Assessment and Monitoring Program – additional monitoring contracts to advance the acquisition of required scientific information or support deployment of critical monitoring infrastructure needs

The ARRA also provided $28.8 million for operations and maintenance eligible activities, including several C&SF-related and Foundation Projects, the levee inspection program, and removal of unwanted aquatic growth in the South Florida Ecosystem.

US DOI American Recovery and Reinvestment Act

Approximately $3 billion was appropriated through ARRA for the DOI. The NPS will invest $750 million and the FWS will invest $280 million to stimulate the economy through ARRA. The FWS anticipates that it will expend $2.2 million on projects planned at refuges and field offices in the Everglades, and the NPS expects to expend $21.1 million on projects planned at parks in the Everglades. This is in addition to the $118.7 million appropriated by Congress in 2009 for DOI Everglades activities.

Examples of projects that NPS and FWS are able to undertake due to this increased federal funding are:

- Replace two failed dams at ENP to prevent salt water intrusion into Cape Sable
- Remove invasive animals and vegetation at the A.R.M. Loxahatchee National Wildlife Refuge and replace invasive vegetation with native vegetation in partnership with the State and County
- Inventory and monitor plant and animal populations critical to ensuring the biological integrity of the Florida Keys National Wildlife Refuge Complex
- Conduct invasive species control and south Florida marsh and mangrove swamp restoration and enhancement through the FWS South Florida Coastal Program office
- Repair and rehabilitate facilities, trails, and utilities at multiple parks and refuges, ensuring resource protection and energy efficiency

Groundbreaking at Picayune Strand in January 2010.

Key Environmental Legislation & Programs

- 1934 Everglades National Park is authorized.
- 1968 Biscayne National Park is established as a national monument; expanded to a national park in 1980.
- 1972 Florida Water Resources Act establishes fundamental water policy for Florida, attempting to meet human needs and sustain natural systems; puts in place a comprehensive strategic program to preserve and restore the Everglades ecosystem.
- 1972 Florida Land Conservation Act authorizes the issuance of bonds to purchase environmentally endangered and recreation lands.
- 1974 Big Cypress National Preserve is created; legislation incorporates concerns of the Seminole Tribe and the Miccosukee Tribe for access to this preserve.
- 1982 Florida Indian Land Claims Settlement Act establishes a perpetual lease from the State of Florida for the Miccosukee Tribe's use and occupancy of 189,000 acres in WCA-3A, which is to be preserved in its natural state, and a 75,000-acre Federal Indian Reservation in the Everglades.
- 1983 Florida Governor's Save Our Everglades Program outlines a six-point plan for restoring and protecting the South Florida Ecosystem so that it functions more like it did in the early 1900s.
- 1984 Florida Warren Henderson Act authorizes 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 requires the development and coordination of local land use plans.
- 1987 Compact among the Seminole Tribe, the State of Florida, and the federal government is completed, clearly describing the Tribe's water supply and flood control rights; the goal of the compact is to harmonize state and federal water law.
- 1987 The Seminole Tribe transfers ownership to lands critical to the State of Florida's Everglades Construction Project in WCA-3.
- 1987 Florida Surface Water Improvement and Management Act requires the five Florida water management districts to develop plans to clean up and preserve Florida lakes, bays, estuaries, and rivers.
- 1988 Federal government sues the State of Florida, alleging that the state had failed to direct the SFWMD to require water quality permits for the discharge of water into the C&SF project canals.
- 1988 Land Settlement Act transfers acreage in WCA-3 and the Rotenberger tract to the State of Florida for Everglades restoration.
- 1988 Big Cypress National Preserve Addition Act expands the preserve and affirms the Seminole and Miccosukee Indian Tribes' customary use and occupancy rights in the preserve.
- 1989 Everglades National Park Expansion Act adds the East Everglades addition.
- 1990 Florida Preservation 2000 Act establishes a coordinated land acquisition program at $300 million per year for 10 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 establishes a 2,800-square-nautical-mile marine sanctuary and authorizes a water quality protection program.
- 1991 Florida Everglades Protection Act provides the SFWMD with clear tools for ecosystem restoration.
- 1992 Federal and state parties enter into a consent decree on Everglades water quality issues in federal court. The Miccosukee Tribe signs a Memorandum of Agreement with the federal government which gives it the right to seek enforcement of the Settlement Agreement entered as a Consent Decree.
- 1992 WRDA 1992 authorizes the Kissimmee River Restoration Project and the C&SF Project Restudy; also provides for a fifty/fifty cost share between the federal government and the project sponsor, the SFWMD.
- 1993 Federal Task Force is established to coordinate ecosystem restoration efforts in south Florida.
- 1993 Seminole Tribe is approved by the USEPA to establish water quality standards for reservation lands in accordance with section 518 of the Clean Water Act.
- 1994 Florida Everglades Forever Act establishes and requires 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 is 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 is approved by USEPA to establish water quality standards for reservation lands in accordance with section 518 of the Clean Water Act.
- 1996 WRDA 1996 authorizes a comprehensive review study for restoring the hydrology of south Florida; expands the Task Force to include tribal, state, and local governments; mandates extensive public involvement.
- 1996 Section 390 of the Farm Bill grants $200 million to conduct restoration activities in the South Florida Ecosystem.
- 1997 Seminole Tribe of Florida's water quality standards for the Big Cypress Reservation are approved by USEPA.

Key Environmental Legislation & Programs, continued

- 1997 Miccosukee Tribe water quality standards for the Tribe's Federal Indian Reservation establish a 10 ppb criterion for total phosphorus in tribal waters.
- 1997–2000, Annual Interior Appropriations Acts provide for land acquisition by the NPS and the FWS in the South Florida Ecosystem.
- 1998 Miccosukee Reserved Area Act clarifies the rights of the Miccosukee Tribe to live in ENP and sets aside 666.6 acres along the border for the tribe to govern in perpetuity.
- 1998 Seminole Tribe of Florida's water quality standards for the Brighton Reservation are approved by USEPA.
- 1998 Miccosukee Reserved Area Act directs the Miccosukee Tribe to establish water quality standards for the Miccosukee Reserved Area (inflow points to ENP).
- 1999 WRDA 1999 extends Critical Restoration Project authority until 2003; authorizes two pilot infrastructure projects proposed in the CERP.
- 1999 Governor's Commission for the Everglades is established to make recommendations on issues relating to Everglades protection and restoration, environmental justice, and water resource protection, among other issues.
- 1999 Miccosukee Tribe water quality standards are established for the Miccosukee Reserved Area on the border of ENP and they are approved by USEPA.
- 1999 Florida Forever Act improves and continues the coordinated land acquisition program initiated by the Florida Preservation 2000 Act of 1990; commits $300 million per year for 10 years.
- 1999 Florida State Legislature passes Chapter 99-143, Laws of Florida, authorizing the SFWMD to be the local sponsor for Everglades restoration projects.
- 2000 Florida Everglades Restoration Investment Act creates a funding and accountability plan to help implement the CERP; commits an estimated $2 billion in state funding to Everglades restoration over 10 years.
- 2000 Florida Legislature passes the Lake Okeechobee Protection Act, a phased, comprehensive program designed to restore and protect the lake.
- 2000 WRDA 2000 includes $1.4 billion in authorizations for 10 initial Everglades infrastructure projects, 4 pilot projects, and an adaptive management and monitoring program; also grants programmatic authority for projects with immediate and substantial restoration benefits at a total cost of $206 million; establishes a 50-percent federal cost share for implementation of CERP and for operation and maintenance.
- 2001 Numeric water quality criterion of 10 ppb geometric mean is proposed by FDEP in the Everglades Protection Area.
- 2001 The Water Resources Advisory Commission (WRAC) is established by the SFWMD Governing Board as a representative public interest group to advise them on all aspects of water resource protection in south Florida.
- 2002 Task Force designates the WRAC as an advisory body to the Task Force on ecosystem restoration activities.
- 2003 Senate Bill 626 amends the Everglades Forever Act.
- 2003 Science Coordination Group is established with direct reporting responsibilities to the Task Force.
- 2003 Combined Structural and Operational Plan Advisory Team is established with direct reporting responsibilities to the Task Force.
- 2003 Final USACE Programmatic Regulations are issued.
- 2003 SFWMD develops the Long-Term Plan for achieving Everglades water quality goals.
- 2003 Environmental Regulation Commission adopts phosphorus rule for the Everglades Protection Area.
- 2003 State of Florida initiates early start on Southern Golden Gate Estates Hydrologic Restoration Project.
- 2004 Indian River Lagoon-South CERP project is approved by State of Florida under Section 373.1501.F.S.
- 2004 State of Florida unveils plan to accelerate restoration of America's Everglades (Acceler8).
- 2005 USEPA approves State of Florida's phosphorus rule for the Everglades Protection Area.
- 2005 The State of Florida's Water Resource Protection and Sustainability Program requires a higher level of water supply planning and coordination between the water management districts and local governments.
- 2005 State of Florida announces the Lake Okeechobee Estuary Recovery Plan to help restore the ecological health of Lake Okeechobee and the St. Lucie and Caloosahatchee Estuaries.
- 2007 Water Resources Development Act authorizes three projects for construction: Picayune Strand Restoration, Site 1 Impoundment (Fran Reich Preserve), and Indian River Lagoon – South.
- 2007 State of Florida expands the Lake Okeechobee Protection Act to include protection and restoration of the interconnected Kissimmee, Lake Okeechobee, Caloosahatchee, and St. Lucie watersheds (Northern Everglades and Estuaries Protection Program).
- 2009 Omnibus Appropriations Act (directs preparation of Tamiami Trail Study to increase sheetflow)

Additional Ecosystem-Wide Efforts

In addition to the programs and projects previously discussed, there are additional restoration efforts underway, some of which are highlighted below.

CERP Activities

The single largest component of the Everglades restoration initiative is the CERP. Authorized by Congress in 2000, this plan is vital to *getting the water right* for the natural system. Implementation of the CERP will also provide benefits to the ecosystem's habitats, improve urban and agricultural water supply, and maintain existing levels of flood protection.

Along with the additional project funding, groundbreakings, and partnership agreements, other CERP program activities also took place during the reporting period. Published by RECOVER, the *System Status Report* (SSR) addresses the overall status of the ecosystem relative to system-level hypotheses, performance measures, and restoration goals. The 2009 SSR provides an integrated assessment of RECOVER's MAP and non-MAP data, spans multiple spatial scales, and in some cases decades worth of information. Because of the broad intergovernmental coordination, the SSR incorporates elements of the "stoplight" indicator update and the SSR provides the detailed underlying, data, theory, and analysis used by the *System-wide Ecological Indicators for Everglades Restoration: 2010 Report*. The 2009 SSR is available on an interactive web page that allows managers, stakeholders, and scientists with varying interests and degrees of technical expertise to easily find the information they need (http://www.evergladesplan.org/pm/ssr_2009/ssr_main.aspx#). This combination of indicator reports will provide managers with information they need to adjust restoration activities at both large and small scales.

For further details on the CERP, please refer to the CERP 2010 Report to Congress.

Independent Scientific Review

In accordance with WRDA 2000, the National Research Council (NRC) Committee on Independent Scientific Review of Everglades Restoration Progress (CISRERP) was convened to conduct biennial reviews of the CERP. CISRERP is composed of a diverse team of internationally recognized experts in ecosystem restoration science.

Although the biennial reviews have recognized the development of good science for the restoration effort, the committee has recommended the utilization of Incremental Adaptive Restoration (IAR) (2006) and the expeditious implementation of projects that have the most potential for contributing to natural system restoration (2008). The findings from the committee's third biennial review (2010) will be reviewed and incorporated into the restoration effort.

Climate Change Coordination

Understanding the implications of climate change related to restoration of the Everglades is critical because of the exceptionally flat terrain in south Florida and the susceptibility of native plants and animals to changes in temperature, humidity, and precipitation. Equally important, a workshop at the 2008 Greater Everglades Ecosystem Restoration conference concluded that it is likely that Everglades restoration will be an important aspect of our adaptation response to climate change. Addressing these challenges and opportunities requires a coordinated intergovernmental approach.

To help coordinate the significant number of individual climate change projects in South Florida, the Task Force is developing a conceptual model that will analyze and organize the critical aspects of climate change related to Everglades restoration.

The Task Force

The intergovernmental Task Force is the only forum that provides strategic coordination and a system-wide perspective to guide the separate restoration efforts being planned and implemented in south Florida.

Providing a forum for consensus building and issue engagement 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. Each member is accountable individually to its appropriate authorities and to each other for the success of the restoration. The Task Force has no overriding authority to direct its members. Instead the Task Force's coordination role complements the implementation roles of its members.

Organization

Four sovereign entities (federal, state, and two tribes) are represented on the Task Force. Fourteen members sit on the Task Force itself, representing seven federal departments, three state agencies/offices, two American Indian tribes, and two local governments.

The Florida-based Working Group and the SCG have been established to assist the Task Force with its responsibilities. Their members include additional federal, state, and local agencies. The Task Force and Working Group establish regional and issue-based teams as needed to address pressing or area-based restoration concerns.

Currently, the Water Resources Advisory Commission of the SFWMD serves as an advisory body to the Task Force.

Strategic Responsibilities

The WRDA 1996 details the primary responsibilities of the Task Force. These are intergovernmental coordination, coordination of strategic science, exchange of information, facilitation and conflict resolution, and public participation and access. The Task Force meets regularly to report on progress, facilitate consensus, and identify opportunities for improvement. The Task Force includes public participation in all its coordination activities.

Above: Secretary Salazar welcomed the Task Force to their June 2009 meeting in Washington D.C. From left to right: Chair Tom Strickland (Assistant Secretary for Fish, Wildlife, and Parks, DOI), Secretary Salazar (DOI), and Vice Chair Mike Sole (Secretary, Florida Department of Environmental Protection).

Left: The Working Group and Science Coordination Group developed several key information briefs at their joint meeting in September 2009.

Intergovernmental Coordination

Coordination Meetings

The Task Force and its subgroups conduct meetings for the purpose of intergovernmental coordination. In September 2009, a Task Force meeting was conducted in situ in south Miami-Dade County to provide members and attendees the opportunity to gather at a project location and discuss the project on-site.

Coordination Reports

The Task Force documents the major aspects of its intergovernmental coordination efforts through the following reports:

Strategy and Biennial Report. Identifies the Task Force's strategic goals, subgoals, and measurable objectives and outlines how progress will be measured through a suite of system-wide ecological indicators. Summarizes restoration activities, progress made toward the strategic goals, and status of the system-wide ecological indicators.

Integrated Financial Plan. Provides individual project sheets for each of the federal, state, tribal, and local restoration projects.

Land Conservation Strategy. Provides a broad picture of all land acquisition and conservation initiatives that contribute to the restoration.

Plan for Coordinating Science. Documents the framework for coordinating science and communicates strategic level science priorities and system-wide assessments for restoration success.

Information Briefs

In 2009, the Task Force initiated a series of information briefs on three current topics: new science, climate change, and invasive exotic animals. The Working Group and SCG collaborated on developing brief overviews of these critical issues, synthesizing the latest in scientific knowledge, and providing suggested next steps.

The information was compiled in a four-page format that utilizes plain language and key graphics to convey findings and concerns. The information briefs are proving a useful tool in providing concise updates of current Everglades issues to the Task Force members.

Meeting In Situ: In September 2009, experts provided orientation tours for the command and control facility for regional water control structures, the C-111 South Dade project, the C&SF project, and the C-111 Spreader Canal project. Formal project consultation with the Task Force (as provided in the Programmatic Regulations for CERP) took place on-site for the C-111 Spreader Canal project.

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**Chair
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Local Government Representative

Executive Director
Greg May
South Florida Ecosystem Restoration Task Force

*As of June 2010
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***Vice Chair

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Vacant
Florida Department of Agriculture and Consumer Services

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**Interim Chair

Abbreviations & Acronyms

µg/L	Micrograms per liter
ARM	Arthur R. Marshall
ARRA	American Recovery and Reinvestment Act
ARS	Agricultural Research Service
ASR	Aquifer Storage and Recovery
AWS	Alternative Water Supply
BMAP	Basin Management Action Plan
BMB	Barnes, Manatee, and Blackwater Sounds
BMP	Best Management Practice
C/N	Chicks per nest
C&SF	Central and Southern Florida
C-#	Canal
c/n	Chicks per nest
CBB	Central Biscayne Bay
CERP	Comprehensive Everglades Restoration Plan
CISRERP	Committee on Independent Scientific Review of Everglades Restoration Progress
CREW	Corkscrew Regional Ecosystem Watershed
DCA	Florida Department of Community Affairs
DEIS	Draft Environmental Impact Statement
DOI	U.S. Department of the Interior
DOT	Florida Department of Transportation
E&SF	Everglades and South Florida
EA	Environmental Assessment
EAA	Everglades Agricultural Area
ECISMA	Cooperative Invasive Species Management Area
ENP	Everglades National Park
EPA	Everglades Protection Area
EPOC	Emerging Pollutant of Concern
EQIP	Environmental Quality Incentive Program
FDEP	Florida Department of Environmental Protection
FEMA	Federal Emergency Management Agency
FKNMS	Florida Keys National Marine Sanctuary
FIAN	Fish and Invertebrate Assessment Network
FWC	Florida Fish and Wildlife Conservation Commission
FWS	U.S. Fish and Wildlife Service
FY	Fiscal Year
GCSSF	Governor's Commission for a Sustainable South Florida
HHD	Herbert Hoover Dike
IAR	Incremental Adaptive Restoration
KB	Kissimmee Basin
L-#	Levee
LEC	Lower East Coast
LOST	Lake Okeechobee Scenic Trail
LWC	Lower West Coast
MAP	Monitoring and Assessment Plan
MFL	Minimum Flows and Levels
mgd	Millions of gallons per day
Mod Waters	Modified Water Deliveries to Everglades National Park
MRP	Master Recreation Plan
MSRP	South Florida Multi-Species Recovery Plan
MTZ	Mangrove Transition Zone
NBB	North Biscayne Bay
NCFB	North-central Florida Bay
NEFB	Northeast Florida Bay
NRC	National Research Council
NPS	National Park Service
OGT	Office of Greenways and Trails
P	Phosphorus
ppb	Parts per billion
PIR	Project Implementation Report
RECOVER	Restoration Coordination and Verification Team
ROC	Reptile of Concern
SAV	Submersed Aquatic Vegetation
SBB	South Biscayne Bay
SCG	Science Coordination Group
SCS	Southern Coastal System
SDCS	South Dade Conveyance System
SEIS	Supplemental Environmental Impact Statement
SFB	South Florida Bay
SFWMD	South Florida Water Management District
SSR	System Status Report
STA	Stormwater Treatment Area
SWFS	Southwest Florida Shelf
Task Force	South Florida Ecosystem Restoration Task Force
TMDL	Total Maximum Daily Load
TP	Total Phosphorus
UEC	Upper East Coast
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
WCA	Water Conservation Area
WFB	West Florida Bay
WHIP	Wildlife Habitat Incentives Program
WRAC	Water Resources Advisory Commission
WRDA	Water Resources Development Act

The South Florida Ecosystem Restoration Task Force

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