



# SOUTH FLORIDA ECOSYSTEM RESTORATION TASK FORCE

---

LEADERSHIP • PARTNERSHIP • RESULTS

## 2016

## STRATEGY AND BIENNIAL REPORT

EVERGLADESRESTORATION.GOV  
Restoring America's Everglades

# 2016 SOUTH FLORIDA ECOSYSTEM RESTORATION TASK FORCE: STRATEGY AND BIENNIAL REPORT

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.

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

The Biennial Report satisfies the requirements of the Water Resources Development Act of 1996 (WRDA 96) to report biennially on Task Force activities and progress made toward restoration. The reporting period is July 1, 2014 – June 30, 2016.

The Biennial Report is intended for four principal audiences:

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

The Biennial Report synthesizes information from the following reports:

- Integrated Financial Plan
- System-wide Ecological Indicators for Everglades Restoration

## EXECUTIVE SUMMARY

**R**estoring the Everglades and protecting south Florida's natural resources cannot be achieved by any single organization but depends upon a strategically coordinated set of federal, state, local, and tribal initiatives, funding, and partnerships. These restoration programs and projects require a long-term process for addressing key technical, management, and policy issues. The intergovernmental South Florida Ecosystem Restoration Task Force (Task Force) was created by Congress in 1996 to provide this long-term strategic coordination and to facilitate the incorporation of new information and opportunities over the multi-decade restoration initiative.

### Restoration Framework

The Task Force uses 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.

#### 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 responds over time to the implementation of restoration projects and system-wide operational changes. The "stoplight" assessment of the system-wide ecological indicators communicates overall ecosystem health (pp 65-80).

### Restoration Highlights

Restoration has moved forward in important ways over the past two years, and the following examples illustrate some of the most significant accomplishments achieved. Although the body of this report reflects the July 1, 2014 to June 30, 2016 reporting period, the information in the Executive Summary includes some of the most significant accomplishments achieved from July 1, 2014 to September 30, 2016. Since the end of June 2016, three more planning efforts were initiated to address some important areas in the Everglades ecosystem and though they were not initiated within the reporting period, they are significant enough to highlight in this Executive Summary.

#### Support for Restoration Remains Strong

Comprehensive Everglades Restoration Plan (CERP) projects require Congressional authorization, through periodic water resources development acts. The Water Resources Reform and Development Act of 2014 (WRRDA 2014) authorized four new projects (C-111 Spreader Canal Western Project; C-43 West Basin Storage Reservoir; Biscayne Bay Coastal Wetlands Project Phase 1; and Broward County Water Preserve Areas Project), continuing the progress toward restoration.

The citizens of Florida passed an amendment to the Florida Constitution in 2014 that requires the Legislature to appropriate funds annually for land conservation and improvement. A portion of these funds is intended to go towards Everglades restoration efforts.

The Florida Legislature passed the Legacy Florida Bill in 2016 that provides a dedicated funding source for 10 years to 2026 for Everglades restoration. As written, it will deliver approximately \$200 million a year to restoration projects for the Everglades.

### Planning for Future Restoration Projects

During 2015, the U.S. Army Corps of Engineers (USACE) and the South Florida Water Management District (SFWMD) initiated a process to update the **Integrated Delivery Schedule (IDS)**. The IDS provides an overall strategy for project planning, design, and construction based upon ecosystem needs, benefits, costs, and available funding. The schedule helps restoration planners, stakeholders, and the public focus on priorities, opportunities, and challenges and provides a path forward to complete construction on previously authorized projects while outlining the next projects to undergo planning and design. The update to the IDS utilized the Task Force's successful public workshop model to engage the public and stakeholders and enable meaningful input towards identifying priorities for completing construction of projects underway as well as priorities for the next phase of CERP planning.

The IDS lays out a path to complete construction in the years ahead on projects already authorized and identifies three planning efforts to be undertaken in the next reporting period to address some significant areas in the ecosystem that need improvement. The planning for the **Loxahatchee River Watershed Restoration Project** was re-initiated in 2016 to restore and sustain the overall quantity, quality, timing, and distribution of freshwaters to the federally-designated "National Wild and Scenic" Northwest Fork of the Loxahatchee River for current and future generations. This project also seeks to restore, sustain, and reconnect the area's wetlands and watersheds that form the historic headwaters for the river.

Two additional planning efforts began in summer 2016, the Western Everglades Restoration Project and the Lake Okeechobee Watershed Project. The overall purpose of the **Western Everglades Restoration Project** is to improve the quantity, quality, timing, and distribution of water needed to restore and reconnect the western Everglades ecosystem, while complying with applicable water quality standard. The preliminary project objectives are to: 1) restore and improve seasonal hydroperiods and freshwater distribution to support a natural mosaic of wetland and upland habitat in the western Everglades ecosystem; 2) reestablish and improve sheetflow patterns, surface water depths, and durations in the study area to reduce soil subsidence and the frequency of damaging peat fires; and 3) reduce water loss out of the natural system to prevent overdrainage and improve ground and surface water elevations. The Western Everglades Restoration Project will explore the potential to address over-drainage in northwestern Water Conservation Area (WCA) 3A while also solving ponding in the southern Triangle area. If the project includes removal of the L-28 Interceptor levees and the L-28 levees between I-75 and Tamiami Trail, it would increase the spatial extent of the greater Everglades by over 9,000 acres, without land acquisition costs. One of the largest voluntary land additions to date, courtesy of the Miccosukee Tribe, this project will increase the spatial extent of the Everglades while restoring sheetflow and enhancing ecological connectivity between the Big Cypress National Preserve and the WCAs. The **Lake Okeechobee Watershed Project** will focus on the major tributary systems north of Lake Okeechobee that drain the lower portion of the watershed into the Lake. The project purpose is to improve the quantity and timing of water entering Lake Okeechobee and the northern estuaries, improve regional water management operational flexibility in context of the overall Everglades ecosystem restoration, and to restore wetland habitat within the project area and Lake Okeechobee.

An update to the 2015 IDS to reflect state and federal Fiscal Year 2016 and 2017 budgets was presented to the Working Group and Science Coordination Group in September 2016 and will be presented to the Task Force in December 2016.

### Restoring the Heart of the Everglades (Strategic Goal 1)

The **Central Everglades Planning Project (CEPP)** was submitted to Congress in August 2015 recommending authorization and construction of the project. The goals of CEPP are to improve the quantity, timing, and distribution of water in the Northern Estuaries, central Everglades, and Everglades National Park (ENP) in order to restore habitats and ecological function in the natural system. The CEPP combines six key CERP components into a comprehensive project that includes water storage, conveyance, and decompartmentalization in the heart of the Everglades.

### Restoring Wetlands (Strategic Goal 2)

The U.S. Department of Agriculture (USDA) supports the restoration of the Everglades by providing financial and technical assistance to private landowners and tribes. The **Agricultural Conservation Easement Program (ACEP)**, implemented through USDA's Natural Resources Conservation Service (NRCS), provides agricultural and wetland easements to landowners. Agricultural easements on productive working lands prevent them from being converted to non-agricultural uses and protects lands devoted to food production. Wetland easements restore and enhance wetlands and improve wildlife habitat.

During the reporting period, the USDA invested over \$65 million in ACEP funds to protect 8,000 acres of land in Florida. Over 99% of this acreage is located in the Northern Everglades Initiative area. In 2016, for the eighth consecutive year, Florida received the largest NRCS easements program funding allocation in the nation.

**The Biscayne Bay Coastal Wetlands Project** was authorized in WRRDA 2014. The goal of this CERP project is to improve the ecology of Biscayne National Park and Biscayne Bay by rehydrating coastal wetlands, and reducing freshwater point source discharges with a redistribution of surface water flows through a spreader canal system. Phase 1 includes construction of three components (Deering Estate, L-31E Culverts and Cutler Wetlands), to redistribute the flow of surface water into Biscayne Bay. In advance of Congressional authorization, the SFWMD completed construction on its portion of the L-31E Flowway and the Deering Estate features. A Project Partnership Agreement between the SFWMD and the USACE was executed on August 25, 2016, paving the way for project completion. Construction of the Cutler Wetlands is scheduled for initiation in 2019. Plans and specifications are currently under development by the USACE for the remaining features and a construction contract award for the USACE' portions of the L-31E Flowway is scheduled for award by the end of 2016.

### Restoring Natural Hydrology (Strategic Goal 1)

**The Picayune Strand Restoration Project** involves restoring flow across an area larger than the District of Columbia in western Collier County that was drained in the early 1960s in anticipation of an extensive residential development that never materialized. Construction was completed on the Merritt Pump Station and Phase II Road Removal in 2014. The Faka Union Pump Station was completed in January 2016 and is currently in the 12-month operational testing phase. Work began on the Miller Pump Station in January 2014 and is scheduled to be completed in 2017. Analysis of the effects to the water levels of adjacent private lands is currently underway and levees required to maintain current levels of flood protection will be constructed in FY2018. The Manatee Refugia Feature designed to provide warm water habitat is complete and fully operational.

**The Indian River Lagoon-South (IRL-S) Project** will help restore the St. Lucie Estuary and southern portion of the Indian River Lagoon. The USACE completed the first major construction contract for the C-44 Reservoir and Stormwater Treatment Area (STA) component of the project in July 2014. The remaining three construction contracts for the C-44 Reservoir and STA project have been awarded and are currently underway. The SFWMD awarded the construction contracts for the STA in October 2014, and the pump station in April 2015. The USACE awarded the construction contract for the reservoir in September 2015. Construction of the STA and Pump Station are scheduled for completion in 2017 and 2018, respectively. Construction for the C-44 reservoir is scheduled to be complete in 2020, and will be followed by up to two years of operational testing and monitoring for all of the completed features of the project.

### **A Partnership to Restore Flow through the River of Grass (Strategic Goal 1)**

The National Park Service (NPS), the Florida Department of Transportation, and the Federal Highway Administration advanced the next phase of bridging U.S. Highway 41 (“Tamiami Trail”) to restore flow through the central Everglades and ENP. Built in the 1920s, U.S. Highway 41, known as “Tamiami Trail,” unintendedly functions as a dam between the central Everglades and ENP. Replacing sections of this roadway with bridges is one of the most important restoration features in the Everglades. The NPS and the USACE completed construction on the first mile of bridging on Tamiami Trail in 2013. The one-mile bridge proved invaluable during the historic El Niño winter of 2016, when record rainfall fell across the central Everglades, because it provided operational flexibility to manage that event adaptively reducing water levels in the central Everglades and increasing flows to eastern ENP.

Two additional bridges totaling approximately 2.6 miles (**Tamiami Trail Next Steps Project, Phase 1**) will allow more flow from north to south and will distribute that flow across a wider area to hydrate important deeper water habitats in ENP. All of the bridges on Tamiami Trail will ultimately work in tandem with elements of CERP and other restoration features to increase flow from Lake Okeechobee through the central Everglades to Florida Bay. The 2.6 miles of bridge construction contract was awarded in May 2016 and construction will begin in the fall of 2016.

### **The Return of a River (Strategic Goal 1)**

The **Kissimmee River Restoration Project** continues to shine as the keystone Everglades restoration project and, after 20-plus years of large-scale construction, the project is nearing completion and interim ecological responses are being observed. During the reporting period a significant amount of construction was completed, including features to ensure that the current level of flood protection for the region is maintained after the project is complete. Other features completed in the past two years help to reduce flood impacts to residential development and restore part of the river’s floodplain. Currently, two major canal backfilling contracts are under construction. These efforts will backfill 9 additional miles of canal, re-carve 4 miles of the historic river, and restore approximately 4,700 more acres of wetlands.

### **Continuing to Invest in Water Quality Restoration (Strategic Goal 1)**

During the reporting period, the State of Florida made significant progress implementing the **Restoration Strategies Plan** water quality program, building on its existing multi-billion dollar investment in water quality improvements in the Everglades. The Restoration Strategies program includes more than 6,500 acres of new STAs and 116,000 acre-feet of additional water storage through construction of Flow Equalization Basins (FEBs). The additional storage is equivalent to enough water to fill the US Capitol rotunda 4,000 times. To date, 3 projects are complete, 28 program milestones have been achieved, and all upcoming milestones are on track to be completed on or before their deadlines.

### **Putting Restoration Infrastructure to Work**

As a result of record setting rainfall, on February 26, 2016, Gov. Rick Scott declared a state of emergency in counties in Florida’s east and west coasts. The Governor cited “extensive environmental harm” and “severe economic losses” from ongoing discharges of Lake Okeechobee water to the St. Lucie and Caloosahatchee rivers. The Florida Department of Environmental Protection (FDEP) and the Florida Fish and Wildlife Conservation Commission (FWC) asked the USACE to temporarily ease regulatory restrictions to allow about 10,000 gallons per second of clean water to flow south from WCA-3A through the L-29 Canal (which runs along eastern Tamiami Trail) into Northeast Shark River Slough in ENP. Immediate action was necessary to deviate from permitted water management practices in order to move significant volumes of flood water out of the WCAs, which has helped to enable or maintain releases of water south out of Lake Okeechobee.

The FDEP, the FWC, the SFWMD, the USACE, the NPS, the U.S. Fish and Wildlife Service (USFWS), and the U.S. Department of the Interior (USDOI) all worked together to implement these changes and temporary deviations to successfully move additional water out of WCA-3A and into Northeast Shark River Slough. To maintain levels of flood protection and minimize impacts to commercial airboat operations south of Tamiami Trail, the SFWMD took additional actions to raise infrastructure and provide additional drainage. As water levels in WCA-3A subsided in April and May of 2016, the temporary deviation was terminated in

May and a system recovery period was extended through December 2016. The actions were viewed as highly successful and demonstrated the ability of the new infrastructure to move large volumes of water out of the WCAs and into the eastern portion of ENP, while also validating the importance of completing on-going construction of the **Modified Water Deliveries to Everglades National Park** and **C-111 South Dade** projects to enable full operational capacity.

In the northern part of the system, widespread algal blooms have impacted Lake Okeechobee, the St. Lucie Estuary, the Caloosahatchee Estuary, and other nearby coastal areas. This problem reached such a level that on June 29, 2016, Governor Scott declared an additional state of emergency for Martin and St. Lucie counties, and then on June 30, 2016 a second order was issued amending the first order to add Palm Beach and Lee counties. The orders directed state agencies to implement a number of actions to help reduce the extent and impacts of the algal blooms. As a result, additional monitoring throughout the Caloosahatchee, St. Lucie, and Lake Okeechobee areas was implemented, a hotline for reporting algae problems was established, and several actions were taken by the SFWMD to time releases with tidal cycles and store more water throughout the system in an effort to minimize discharges from the lake to the estuaries. This recurring phenomenon is expected to continue to produce conditions conducive to development of algal blooms.

This page was intentionally left blank

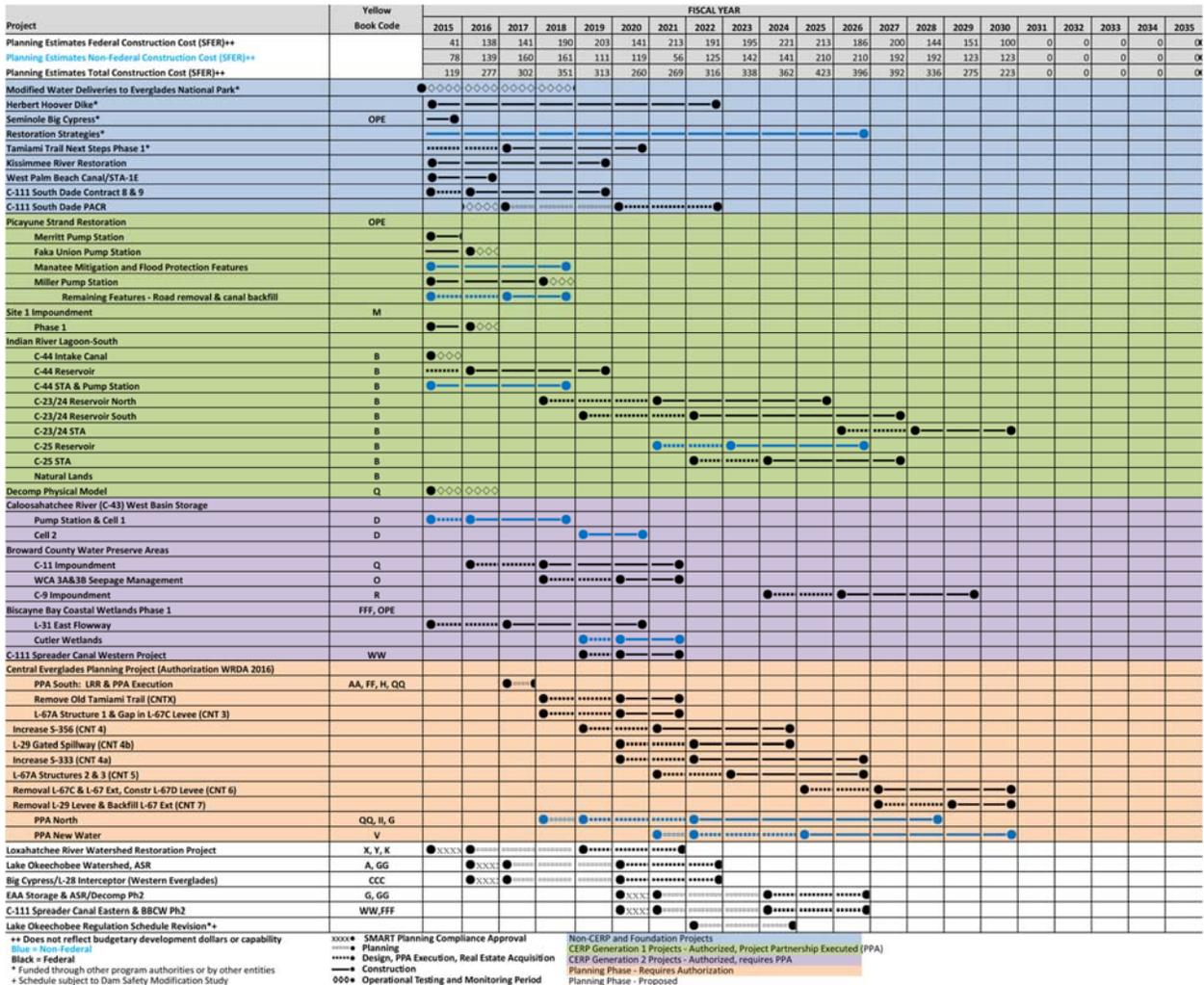
# LOOKING AHEAD

## Integrated Delivery Schedule

During 2015, the U.S. Army Corps of Engineers (USACE) and the South Florida Water Management District (SFWMD) initiated a process to update the **Integrated Delivery Schedule (IDS)**. The IDS provides an overall strategy for project planning, design, and construction based upon ecosystem needs, benefits, costs, and available funding. The schedule helps restoration planners, stakeholders, and the public focus on priorities, opportunities, and challenges and provides a path forward to complete construction on previously authorized projects while outlining the next projects to undergo planning and design. The 2015 update to the IDS utilized the Task Force's successful public workshop model to engage the public and stakeholders and enable meaningful input towards identifying priorities for completing construction of projects underway as well as priorities for the next phase of CERP planning. At the time of this report, the USACE was planning budget-informed updates to the IDS to capture changes to the program resulting from the state and federal fiscal year (FY) 2016 and anticipated FY2017 budgets.

The IDS lays out a path to complete construction in the years ahead on projects already authorized and identified three planning efforts to be undertaken in the next reporting period to address some significant areas in the ecosystem that need improvement. The planning for the **Loxahatchee River Watershed Restoration Project** was initiated in 2016 to restore and sustain the overall quantity, quality, timing, and distribution of freshwaters to the federally-designated "National Wild and Scenic" Northwest Fork of the Loxahatchee River for current and future generations. This project also seeks to restore, sustain, and reconnect the area's wetlands and watersheds that form the historic headwaters for the river.

Two additional planning efforts were initiated during the summer of 2016, the Western Everglades Restoration Project and the Lake Okeechobee Watershed Project. The overall purpose of the **Western Everglades Restoration Project** is to improve the quantity, quality, timing, and distribution of water needed to restore and reconnect the western Everglades ecosystem. The preliminary project objectives are to: 1) Restore and improve seasonal hydroperiods and freshwater distribution to support a natural mosaic of wetland and upland habitat in the western Everglades ecosystem; 2) reestablish and improve sheetflow patterns, surface water depths, and durations in the study area to reduce soil subsidence and the frequency of damaging peat fires; and 3) reduce water loss out of the natural system to prevent overdrainage and improve ground and surface water elevations. The **Lake Okeechobee Watershed Project** will focus on the major tributary systems north of Lake Okeechobee that drain the lower portion of the watershed into the lake. The project purpose is to improve the quantity and timing of water entering Lake Okeechobee and the northern estuaries, improve regional water management operational flexibility in context of the overall Everglades ecosystem restoration, and to restore wetland habitat within the project area and Lake Okeechobee.



Integrated Delivery Schedule November 2015.

## Restoration as a Strategy for Addressing New and Emerging Challenges: Climate Change

Understanding the potential impacts of climate change is critical to promoting the long-term sustainability of the Everglades ecosystem. Potential climate change impacts include acceleration of the historic rate of sea level rise and related saltwater intrusion, plus changes in weather and hydrologic patterns. The Everglades ecosystem is particularly sensitive to these kinds of changes because of its exceptionally flat terrain. It has a very strong response to short- and long-term rainfall amounts and changes in seasonal and spatial rainfall patterns due to extremely porous geology, extensive underground aquifers, broad areas of peat soils, and the susceptibility of native plants and animals to changes in temperature, humidity, evapotranspiration, salinity, and precipitation (all aspects of the hydrologic cycle).

While the Everglades ecosystem may be particularly sensitive to climate change, restoration efforts are particularly well-suited to address climate change impacts. A workshop at the 2008 Greater Everglades Ecosystem Restoration conference concluded that it is likely that restoration of the Everglades will be an important aspect of our adaptation response to climate change. The Committee on Independent Scientific

Review of Everglades Restoration Progress (CISRERP) stated in its 2014 report that climate change is a “strong incentive” for accelerating restoration. CISRERP further stated that “Everglades restoration enhances the ability of the ecosystem to withstand and adapt to future changes and increases water availability to the ecosystem and to urban and agricultural users. Improvements in Everglades water depths promote higher rates of peat accretion that could help mitigate the effects of sea-level rise and reduce the impacts of saltwater intrusion on urban water supplies” (CISRERP 2014). The following discussion considers how climate change may affect the Everglades ecosystem and how Everglades restoration efforts can help mitigate climate change impacts.

Determining *exactly* how high sea levels may rise or *exactly* how much temperature and rainfall will change is not necessary to develop a prudent response to climate change. Ranges of impacts have been developed by the Intergovernmental Panel on Climate Change, the USACE, the National Oceanic and Atmospheric Administration (NOAA), the Southwest Florida Regional Planning Council/Charlotte Harbor National Estuary Program, and the Southeast Florida Regional Climate Change Compact (Compact).

### Sea Level Rise

Sea level rise can be expected to impact the Everglades ecosystem in several interlinked ways:

- **Water supply** impacts for the ecosystem, including saltwater intrusion into our underground, freshwater aquifers
- Impacts on the region’s network of gravity flow **drainage** canals, hampering the ability to move excess inland freshwater to the coasts and allowing saltwater to use the canals to move inland
- **Ecological impacts** including degradation of wetlands and coastal habitats

#### Water Supply

Rising seas cause salty ocean water to infiltrate south Florida’s porous limestone, entering our underground, freshwater aquifers. This saltwater intrusion can impact water supply wells, creating a brackish zone unsuitable for consumption. Concerns heighten as the underground freshwater/saltwater interface moves further inland, impacting more wells. Saltwater intrusion can also impact critical freshwater canals in coastal habitats.

Combating saltwater intrusion is included in the SFWMD’s regional water supply planning effort. These regional plans have a 20-year planning horizon and are updated every five years as required by Florida law. According to the SFWMD, “as a part of the 5-year water supply plan updates, numerical modeling should be completed to assess the water resources and the location of the freshwater/saltwater interface” (SFWMD ND).

The CISRERP identified the need to “improve modeling tools that can be used to assess the effects of projected sea-level rise on groundwater supplies and coastal ecosystem functioning, and examine the potential for the CERP to mitigate these effects” (CISRERP 2014). Efforts are underway to improve groundwater modeling, particularly regarding the impacts of sea level rise. The U.S. Geological Survey (USGS) is conducting modeling to analyze the effects of projected sea level rise on groundwater supply in developed areas of Miami-Dade and Broward counties. They are also completing a model that covers the entire southern peninsula and will illustrate the effects of sea level rise on groundwater in natural areas. Continued monitoring is needed in order to map the freshwater/saltwater interface. The USGS is also working with the urban communities on the southeast coast to continue and improve existing groundwater salinity monitoring.

#### Drainage System

The Central and Southern Florida Project (C&SF) flood control system was designed to utilize gravity to flow water from the center of the Everglades to coastal areas. When sea level increases, the ability of the

existing system to move water is compromised. Complicating matters, while sea level rise obviously impacts coastal areas, it also can cause increases to inland groundwater levels or require increases in order to protect freshwater aquifers from further saltwater intrusion. Thus, the secondary and tertiary systems that are operated by drainage districts and local governments and ultimately drain into the C&SF system, may also be impacted. Higher groundwater levels can affect these primarily gravity-based systems, leading to inland flooding.

The SFWMD is assessing its existing flood protection capabilities to identify structures that may be affected by sea level rise. Forward pumps have already been added to some gravity features to enhance the movement of water when downstream levels are too high for gravity flow. Continued monitoring and model development is needed to identify current and future climate impacts on the region's drainage system.

## **Ecological Impacts**

By the end of the 21st century, sea level rise is expected to have a tremendous impact on wetlands in the Everglades. Wetlands provide many important ecosystem goods and services. In addition to supporting fish and wildlife habitat, wetlands protect coastlines, store carbon, provide clean water, modulate hydrologic regimes, and provide recreational opportunities. Coastal stability is important not only for the land-side of the ecosystem, but for nearshore waters as well. Soil erosion and the transport of nutrients can result in turbidity and declining water quality in coastal communities.

The U.S. Fish and Wildlife Service (USFWS), in assessing the ecological implications of sea level rise projections, has found that national wildlife refuges in coastal areas will be increasingly impacted by sea level rise and storm/tidal surge. Climate change is expected to increase harmful algal blooms and disease-causing agents in inland and coastal waters. Tidal marshes and swamps are at risk from sea level rise. Some tidal freshwater forests are retreating, while mangrove forests are expanding inland as saltwater encroaches.

To improve our understanding of the responses of mangrove and marsh ecosystems to sea-level rise, scientists at the USGS Wetland and Aquatic Research Center, the National Park Service, and the SFWMD have been collecting data from a network of surface elevation table and marker horizon stations installed in mangrove and marsh sites in Everglades National Park. These data are being used to quantify rates of shallow subsidence, soil accretion, and net soil elevation change, which is information that can be used to better gauge coastal wetland vulnerability to sea level rise.

The Compact executed by Broward, Miami-Dade, Monroe, and Palm Beach Counties in January 2010 to coordinate mitigation and adaptation activities across county lines, has established a Shoreline Resilience Working Group whose goal is to improve coastal resilience through nature-based erosion control and flood attenuation projects. The group conducted seven case studies that included a range of efforts to restore and enhance dune and mangrove habitats. The group hopes that other efforts to reinforce shorelines will incorporate natural solutions where possible.

## **Drier and Hotter Conditions**

A drier and hotter climate can be expected to impact the Everglades ecosystem in several ways:

- Impacts on **water supply** due to less rain and more evaporation
- Impacts on **native species**, including introduction and spread of invasive exotic species
- Impacts on **native habitats**, including the loss of peat soils due to oxidation and/or muck fires
- Impacts on **coral communities** including coral bleaching which is due, in part, to rising water temperatures

## Water Supply

Lake Okeechobee is a vital source of freshwater for south Florida's built and natural systems. At 730 square miles, it is the largest freshwater lake in the southeastern United States. However, at an average depth of nine feet, it is also one of the nation's most shallow lakes. Drier and hotter conditions would have significant effects on the lake, dramatically dropping the surface elevation of the lake for multiple years (Havens and Steinman 2015).

Increasing storage capacity of freshwater is key to maintaining a healthy environment and adequate water supply for south Florida's 8.1 million residents. The regional water supply plans mentioned in the prior section, along with storage features being pursued through the CERP, will add storage and greater flexibility to the existing water management system, helping to get freshwater where it is needed most.

Florida's legislation governs water use permitting and mandates establishment of Minimum Flows and Levels (MFLs) for specified water bodies and aquifers in Florida. MFLs are focused on the impacts of water consumption, but may need to also assess the impacts of climate change on maintaining water levels at the determined levels to avoid significant harm.

## Native Species

According to recent research, drier conditions resulting from decreased rainfall and increased evapotranspiration have "a negative impact on the foraging response of all wading bird species, particularly the Great Egret and Wood Stork which typically use deep water habitats" (Catano et al. 2014). This same study also found that during drier and hotter conditions, "decreased water depths from evapotranspiration led to drought increases which reduced fish densities throughout the Everglades system, with the largest decreases in WCA-3A and WCA-3B" (Catano et al. 2014).

Terrestrial and freshwater aquatic species that require wet habitats, including rivers, lakes, and wetlands, will be adversely affected by a drier and hotter climate. Efforts to enhance habitat are described in the next section. Changes to native habitats will open the door to invasive exotic species that are better adapted to hotter and drier conditions. As the climate changes, it will be imperative to quickly identify and eradicate invasive exotic species. This ecosystem-wide challenge is already being addressed through many individual agency programs as well as the cooperative efforts of the Everglades Cooperative Invasive Species Management Area (ECISMA) and the *Invasive Exotic Species Strategic Action Framework* developed by Task Force members.

## Native Habitats

Drier and hotter conditions will cause shifts in native habitats, affecting native plant species and oxidizing peat soils. A recent study found that less rainfall and more evapotranspiration "substantially reduced" habitat suitability for many native wildlife, including wading birds and alligators (Catano et al. 2014). The movement of water through the ecosystem is necessary for maintaining the historic ridge and slough landscape and for soil accretion. Regardless of the mechanism (e.g., decomposition of organic matter, sea level rise), increased peat loss will yield loss of land elevation, nutrient release, and more saltwater intrusion.

Prolonged periods of record high temperatures associated with droughts contribute to dry conditions that are driving wildfires. Wildfires can cause drastic changes in species composition, changes in tree density, peat soil and land elevation losses, increased flooding and erosion risks, decreased carbon storage capacity, and nutrient release from burned plants and soils. The effects of climate change weaken the natural protections ecosystems have against these extreme events, making them more vulnerable.

Protection of native habitats can best be promoted by expediting our restoration plans, especially the CEPP, and continuing to gain knowledge of the vulnerabilities of these habitats and best approaches to build their resilience. With recent advances in the Mod Waters and C-111 South Dade projects, we are increasing

freshwater flow through Everglades habitats to coastal habitats and taking steps necessary for CEPP implementation to further protect these habitats. By sustaining ongoing monitoring, research, and modeling, we are gaining understanding of the vulnerability of different habitats, especially with regard to “tipping points” that can destabilize the entire ecosystem (Koch et al. 2015). Accelerating geographically distributed restoration benefits throughout the greater Everglades ecosystem can support the resilience of species under changing climate conditions.

### **Coral Communities**

Increased water temperature is one of the conditions that can stress corals and result in coral bleaching (so called due to the white color of corals after the loss of symbiotic algae in their tissues). Even slight increases in summer temperatures can result in coral bleaching. Bleaching can result in coral mortality, lower rates of calcification, and reduced resistance to disease (Koch et al 2015). Corals in south Florida have been subject to back-to-back elevated temperatures and mass bleaching during both the 2014 and 2015 summer/fall seasons with severe coral mortality levels due to both direct bleaching impacts and the follow on severe disease outbreaks (Manzello 2015).

Declines in some branching corals, major building blocks of coral reefs, cause loss of a reef’s vertical structure and habitat complexity. Genetics research at NOAA’s National Marine Fisheries Service (NMFS) is exploring the potential for adaptive change within these branching corals to save both the species and the reefs dependent upon their building capability. Research is not only looking for signs of advantageous genetic change but also how to help it along.

Ocean acidification is a change in water chemistry attributed to ocean waters taking up carbon dioxide from the atmosphere. The uptake of carbon dioxide alters the carbonate chemistry equilibrium of ocean waters with resultant reductions in pH. This is particularly significant in coral communities as coral calcification is affected by the carbonate chemistry of the surrounding water and is needed for reef formation. Due to their low coral cover (i.e. low constructional potential), Florida reefs are particularly vulnerable to potential shifts to net reef dissolution under ocean acidification (Kuffner and Toth 2016; Wisshak et al 2012). Acidification can also have direct negative effects on coral early life stages and metabolism (Albright et al 2010). Other organisms, including shellfish and some algae, are also affected by ocean acidification that inhibits their calcification processes (Guinotte and Fabry 2008).

Monitoring of coral abundance and condition is underway through the Florida Fish and Wildlife Conservation Commission (FWC) Coral Reef Evaluation and Monitoring Program funded by the U.S. Environmental Protection Agency, Florida Reef Resilience Program Disturbance Response Monitoring program led by the Nature Conservancy and NOAA’s National Coral Reef Monitoring Program. NOAA’s program also funds some local climate-related research and conservation measures.

Planning efforts regarding corals and climate impacts are also underway. Seven local coral species are listed under the US Endangered Species Act. A recovery plan has been developed for two of these that contains climate-related recovery criteria and required recovery actions. NOAA’s NMFS is in the process of developing regional Climate Science Action Strategies under its national Climate Science Strategy and the draft regional plan for the South Atlantic should be out for public comment very shortly.

# TABLE OF CONTENTS

Executive Summary .....	i
Looking Ahead .....	vii
Why Restoration? .....	1
Restoration Framework.....	3
Goal 1: Get the Water Right .....	5
Subgoal 1.A: Get the Water Hydrology Right .....	5
Objective 1.A.1: Provide 1.8 million acre-feet of surface water storage by 2036.....	6
Objective 1.A.2: Develop alternative water storage systems capable of storing 1.7 billion gallons per day by 2030. ....	8
Objective 1.A.3: Modify 361 miles of impediments to flow by 2020.....	9
Subgoal 1.B: Get the Water Quality Right.....	15
Objective 1.B.1: Construct 96,010 acres of stormwater treatment areas by 2035.....	15
Objective 1.B.2: Prepare locally based plans to reduce pollutants as determined necessary by the total maximum daily loads.....	18
Goal 2: Restore, Preserve, & Protect Natural Habitats & Species .....	23
Subgoal 2.A: Restore, Preserve, & Protect Natural Habitats .....	24
Objective 2.A.1: Complete acquisition of 5.7 million acres of land identified for habitat protection by 2020.....	24
Objective 2.A.2: Protect 20 percent of the coral reefs .....	25
Objective 2.A.3: Improve habitat quality for 2.4 million acres of natural areas in south Florida .....	27
Subgoal 2.B: Protect the South Florida Ecosystem from the harmful effects of Invasive Exotic Species....	30
Objective 2.B.1: Prevent the introduction of invasive exotic species.....	31
Objective 2.B.2: Eradicate invasive exotic species by implementing early detection and rapid response (EDRR).....	32
Objective 2.B.3: Contain the spread of invasive exotic species .....	33
Objective 2.B.4: Reduce the populations of widely established invasive exotic species and maintain at lowest feasible levels.....	35
Goal 3: Foster Compatibility of the Built and Natural Systems .....	46
Subgoal 3.A: Use & Manage Land in a Manner Compatible with Ecosystem Restoration .....	47
Objective 3.A.1: 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.....	47
Objective 3.A.2: Increase participation by 350,000 acres in the Agricultural Conservation Easement Program and the Environmental Quality Incentive Program to promote compatibility between agricultural production and South Florida Ecosystem restoration. ....	48
Objective 3.A.3: Increase the use of educational programs and initiatives to further public and local government understanding of the benefits of South Florida Ecosystem restoration. ....	50
Subgoal 3.B: Maintain or Improve Flood Protection in a Manner Compatible with Ecosystem Restoration.....	52

Objective 3.B.1: Maintain or improve existing levels of flood protection for the urban, agricultural, and natural environments. ....	52
Objective 3.B.2: Rehabilitate the Herbert Hoover Dike to provide adequate levels of flood protection to the communities and lands surrounding Lake Okeechobee . ....	53
Subgoal 3.C: Provide Sufficient Water Resources for the Built & Natural Systems .....	55
Objective 3.C.1: Plan for regional water supply needs.....	55
Objective 3.C.2: Increase volumes of reuse on a regional basis.....	56
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 .....	57
Subgoal 3.D: Reduce invasive exotic species pathways originating from the built environment .....	59
Objective 3.D.1: Increase awareness of the impacts of invasive exotic species on south Florida’s environment, economy, culture, and human health.....	59
Objective 3.D.2: Continue existing and develop new partnerships that focus on reducing pathways. ...	60
System-wide Ecological Indicators .....	65
The Task Force .....	81
Acronyms.....	82

## 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. A healthy ecosystem depends upon reversing the unintended consequences of changes to the region's waters and habitats. Historically, water flowed slowly from the Kissimmee River to Florida Bay across the ecosystem's extremely flat landscape forming what became known as the "River of Grass." This natural functioning system began to be altered over a century ago.

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 nearshore saltwater game fishing and coral reef snorkeling off of mainland southeast Florida and the Keys. Fertile soils support the region's agricultural industry. The Seminole Tribe of Florida and the Miccosukee Tribe of Indians of Florida live in the Everglades and their culture and way of life depends on the health of this ecosystem. Yet the waters, natural habitats, and native species of the South Florida Ecosystem are at risk.

### 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) Flood Control 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.

Today, the C&SF project is comprised of over 1,800 miles of canals and levees and 200 water control structures and drains approximately 1.7 billion gallons of water per day into the Atlantic Ocean and Gulf of Mexico.

The C&SF Project was accompanied by other efforts to control water and develop the region. 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 native species were immense and the ecosystem declined. Extensive growth and development as a result of these projects further 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 levels 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 and quantity.

### 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 initiated, 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**

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

The WRDA 1996 also called for a comprehensive approach to restoring the hydrology of south Florida. The result was the Comprehensive Everglades Restoration Plan (CERP), a consensus plan approved by Congress and signed by the President as part of WRDA 2000. The CERP is designed to reverse unintended consequences resulting from the construction and operation of the C&SF Project. With CERP's approval, the US Congress requested adaptive management principles be applied during Everglades restoration and the REstoration COordination and VERification (RECOVER) program was established to support the CERP and help carry out the AM program. RECOVER provides essential support to CERP in meeting its goals and purposes by applying a system-wide and integrative perspective to the planning and implementation of the plan. RECOVER conducts scientific and technical evaluations and assessments for improving CERP's ability to restore, preserve, and protect the South Florida Ecosystem while providing for the region's other water-related needs. RECOVER communicates and coordinates the results of these evaluations and assessments.

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

## **Independent Scientific Review**

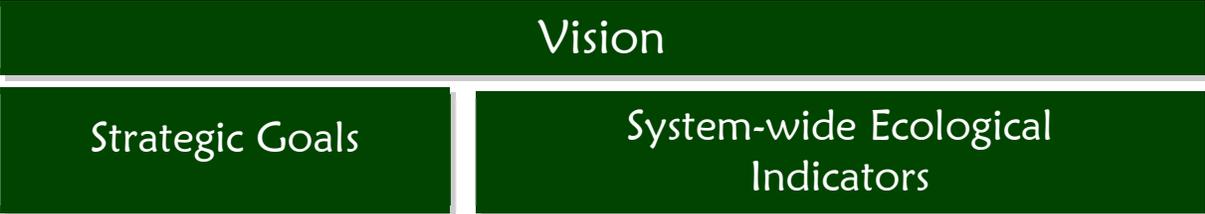
In accordance with WRDA 2000, the National Research Council's Committee on Independent Scientific Review of Everglades Restoration Progress (CISRERP) was convened to conduct biennial reviews of the CERP. CISRERP is composed of a diverse team of internationally recognized experts in ecosystem restoration 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 (2006) and the expeditious implementation of projects that have the most potential for contributing to natural system restoration (2008). The Committee's fifth biennial review was released in June 2014. The Committee's report reaffirmed that significant restoration progress has been made, but also noted that much more needs to be done, including renewing the focus on restoring the flow of water to the central Everglades, better integrating water quality and water quantity components, and increasing the overall pace of restoration. The expedited CEPP planning process and its focus on the central Everglades addresses many of the Committee's recommendations. At the time of this report, CISRERP was authoring the sixth biennial review.

# 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, which requires understanding 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. 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 reports on the progress of the overall 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. The general status of the ecosystem and how the key ecological components respond to implementation of restoration projects (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 provide a framework in which to organize individual restoration projects. Measurable objectives have been established to track project implementation and restoration progress.

The strategic goals, subgoals, and measurable objectives are discussed in detail on pages 5–63. 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.

Additional information on individual projects is compiled by the Integrated Financial Plan (IFP), also published by the Task Force. Project information from the 2016 IFP has been incorporated into the web version of this document, allowing the reader to explore many layers of restoration information.

## System-wide Ecological Indicators

- Invasive Exotic Plants
- Lake Okeechobee Nearshore Zone Submersed Aquatic Vegetation
- Eastern Oysters
- Crocodylians (American Alligators & Crocodiles)
- Fish & Macroinvertebrates
- Periphyton
- Wading Birds (White Ibis & Wood Stork)
- Southern Coastal Systems Phytoplankton Blooms
- Florida Bay Submersed Aquatic Vegetation
- Juvenile Pink Shrimp
- Wading Birds (Roseate Spoonbill)

---

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. The suite of ecological indicators is discussed beginning on page 65.

## GOAL 1: GET THE WATER RIGHT

**W**ater 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.

### Subgoal 1.A: Get the Hydrology Right

**T**he 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.

This subgoal consists of three measurable objectives: surface water storage, alternative water storage, and removing impediments to flow. Progress on the measurable objectives during the reporting period (July 1, 2014–June 30, 2016) is described below. Additional hydrology efforts to help fulfill this subgoal are also described below.

## Objective 1.A.1: Provide 1.8 million acre-feet of surface water storage by 2036.

### Policy/Regulatory Framework

- WRDA 1996, Public Law 104-303
- WRDA 1999, Public Law 106-53
- WRDA 2000, Public Law 106-541
- WRDA 2007, Public Law 110-114
- Water Resources Reform and Development Act (WRRDA) 2014, Public Law 113-121

### Implementation Approach

**Surface water storage impoundments** provide the ability to retain water until it is needed downstream, avoiding adverse unnatural pulses of freshwater to the estuaries and better mimicking flows in the region's core.

**Seepage management projects** will be implemented to maintain flood protection and 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.

### 2014 – 2016 Progress Highlights

**Broward Water Preserve Areas Project:** This CERP project received congressional authorization in the WRRDA of 2014. The Project Partnership Agreement (PPA) is scheduled to be approved by the end of FY 2016. Engineering plans and specifications, and required permits and authorizations for the northern mitigation area and C-11 Impoundment started in FY 2015. The first construction contract is scheduled to begin in November 2016. Once completed, this project will provide 11,650 acre-feet of storage that will reduce seepage losses from Water Conservation Area (WCA) 3 and capture stormwater that would be lost to tide, allowing it to be redistributed for urban and natural system water deliveries.

**C-111 South Dade Project:** Construction is underway on the Northern Detention Area (Contract 8) component of the project. One remaining construction contract for Interior Flowway Berms (Contract 8A) is scheduled to be awarded in 2016. The other remaining construction contract, L-31W Backfill Plugs and L-31W Gap Modification (Contract 9), is scheduled to be awarded next year. When completed, the C-111 South Dade project will provide 9,500 acre-feet of storage that will reduce damaging canal discharges to Barnes Sound, reduce seepage losses from Everglades National Park (ENP), and maintain flood protection for commercial, residential, and agricultural properties east of the project.

**SFWMD South Dade Project:** For several years, ongoing projects in the C-111/South Dade region have sought to provide improved infrastructure to achieve the water resource management goals. While progress toward long-term goals for the C-111 and C-111 Spreader Canal projects have been achieved, the region still struggled with significant shortfalls from desired performance, with observed impacts to flood management in agricultural areas of South Dade during wetter times and severe drought conditions causing an extensive seagrass die off in Florida Bay. In 2015, the South Florida Water Management District (SFWMD) undertook the South Dade Study, an initiative to identify a means of comprehensively operating or further improving the infrastructure in the C-111/South Dade area to reduce flood risks in urban and agricultural areas of Miami-Dade, while providing much-needed water to natural areas including Taylor Slough in ENP and Florida Bay.

The South Dade Study provided an opportunity to gather extensive public input through a series of interactive workshops and to perform robust scientific and engineering examination of the broad range of ideas that were proposed. It also leveraged existing project planning information and discussions held in parallel venues, such as when the Task Force brainstormed strategies to benefit Florida Bay during their November 2015 meeting. Ultimately, a group of proposed modifications to the existing infrastructure was identified and paired with a novel operation strategy to significantly enhance performance of both the

environmental and developed areas in the region. These outcomes were accepted by the Governing Board of the SFWMD, who authorized staff to pursue implementation of the plan components in February 2016 and to expedite the specific project elements that provide Florida Bay / Taylor Slough enhancement in July 2016.

At this time, several operational components of the plan have been implemented and additional project features are in various stages of the permitting process. Early implementation has demonstrated the effectiveness of the South Dade Study's recommendations. In early 2016, record dry season rains resulted in excessively high water levels in WCA 3A. The resulting high-water emergency declaration discharged significant volumes of water into the C-111/South Dade area and provided an opportunity to exercise and test the operations envisioned by the South Dade Study. The results were remarkable and with the modified operations to the system, the SFWMD was able to move unprecedented volumes of water to the natural areas of South Dade with minimal flood risk to developed areas. The observed success of the operations has led to their incorporation into ongoing operational planning efforts in the region including the effort of the US Army Corps of Engineers (USACE) to develop incremental and final operational criteria for the Modified Water Deliveries to Everglades National Park (Mod Waters) and C-111 projects. Leveraging these early successes, continued progress on implementation is expected to be expedited over the next several years, with full benefits of the plan realized in Florida Bay before the start of the 2017 dry season.

**C-111 Spreader Canal Western Project:** Authorized in WRRDA 2014, this CERP project helps keep underground water in ENP, allowing water to reach Florida Bay through Taylor Slough instead of being lost to seepage. Construction was completed by the SFWMD in 2012, adding approximately 1,800 acre feet of additional storage. The 2014 Congressional authorization allows the State of Florida to receive cost share credit for its earlier outlays constructing this project which can be applied to other CERP projects once a PPA is executed.

**Caloosahatchee River (C-43) West Basin Storage Reservoir:** This CERP project received congressional authorization in WRRDA 2014 and a PPA was signed on June 2, 2016. In advance of construction appropriations, the SFWMD initiated construction on the eastern portion of the project. Construction of the 10,500 acre reservoir was initiated in March 2016 and is scheduled to be completed in 2021. When completed, this reservoir will provide 170,000 acre-feet of storage. Preload, demolition, and construction of Cell 1 of the Caloosahatchee River (C-43) West Basin Storage Reservoir began in November 2015 and is expected to be completed in December 2020.

**Central Everglades Planning Project (CEPP):** The CEPP combines several CERP components extending from Lake Okeechobee down to ENP into a comprehensive project that includes water storage, water quality treatment, conveyance, and decompartmentalization (the removal of levees and canals) in the heart of the Everglades. Primary features include water storage, including construction of a Flow Equalization Basin (FEB) in the Everglades Agricultural Area (EAA) that will store an additional 60,000 acre feet of water. The Chief's Report for the CEPP was signed in December 2014 and the Project Implementation Report (PIR) was transmitted to Congress in August 2015. The project is currently awaiting Congressional authorization and appropriation.

**Dispersed Water Management Program:** In December 2014, the Florida Department of Environmental Protection (FDEP) announced a \$3 million grant award for the SFWMD to support its thriving Dispersed Water Management Program. The program, which creates additional water storage on private and public lands, provides another tool to reduce the amount of water flowing into Lake Okeechobee and the Caloosahatchee and St. Lucie estuaries during high-water conditions. The funds will cover service payments and operations and maintenance costs for the program. In 2016, the Florida Legislature provided \$47.8 million dollars for public private partnerships to implement the Northern Everglades and Estuaries Protection Program (NEEPP). It is anticipated that the Northern Everglades Public-Private Partnerships projects will provide regional water quality and quantity benefits to multiple watersheds by storing and retaining excess rainfall and runoff from the regional system.

**Indian River Lagoon-South Project:** Construction on this CERP project began in July 2011 on the C-44 Reservoir and Stormwater Treatment Area (STA) component. The first major construction contract was completed in July 2014 and the remainder of the project is under construction. In 2014, the SFWMD and the USACE executed an amendment to the C-44 Reservoir and STA project to allow the SFWMD to assume responsibility for construction of the STA and pump station components of the project. The SFWMD initiated construction for the C-44 System Discharge structure and canal in September 2014 and completed construction of this feature in November 2015. Construction contracts for the C-44 STA and pump station were initiated by the SFWMD in October 2014 and April 2015, respectively. The USACE issued a Notice to Proceed to the reservoir contractor in October 2015 and construction is expected to be complete in April 2020. The completion of the reservoir in 2020 will be followed by up to two years of operational testing and monitoring to integrate operation of all of the project components. When completed, the 3,400 acre reservoir will store up to 50,600 acre-feet of water. The 6,500 acre STA will hold another 9,900 acre-feet of water.

**Modified Water Deliveries to Everglades National Park, 8.5 Square Mile Area Project:** This project, known as Mod Waters, provides for the rehydration of Northeast Shark River Slough by redirecting discharges from WCA 3A to the east. Much of the project is complete with the completion of the Tamiami Trail 1 mile bridge and road raising. The remaining components focus on the completion of the 8.5 Square Mile Area (SMA) flood mitigation plan and the development of a final comprehensive operational plan. The 8.5 SMA project will provide mitigation for the increased water flow to Northeast Shark River Slough and ENP associated with the Mod Waters project. Construction of the 8.5 SMA seepage collection canal (C-358) has been completed and the contract for construction of the water control culvert structure in the seepage collection canal was awarded in 2015 and is anticipated to be completed in December 2016. These are the last remaining features to complete the Mod Waters project. Operational testing to develop a final operating plan began in October 2015.

**Seminole Tribe Big Cypress Reservation Water Conservation Plan:** This project will rehydrate wetlands, improve water quality, and provide storage on the Seminole Tribe's Big Cypress Reservation. Basin 4 was completed in January 2013 and transferred to the Seminole Tribe of Florida in July 2013. The wetland resource area provides approximately 120 acre-feet of storage and the irrigation cell provides approximately 230 acre-feet of storage. Basin 2 construction is currently underway and will provide approximately 990 acre-feet of storage once complete. The official transfer of Basin 2 is anticipated in the summer of 2016.

**Site 1 Impoundment Project:** Phase 1 of this CERP project will reduce seepage loss from the Arthur R. Marshall Loxahatchee National Wildlife Refuge (LNWR). The project includes rehabilitation and improvements to the levee bordering the refuge. Construction of Phase 1 was substantially completed in January 2016 and is currently in the operational testing and monitoring phase.

## Objective 1.A.2: Develop alternative water storage systems capable of storing 1.7 billion gallons per day by 2030.

### Policy/Regulatory Framework

- WRDA 1996, Public Law 104-303
- WRDA 1999, Public Law 106-53
- WRDA 2000, Public Law 106-541
- WRDA 2007, Public Law 110-114
- WRRDA 2014, Public Law 113-121

## Implementation Approach

**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 technical uncertainties identified with the ASR technology at this scale, pilot projects were constructed and tested as a component of a regional evaluation to determine the viability of ASR to the extent needed to fulfill this objective. Many of the uncertainties were resolved in the ASR Regional Study published in 2015.

### 2014-2016 Progress Highlights

**ASR Pilot Projects/Regional Study:** Two pilot project facilities within this objective were constructed in 2009. Testing was conducted on the Hillsboro ASR facility through 2012 and on the Kissimmee River ASR facility through 2013. Modeling of the envisioned CERP ASR (333 wells) operations strategy was completed in 2013. The results of the pilot projects were summarized in a Technical Data Report in late 2014 and subsequently peer reviewed by the National Research Council of the National Academy of Sciences in 2015. The study recommends that projects in the planning phase consider incorporating ASR as an aspect of planning alternatives in conjunction with reservoirs. Furthermore, future ASR systems will be implemented in a phased approach in conjunction with iterations of groundwater and ecological model assessments.

The Kissimmee River and Hillsboro Canal ASR wells are still in service under FDEP-issued Underground Injection Control Program and National Pollutant Discharge Elimination System permits. In March 2016, the SFWMD applied for permits to implement larger operational testing cycles for both the Kissimmee River ASR and the Hillsboro ASR and began rehabilitation of those facilities for future operations.

## **Objective 1.A.3: Modify 361 miles of impediments to flow by 2020.**

### Policy/Regulatory Framework

- WRDA 1996, Public Law 104-303
- WRDA 1999, Public Law 106-53
- WRDA 2000, Public Law 106-541
- WRDA 2007, Public Law 110-114
- WRRDA 2014, Public Law 113-121

## Implementation Approach

Canals, internal levees, and other impediments will be removed or modified to reestablish the natural sheetflow of water through the system. Operational changes in water delivery management schedules will also be made to alleviate extreme fluctuations and better match natural hydrological patterns while maintaining urban and agricultural water supply and flood control.

### 2014-2016 Progress Highlights

**C-111 Spreader Canal Western Project:** This CERP project will reduce seepage losses from ENP and provide increased flows to Florida Bay through Taylor Slough. Authorized in WRRDA 2014, construction of the major features of the C-111 Spreader Canal Western Project was completed in advance by the SFWMD and is already showing positive environmental benefits in the Taylor Slough area.

**Decomp Physical Model:** This CERP project is a design effort that provides for the temporary installation and testing of water management features to address scientific, water flow, and water management uncertainties prior to the decompartmentalization of WCA-3. The Decomp Physical Model has completed three full seasons of operation and data collection from November 2013 through January 2016. Results of the testing are currently being evaluated.

**Kissimmee River Restoration:** This restoration project seeks to return the river to a more natural flow after having been channelized in the 1960s. To date, more natural floodplain flow has been reestablished for 24 of 40 miles of the historic meandering Kissimmee River by backfilling the canal and restoring historic oxbows. During the reporting period, work began on three canal backfilling contracts: Reach 3 Backfill, Reach 2 Backfill, and MacArthur Ditch Backfill. The S-65EX1 structure was completed and will help maintain the existing level of flood protection after the project is complete.

**Miami Dade Limestone Products Association Seepage Wall:** In 2012, the Miami-Dade Limestone Products Association completed construction of a 2-mile long, 35-foot deep cement-bentonite wall along the L-31N canal, immediately south of Tamiami Trail. The project cost approximately \$7.8 million and was implemented as part of the required mitigation to offset the potential increase in groundwater flow resulting from limestone excavations adjacent to ENP. Based upon two years of monitoring data indicating the seepage barrier was performing as expected, the inter-agency Lake Belt Mitigation Committee approved funding for construction of an additional three miles of seepage barrier. The Miami-Dade Limestone Products Association constructed the 3-mile segment at an approximate cost of \$10.05 million and completed the project in April 2016. Funding for the seepage wall construction came from fees collected by the State of Florida on limestone products sold from the Lake Belt to implement mitigation measures to offset the impacts of permitted mining activities.

**Modified Water Deliveries to Everglades National Park and Tamiami Trail Next Steps:** The Mod Waters project, including a one-mile bridge and associated Tamiami Trail modifications, sets the stage for future CERP components and operating plans that have the potential to improve the quantity, quality, timing, and distribution of water deliveries to ENP, thereby supporting the recovery of wading bird populations, restoration of naturally occurring ridge and slough formation, restoration of fish and wildlife resources, and overall improvement of 63,000 acres of wetlands.

Built in the 1920s, U.S. Highway 41, known as “Tamiami Trail,” functions as a dam between the central Everglades and the park. Replacing sections of this roadway is one of the most important restoration features in the Everglades. The National Park Service (NPS) and the USACE completed construction on the first mile of bridging on Tamiami Trail in 2013. This one-mile bridge and road raising effort, when combined with higher L-29 canal stages, increases flows to the eastern portions of ENP by 92%. The one-mile bridge proved invaluable during the historic El Niño winter of 2016, when record rainfall fell across the central Everglades. The bridge and road raising provided water managers unprecedented flexibility to manage that event adaptively.

The NPS, the Florida Department of Transportation (FDOT), and the Federal Highway Administration advanced the next phase of bridging of Tamiami Trail to restore flow through the Central Everglades and ENP. Two additional bridges totaling approximately 2.6 miles (Tamiami Trail Next Steps, Phase 1) will allow even more flow from north to south and will distribute that flow across a wider area to hydrate important deeper water habitats in ENP. All of the bridges on Tamiami Trail will ultimately work in tandem with elements of CERP and State restoration features to increase flow from Lake Okeechobee through the central Everglades to Florida Bay. The 2.6 miles of bridge construction contract was awarded in May 2016 and construction will begin in the fall of 2016.

During the reporting period the USACE began field tests that deliver more water under the one-mile bridge to Northeast Shark Slough. Data from the ongoing field tests will be used to develop a combined operating plan for the Mod Waters and C-111 South Dade projects. Once the combined operating plan is completed, the new infrastructure will be able to be fully utilized to fulfill the ecological restoration objectives of these projects.

In addition, with the passage of the Consolidated Appropriations Act in 2012, Congress appropriated \$25 million for acquisition of five commercial properties along Tamiami Trail authorized for acquisition by the 1989 ENP Protection and Expansion Act. The NPS has acquired two of these sites and is negotiating the acquisition of the remaining real estate needed for the completion of the Mod Waters project and implementation of the first phase of the Tamiami Trail Next Steps project. Current estimates indicate that this will be completed in the fall of 2016.

**Picayune Strand Restoration:** This CERP project will restore over 55,000 acres by removing barriers (48 miles of canals and 260 miles of roadways) to the natural flow of water in the region. Three large pump stations are required to reroute the water and maintain flood protection to development north of the project area. The first (Merritt) was completed in 2014, the second (Faka Union) was completed in January 2016, and the last (Miller) is underway and expected to be complete in 2017. Associated canal plugging, roadway removal, and flood mitigation efforts are also ongoing.

**Southern Corkscrew Regional Ecosystem Watershed (CREW):** Construction of the Southern CREW project was initiated in February 2016. The SFWMD has led this restoration effort with its partners, including the U.S. Department of the Interior (USDOJ), in order to restore historic sheetflow within the watershed. Prior efforts included land acquisition (~4,000 acres), road removal, plugging of agricultural ditches, and invasive exotic vegetation removal. Current efforts include degrading 10 additional miles of roadways, plugging or filling ditches and canals, removing spoil mounds, and degrading berms within the project area. Completion is anticipated in 2017.

**Western Everglades:** The Seminole Tribe of Florida, at the December 2012 Task Force meeting, raised concerns with the hydrology in the western basins and flagged the lack of monitoring, modeling, planning, and project implementation in this region for many years. The Task Force directed the Office of Everglades Restoration Initiatives to convene a team of Task Force member agencies to discuss these concerns. The kick-off meeting for the Big Cypress Seminole Indian Reservation Natural Areas and adjacent portions of the Big Cypress was held in January 2013. To date this team has identified immediate, short-term, and long-term actions and will continue to work together through the implementation of these actions. The USACE and SFWMD have prioritized the next phase of planning efforts for CERP to include the Western Everglades Restoration Project which will focus on restoring the quantity, quality, timing, and distribution of water in the Feeder Canal basins and Western Everglades.

**Table 1: Subgoal 1.A: Get the Hydrology Right  
Comprehensive Status July 1, 2014–June 30, 2016**

Objective	Projects	Status
<p><b>Surface Water Storage Reservoirs</b></p> <p><b>Objective 1.A.1: Provide 1.8 million acre-feet of surface water storage by 2036.</b></p>	<p>C&amp;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]</p>	<p><b>Construction:</b> C-44 reservoir design was completed in 2014 and construction contract was awarded in September 2015.</p> <p><b>Authorization:</b> WRDA 2007; 2010 PPA for all reservoirs and STAs, 2014 PPA Amendment delineating construction responsibilities.</p> <p><b>Construction:</b> Started in 2011, scheduled completion for IRL-S C-44 Reservoir/STA is 2020.</p>
	<p>C&amp;SF: CERP Everglades Agricultural Area Storage Reservoir [Project ID 1102 ]</p>	<p><b>Planning:</b> A 60,000 acre-foot increment of storage is included as a Flow Equalization Basin in the CEPP recommended plan.</p> <p><b>Authorization:</b> CEPP’s Report of Chief of Engineers submitted to Congress for authorization in August 2015.</p>
	<p>C&amp;SF: CERP Central Everglades Planning Project [Project ID 1103]</p>	<p><b>Planning:</b> The Project Implementation Report (PIR) was finalized July 2014. The Chief’s Report was signed in December 2014. Record of Decision signed and PIR transmitted to Congress in August 2015. The project is currently awaiting Congressional authorization and appropriation.</p>
	<p>C&amp;SF: CERP Lake Okeechobee Watershed [Project ID 1104]</p>	<p><b>Planning:</b> Planning was initiated on July 25, 2016.</p>
	<p>C&amp;SF: CERP Site 1 Impoundment [Project ID 1107]</p>	<p><b>Planning:</b> Site 1 Impoundment Project PIR completed; Site 1 Impoundment Chief’s Report completed.</p> <p><b>Authorization:</b> WRDA 2007.</p> <p><b>Construction:</b> Construction of the L-40 Levee modifications and 6-acre wildlife wetland area was completed in 2016. Phase 1 substantially complete in January 2016, project transfer targeted September 2016.</p>
	<p>C&amp;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]</p>	<p><b>Planning:</b> Caloosahatchee River (C-43) West Basin Storage Reservoir PIR completed. Southwest Florida Comprehensive Watershed study was completed in 2016. Chief’s Report for C-43 completed.</p> <p><b>Authorization:</b> WRRDA 2014 authorized the C-43 West Basin Storage Reservoir.</p> <p><b>Construction:</b> Preloading and demolitions began in November 2015; 195 cfs pump station (water supply to adjacent landowners) began in July 2016.</p>
	<p>Everglades and South Florida (E&amp;SF): Critical Projects–Ten Mile Creek [Project ID 1111]</p>	<p><b>Planning:</b> Completed.</p> <p><b>Construction:</b> Physically completed.</p> <p><b>Implementation:</b> De-authorized and transferred to SFWMD for modified operations.</p>
	<p>C&amp;SF: Loxahatchee River Watershed Restoration Project (formerly North Palm Beach County–Part 1) [ID 1115]</p>	<p><b>Planning:</b> Project planning was reinitiated in January 2016. Final PIR is expected to be complete in November 2018.</p> <p><b>Construction:</b> Completed on two features (G-160 and G-161) through the SFWMD expedited program.</p>

**Table 1: Subgoal 1.A: Get the Hydrology Right  
Comprehensive Status July 1, 2014–June 30, 2016**

Objective	Projects	Status
<p><b>Surface Water Storage Reservoirs, Continued</b></p> <p><b>Objective 1.A.1: Provide 1.8 million acre-feet of surface water storage by 2036.</b></p>	C&SF: CERP Broward County Water Preserve Areas [Project ID 1116]	<p><b>Planning:</b> Chief's Report signed May 2012. Record of Decision was executed in October 2012.</p> <p><b>Authorization:</b> WRRDA 2014. Work on a PPA and ancillary documents started in FY2015.</p> <p><b>Design:</b> Work on required permits, authorizations, and plans &amp; specifications for the C-11 component started in FY2015.</p>
	<p><b>Alternative Water Storage</b></p> <p><b>Objective 1.A.2: Develop alternative water storage systems capable of storing 1.7 billion gallons per day by 2030.</b></p>	<p>C&amp;SF: CERP ASR Regional Study [Project ID 1203]</p> <p>Seminole Tribe Brighton Reservation Aquifer Storage and Recovery (ASR) Pilot Project [Project ID 1206]</p> <p>Taylor Creek Aquifer Storage and Recovery (ASR) Project [Project ID 1207]</p> <p>Fisheating Creek Feasibility Study [Project ID 1208]</p>
<p><b>Modifying Impediments to Flow</b></p> <p><b>Objective 1.A.3: Modify 361 miles of impediments to flow by 2020.</b></p>	C&SF: C-111 (South Dade) [Project ID 1300]	<p><b>Planning:</b> Completed.</p> <p><b>Construction:</b> Completed several features. The Project Cooperation Agreement amendment between the USACE and SFWMD for future construction was executed in August 2014. The North Detention Area (Contract #8) was awarded October 2015 and is currently under construction. Internal flowway berms (Contract #8A) are scheduled to be awarded in September 2016 with L-31W canal earthen plugs (Contract 9) scheduled to be awarded in 2017.</p>
	C&SF: CERP WCA-3 Decentralization and Sheetflow Enhancement [Project ID 1301]	<p><b>Planning:</b> Backfilling of the upper 15 miles of the Miami Canal is included in the Central Everglades Planning Project recommended plan.</p> <p><b>Authorization:</b> Components of this project were submitted to Congress for authorization in August 2015 as part of the Chief's Report for the CEPP.</p> <p><b>Construction:</b> Physical Model contract awarded May 2012. Three years of operation were successfully completed through January 2016.</p>
	E&SF: Critical Projects - Southern CREW [Project ID 1303]	<p><b>Land Acquisition:</b> Completed.</p> <p><b>Planning:</b> Planning, design, and permitting completed.</p> <p><b>Construction:</b> Initiated in February 2016.</p>

**Table 1: Subgoal 1.A: Get the Hydrology Right  
Comprehensive Status July 1, 2014–June 30, 2016**

Objective	Projects	Status
<p><b><u>Modifying Impediments to Flow, Continued</u></b>  <b>Objective 1.A.3: Modify 361 miles of impediments to flow by 2020.</b></p>	<p>Kissimmee River Restoration [Project ID 1306]</p>	<p><b>Planning:</b> Completed.  <b>Construction:</b> Underway; completed for 14 of 22 miles of canal backfilling (24 of 40 miles of restored river channel). Construction is scheduled for completion in 2020 with a five year post-construction evaluation phase. The River Acres flood mitigation features were constructed to maintain the existing level of service in Pool D of the Kissimmee River. Structure 65EX1 construction was completed and is designed to pass high flows after the river restoration is complete. MacArthur Ditch Backfill, Reach 2, and Reach 3 Backfill are underway.</p>
	<p>Modified Water Deliveries to Everglades National Park [Project ID 1307]</p>	<p><b>Planning:</b> Completed.  <b>Construction:</b> Underway. Tamiami Trail Modification completed in 2013; 8.5 Square Mile Area component structural modification is scheduled for completion FY2016; planning for operational field testing underway in FY2014-2015. Increment 1 field test initiated in October 2015. Real estate acquisition to be completed in 2016.</p>
	<p>Tamiami Trail Modifications: Next Steps [Project ID 1309]</p>	<p><b>Planning:</b> Completed.  <b>Construction:</b> Bid received for first 2.6 miles of bridging on April 15, 2016. Contract was executed on May 23, 2016. The adjusted total project cost for first 2.6 miles of bridging is approximately \$97 million FDOT is responsible for 50% of the project cost. NPS will be responsible for 50% of the project cost, which includes the awarded Federal TIGER grant of \$20 million. The construction is scheduled to begin in Fall 2016 with completion in 2020.</p>
	<p>C&amp;SF: CERP C-111 Spreader Canal [Project ID 2310]</p>	<p><b>Planning:</b> PIR and Chief's Report completed.  <b>Authorization:</b> WRRDA 2014.  <b>Construction:</b> SFWMD completed construction of the recommended plan, with the exception of structure 198 under its expedited construction program in 2012. The Operational Testing and Monitoring Period was completed in 2013.  <b>Operation:</b> The SFWMD operates the project as intended to provide water to and maintain water in Taylor Slough. A Project Partnership Agreement between USACE and SFWMD is scheduled for 2018.</p>

## SUBGOAL 1.B: GET THE WATER QUALITY RIGHT

**R**unoff from agriculture and stormwater from urban areas has impacted 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 problem. The Caloosahatchee and St. Lucie rivers and estuaries, Biscayne Bay, Florida Bay, the Florida Keys, and nearshore coastal waters periodically show signs of impacts from nutrients, too little or too much fresh water, and agricultural or industrial pollutants such as copper and pesticides. Although nitrogen is of particular concern for marine systems, increased total phosphorus concentrations continue to trigger algal bloom concerns in some estuaries, particularly Biscayne Bay and northeast Florida Bay. Mercury, resulting from atmospheric deposition, continues to be a concern in both freshwater and marine systems in south Florida. Potentially toxic contaminants, such as trace metals, pesticides, and other synthetic organic chemicals are found in certain soils and sediments. This is of specific concern when former agricultural sites are used to construct water treatment and storage facilities.

The majority of the state and federal strategies in south Florida focus on water quality and quantity, with an emphasis on nutrient reduction. Therefore it is generally recognized that achieving all of the water quality goals for ecosystem restoration in all use-impaired water bodies may depend on actions outside the scope of those described in this document.

The State's Long-Term Plan for Achieving Water Quality Goals for Everglades Protection Area Tributary Basins (Long-Term Plan) focuses on strong science-based and adaptive implementation philosophy to allow continuous improvement until the long-term water quality goal for the Everglades Protection Area is achieved. Improvement of water quality is a required element of both federal and state legislation for restoring the Everglades ecosystem. There are also specific mandates in state law for water quality improvements in Lake Okeechobee and the Caloosahatchee and St. Lucie estuaries, in addition to the Everglades systems south of Lake Okeechobee.

The strategy for this subgoal consists of two measurable objectives: 1) STAs and 2) Water Management Plans. Progress on the measurable objectives during the reporting period (July 1, 2014–June 30, 2016) is described below and further delineated in Table 2. Additional water quality efforts that will help fulfill this subgoal are also described below.

### Objective 1.B.1: Construct 96,010 acres of stormwater treatment areas by 2035.

#### Policy/Regulatory Framework

- In 1988, the federal government filed a complaint in federal court against the FDEP and SFWMD for alleged violations of state water quality. The lawsuit was settled in 1991, with parties entering into a Consent Decree in 1992.
- The Florida Legislature passed the Everglades Forever Act in 1994 which required the construction of STAs to meet the water quality standard for phosphorus described above. To date, 57,000 acres of STAs have been constructed.
- The 1999 Comprehensive Review Study proposed the construction of 35,600 acres of manmade wetlands to treat urban and agricultural runoff before it is released into the Everglades.
- In 2005, the US Environmental Protection Agency (USEPA) approved the State of Florida's phosphorus rule for the Everglades Protection Area that established a stringent phosphorus water quality standard of 10 parts per billion (ppb).
- NEEPP: In 2007, the Florida Legislature expanded the existing Lake Okeechobee Protection Act (LOPA) to include the Caloosahatchee and the St. Lucie rivers and estuaries. The primary goal of the legislation is to restore and to protect the state's surface-water resources by addressing the quality, quantity, timing, and distribution of water to the natural system.

- In 2012, the State of Florida developed the Restoration Strategies Regional Water Quality Plan, which is the next phase of the Long-Term Plan required by the Everglades Forever Act pursuant to 373.4592, Florida Statutes (F.S.)
- Chapter 2013-59, Laws of Florida (CS/HB 7065), Everglades Improvement and Management, ratified the SFWMD's Restoration Strategies Plan and dedicated recurring funding through the Save Our Everglades Trust Funds.

### **Implementation Approach**

STAs are man-made treatment wetlands designed primarily to remove nutrients from stormwater runoff from urban and agricultural areas before the runoff reaches the natural system. Nutrient removal relies on uptake by vegetation and periphyton communities and other biogeochemical processes with permanent phosphorus removal occurring through the accumulation of partially decomposed organic sediments. The vegetation in the STAs consists of emergent aquatic vegetation in the upper reaches of the STAs and submerged aquatic vegetation (SAV) in the lower reaches. Projects currently underway are detailed in Table 2. Further information can be found here: [www.sfwmd.gov/sta](http://www.sfwmd.gov/sta).

### **2014-2016 Progress Highlights**

**C-43 Water Quality Treatment and Testing Facility:** This project was initiated by a Memorandum of Agreement between Lee County and the SFWMD in 2007. It is intended to improve water quality in the Caloosahatchee Basin. Construction of Phase I demonstrations for the C-43 Water Quality Treatment and Testing Project began in March 2016. Mesocosm installation was initiated at the Boma site.

**Everglades STAs:** Approximately 68,000 acres of land south of Lake Okeechobee have been converted to STAs, yielding 57,000 acres of effective treatment wetlands. More than 1.4 million acre-feet of runoff water was treated by the Everglades STAs in Water Year 2015. Everglades STAs achieved a total phosphorus load reduction of 83 percent in Water Year 2015, reducing inflow flow-weighted mean total phosphorus concentrations from 99 to 17 parts per billion.

**Hybrid Wetland Treatment Technology (HWTT):** The HWTT combines attributes of treatment wetlands and chemical treatment systems. There are currently eight operational HWTT systems: five in the Lake Okeechobee Watershed (Nubbin Slough, Mosquito Creek, Lemkin Creek, Grassy Island, and Wolff Ditch); and three in the St. Lucie River Watershed (Ideal 2 Grove, Bessey Creek, and Danforth Creek). These systems remove between 75% and 90% of total phosphorus and 50% of the total nitrogen.

**Floating Aquatic Vegetation Technology (FAVT):** FAVT systems are operated with an initial growing season during which the FAVT assimilate nutrients and grow to a high density. The FAVT is then drained during the dry season, thereby stranding the FAVT on the soil. After a natural drying process, the plant material is tilled into the soil, stored in deeper zones, and used to repopulate the wetland for the subsequent growth period. The technology uses the direct assimilation of nutrients from the water column through the use of floating plant roots (as compared to plants rooted in the soil), and all of the biomass is rapidly incorporated directly into the soil through tilling. The FAVT process may result in a reduction of up to 80 percent of land needed for treatment as compared to traditional wetland treatment systems. The East Caloosahatchee FAVT site is 540 acres and has a capacity of 90 cubic feet per second (cfs). It is designed to treat local agricultural runoff from the Hendry Hilliard Water Control District, the East Caloosahatchee River, and Lake Okeechobee. The East Caloosahatchee FAVT facility removes approximately 90% of the inflow total phosphorus load on an annual basis.

**Restoration Strategies:** The plan represents the culmination of consensus reached by the State of Florida and the USEPA on new strategies for improving water quality in America's Everglades. Under this program, the SFWMD will create more than 6,500 acres of new STAs and 116,000 acre-feet of additional water storage through construction of FEBs. FEBs provide a more steady flow of water to the STAs, helping to maintain desired water levels needed to achieve optimal water quality treatment performance. These facilities will work in conjunction with the existing Everglades STAs to achieve compliance with the State of Florida water quality standards. Restoration Strategies Plan projects are estimated to cost \$880 million and will be completed by December 2025.

The SFWMD completed the acquisition of land needed to construct STA-1W Expansion No. 1 in April 2014. STA-1W Expansion No. 1 is adjacent to and directly west of the existing STA-1W and will work in concert with STA-1W, STA-1E, and the L-8 FEB to reduce total phosphorus concentrations in discharges to the Everglades. Construction of the 4,300-acre STA-1W Expansion No. 1 began in November 2015 and is anticipated to be complete by December 2018. Coordination between the SFWMD and the federal government to acquire land for STA-1W Expansion No. 2 is ongoing.

In November 2015, construction of the 60,000-acre-foot A-1 FEB was completed. The A-1 FEB has been successfully operating in 2016 and is improving the water quality performance of the downstream STA-3/4 and STA-2. Construction of the 45,000-acre-foot L-8 FEB is underway and is expected to be complete by December 2016. Operation of the L-8 FEB will improve the water quality performance of STA-1 West and STA-1 East, protecting the LNWR from harmful phosphorus.

The construction of several other water control structures and conveyance improvement projects is ongoing to improve STA/FEB-related operational flexibility. Nine Science Plan studies to better understand the sustainability of STA performance at low phosphorus are also ongoing.

**Lake Okeechobee Water Retention and Phosphorus Removal Project/Taylor Creek and Nubbin Slough:** This completed project consists of two STAs and associated water management features that capture and treat inflows and subsequently discharge cleaner water back into Taylor Creek, Nubbin Slough, and Lake Okeechobee. During the reporting period, Nubbin Slough STA repairs were completed in 2014 and the STA was transferred to the SFWMD in February 2015.

**Lakeside Ranch STA:** This STA will help improve water quality flowing into Lake Okeechobee. Phase I of this 2,700-acre STA in the Taylor Creek/Nubbin Slough basin was constructed by the SFWMD and is currently operating. The construction contract for Phase II was awarded in November 2015 and the project is expected to be completed in 2018.

## Objective 1.B.2: Prepare locally based plans to reduce pollutants as determined necessary by the total maximum daily loads.

A combination of planning efforts is underway by the State of Florida and other entities to improve water quality in the Everglades ecosystem.

### Basin Management Action Plans (BMAPs)/Total Maximum Daily Loads (TMDLs)

#### Policy/Regulatory Framework

- 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 TMDLs for these waters on a prioritized schedule.
- The State of Florida has its own TMDL legislation; the Florida Watershed Restoration Act (F.S. 403.067) details the FDEP's role in implementing its TMDL program. BMAPs are one of the main mechanisms to implement the State of Florida's TMDLs.

#### Implementation Approach

Implementation of TMDLs will involve a combination of regulatory, non-regulatory, and incentive-based actions to attain the necessary reduction in pollutant loading. BMAPs are one of the main mechanisms to implement pollution load reduction in the State of Florida. A BMAP is the "blueprint" for restoring impaired waters by reducing pollutant loadings to meet the allowable loadings established in a TMDL. It represents a comprehensive set of strategies including permit limits on wastewater facilities, urban and agricultural best management practices, conservation programs, financial assistance, and revenue generating activities. BMAPS are designed to implement the pollutant reductions established by the TMDL. These broad-based plans are developed with local stakeholders as they rely on local input and local commitment and they are adopted by Secretarial Order to be enforceable.

In south Florida, water quality restoration and protection strategies have been incorporated into regional and comprehensive restoration programs designed to address water quality, hydrology, and natural habitats. In many cases, these programs are designed to incorporate or complement BMAPs designed to address local and regional water quality issues. In some cases, regional restoration plans can serve in lieu of a BMAP, as Florida law allows the FDEP to adopt Reasonable Assurance Plans (4b) or Pollutant reduction plans (4e) for impaired waters that have control programs in place that will assure that water quality standards will be restored.

#### 2014-2016 Progress Highlights

**TMDLs/BMAPs:** In December 2014, the Lake Okeechobee BMAP was adopted. The BMAP was developed as part of FDEP's TMDL Program and initially includes projects in the six sub-watersheds north of Lake Okeechobee that will achieve a total phosphorus (TP) reduction of approximately 145.8 to 148.1 metric tons per year. The Lake Okeechobee BMAP will eventually have water quality improvement activities within every basin discharging to the Lake.

Estimated TP and total nitrogen (TN) load reductions to date from projects in the St. Lucie River and Estuary BMAP exceed the reductions required in the first phase of the three-phase BMAP implementation. Compliance for all three phases of reductions are scheduled for 2028.

According to the FDEP 2015 annual report, the total reductions to date are 196,181 pounds per year of TN, or 50% of the reductions needed to meet the portion of the TMDL allocated to the Caloosahatchee Estuary Basin. Modeling is underway to update the Caloosahatchee TMDL including Tidal, West, and East Basins.

## **Best Management Practices Policy/Regulatory Framework**

- The Everglades Forever Act (Section 373.4592, F.S.) established source control requirements for the drainage basins in the Southern Everglades with primary responsibility assigned to the SFWMD as described under Chapter 40E-63, Florida Administrative Code (F.A.C.)
- The NEEPP (Section 373.4595, F.S.) established coordinated source control requirements for the Lake Okeechobee, Caloosahatchee River and Estuary, and St. Lucie River and Estuary watersheds.

## **Implementation Approach**

Best Management Practices (BMPs) are onsite source control activities that include structural and operational management practices targeting water quality in stormwater runoff on agricultural and non-agricultural lands with the goal to improve or maintain the health of downstream receiving water bodies and natural resources. Pollutant source control programs including BMPs are an integral component of Southern and Northern Everglades restoration and protection programs. The success of the source control strategies is dependent upon agency coordination and the comprehensive and consistent approach among watersheds, effective in-field verification, a robust water quality monitoring network for measuring progress, and an adaptive management process for factoring in the lessons learned and the unique needs and characteristics of each region.

## **2014-2016 Progress Highlights**

The SFWMD's regulatory BMP program in the EAA Basin under Chapter 40E-63, F.A.C., is an example of how source controls can play a major role in the overall success of long term restoration strategies. For over 20 years, the SFWMD's regulatory program has exceeded expectations with a 79 percent reduction in phosphorus loads in 2015 compared to the pre-BMP historic period. Results have been consistently above the 25 percent load reduction mandated by Florida Statute. The results of the SFWMD BMP program and the water quality treatment by the STAs together have prevented approximately 4,860 metric tons of phosphorus from entering the Everglades.

## **Northern Everglades Initiative Policy/Regulatory Framework**

- NEEPP (373.4594, F.S.) requires Watershed Protection Plans for all three of the Northern Everglades watersheds.
- NEEPP Amendments effective July 1, 2016 (Chapter 2016-1, Laws of Florida)
- LOPA (Section 373.4595, F.S.) requires protection and restoration of the Lake Okeechobee Watershed and the Caloosahatchee and St. Lucie River watersheds and their estuaries.

## **Implementation Approach**

The NEEPP include source controls (e.g., BMPs) and several sub-regional and regional technologies (e.g., STAs) to improve the quality of water within each watershed and of that delivered to Lake Okeechobee and the Northern Estuaries. Several measures are also included to improve both water levels within the Lake and the quantity and timing of discharges from Lake Okeechobee to the Northern Estuaries to achieve more desirable salinity ranges. These measures include reservoirs, dispersed water management projects, aquifer storage and recovery, and deep well injection. The St. Lucie and Caloosahatchee river watershed protection plans identify major influences that negatively affect the estuaries' ecological health (primarily water quality, timing, distribution, and quantity) and propose strategies to minimize those stressors.

### **2014-2016 Progress Highlights**

The BMAPs for the Caloosahatchee Estuary Basin, St. Lucie River and Estuary Basin, and Lake Okeechobee were adopted in 2012, 2013, and 2014, respectively. Along with the BMAPs, the Watershed Protection Plans were developed in accordance with NEEPP mandated timelines and were last updated in 2014 (Lake Okeechobee) and 2015 (Caloosahatchee and St. Lucie rivers). With the recent passage of the 2016 legislation, future updates to the Watershed Protection Plans will be done in accordance with the amended NEEPP to ensure that they are consistent with the adopted BMAPs for Lake Okeechobee and the St. Lucie and Caloosahatchee river watersheds, respectively.

### **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 protect the tribal Everglades under their jurisdiction on the Federal Reservation.

### **2014-2016 Progress Highlights**

The Seminole Tribe of Florida is working to develop numeric nutrient criteria and plans on submitting it to the USEPA for approval in 2017. The USACE and SFWMD have prioritized the next phase of planning efforts for CERP to include the Western Everglades Restoration Project which will focus on restoring the quantity, quality, timing, and distribution of water in the Feeder Canal basin and the Western Everglades.

### **L-28 Canal System: Range of Options for Improving Water Quality**

In response to the Miccosukee Tribe's concerns about phosphorus impacts to the Reservation, in December of 2015, the Interior, Environment, and Related Agencies House Appropriations Sub-Committee directed the NPS in the Consolidated Appropriations Act of 2016 to work with the Miccosukee Tribe of Indians of Florida and relevant federal agencies to develop a range of options to address the water quality issues of the L-28 canal system. The NPS has prepared a draft report and will report back to the committee.

### **Nutrient Criteria for Surface Waters**

Since late 2011, the State of Florida has made significant progress toward establishing numeric nutrient criteria (NNC) for freshwater bodies and coastal waters.

### **2014-2016 Progress Highlights**

Today, the FDEP with the approval of the USEPA has promulgated NNC for most of Florida's freshwater streams, lakes, and springs, and narrative nutrient criteria for wetlands (except for the Everglades Protection Area) and south Florida canals, which includes non-perennial streams, canals/ditches used primarily as water conveyances for flood control, irrigation, and tidal creeks. In addition, the FDEP has promulgated NNC for the majority of estuaries and coastal waters.

### **Ban of Harmful Pesticide**

In 2010, the USEPA and the product registrant came to an agreement to voluntarily cancel and phase out all uses of endosulfan, an organochlorine pesticide. There will be no sales after 2016. Endosulfan had been extensively used in Florida to control insect pests and mites in agriculture, such as row crops, fruit trees, greenhouses plants, and vegetables. Endosulfan has been detected within or in the vicinity of ENP in air, rain, surface water, groundwater, sediment, fish, and oysters. In its national review, the USEPA concluded that endosulfan poses unacceptable risks to agricultural workers and wildlife, can persist in the environment, and has a high potential to bioaccumulate in aquatic and terrestrial organisms. The USEPA concluded that there are risks above the agency's level of concern to aquatic and terrestrial wildlife, as well as to birds and mammals that consume aquatic prey in which endosulfan has bioaccumulated. Information considered by the USEPA included a study sponsored by ENP that documented the presence of endosulfan in small, bottom feeding fish that support higher level species, such as wading birds.

## Florida Keys National Marine Sanctuary (FKNMS) Water Quality Protection Program

The USEPA, National Oceanic and Atmospheric Administration, FWC, and FDEP conduct a comprehensive water quality monitoring and research program that monitors water quality, seagrasses and corals within the sanctuary. FDEP and USEPA co-chair this program, which is called for in the act that designated the FKNMS. The purpose of the Water Quality Protection Program is to facilitate implementation of corrective actions to address point and nonpoint sources of water pollution in sanctuary waters to help sustain healthy populations of animals and plants.

### 2014-2016 Progress Highlights

Since 2014 several canal water quality demonstration projects have been completed and have provided information on the effectiveness of different methods of restoring dissolved oxygen conditions in impaired canals. In 2015, Florida Keys Water Watch, a volunteer monitoring program, was implemented in the Florida Keys. Volunteers in this program collect water quality data from over 30 different residential canals and other local water bodies to increase awareness and document water quality conditions. Data are collected in accordance with methods developed by Georgia Adopt a Stream ([georgiaadoptastream.org](http://georgiaadoptastream.org)).

As mentioned previously, regional water quality plans can serve in lieu of a BMAP. On February 7, 2012, the FDEP adopted the Florida Keys Reasonable Assurance Plan by FDEP Secretarial order. The plan was developed by the FDEP in cooperation with local governments, state agencies, and federal agencies within the Florida Keys to set forth and accelerate the actions to reduce nutrient loadings to nearshore waters throughout the Florida Keys so that water quality standards are met and beneficial uses are restored. As part of this plan, Monroe County and its municipalities have been implementing advanced wastewater treatment throughout the Florida Keys. In addition to the recent adoption of these Reasonable Assurance Plans, in May 2012 the FDEP submitted these reports to the USEPA for acceptance with the submittal of the Group 5-Cycle 2 assessment updates to Florida's 303(d) list. The USEPA accepted these reports through their Florida 303(d) Decision Document provided to the FDEP on September 30, 2014.

**Table 2: Subgoal 1.B: Get the Water Quality Right  
Comprehensive Status July 1, 2014–June 30, 2016**

Objective	Projects	Status
<p><b>Stormwater Treatment Areas</b></p> <p><b>Objective 1.B.1: Construct 96,010 acres of stormwater treatment areas by 2035.</b></p>	<p>E&amp;SF: Critical Projects Lake Okeechobee Water Retention/Phosphorus Removal [Project ID 1506]</p>	<p><b>Planning:</b> Completed. <b>Construction:</b> The approximately 800-acre Nubbin Slough project was transferred to sponsor in Sept. 2012 for operations. The approximately 200-acre Taylor Creek project was transferred to sponsor for operations in 2011 and is currently in operation.</p>
	<p>C&amp;SF: West Palm Beach Canal STA-1E / C-51 West [Project ID 1513]</p>	<p><b>Planning:</b> Completed. <b>Construction:</b> Decommissioning of the Periphyton STA (PSTA) site and renovation of the culvert structures and trash rakes in the STA-1E complex has been completed. A contract to repair/replace gates on culverts was awarded at the end of fiscal year 2015; work on the gates is ongoing and is scheduled to be completed in 2017.</p>
	<p>State Expedited Project: Everglades Agricultural Area (EAA) STAs Built-out Expansion [Project ID 1514A]</p>	<p><b>Construction:</b> Completed additional 11,500 acres for STA-2 in 2007 and these expansion areas are in operation.</p>
	<p>State Expedited Project: Lakeside Ranch STA (part of the Northern Everglades Project) [Project ID 1515]</p>	<p><b>Planning:</b> Completed. <b>Construction:</b> Phase I construction completed and in operation; Phase II is designed and construction was initiated in 2016. Construction is expected to be completed in 2018.</p>
	<p>C-43 Water Quality Treatment and Testing Facility [Project ID 1519]</p>	<p><b>Planning:</b> Completed. <b>Construction:</b> Phase I (including bioassays and mesocosms) was kicked off in 2015 and construction began in March 2016.</p>
	<p>Restoration Strategies/Long-Term Plan for Achieving Water Quality Goals for Everglades Protection Area Tributary Basins [Project ID 1520]</p>	<p><b>Planning:</b> Completed. <b>Construction:</b> A-1 FEB construction completed and operations began November 2015; L-8 FEB construction ongoing and expected to be complete by December 2016; STA-1W Expansion No. 1 construction began November 2015 and expected to be complete by December 2018; construction of several other water control structures and conveyance improvement projects are ongoing; Nine Science Plan studies to better understand the sustainability of STA performance at low phosphorus concentrations are ongoing. <i>Note: In 2013, the Florida legislature amended the Everglades Forever Act to incorporate Restoration Strategies into the Long-Term Plan. Restoration Strategies projects include additional STA treatment wetlands and construction of flow equalization basins upstream of STAs.</i></p>
<p><b>Water Management Plans</b></p> <p><b>Objective 1.B.2: Prepare locally based plans to reduce pollutants as determined necessary by the total maximum daily loads.</b></p>	<p>Total Maximum Daily Load for South Florida [Project ID 1600]</p>	<p><b>Planning:</b> BMAP for Lake Okeechobee (total phosphorus) was completed and adopted by FDEP in December 2014.</p>
	<p>Hybrid Wetland Treatment [Project ID 1723]</p>	<p><b>Planning:</b> Completed. <b>Construction:</b> Completed for three sites (Lemkin Creek, Wolff Ditch, and Phase 1 of Grassy Island). <b>Implementation:</b> Completed for two sites (Lemkin Creek and Wolf Ditch).</p>
	<p>Local Cost-Share Projects with Martin County [Project ID 1724]</p>	<p><b>Planning:</b> Completed. <b>Construction:</b> Construction is complete for four projects: Old Palm City Stormwater Quality Improvement Project; Manatee Pocket Dredging; Manatee Creek Stormwater Improvement Project; and North River Shores Vacuum Sewer System Phase I.</p>

## GOAL 2: RESTORE, PRESERVE, & PROTECT NATURAL HABITATS & SPECIES

**H**istorically, 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. To ensure the best conditions for restoration of native species, invasive exotic species must also be managed, and the escape of new invasive exotics must be prevented.

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

#### Subgoal 2.B: Protect the South Florida Ecosystem from the Harmful Effects of Invasive Exotic Species

- Objective 2.B.1:** Prevent the introduction of invasive exotic species.
- Objective 2.B.2:** Eradicate invasive exotic species by implementing early detection and rapid response (EDRR).
- Objective 2.B.3:** Contain the spread of invasive exotic species.
- Objective 2.B.4:** Reduce the populations of widely established invasive exotic species and maintain at lowest feasible levels.

**C**urrently, the Florida panther and more than 76 other animal or plant species which inhabit south Florida are listed by the U.S. Fish and Wildlife Service (USFWS) 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.

## SUBGOAL 2.A: RESTORE, PRESERVE & PROTECT NATURAL HABITATS

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.

The strategy for Subgoal 2-A consists of three measurable objectives: land acquisition, coral reef protection, and habitat improvement. Progress on the measurable objectives during the reporting period (July 1, 2014–June 30, 2016) is described in this section and further delineated in Table 3. Additional efforts that will help fulfill this subgoal are also described below.

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

#### Policy/Regulatory Framework

- In 1963, the Florida Legislature began the first of a series of land acquisition programs for conservation and recreation purposes, all with dedicated funding sources. The Land Acquisition Trust Fund was created to fund a newly-created Outdoor Recreation and Conservation Program, designed primarily to purchase land for parks and recreation areas.
- In 1972, the Florida Legislature passed the Land Conservation Act, which created the Environmentally Endangered Lands (EEL) program. The EEL program was designed specifically to protect environmentally unique and irreplaceable lands in the state and was not designed to have outdoor resource-based recreation as its primary goal.
- The Florida Legislature replaced and expanded the EEL program in 1979 with the creation of the Conservation and Recreation Lands (CARL) Program. The CARL Program and its authorizing statute (originally Chapter 253, Florida Statutes, but now included in Chapter 259) called for a recurring revenue stream (instead of bond revenues) and significantly altered the administration and oversight of land acquisition activity.
- In 1981, the Florida Legislature created the Water Management Lands Trust Fund, also funded from documentary stamp tax revenues from real estate transactions, for the acquisition and restoration of water resources.
- In 1989, the Florida Communities Trust was actually established, but it did not receive funding until passage of the Preservation 2000 Act. The program was housed in the Department of Community Affairs and was designed to assist local governments in implementing the conservation, recreation and open space, and coastal elements of their comprehensive plans.
- Florida Forever is Florida's premier conservation and recreation lands acquisition program, a blueprint for conserving natural resources and renewing Florida's commitment to conserve the state's natural and cultural heritage. Florida Forever replaced Preservation 2000, the largest public land acquisition program of its kind in the United States.

## **Implementation Approach**

Mechanisms for Land Conservation: There are numerous federal, state, and local government programs and cooperating non-governmental organization programs that could potentially be utilized in support of land acquisition and conservation. Many of these programs provide opportunities to match or leverage funding available through other sources for land acquisition, conservation, or restoration. Land conservation can be achieved through various methods, including:

- Fee purchase
- Easement purchase
- Easement donation
- Purchase of development rights
- Mitigation banks
- Outright land donation

Increasingly, land conservation will rely on collaborative efforts to protect vital wildlife habitats through community-based coalitions of private landowners, conservation groups, and state, local, and federal agencies. Conservation banks are like a biological bank account. Instead of money, a habitat owner has conservation credits to sell. Conservation easements involve purchasing a portion of the rights associated with the land to provide some degree of protection to natural resources on the land.

## **2014-2016 Progress Highlights**

### **Since 1980:**

- 4.9 million acres of land have been acquired.
- 12 projects have been completed.
- 60 projects are underway.

The 10 year, \$3 billion Florida Forever program was established in 2000 by the Florida Legislature to conserve environmentally sensitive land, restore waterways, and preserve important cultural and historical resources. Florida Forever is the successor to Preservation 2000. The 2008 Legislature authorized an additional \$3 billion through 2020.

In 2016, Florida Governor Rick Scott signed the Legacy Florida bill into law, which is the implementing bill for Amendment 1 allocations. The bill provides up to \$200 million dollars annually for Everglades restoration efforts through State Fiscal Year 2025-2026. Of this amount, \$32 million is to support the State's Restoration Strategies through 2024, and up to \$100 million is dedicated to support Comprehensive Everglades Restoration Plan (CERP). The remaining funds are to be used for either Northern Everglades or CERP projects, with a priority focus on addressing harmful discharges from Lake Okeechobee to the St. Lucie and Caloosahatchee estuaries.

## **Objective 2.A.2: Protect 20 percent of the coral reefs**

### **Policy/Regulatory Framework**

- The Florida Keys National Marine Sanctuary (FKNMS) and Protection Act and the National Marine Sanctuaries Act
- The Magnuson-Stevens Reauthorization Act of 2006
- Memorandum of Understanding for the Dry Tortugas National Park Research Natural Area (RNA) by the State of Florida and the National Park Service (NPS), 2013
- Dry Tortugas National Park Final General Management Plan Amendment 2000
- Dry Tortugas National Park Research Natural Area Science Plan, 2015
- NPS / State of Florida Submerged Lands Management Agreement 2005
- The NPS Organic Act (16 U.S.C. 1 and 16 U.S.C.3)
- NPS Management Policies (2006)
- NPS General Authorities Act of 1970
- Public Law 102-525 establishing Dry Tortugas National Park

- Executive Order 13089 of June 11, 1988, Coral Reef Protection
- Executive Order 13158 of May 26, 2000, Marine Protected Areas
- National Parks Omnibus Management Act of 1998
- National Parks and Recreation Act of 1978
- National Environmental Policy Act

### **Implementation Approach**

Restoring and preserving off-shore habitat involves restoring more natural timing and delivery of freshwater flows to coastal estuaries, which are critical to the life-cycles of many reef fish, as well as the protection of critical coral reef communities in southeast Florida, the FKNMS, Dry Tortugas National Park, and Biscayne National Park (BNP). Reef habitat protection involves a variety of management tools designed to increase biological and benthic integrity, which range from fisheries management practices that govern size, bag, and gear restrictions on fished species to the establishment of areas such as marine zones which protect habitat and are closed to extractive activities.

### **2014-2016 Progress Highlights**

**Biscayne National Park Planning Efforts:** In 2014, BNP finalized its Fishery Management Plan. The selected alternative seeks a 20% improvement in the sizes and abundances of fishery-targeted species. BNP is currently working with the cooperating agency, the Florida Fish and Wildlife Conservation Commission (FWC), to develop and implement fishing regulations in support of the selected alternative. These regulations might include changes in size and/or bag limits, seasonal closures, and gear restrictions. The park is also developing a federal rule that would phase out commercial fishing in the park by implementation of a non-transferable use-or-lose commercial permit that requires annual renewal. Additionally, BNP will soon require fishing guides and charter boat operators to file for Special Use Permits and submit monthly catch logs to the park. In 2015, BNP finalized its General Management Plan, which calls for a no-fishing Marine Reserve Zone that covers 10,512 acres of reef (~27% of the parks reefs).

**Coral Reef Conservation Program (CRCP)/Southeast Florida Coral Reef Initiative (SEFCRI):** Established in 2004, FDEP's CRCP coordinates coral reef research, monitoring, and mapping, conducts education and outreach, develops management strategies, and encourages partnerships and stakeholder participation to advance protection of Florida's reefs. The 2014 - 2016 Coastal Management Fellowship was hosted by the CRCP in Miami, Florida.

The CRCP leads the implementation of SEFCRI, Florida's Local Action Strategy. Started in 2004, the SEFCRI is a local action strategy for collaborative action among over 60 government and non-governmental partners to identify and implement priority actions needed to reduce key threats to coral reef resources off mainland southeast Florida in Miami-Dade, Broward, Palm Beach, and Martin counties. The SEFCRI is targeting four priority focus areas that address threats to southeast Florida's coral reef ecosystems. Completion of the comprehensive coral reef management strategy and implementation plans is anticipated by July 30, 2016.

**Coral Restoration Efforts:** With funding from the National Oceanic and Atmospheric Administration's (NOAA) Community-Based Restoration Grant, The Nature Conservancy out-planted 1,042 staghorn corals in the FKNMS. The Coral Restoration Foundation has out-planted over 8,200 Staghorn and 2,600 Elkhorn corals in the FKNMS during this period. Research is ongoing regarding culture techniques for protected coral species and refining out-planting techniques.

In 2016, BNP biologists partnered with NOAA to attempt to salvage a few small specimens of the threatened coral *Dendrogyra cylindrus*. This species has experienced dramatic decline in a short time period, and the genotype found within the park occurs only in the park. It is hoped that NOAA biologists will be able to rear the specimens in a nursery setting to allow for this unique genotype to persist.

**Florida Keys National Marine Sanctuary (FKNMS) Planning Efforts:** Recommendations for modifications to existing and proposals for new marine zones were made by three Sanctuary Advisory Council working groups as part of the FKNMS marine zone and regulatory review. In August 2014, the

FKNMS advisory council adopted a set of recommendations developed by its Ecosystem Protection: Ecological Reserves, Preservation Areas, and Wildlife Protection working group. The advisory council has continued to hold regular meetings designed to inform members about ecological and sociological issues related to sanctuary resource management. Additional recommendations designed to enhance ecosystem protection and restore important habitats including shallow water and coral reef ecosystems are currently being evaluated in a Draft Environmental Impact Statement.

**Monitoring:** Ecological monitoring continues throughout the FKNMS and Biscayne and Dry Tortugas National Parks. Reef Visual Census surveys were successfully completed in Biscayne and Dry Tortugas National Parks in 2014 and at the time of this report, were underway for 2016. In 2014, NPS biologists completed surveys of reef fish and benthic habitat at over 100 sites in BNP. Beginning in 2015, BNP biologists began partnering with coral biologists from FWC and NOAA to monitor coral bleaching and disease in the park and to provide small samples of coral tissues for further laboratory analyses that might help park managers better understand and respond to disease outbreaks in future years. Coral reef ecosystem monitoring was conducted in the FKNMS as part of The Nature Conservancy's Florida Reef Resilience Program, NOAA's National Coral Reef Monitoring Program, and FWC's Coral Reef Evaluation and Monitoring Program.

**Our Florida Reefs:** This program is designed to increase public involvement in the future management of southeast Florida's coral reefs by seeking input from community members on the development of recommendations that can become part of a comprehensive management strategy to ensure healthy coral reefs in the future. The *Our Florida Reefs* process began in June 2013 to introduce the process and southeast Florida coral reef information to the local community. Community representatives were selected to form Community Working Groups. These members represent a wide range of different interests, each who have a stake in the wellbeing of our coral reef communities.

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

#### Policy/Regulatory Framework

- Everglades Restoration Investment Act, Chapter 373.470, F.S.
- South Florida Water Management District (SFWMD) as Local Sponsor, Chapter 373.1501, F.S.
- In order to restore and protect the greater Everglades ecosystem, the Florida legislature established the State of Florida's responsibilities in a series of statutes under the Florida Water Resources Act (Chapter 373, Florida Statutes). In addition to authorizing the SFWMD to serve as local sponsor for the majority of restoration efforts, the statutes establish a funding mechanism for the State's share of the 50-50 federal-state partnership and establish a streamlined regulatory process for CERP.

#### Implementation Approach

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.

#### 2014-2016 Progress Highlights

**Biscayne Bay Coastal Wetlands Project:** The goal of this CERP project is to improve the ecology of BNP and Biscayne Bay by re-directing freshwater flows to rehydrate coastal wetlands. Freshwater point source discharges will be replaced with a spreader canal system. Phase 1 includes construction of three components (Deering Estate, L-31E Culverts, and Cutler Wetlands), to redistribute surface water into Biscayne Bay. The SFWMD has completed construction of the Deering Estates features, a portion of the L-31E culverts features and installation of the L-31E Interim Operations Pump.

**Biscayne Bay Habitat Focus Area:** Biscayne Bay and its nearshore reef, including all of the state Aquatic Preserves, all of BNP, and the upper portion of the FKNMS, have been designated as a Habitat Focus Area in the NOAA Habitat Blueprint Initiative. A draft implementation plan was prepared and presented to the NOAA Habitat Conservation Team in April 2016 and is now undergoing refinement. Activities are already underway to support the four goals: 1) to understand major sources of nutrients contributing to phytoplankton and algal blooms in the bay; 2) to provide information and work with management and operations personnel to improve freshwater flow to Biscayne Bay; 3) to advance recovery of protected species and the sustainability of fishery species by improving protection of their habitat; and 4) to increase public awareness of bay ecosystem services and citizen involvement in conservation.

**Biscayne National Park:** From 2014 through 2016, BNP staff, with the help of 923 volunteers, restored sensitive coastal habitats in the park (including beaches where threatened and endangered sea turtles nest) by removing 21.1 tons of marine debris from these areas. In 2014 and 2015, a total of 860 derelict traps (or their equivalencies) were removed from park waters by contractors funded by habitat restoration funds. In 2016, BNP biologists implemented a new monitoring program to measure marine debris accumulation and marine debris impacts to organisms along the reef tract. In the initial clean-up of the 12 permanent study sites, park biologists documented and removed 373 pieces of debris which, together, weighed 415kg, and accounted for 1,341 documented injuries or mortalities to benthic reef organisms (stony corals, soft corals, sponges, and fire corals).

**C-111 South Dade Project:** This project is intended to restore the wetland sloughs and prairies along the eastern boundary of Everglades National Park (ENP), improve hydrologic conditions in Taylor Slough and other adjoining areas of the park, and maintain flood protection for development and agricultural interests located east of the project. The North Detention Area (Contract 8) component of the project was awarded in October 2015 and will connect the C-111 South Dade project to the Modified Water Delivers to ENP (Mod Waters) project. Upon completion of the internal flowway berms (Contract 8A, scheduled for award in September 2016), the hydraulic ridge will be completed to provide restoration to the ecosystem in Taylor Slough and the eastern panhandle of ENP.

**Caloosahatchee Creeks:** A hydrological restoration project on Caloosahatchee Creeks Preserve was completed in 2016. \$250,000 in grant funding from the Florida Department of Environmental Protection (FDEP) was awarded to the Conservation 20/20 program for this hydrological restoration project in North Fort Myers. The project enhanced wetlands and created sinuous channels that mimicked the creeks that were there prior to the dredging of the Caloosahatchee River decades ago. These creeks will enhance the existing wetlands and provide additional habitat for the small-toothed sawfish and wood storks, both federally protected species.

**Picayune Strand Restoration:** This CERP project covers more than 55,000 acres and will restore natural habitats and the region's historic sheetflow while maintaining flood protection for neighboring communities. During the reporting period, construction was completed on the Merritt Pump Station and Phase II Road Removal in 2014. The Faka Union Pump Station was completed in January 2016. Construction of the Faka Union Pump Station is complete and the 12 month operational testing began in January 2016. Work began on the Miller Pump Station in January 2014 and is scheduled to be completed in 2017. The Picayune Strand Manatee Refugia Feature construction has been completed and the Merritt Canal was plugged in June 2015.

**SR 786/PGA Boulevard Safety Improvements:** The improvements address roadway flooding that occurs on a regular basis as well as allow the South Florida Water Management District (SFWMD) to operate the G-160 and G-161 gated water control structures to better manage water levels in the Loxahatchee Slough while not adversely affecting the roadbed integrity. SR 786 bisects the Loxahatchee Slough, a 12,000-acre protected natural area consisting of unique habitats and home to numerous listed and non-listed species. The roadbed is being raised 4 feet so that roadway flooding will be alleviated. In order to re-establish a hydrologic connection for Loxahatchee Slough, a bridge is being constructed that will provide a public recreational facility with a new connection to the County's 37 mile Northeast Everglades Natural Area (NENA) kayak trail as well as a safe crossing for wildlife under the road and access to both sides of the slough. NENA stretches from Southern Boulevard in Palm Beach County north to Bridge Road in Martin

County, and from the Atlantic Ocean west to Lake Okeechobee. NENA includes over 165,000 acres of natural Florida lands and more than a dozen different activity and education centers that provide information about the area’s natural and human history.

<p style="text-align: center;"><b>Table 3: Subgoal 2.A: Restore, Preserve, and Protect Natural Habitats Comprehensive Status July 1, 2014–June 30, 2016</b></p>		
Objective	Projects	Status
<p><b><u>Land Acquisition</u></b> <i>Objective 2.A.1: Complete acquisition of 5.7 million acres of land identified for habitat protection by 2020.</i></p>	<p>Land Acquisition Projects [Project IDs 2100-2171]</p>	<p><b>Real Estate:</b> 4,902,417 acres of the 5,669,860 acres (86%) have been acquired to date at a cost of \$3.7 billion.</p>
<p><b><u>Coral Reef Protection</u></b> <i>Objective 2.A.2: Protect 20 percent of the coral reefs.</i></p>	<p>Florida Keys National Marine Sanctuary is undergoing a marine zoning and regulatory review. BNP has been developing updates to its fisheries and general management plans, including the creation of a 10,512 acre no-fishing marine reserve.</p>	<p><b>Implementation:</b> Ecological and water quality monitoring is underway at coral reefs and adjacent areas; a draft Environmental Impact Statement with preferred alternatives regarding marine zones for ecosystem protection is being developed. BNP has been developing updates to its fisheries and general management plans. SEFCRI’s Our Florida Reefs is underway.</p>
<p><b><u>Habitat Improvement</u></b> <i>Objective 2.A.3: Improve habitat quality for 2.4 million acres of natural areas in south Florida.*</i></p>	<p>C&amp;SF: CERP Lakes Park Restoration [Project ID 2302]</p>	<p><b>Construction:</b> Completed.</p>
	<p>Arthur R. Marshall Loxahatchee National Wildlife Refuge Prescribed Fire Program [Project ID 2304]</p>	<p><b>Implementation:</b> Ongoing.</p>
	<p>C&amp;SF: CERP Acme Basin B Discharge [Project ID 2306]</p>	<p><b>Construction:</b> Completed construction of Pump Station #7, C-1 canal conveyance improvements, and Section 24 Impoundment.</p>
	<p>C&amp;SF: CERP Picayune Strand Restoration [Project ID 2307]</p>	<p><b>Planning:</b> Project Implementation Report (PIR) and Chief’s Report completed; Post Authorization Change Limited Reevaluation Report Director of Civil Works Report and Recommendation submitted to the Assistant Secretary of the Army in March 2016 and approved in July 2016. <b>Design:</b> Initiated design level modeling and completed initial field work for the Southwestern Protection Levee. <b>Construction:</b> Prairie Canal Phase I and road removal completed; Merritt Pump Station, Phase II road removal, and Merritt Canal plugging completed in 2016; Faka Union Pump Station &amp; Phase III road removal completed in 2015; Miller Pump Station was awarded in 2013 and anticipated to be completed in 2017; Manatee Refugia Feature completed in April 2016.</p>
	<p>C&amp;SF: CERP Biscayne Bay Coastal Wetlands [Project ID 2309]</p>	<p><b>Planning:</b> PIR and Chief’s Report completed <b>Authorized:</b> WRRDA 2014. <b>Construction:</b> SFWMD completed construction of Deering Estate Flow-way component, a portion of the L-31 East component, and the installation of the L-31E Interim Operations pump.</p>

**Table 3: Subgoal 2.A: Restore, Preserve, and Protect Natural Habitats  
Comprehensive Status July 1, 2014–June 30, 2016**

	C&SF: CERP C-111 Spreader Canal [Project ID 2310]	<p><b>Planning:</b> PIR and Chief's Report completed.  <b>Authorized:</b> WRRDA 2014.  <b>Construction:</b> SFWMD completed construction of the recommended plan, with the exception of structure 198, under its expedited construction program in 2012. The Operational Testing and Monitoring Period was completed in 2013.  <b>Operation:</b> The SFWMD operates the project as intended to provide water to and maintain water in Taylor Slough, until a cost-share agreement between USACE and SFWMD is reached.</p>
<p><b>Habitat Improvement, Continued</b>  <b>Objective 2.A.3: Improve habitat quality for 2.4 million acres of natural areas in south Florida.*</b></p>	NOAA: Biscayne Bay Habitat Focus Area	<p><b>Planning:</b> Draft Implementation Plan completed and under review by NOAA National Habitat Conservation Team.  <b>Underway:</b> Canal nutrient load study; alongshore epiphyte nutrient and diatom community study; citizen science water quality monitoring project; water school; Junior Waterkeepers; and habitat mapping.</p>
	C&SF: C-111 South Dade [Project ID 1300]	<p><b>Planning:</b> Completed.  <b>Construction:</b> North Detention Area (Contract 8) under construction and internal flowway berms (Contract 8A) is scheduled for award in September 2016, which will complete hydraulic ridge to restore ecosystem in Taylor Slough.</p>

\* 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 are examples, not a comprehensive list, of how this objective will be achieved.

## SUBGOAL 2.B: PROTECT THE SOUTH FLORIDA ECOSYSTEM FROM THE HARMFUL EFFECTS OF INVASIVE EXOTIC SPECIES

Florida has the highest severity of the threats posed to native habitats and species by invasive exotic species in the continental U.S. Florida's subtropical climate, major ports of entry, and large-scale pet, aquarium, and agricultural and ornamental plant industries contribute to the state's vulnerability to biological invasions. The Everglades ecosystem has long been valued for its tourism draws, ecological diversity, recreational opportunities, and many natural areas. Invasive exotic species are detrimental to the Everglades causing harm to native species through predation, food web disruption and resource competition, loss of threatened and endangered species, and physical changes to habitats and disruptions to their unique ecological processes and functions. The Task Force has been concerned about invasive exotic species and their impacts on the South Florida Ecosystem for more than a decade and in 2013 launched a renewed effort to address the problem effectively, which resulted in increased coordination and an elevation of the issues to leadership levels.

Recognizing the importance of protecting valuable resources by preventing, eradicating, containing, and managing invasive exotic species, the Task Force has developed an Invasive Exotic Species Strategic Action Framework (IES Framework) to leverage the large body of work and coordination already being accomplished through groups like the Everglades Cooperative Invasive Species Management Area (ECISMA). The IES Framework takes a comprehensive, system-wide approach and helps to increase coordination at leadership levels within and between agencies.

The Framework and its associated cross-cut budget enhance our collective ability to combat invasive exotic species by:

- Helping decision-makers understand regional priorities and the connections between goals, strategies, and tactics;
- Maximizing the extent to which the current capacity for partnership is leveraged to meet common goals;
- Helping decision-makers make wise and timely investment decisions in the battle against invasive exotics; and
- Defining success and providing for accountability.

The following sections 2.B.1 thru 2.B.4 are organized around the four goals of the IES Framework which are, in short: Prevention; Early Detection and Rapid Response; Containment; and Long-term Management and Resource Protection. There is an additional section in Objective 3.D that discusses outreach and education related to invasive exotic species.

## Objective 2.B.1: Prevent the Introduction of Invasive Exotic Species.

### Policy/Regulatory Framework

- Plant Protection Act – Title 7-Agriculture
- Lacey Act (1900; amended 1981)
- The National Environmental Policy Act (NEPA) (1969)
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (1975)
- Non-indigenous Aquatic Nuisance Prevention and Control Act (1990)
- Executive Order 13112, Invasive Species (1999)
- Florida Department of Forestry Service - Exotic Control Practices
- Chapter 379.231, F.S
- Rule 68,5.001, F.A.C.
- The NPS Organic Act (16 U.S.C. 1 and 16 U.S.C.3)
- Title 36, Chapter I, Parts 2-199 of the Code of Federal Regulations; Park-specific or “special” regulations
- NPS Management Policies (2006)

For an extensive look at regulations and laws governing invasive exotic species in Florida please see the Environmental Law Institute’s regulatory section in the technical report titled, *“Cooperative Prevention of Invasive Wildlife Introduction in Florida.”*

### Implementation Approach

Preventing the introduction of invasive exotic species protects the South Florida Ecosystem from the negative ecological and economic impacts of those species and the subsequent high costs associated with long-term control efforts. Prevention requires the ability to assess risks systematically but efficiently in order to stop the identified species from entering the South Florida Ecosystem. The ability to prioritize prevention efforts will rely on technical expertise and tool development, including the establishment of a system for conducting ecological risk assessment.

### 2014-2016 Progress Highlights

**Prevention at Ports:** The FWC has added a total of four detector dogs to inspect for invasive exotic species at south Florida ports.

**Regulatory Tools:** The USFWS listed another four species of large constrictors that have the potential to become established in south Florida as injurious under the Lacey Act (2015).

## Objective 2.B.2: Eradicate Invasive Exotic Species by Implementing Early Detection and Rapid Response (EDRR).

### Policy Regulatory Framework

- ECISMA Memorandum of Understanding
- Endangered Species Act (1973)
- Executive Order 13112, Invasive Species (1999)
- Refuge Planning Policy (published and effective May 25, 2000)
- Biological Integrity, Diversity, and Environmental Health Policy (published January 16, 2001, effective April 16, 2001)
- FWC-Chapter 379.231, F.S., Rule 68-5.002 F.A.C and Rule 68-5.004 F.A.C.
- FWC must prepare land management plans pursuant to Chapters 253.034 and 259.032. F.S.
- FDEP Resource Management Standard: Nuisance and Exotic Animal Removal
- The National Park Service Organic Act (16 U.S.C. 1 and 16 U.S.C.3)
- Title 36, Chapter I, Parts 1-199 of the Code of Federal Regulations; Park-specific or “special” regulations
- NPS Management Policies (2006)
- Miami-Dade County Comprehensive Development Master Plan, Conservation, Aquifer Recharge and Drainage Element and Coastal Management Element
- Miami-Dade County Code, Chapter 8CC Code Enforcement; Chapter 18A Landscape Ordinance; Chapter 18B, Right-of-Way Landscape Ordinance; Chapter 24, Environmental Protection; Chapter 26 Park and Recreation Department Rules and Regulations; and Chapter 33B Areas of Critical Environmental Concern

### Implementation Approach

It is imperative to respond quickly and deal with emerging threats while they remain localized. Eradication through EDRR is the second most cost-effective method to deal with invasive exotics, after prevention. Preparation and monitoring are essential first steps to identify invasions as early as possible. According to ECISMA’s EDRR Plan, “in order to respond rapidly and effectively to an invasion, actions should be anticipated and consensus reached on as many response details as soon as possible, prior to discovery of an unwanted introduction. Then, when a response is needed, it will be rapid, streamlined, and more effective.” Once a new invader is detected, rapid assessment should occur so that the response priority can be determined. All of the prior steps should enable a rapid response to identified threats.

### 2014-2016 Progress Highlights

**EDRR Decision Framework:** Despite increased awareness of the environmental and cost benefits of early detection and rapid response to new invasions, south Florida still lacks a dedicated program to detect and respond to new natural areas invaders. In 2015, the US Geological Survey (USGS) and Florida Atlantic University co-hosted an interagency workshop titled “Improving the EDRR Decision Framework for the Greater Everglades,” which began work to develop a risk screening tool and to improve EDRR methods. The tool will be presented in a second workshop, along with other forums to provide an opportunity for comment and editing.

**Web-Based Mapping:** The Florida Exotic Pest Council is a non-profit organization that educates the public and tracks sightings of invasive exotics through Early Detection and Distribution Maps (EDDMapS), a web-based mapping system for documenting invasive species distribution. EDDMapS combines data from other databases and organizations as well as volunteer observations to create a national network of invasive species distribution. As of May 2016, EDDMapS had over 2.9 million records.

**Invasive Exotic Plant Rapid Response:** ECISMA participants continued monitoring and treatment of the invasive mangrove species Asian black mangrove. Previous efforts resulted in the removal of all mature Asian black mangrove. Ongoing efforts are focused on seedlings emerging from the seed bank. This effort will continue until the seed bank is depleted.

Mile-a-minute weed (*Mikania micrantha*), a federally-listed noxious weed, recently appeared in Miami-Dade County and is the focus of a coordinated rapid response effort by ECISMA partners. Despite limited dedicated funding, ECISMA partners have monitored and removed this highly aggressive vine within its known range during the reporting period.

**USFWS Invasive Species Strike Team (ISST):** For FY2016, \$1.15 million was made available to Southeast Florida (SE) and Florida's national wildlife refuges through a competitive Request for Proposals for invasive plant and exotic wildlife control projects. A total of 28 invasive-related projects were funded in the SE Region. Target species included Florida (FL) and SE Florida Exotic Pest Plant Council Category 1 and 2 non-native invasive plants and approximately eight feral hog projects in collaboration with US Department of Agriculture (USDA)-Wildlife Services, and developing and deploying new trap technologies.

Since its inception, the Region 4 ISST has provided over \$5 million to SE and FL refuges for the control and management of non-native invasive plants and non-indigenous wildlife.

**Invasive Exotic Animal Rapid Response:** During the reporting period, federal, state, local, and tribal partners continued rapid response efforts to control expanding populations of several invasive animal species including northern African pythons and the spectacled caiman.

The giant African land snail, a known host of a meningitis vector (rat lungworm) that eats a great variety of vegetation, is the focus of an ongoing federal-state cooperative program to eradicate the existing population in Miami-Dade County. There are currently over 4,500 parcels under survey in the cooperative program.

ECISMA partners from many agencies conducted efforts to assess and remove a newly detected potentially invasive Cichlid fish, the bay snook, from a private pond in Miami. Additional fish sampling surveillance efforts were conducted throughout canals of Miami-Dade and Broward counties and range expansions and/or new occurrences of several species were recorded.

Another invader, the conehead termite, was believed to have been eradicated from south Florida until it was found infesting a large commercial structure in Dania Beach in July 2011. Surveys of natural areas and neighborhoods near that building and infested adjacent wetlands revealed three additional residential and natural areas with substantial conehead termite activity. The Florida Department of Agriculture and Consumer Services (FDACS) reignited aggressive containment and control efforts, focusing especially on complex overgrown acreage.

## Objective 2.B.3: Contain the spread of invasive exotic species.

### Policy Regulatory Framework

- Endangered Species Act (1973)
- Executive Order 13112, Invasive Species (1999)
- Refuge Planning Policy (published and effective May 25, 2000)
- Biological Integrity, Diversity, and Environmental Health Policy (published January 16, 2001, effective April 16, 2001)
- FWC-Chapter 379.231, F.S., Rule 68-5.002 and Rule 68-5.004
- FWC must prepare land management plans pursuant to Section 253.034 and 259.032. F.S.
- FDEP Resource Management Standard: Nuisance and Exotic Animal Removal
- The NPS Organic Act (16 U.S.C. 1 and 16 U.S.C.3)
- Title 36, Chapter I, Parts 2-199 of the Code of Federal Regulations. Park-specific or "special" regulations : 36 C.F.R. Parts 7 and 13
- NPS Management Policies (2006)

- Miami-Dade County Comprehensive Development Master Plan, Conservation, Aquifer Recharge and Drainage Element and Coastal Management Element
- Miami-Dade County Code, Chapter 8CC Code Enforcement; Chapter 18A Landscape Ordinance; Chapter 18B, Right-of-Way Landscape Ordinance; Chapter 24, Environmental Protection; Chapter 26 Park and Recreation Department Rules and Regulations; and Chapter 33B Areas of Critical Environmental Concern
- Lacey Act (1900; amended 1981)

### **Implementation Approach**

Once it is determined that eradication is not possible, we enter the third phase of the Invasion Curve. Containment efforts focus on preventing the spread of an invasive exotic species to new areas in order to minimize the damage to the ecosystem and reduce long-term control costs. The containment phase focuses on utilization of control tools at containment boundaries and known pathways. Technical expertise, enforcement mechanisms, and adequate funding are needed to successfully contain expanding populations of priority species. Coordination at all levels should be enhanced and strengthened to enable better coordinated on-the-ground management activities directed at species, pathways, and high-value assets. Assessment and adaptation of current methodologies, investment in monitoring and science-based containment methods, and a supportive and engaged public will improve containment success.

### **2014-2016 Progress Highlights**

**Containment of Invasive Exotic Animals:** During the reporting period, federal, state, local, and tribal partners increased coordination efforts to control expanding populations of several invasive animal species including the Argentine black and white tegu and the Nile monitor. Ongoing monitoring, research on best management practices, and control efforts are being carried out by ECISMA partners including the USGS, the FWC, ENP, University of Florida, the USFWS, and the SFWMD. The total number of Argentine black and white tegus removed from the south region/core area is approaching 1,100 for July 1, 2014 to the present.

BNP biologists have conducted trapping efforts for non-native invasive reptiles primarily targeting the green iguana and the Argentine black and white tegu within the park and in lands immediately adjacent to it. No tegus have been trapped (and very few have been observed), but many iguanas were trapped as a result.

During the reporting period, an interagency structured decision-making workshop was held to help determine the best application of resources and the resources needed to successfully contain the Argentine black and white tegu population in south Florida. The effort led to developing explicit goals and priority resource needs.

**Containment of Invasive Exotic Plants:** The FWC, SFWMD, and other agencies continued efforts to contain and control several invasive plant species that have limited but expanding populations in the Everglades region. These species include Tropical American watergrass on Lake Okeechobee, feathered mosquito fern in canals of the Northern Everglades, and Wright's nut-rush in WCA-3.

The SFWMD is actively monitoring for and controlling a recently discovered population of West Indian marsh grass in WCA-2A. This plant is an aggressive invader in the Kissimmee River floodplain and has the potential to invade open water sloughs within the Everglades.

## Objective 2.B.4: Reduce the populations of widely established invasive exotic species and maintain at lowest feasible levels.

### Policy /Regulatory Framework

- 369.22, Florida Statutes
- Lacey Act (1900; amended 1981)
- Endangered Species Act (1973)
- Executive Order 13112, Invasive Species (1999)
- Refuge Planning Policy (published and effective May 25, 2000)
- Biological Integrity, Diversity, and Environmental Health Policy (published January 16, 2001, effective April 16, 2001)
- CERP Guidance Memorandum 62 (CGM 62)
- FWC-Chapter 379.231, F.S., Rule 68-5.002 and Rule 68-5.004
- FWC must prepare land management plans pursuant to Section 253.034 and 259.032. F.S.
- FDEP Resource Management Standard: Nuisance and Exotic Animal Removal
- The NPS Organic Act (16 U.S.C. 1 and 16 U.S.C.3)
- Title 36, Chapter I, Parts 2-199 of the Code of Federal Regulations. Park-specific or “special” regulations: 36 C.F.R. Parts 7 and 13
- National Historic Preservation Act
- National Park Service Management Policies (2006)
- Miami-Dade County Comprehensive Development Master Plan, Conservation, Aquifer Recharge and Drainage Element and Coastal Management Element
- Miami-Dade County Code, Chapter 8CC Code Enforcement; Chapter 18A Landscape Ordinance; Chapter 18B, Right-of-Way Landscape Ordinance; and Chapter 24, Environmental Protection; Chapter 26 Park and Recreation Department Rules and Regulations; and Chapter 33B Areas of Critical Environmental Concern

### Implementation Approach

The final stage of the Invasion Curve is resource protection and long-term management of established invaders. This phase endeavors to mitigate the ecological and economic impact of invasive exotic species. This can be accomplished by developing and using control tools to reduce the population densities of a species within a specific area and by strengthening the resilience of natural areas through restoration and recovery efforts. The most effective long-term management programs utilize an integrated pest management strategy, which incorporates multiple control tools and best management practices to achieve optimal levels of control. Restoration efforts aid recovery of habitat structure and function, making native species better suited to outcompete invasive exotic species and helping to bring invasive exotic species control efforts to a minimum cost and impact (known as maintenance control).

Improvements in long-term management effectiveness will stem from investment in science, development of new tools, enhanced coordination, and increased funding/resources to support control. Investment in research and monitoring may yield future tools that could dramatically reduce the population and extent of invasive exotic species that are well established today. Continual assessment and adaptation based on lessons learned will also reduce the extent and population of a currently established species.

## 2014-2016 Progress Highlights

**Long-term Maintenance of Invasive Exotic Plants:** The status of invasive plant management in the Everglades remains a mix of successes and continued challenges during the reporting period. Regional, coordinated efforts have yielded the large portions of the Everglades with very low infestations free of melaleuca and several other high profile invasive plant species, though periodic management is still necessary to prevent reestablishment of dense melaleuca forests once common in the WCAs, Lake Okeechobee, and elsewhere.

Knowledge gained from both operational experience and recent herbicide trials allows ECISMA partner agencies to more effectively treat priority invasive plant species. Management evaluations for aquatic and terrestrial invasive plants have improved management outcomes. For example, SFWMD scientists and collaborators from the University of Florida are developing herbicide recommendations for control of priority aquatic weeds.

The greatest threats to invasive exotic plant management success in the Everglades are: 1) insufficient resources to address invasive exotic species and 2) the continued establishment of new invasive exotic species. Experience gained over the last two decades confirms that containing and reducing populations of highly invasive species often requires substantial initial investment of resources as well as commitment to long-term maintenance control of the populations as restoration proceeds.

**Biological Controls:** The CERP Biological Control Implementation Project mass rearing biocontrol facility was opened in 2014. The USDA, Agricultural Research Service (ARS), working in collaboration with SFWMD, USACE, and numerous ECISMA partners, completed 334 biological agent releases in 2015. Four biological control species totaling over 1,000,000 individuals were released to help manage Old World climbing fern (*Lygodium*), water hyacinth, and air potato.

**Melaleuca, *Lygodium*, and Brazilian Pepper:** The remaining large populations of melaleuca occur in the LNWR, northeastern ENP, and numerous project land parcels in the East Coast Buffer Area, though systematic control is diminishing these stands. Unfortunately, private lands adjacent to the Everglades continue to harbor large populations of melaleuca. Three established biological control agents are exerting some control on these infestations and the period of time before herbicide applicators are required to revisit a site is lengthening in many areas.

*Lygodium* continues to present significant challenges to restoration. Long-term data confirm continued increases in abundance range throughout the region. Substantial impacts to forested wetland ecosystems are attributed to the colonization of this vining fern, which displaces native plant species, degrades wildlife habitat, and promotes destructive wildfires. Newly detected infestations in the Southern Glades Wildlife Management Area, WCA-3A, and eastern ENP are priorities for control. Another critical region affected by the continued expansion of *Lygodium*, the LNWR, is discussed below. Two biological control agents for *Lygodium* are slowly establishing in the Everglades, but their impact on the target weed is not yet known.

The SFWMD continues to conduct routine invasive plant management on all District-managed conservation and project lands. In addition to routine maintenance control efforts, the SFWMD focused on intensive treatments for Old World climbing fern and Brazilian pepper in the Kissimmee River floodplain where these two invasive species present significant threats to native habitat sustainability.

**Everglades National Park:** Of the approximately 1,000 plant species recorded in ENP, over 220 species are non-native. Due to funding constraints, systematic treatment is limited to five focal species: Brazilian pepper, melaleuca, Australian pine, lather leaf, and *Lygodium*. Exotic vegetation is estimated to affect approximately 200,000-250,000 acres of the park. Over the last 20 years, funds provided by federal, state, and county agencies have helped to treat exotic vegetation in ENP. Beginning in 2015, funding and support from FWC increased the invasive plant control efforts in the East Everglades portion of ENP, with the intent to continue more intensive treatment over at least a three-year period. Approximately 1,050 acres of these species were removed within a 42,000-acre treatment area within the reporting period.

Miami-Dade County Environmentally Endangered Lands (EEL) Program: The Miami-Dade County Program and the SFWMD co-manage the South Dade Wetlands Preserve, a vast area of wetlands in the watersheds of Biscayne Bay, Florida Bay, Barnes Sound, and Card Sound, which provides an ecological linkage between ENP and BNP. The EEL Program funds approximately \$3 million per year on invasive exotic species control within environmentally sensitive lands throughout Miami-Dade County including the South Dade Wetlands. Invasive exotic eradication efforts target species such as *Lygodium*, shoebutt on ardisia, Brazilian pepper, melaleuca, and Australian pine.

Arthur R. Marshall Loxahatchee National Wildlife Refuge (LNWR): This remote, natural area presents unique challenges to managing *Lygodium*. According to 2015 SFWMD data and aerial assessments, roughly 28,200 acres of the refuge contain high infestations of *Lygodium*. Current conditions reported in the Task Force's 2016 System-wide Ecological Indicator Report for melaleuca and *Lygodium* in the LNWR are red. A red assessment indicates substantial deviations from restoration targets in that area, creating a severe negative condition that merits action.

The license agreement with the state dictates that four major invasive exotic species be under maintenance control by 2017. The LNWR spends between \$1 and \$5 million annually to manage invasive exotic plants. Due to the high level of infestations in the LNWR, treatment projections suggest a minimum of \$5 million per year for five years is required to complete initial treatments of all invasive exotic species within LNWR boundaries followed by sustained funding of \$3 million annually to maintain control. In FY2014, the State of Florida (SFWMD and FWC) entered into a partnership with the LNWR to work cooperatively within the LNWR on invasive plant control efforts. The FWC funded control efforts were implemented by the SFWMD in the Refuge to augment ongoing control efforts by Refuge staff. Between 2014 and 2016, the FWC provided the SFWMD with \$3.8 million to implement invasive plant control in the Refuge. During that time, SFWMD contractors treated over 51,000 acres of melaleuca and over 16,000 acres of *Lygodium*. A five-year invasive plant management plan was jointly developed and is currently being implemented.

Although progress has been made in south Florida by implementing systematic monitoring and herbicide control programs, establishing biological controls, and implementing science based assessments to improve control efficacy, large-scale control of *Lygodium* in the Refuge has not been achieved. Control programs must be expanded in order to achieve control.

Monitoring and Mapping: The NPS and the SFWMD continue the invasive species monitoring program for the Everglades. Using aerial and ground-based techniques, the SFWMD and the NPS are collecting 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 (see Rodgers et al. 2014). Current estimates show that Brazilian pepper is the most abundant invasive plant in the Everglades, followed by melaleuca and *Lygodium*. Biennial updated maps are produced, describing the location and intensity of the four most common exotic plant species and laurel wilt, a rapidly spreading tree disease within the South Florida Ecosystem. Laurel wilt disease, spread by the invasive ambrosia beetle, threatens to cause the extinction of native redbay trees and, swamp bays in the Everglades, and seriously impact commercial avocado groves in south Florida. This may have implications for the structural integrity of tree islands in the Everglades and one of the most important cultural resources to the Miccosukee Tribe of Indians of Florida and the Seminole Tribe of Florida. This program also produces detailed maps of work areas for participating regional managers each year.

**Long-term Maintenance of Invasive Exotic Animals:** Invasive animal species are a rapidly increasing environmental and economic problem in the United States. According to USFWS records, legal wildlife shipments into the United States between 1999 and 2010 comprised over 2.8 billion individual exotic animals, representing at least 4,200 different species from over 150 countries. Florida now ranks as having the largest number of established non-indigenous amphibians and reptile species in the entire world. Fifty-six are established including three frogs, four turtles, one crocodilian, forty-three lizards, and five snakes. Two species in particular, Burmese pythons and lionfish are discussed further below.

Efforts to develop control tools and management strategies for several priority animal species continued during the reporting period. These include the Burmese python and other giant constrictors, the Nile monitor, and the Argentine black and white tegu. Control tools are very limited for free-ranging reptiles and the application of developed methods is often impracticable in sensitive environments where impacts to non-target species are unacceptable. Available tools for removing reptiles generally include trapping, toxicants, barriers, dogs, and introduced predators, as well as visual searching and pheromone attractants.

Pythons: During the reporting period, over 145 pythons were removed from NPS lands through the efforts of authorized python removal agents (volunteers), NPS, USGS, and other agency staff. During the reporting period 146 Burmese pythons were removed under permits from state owned and managed lands. The FWC and cooperating agencies organized a five-week public python removal effort that helped increase invasive species awareness. BNP biologists have begun searching the park and adjacent lands for Burmese pythons, as well as responding to public reports of this species in the area. One small python was removed from the BNP jetty in 2016 and two have been removed from the North canal as they were floating (dead, presumably from being hit by cars) into the park.

Lionfish: Lionfish are a predatory reef fish. They eat native fish, which can reduce native populations and have negative effects on the overall reef habitat and health as they can eliminate species that serve important ecological roles such as fish that keep algae in check on the reefs. Lionfish also compete for food with native predatory fish such as grouper and snapper. Current control efforts have focused on localized spearfishing and removal by recreational divers. BNP biologists and partners (interns from the University of Miami and faculty and staff from the University of South Florida and Oregon State University) have continued to develop and complete novel research on lionfish, including assessing ecological impacts of lionfish on the reef community and determining the frequency of removal efforts needed to avoid negative impacts.

**Table 4: Subgoal 2.B: Control Invasive Exotic Plants and Animals  
Comprehensive Status July 1, 2014–June 30, 2016**

Objective	Projects	Status
<p><b>Prevention</b> <i>Objective 2.B.1: Prevent the introduction of invasive exotic species.</i></p>	Brown Marmorated Stink Bug (interception and research for potential biocontrols [Project ID 2500])	<b>Implementation:</b> Ongoing (project up for annual renewal).
	FDACS Detector Dog Teams [Project ID 2501]	<b>Implementation:</b> Ongoing.
	Fruit Fly Survey and Detection [Project ID 2502]	<b>Implementation:</b> Ongoing (project up for annual renewal).
	Python Responder/Patrol Training [Project ID 2503]	<b>Implementation:</b> Ongoing.
	Exotic Psyllids and Liberibacter species [Project ID 2504]	<b>Implementation:</b> Ongoing.
	High Risk Areas-target domestic inspection activities at vulnerable points in the safeguarding continuum [Project ID 2505]	<b>Implementation:</b> Ongoing.
	Interdiction Sites and Marina and Canals [Project ID 2506]	<b>Implementation:</b> Ongoing annually, status complete for 2014-2015
	Effects of exotic fish on Everglades structure and function: risk assessment [Project ID 2507]	A literature review is currently being conducted to research the biological and ecological variables (e.g. life-history characteristics, physiological tolerances, habitat requirements) of the non-native fishes in Florida. In previous years, studies filled gaps in the known physiological tolerances of Spottin Spiny Eel and Banded Cichlid, two species key to the development of a quantitative risk assessment model funded under the USGS Natural Resources Preservation Program. FY2015 and FY2016 funds are supporting a study to examine the risk of potential impacts of African jewelfish on the structure and function of simulated marsh communities. The final year of work will either fill additional information gaps on physiological tolerances of non-native fishes in Florida in support of quantitative risk assessment development or conduct additional research into the potential impacts of non-native fishes on the structure and function of aquatic communities in ENP.
	Enhanced pest detection at high-risk domestic interdiction sites and marinas/canals systems [Project ID 2508]	<b>Implementation:</b> Ongoing (project up for annual renewal).
Enhancement of Fruit Fly Immature Stage ID and Taxonomy [Project ID 2509]	<b>Implementation:</b> Ongoing (project up for annual renewal).	

**Table 4: Subgoal 2.B: Control Invasive Exotic Plants and Animals  
Comprehensive Status July 1, 2014–June 30, 2016**

Objective	Projects	Status
<p><b>Early Detection and Rapid Response</b></p> <p><b>Objective 2.B.2: Eradicate Invasive Exotic Species by implementing Early Detection and Rapid Response.</b></p>	<p>Early detection of new exotic fish species in adjacent canals Vital Sign [Project ID 2601]</p>	<p><b>Implementation:</b> The South Florida/Caribbean Network conducted this work through FY2015. The 2014 pilot study determined that nighttime electrofishing yields higher fish abundance and higher species richness, and species composition of canals are stable over 3 year sample periods. No sampling was conducted in 2016 pending completion of the protocol for the program, but the work is expected to continue in future years.</p>
	<p>Mexican Red Bellied Squirrel Eradication on the Islands in Biscayne National Park [Project ID 2602]</p>	<p><b>Implementation:</b> Since 2006, EPMT has found 1,814 dreys and 49 squirrels, over 1,760 hours.</p>
	<p>Development of comprehensive fish monitoring programs in Everglades National Park [Project ID 2603]</p>	<p><b>Implementation:</b> Ongoing. Monitoring efforts are ongoing and provide a network of reference sites in Everglades National Park. Several new non-native species have been detected since 2000. The spread of and distribution of the new non-native fishes have been documented throughout the freshwater marshes.</p>
	<p>Cooperative Agricultural Pest Survey [Project ID 2604]</p>	<p><b>Implementation:</b> Ongoing (project up for annual renewal).</p>
	<p>Metagenomic (EDNA) survey in south Florida waters [Project ID 2606]</p>	<p><b>Implementation:</b> Water samples were analyzed using the Titan supercomputer at Oak Ridge National Laboratory. Tentative identifications were made on thousands of taxa from viruses to mammals. These include many disease organisms and invasive species. Positive taxonomic identifications require specific genetic verifications which have yet to be performed, pending NPS input and recommendations. Discussions with NPS scientists resulted in no definitive guidance for pursuing this line of research. At this time, continuation of the research will depend on availability of funding from sources outside USDA.</p>
	<p>Development of eDNA for Nile Monitor detection and removal [Project ID 2607]</p>	<p><b>Implementation:</b> Method development is underway. The development of an eDNA methodology for detecting Nile monitors in south Florida waterways is proceeding. A field-testable method is anticipated in FY 2017.</p>
	<p>Burmese python eDNA development and application [Project ID 2608]</p>	<p><b>Implementation:</b> Methodology developed and published in 2013/2014; field sample collections and analyses are on-going. Field samples from south Florida continue to be processed at University of Florida. Completion of field sample analyses and interpretation of the findings are expected in FY 2017.</p>
	<p>Miami Dade Fire Rescue Rapid Response and Invasive Species Removal (Venom Response) [Project ID 2609]</p>	<p><b>Implementation:</b> Personnel from the unit are currently actively engaged in removal of exotic species during the course of their normal 24 hour workday, and respond to complaints of non-native species regularly (more than 100 calls per year). Recovered 2 new species in 2014, a Madagascar leaf nosed snake and a Taiwan beauty snake.</p>

**Table 4: Subgoal 2.B: Control Invasive Exotic Plants and Animals  
Comprehensive Status July 1, 2014–June 30, 2016**

Objective	Projects	Status
<p><b>Early Detection and Rapid Response</b></p> <p><i>Objective 2.B.2: Eradicate Invasive Exotic Species by implementing Early Detection and Rapid Response.</i></p>	<p>Develop and Implement a FWS Invasive Species Strike Team (ISST) [Project ID 2610]</p>	<p><b>Implementation:</b> Ongoing. For FY 2016, \$1.15M was made available to SE and FLNWRs through a competitive Request for Proposals for invasive plant and exotic wildlife control projects.</p> <p>A total of 28 invasive-related projects were funded in the SE Region. Target species included FL and SE Exotic Pest Plant Council Category 1 and 2 non-native invasive plants and approximately eight feral hog projects in collaboration with USDA-Wildlife Services, and developing and deploying new trap technologies.</p> <p>Since its inception, the Region 4 ISST has provided over \$5M to SE and FL refuges for the control and management of non-native invasive plants and non-indigenous wildlife.</p>
	<p>Giant African Land Snail Eradication Program [Project ID 2611]</p>	<p><b>Implementation:</b> The total number of snails collected by the eradication program is now at 164,336. During this past year, we have seen a dramatic decrease in the amount of live snails collected from core areas with only four cores producing live snails in 2016. FDACS-DPI has been working with USDA-APHIS on a decommissioning plan for core areas; approval has been gained to decommission four cores and the agencies will be working on an additional five cores for decommissioning in December 2016.</p>
	<p>Northern African Python Removal [Project ID 2612]</p>	<p><b>Implementation:</b> Ongoing.</p>
	<p>Corridors of Invasiveness Vital Sign [Project ID 2613]</p>	<p><b>Implementation:</b> A complete sample of all selected survey sites in the three NPS units [BNP, ENP, Big Cypress National Preserve (BICY)] occurs every five years. The sampling effort is balanced across years by using a rotating design, with year one in BNP, two years dedicated to ENP (Eastern and Western Regions), and two years dedicated to Big Cypress National Preserve (Southern and Northern Regions). This is year six of the monitoring program so there have been initial surveys in BNP, Eastern and Western ENP, and Southern and Northern BICY have been completed. This year we began the first resample of BNP; there has been an overall increase in the number of exotic species encountered (6 new species) and total number of infestations. However, there has been an overall drop in total infested area due to efforts to eradicate large populations of latherleaf, beach naupaka, and portiatree.</p>

**Table 4: Subgoal 2.B: Control Invasive Exotic Plants and Animals  
Comprehensive Status July 1, 2014–June 30, 2016**

Objective	Projects	Status
<p><b>Early Detection Rapid Response, Continued</b></p> <p><i>Objective 2.B.2: Eradicate Invasive Exotic Species by implementing Early Detection and Rapid Response.</i></p>	Fruit Fly Eradication Methods Development [Project ID 2614]	<b>Implementation:</b> Ongoing.
	eDNA monitoring of five aquatic invasive species in South Florida [Project ID 2615]	<b>Implementation:</b> The USFWS's Region 4 Conservation Genetics lab has developed eDNA qPCR markers for five AIS taxa found in the Everglades: Mayan cichlid, African jewelfish, bullseye snakehead, Asian swamp eel, and lionfish. This technique has been used to sample waters of the A.R.M. LNWR (Water Conservation Area WCA 1) to help monitor species such as African jewelfish and bullseye snakeheads found in canals outside the refuge.
	ECISMA Early Detection Rapid Response [Project ID 2616]	<b>Implementation:</b> Ongoing management of ECISMA priority EDRR species through ECISMA workdays and contracts. FWC provides funding for rapid response for new invasive species documented on Florida CISMA EDRR plant lists. The NPS, Broward County, Miami-Dade County and others have provided personnel and supplies to respond to newly detected invasive species eradication efforts.
<p><b>Containment</b></p> <p><i>Objective 2.B.3: Contain the spread of invasive exotic species.</i></p>	Eradication of Gambian Pouch Rat [Project ID 2700]	<b>Implementation:</b> Ongoing.
	Population suppression and biology of Black spiny-tailed Iguanas <i>Ctenosaura similis</i> [Project ID 2701]	<b>Implementation:</b> <i>Ctenosaura</i> continue to be removed from Gasparilla Island (Charlotte County) by USDA Wildlife Services personnel. Necropsies are being performed to document additional aspects of the biology of the invasive population.
	Argentine black-and-white tegu ( <i>Tupinambis merianae</i> ) interdiction [Project ID 2702]	<b>Implementation:</b> Ongoing.
	Improve probability of detection and removal of pythons and other invasive reptiles [Project ID 2703]	<b>Implementation:</b> In initial development, currently funded through FY 2014/15.
	Feral Swine Assessment of control and impacts to help contain [Project ID 2704]	<b>Implementation:</b> Recently underway with FY2014 funds. Project will include quantifying swine damage before and after control measures are implemented so that efficacy of control actions can be measured.
	BICY exotic reptile IES data sheet [Project ID 2705]	<b>Implementation:</b> Efforts to control invasive exotic reptiles currently depend upon chance observations from visitors (public and private), contractors, employees, volunteers, and landowners, who report those observations, or are in a position to capture or kill the animal. Often a lag exists between reported observations and staff response capability.

**Table 4: Subgoal 2.B: Control Invasive Exotic Plants and Animals  
Comprehensive Status July 1, 2014–June 30, 2016**

Objective	Projects	Status
<p><b><u>Containment, Continued</u></b>  <b>Objective 2.B.3: Contain the spread of invasive exotic species.</b></p>	<p>Temporal and Spatial Habitat Use, Genetics, Diet and Disease Survey of Boa Constrictor. At Charles Deering Estates. [Project ID 2708]</p>	<p><b>Implementation:</b> Currently 212 transmitted boas are in the field at the Deering Estate and being located twice a week through a partnership between Miami-Dade County Natural Areas Management and Zoo Miami staff.</p>
<p><b><u>Long-Term Maintenance Management</u></b>  <b>Objective 2.B.4: Reduce the populations of widely established invasive exotic species and maintain at lowest feasible levels.</b></p>	<p>Enhanced Mitigation Techniques for Control of Cactus Moth [Project ID 2802]</p>	<p><b>Implementation:</b> Ongoing (project up for annual renewal).</p>
	<p>Biological Control of Imported Fire Ant [Project ID 2803]</p>	<p><b>Implementation:</b> Ongoing (project up for annual renewal).</p>
	<p>Enhanced Mitigation Techniques for the Control of Several Whitefly Species [Project ID 2804]</p>	<p><b>Implementation:</b> Ongoing (project up for annual renewal).</p>
	<p>Expansion of Asian Citrus Psyllid Biocontrol [Project ID 2805]</p>	<p><b>Implementation:</b> Ongoing (project up for annual renewal).</p>
	<p>Python Removal Program - FWC [Project ID 2806]</p>	<p><b>Implementation:</b> Ongoing.</p>
	<p>Everglades Complex of WMA's Exotic Plant Control [Project ID 2807]</p>	<p><b>Implementation:</b> Ongoing annually or biennially (<i>Lygodium</i> surveys).</p>
	<p>Everglades Complex of WMA's Restoration Native Tree planting [Project ID 2808]</p>	<p><b>Implementation:</b> Ongoing.</p>
	<p>Miami-Dade County Environmentally Endangered Lands Program-Conservation Land Acquisition and Management [Project ID 2809]</p>	<p><b>Implementation:</b> Since its inception, the EEL Program has acquired and managed more than 20,800 acres of land within the Everglades ecosystem, including pine rockland, tropical hardwood hammock, salt marsh, mangrove, and freshwater wetlands. The EEL Program manages an additional 2,800 acres of environmentally sensitive lands owned by the county Parks Department. Over 20,000 acres of land within the EEL Program's inventory are within the CERP C-111 and Biscayne Bay Coastal Wetlands project footprints. The primary effort of management activities is eradication of invasive exotic plant species and restoration of native habitats at a cost in excess of \$3,000,000 per year.</p>

**Table 4: Subgoal 2.B: Control Invasive Exotic Plants and Animals  
Comprehensive Status July 1, 2014–June 30, 2016**

Objective	Projects	Status
<p><b>Long-Term Maintenance Management</b></p> <p><i>Objective 2.B.4: Reduce the populations of widely established invasive exotic species and maintain at lowest feasible levels.</i></p>	Arthur R. Marshall Loxahatchee National Wildlife Refuge -Invasive Exotic Control Program [Project ID 2810]	<b>Implementation:</b> Ongoing.
	Python removal authorized agent program for South Florida National Parks [Project ID 2811]	<b>Implementation:</b> In 2014, there were just over 30 authorized agents working in the parks. Their level of effort fluctuates but generally results in several trips per week or 20 or more person hours of searching for pythons and other invasive species. The number of authorized agents has declined since 2014 due to rule changes, but the level of effort has not substantially reduced the agents who are most active have been retained.
	Lionfish assessment and control in South Florida National Parks [Project ID 2812]	<b>Implementation:</b> In 2014 and 2015, Biscayne and Dry Tortugas National Parks had grant-supported programs established to conduct systematic lionfish removals. The continuation of these programs in future years is contingent upon receipt of additional grant funding. In ENP, there is no dedicated program for lionfish removal, but personnel from other parks assist with an annual systematic lionfish survey at sites in Florida Bay. BNP personnel also conduct removals of lionfish from the bordering FKNMS as part of an agreement with the Sanctuary, since the FKNMS does not have staff available to remove the high numbers of large individuals known to occur in the FKNMS waters just east of the park's boundary.
	Digital Aerial Sketch Mapping (DASM) of 4 priority Invasive plants and Laurel Wilt [Project ID 2814]	<b>Implementation:</b> 2013 start and ongoing.
	Python Chemical Communication [Project ID 2815]	<b>Implementation:</b> Chemical extractions from python shed have been made and several steroid derivatives are present; similar compounds play major roles as pheromone components in several lizard species. There are compositional differences between male and female extracts. Preliminary behavioral trials have been conducted with captive pythons. Male pythons exhibited distinct behaviors and showed robust increases in sampling rates when following female chemical trails in Y-mazes. Future trials will further elucidate the male behavioral responses.
	Genetic Analyses of invasive reptiles in Florida [Project ID 2816]	<b>Implementation:</b> Genetic analyses for this project has been completed and 3 manuscripts (one addressing each taxon) from the MS student's thesis are being prepared for publication.

**Table 4: Subgoal 2.B: Control Invasive Exotic Plants and Animals  
Comprehensive Status July 1, 2014–June 30, 2016**

Objective	Projects	Status
<p><b>Long-Term Maintenance Management</b></p> <p><i>Objective 2.B.4: Reduce the populations of widely established invasive exotic species and maintain at lowest feasible levels.</i></p>	<p>C&amp;SF:CERP Melaleuca Eradication and Other Exotic Plants (OPE) (CERP Project WBS # 95) [Project ID 2818]</p>	<p><b>Construction:</b> Rearing facility under construction.</p>
	<p>Everglades National Park Exotic Control Program (Project ID 2819)</p>	<p><b>Implementation:</b> Although contractors, volunteers, interns, and park staff were able to treat exotic vegetation in all districts of ENP, invasive exotic plant problems still occur in the East Everglades, Gulf Coast, Flamingo, and Key Largo districts of the park.</p>
	<p>Hole-in-the-Donut [Project ID 2820]</p>	<p><b>Implementation:</b> In FY 2014, 241 acres of Brazilian pepper were removed at a cost of \$2,134,026.81. To date, 4,895 acres of the Hole-in-the-Donut have been restored. For FY 2015, the Hole-in-the-Donut project did not conduct any new restoration, and in 2016, the unusually wet conditions again prevented restoration work. Restoration is planned for 2017.</p>
	<p>Aquatic and Upland Invasive Plant Management [Project ID 2821]</p>	<p><b>Implementation:</b> Ongoing.</p>
	<p>Invasive Exotic Plant Control in Terrestrial and Aquatic Natural Systems [Project ID 2822]</p>	<p><b>Implementation:</b> Maintenance control of Melaleuca achieved in most regions of the Everglades Protection Area.</p>
	<p>Invasive Species Research and Information Exchange [Project ID 2823]</p>	<p><b>Implementation:</b> Ongoing.</p>
	<p>Big Cypress National Preserve Long-term Maintenance and Control of Invasive Exotic Plants [Project ID 2825]</p>	<p><b>Implementation:</b> Efforts to control invasive plant species in the preserve began in 1984. Currently, Australian pine is at maintenance level; <i>Lygodium</i> is the preserve's highest priority exotic; melaleuca is at or near maintenance level; and Brazilian pepper, while being addressed in all existing exotic plant treatment contracts, is far from a maintenance level. About 20% of the preserve acreage remains infested with invasive exotic plants. New threats from exotic plant invasion are eminent. Untreated areas outside the preserve boundary provide a seed source for new infestations to become established. Two major highways bisect the preserve, providing opportunity for exotic species to find their way into the preserve, requiring constant, perpetual vigilance.</p>
	<p>Mitigating ecological and cultural effects of Laurel wilt disease [Project ID 2826]</p>	<p><b>Implementation:</b> The project was funded in August of 2014, so the work is ongoing.</p>

## GOAL 3: FOSTER COMPATIBILITY OF THE BUILT & NATURAL SYSTEMS

**B**almy 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.

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.

### 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: 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.
- Objective 3.A.2: Increase participation by 350,000 acres in the Agricultural Conservation Easement Program and the Environmental Quality Incentive Program to promote compatibility between agricultural production and South Florida Ecosystem restoration.
- Objective 3.A.3: 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: Maintain or improve existing levels of flood protection for the urban, agricultural, and natural environments.
- 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.D: Reduce Invasive Exotic Species Pathways Originating from the Built Environment

- Objective 3.D.1: Increase awareness of the impacts of invasive exotic species on south Florida's environment, economy, culture, and human health.
- Objective 3.D.2: Continue existing and develop new partnerships that focus on reducing pathways.

## SUBGOAL 3.A: USE & MANAGE LAND IN A MANNER COMPATIBLE WITH ECOSYSTEM RESTORATION

The strategy for Subgoal 3-A consists of three measurable objectives that focus on the compatibility of land use with restoration efforts. Progress during the reporting period (July 1, 2014 – June 30, 2016) is described below and further delineated in Table 5. Additional efforts that will help fulfill this subgoal are also described below.

### Objective 3.A.1: 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.

#### Policy/Regulatory Framework

- For conservation lands per 373.1391, Fla. Stat., “Lands titled to the water management districts shall be managed and maintained to the extent practicable to ensure a balance between public access, general public recreational purposes, and restoration and protection of their natural state and condition.”
- All Everglades Construction Projects (STAs) per 373.4592(4)(a) Fla. Stat., “The District shall allow these areas to be used by the public for recreational purposes.”
- The legislative intent expressed in 373.016(3)(i) Fla. Stat., “To promote recreational development, protect public lands, and assist in maintaining the navigability of rivers and harbors.”
- Limitation on liability of water management district with respect to areas made available to the public for recreational purposes without charge in 373.1395(1) Fla. Stat., “The purpose of this section is to encourage water management districts to make available land, water areas, and park areas to the public for outdoor recreational purposes by limiting their liability to persons going thereon and to third persons who may be damaged by the acts or omissions of persons going thereon.”
- Supporting the state’s no-net-loss of hunting statute §379.3001(5) Fla. Stat., “Any state agency or water management district that owns or manages lands shall assist and coordinate and cooperate with the commission to allow hunting on such lands if such lands are determined by the commission to be suitable for hunting.”
- In 2016 the State of Florida passed the “Water Bill” to ensure that the public has knowledge of and access to conservation lands, and as defined in 253.034(2)(c) Fla. Stat., the Florida Department of Environmental Protection (FDEP) shall publish, update, and maintain a database of such lands where public access is compatible with conservation and recreation purposes. By July 1, 2017, the database must be available to the public online and must include, at a minimum, the location, types of allowable recreational opportunities, points of public access, facilities or other amenities, restrictions, and any other information the department deems appropriate to increase public awareness of recreational opportunities on conservation lands.

## Implementation Approach

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.

### 2014-2016 Progress Highlights

**Recreation in the Stormwater Treatment Areas (STAs) and other State-owned Lands:** The SFWMD with the cooperation of the Florida Fish and Wildlife Conservation Commission (FWC) has expanded public use opportunities by: expanding waterfowl hunting in select STAs to include Fridays; including vehicle access to SFWMD lands for the statewide Python Challenge; opening the Lakeside Ranch STA (approximately 1,000 acres) in Martin County for public access; and providing recreation opportunities including hiking, camping, hunting, fishing, wildlife viewing, and equestrian use on over 640,000 acres of land titled to the District. The SFWMD partnered with the Audubon Society for bird tours in STA-2 and Lakeside Ranch STA. The SFWMD partnered with Broward County to build an access site on SFWMD right-of-way at the C-14 along the Sawgrass Expressway into WCA-2A providing an access site to a popular fishing area and entrance to a bike trail across WCA-2.

**C-139 Annex Restoration Project:** In July 2015, the FDEP authorized the SFWMD to begin construction activities on the C-139 Annex Restoration Project (also known as the Sam Jones/Abiaki Prairie) in Hendry County. The +14,000-acre project will provide benefits to groundwater, surface water, and water supply as well as complement other efforts to improve water quality for the Everglades Western Basins region. The C-139 Annex Restoration Project will occur in two major phases, with the completion of the first smaller phase supplying the native plant material for the larger second phase. It is anticipated that the major restoration work will be completed by 2020. Once restoration is completed, the site will be evaluated for recreational opportunities compatible with permitting requirements and the purposes of the project. Funding for construction of the project is coming in large part from fees collected by the State of Florida from the Miami-Dade Limestone Products Association to implement mitigation measures to offset the impacts of permitted mining activities.

**Objective 3.A.2: Increase participation by 350,000 acres in the Agricultural Conservation Easement Program (ACEP) and the Environmental Quality Incentive Program (EQIP) to promote compatibility between agricultural production and South Florida Ecosystem restoration.**

## Policy/Regulatory Framework

- ACEP - Subtitle H of Title XII of the Food Security Act of 1985, as amended by Section 2301 of the Agricultural Act of 2014 (Public Law 113-79).

## Implementation Approach

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, revitalization of natural habitats, water storage and filtration, and aquifer recharge. In addition to regulatory programs and Best Management Practices (BMPs), several voluntary conservation programs are successfully assisting landowners in protecting and preserving natural resources on agricultural lands. The 2014 Farm Bill places a strong emphasis on the conservation of working lands, ensuring that land remains both healthy and productive. Assistance available to landowners 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.

The ACEP is implemented through the USDA Natural Resources Conservation Service (NRCS). ACEP is a voluntary program that consolidates the former Wetlands Reserve Program (WRP), Grassland Reserve Program, and Farm and Ranchlands Protection Program. ACEP is comprised of agricultural and wetlands easements. Agricultural easements prevent productive working lands from being converted to non-agricultural uses and protect land devoted to food production. Wetland easements offer landowners the opportunity to protect, restore, and enhance wetlands and wildlife habitat on their property. The NRCS provides technical and financial support to help landowners with their wetland restoration efforts. The NRCS goal is to achieve the greatest wetland functions and values, along with optimum wildlife habitat, on every acre enrolled in the program.

## 2014-2016 Progress Highlights

**ACEP Programs in Florida:** During the reporting period, the USDA has invested over \$65 million in ACEP funds to protect 8,000 acres of land in Florida. Over 99% of this acreage is located in the Northern Everglades Initiative area. In 2016, for the eighth consecutive year, Florida received the largest USDA-NRCS easement program funding allocation in the nation.

**Fisheating Creek:** Under the WRP, NRCS acquired permanent conservation easements in the Fisheating Creek Wetland Restoration Project area. The planned restoration activities will reduce the amount of surface stormwater leaving the land, slowing water runoff and the concentration of nutrients entering Lake Okeechobee and the Everglades. The purchase and restoration of easements in Fisheating Creek will contribute to the connection of public and private lands and help form a conservation corridor from the Kissimmee River to ENP. The easements will provide large open spaces, food resources, and connectivity needed to sustain wide ranging animals like the federally endangered Florida panther, and other wildlife including the crested caracara, Florida black bear, red-cockaded woodpecker, and whooping crane. The restoration of the Fisheating Creek Wetlands Reserve Program is being designed in two phases, with the first phase underway. The target construction date is the dry season of 2017.

**Northern Everglades:** Throughout the 20th Century, agricultural producers in what is now referred to as the Northern Everglades were encouraged to construct surface water drainage systems to facilitate the establishment and production of "improved" pasture forages and crops. As a result, thousands of miles of surface water drainage systems and other water control infrastructures were installed, resulting in accelerated drainage of both water and nutrients from local ranches and farms into downstream water bodies. The USDA-NRCS delivers the ACEP program to agricultural landowners located within the Northern Everglades and Estuaries Protection Program (NEEPP) region and partners with the SFWMD for technical support. As a result of this program, the amount of surface water leaving lands from participating landowners will be reduced through infiltration and evapotranspiration and will occur over a more natural period of time compared to drained agricultural land. Consequently, the concentrations of nutrients entering the public water management system and ultimately Lake Okeechobee will be reduced.

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

### Policy/Regulatory Framework

- The NPS Organic Act (16 U.S.C. 1 and 16 U.S.C.3)
- ENP Protection and Expansion Act of 1989 (16 U.S.C. 410r-5)
- Modified Water Deliveries to Everglades National Park Project (16 U.S.C. 410r-S)
- WRDA 2000 (Public Law No. 106-541). Title VI, Section 601, of the Act, describes authorizations specific to CERP.
- AR-360-1, The Army Public Affairs Program

### Implementation Approach

Public outreach and communication form an important cornerstone for support of ecosystem restoration efforts. Public outreach strategies aim to instill a broad sense of stewardship, and responsibility for all stakeholders involved, including private citizens. Efforts include environmental education, small business outreach, community outreach, and project-specific local outreach.

### 2014-2016 Progress Highlights

**Stakeholder Engagement:** At their October 2011 meeting, the Task Force directed the Working Group to develop an enhanced public and stakeholder dialogue for the Central Everglades Planning Project (CEPP). This same workshop model was applied to the 2015 update of the Integrated Delivery Schedule. The workshop model has been very successful and has received widespread praise from the public, agency staff, and decision makers.

**EvergladesRestoration.gov:** A new partnership between the USDOJ and the USACE was initiated in 2013 to combine [www.sfrestore.org](http://www.sfrestore.org) and [www.evergladesplan.org](http://www.evergladesplan.org) by overhauling our web presence for Everglades restoration in a new, consolidated webpage. The new website, [www.evergladesrestoration.gov](http://www.evergladesrestoration.gov), was launched in the Fall of 2014 and continues to be updated.

**Comprehensive Everglades Restoration Plan (CERP) Outreach:** During the reporting period, the USACE and the SFWMD continued their efforts to raise awareness about the CERP and overall restoration of the South Florida Ecosystem. The USACE and the SFWMD continue to utilize web-based communication to help ensure that CERP and the Everglades ecosystem is better understood and that the public has opportunities to participate in decision-making.

Table 5: Subgoal 3.A: Use and Manage Land in a Manner Compatible with Ecosystem Restoration Comprehensive Status July 1, 2014—June 30, 2016		
Objective	Projects	Status
<b>Parks, Recreation, and Open Space</b> <i>Objective 3.A.1: 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.</i>	Florida Communities Trust Grant Program	<b>Land Acquisition:</b> 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 State Trail [Project ID 3200]	<b>Planning:</b> Completed for three new segments; underway for six others. <b>Construction:</b> Completed for 4.7 miles; underway for 14 miles.
	Florida Greenways and Trails Program [Project ID 3202]	<b>Planning:</b> 2 Blueway systems (Lee County and Charlotte County), Shingle Creek paddling trail, and Shingle Creek Regional Park designated. <b>Land Acquisition:</b> 5.22 acres in Orange County.
<b>Compatible Agriculture</b> <i>Objective 3.A.2: Increase participation by 350,000 acres in the Agricultural Conservation Easement Program and the Environmental Quality Incentive Program to promote compatibility between agricultural production and South Florida Ecosystem restoration.</i>	Technical Assistance to Indian Reservations [Project ID 3300]	<b>Implementation:</b> Ongoing.
	2002 Farm Bill Conservation Programs [Project ID 3301]	<b>Implementation:</b> Enrolled 394,589 acres at an obligated cost of \$330,738,014.
<b>Community Understanding</b> <i>Objective 3.A.3: Increase the use of educational programs and initiatives to further public and local government understanding of the benefits of South Florida Ecosystem restoration.</i>	USACE CERP Public Outreach and Assistance [Project ID 3502]	<b>Implementation:</b> Ongoing.
	SFWMD Outreach Program [Project ID 3503]	<b>Implementation:</b> 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 1, 2014–June 30, 2016) is delineated in Table 6.

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

#### Policy/Regulatory Framework

- The Flood Control Act of June 30, 1948
- The Flood Control Act of September 3, 1954
- The Flood Control Act of July 3, 1958
- The Flood Control Act of July 14, 1960
- The Flood Control Act of October 23, 1962
- The Flood Control Act of October 27, 1965
- The Flood Control Act of 1968
- ENP Protection and Expansion Act of 1989, Public Law 101-229
- WRDA 1992, Public Law 102-580
- WRDA 1996, Public Law 104-303
- WRDA 1999, Public Law 106-53
- WRDA 2000, Public Law 106-541
- WRDA 2007, Public Law 110-114
- WRRDA 2014, Public Law 113-121

#### Implementation Approach

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. Numerous non-structural options for flood protection also 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.

### 2014-2016 Progress Highlights

**Broward County:** The S-13 Pump Station has been fully refurbished, including installation of new engines, new generator building, new trash rakes, new automated controls, and complete removal and overhaul of the pumps. The project allows an aging pump station constructed in the 1950s to continue to provide flood protection to highly populated southern Broward County.

**C-4 Flood Mitigation Project:** The C-4 Flood Mitigation Projects include multiple individual projects to provide flood mitigation in the C-4 Basin. These include impoundments, pump stations, flood walls, and berms as well as conveyance improvements. Two forward pumps (S-25B and S-26) have been completed. Five (of seven) canal bank improvement projects have been completed. Of the remaining canal bank improvements, one project is in construction and the other is in design.

**Hillsboro Canal Bank Stabilization Project:** Construction is complete on the first two phases of Hillsboro Canal Bank Stabilization. The project replaced collapsing banks on both the north and south sides with properly sloped, armored, and vegetated banks and removed sediment from the canal that resulted from the collapsing material. This returned the canal to its full hydraulic capacity. The first two phases covered 7.5 miles of canal from the southeast corner of Site 1 eastward to the G-56 coastal structure. Design is nearing completion on the last phase, covering the westernmost 3 miles of remaining canal. The Hillsboro Canal is a primary flood control feature serving southern Palm Beach County and northern Broward County.

**J.W. Corbett Wildlife Management Area Levee:** In August 2014, the FDEP issued a permit for the construction of a new 6.25 mile levee system to increase flood protection for south Florida residents. This project is located within the J.W. Corbett Wildlife Management Area located in western Palm Beach County. The levee system improvement project consists of constructing a new levee within uplands and wetlands in areas which separate J.W. Corbett from the Indian Trail Improvement District's M-O Canal. It was a cooperative effort between the SFWMD, the FWC, and the Indian Trail Improvement District.

**Lake Okeechobee's North Shore:** Lake Okeechobee's North Shore Series of Pump Stations (S-127, S-129, S-131, S-133, and S-135) are currently under construction to install new control systems to provide the ability to remotely operate all five stations from a control center at S-127, improving flood control response and operational efficiency for surrounding lakeside communities and agricultural lands.

**Palm Beach County:** Construction is nearly complete on the S-46 Tailwater Weir and Gate Replacement Project. The S-46 is a coastal flood control structure serving northern Palm Beach County that was constructed in the 1950s. A tailwater weir was needed to assure future stability of the structure due to the large difference in water elevation from the upstream to downstream sides. Additionally, the gates and operators of the structure were removed and replaced and a fishing area will be created on each side of the tailwater weir.

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

#### Policy/Regulatory Framework

- The Rivers and Harbors Act of 1930
- The Rivers and Harbors Act of 1935
- The Flood Control Act of June 30, 1948
- The Flood Control Act of July 3, 1958
- The Flood Control Act of 1968

The Herbert Hoover Dike Major Rehabilitation Evaluation Report from 2000 was the beginning of the rehabilitation efforts at Herbert Hoover Dike. The ongoing Dam Safety Modification Study is being developed in accordance with USACE Engineering Regulation 1110-2-1156: Safety of Dams – Policy and Procedures.

### Implementation Approach

The Herbert Hoover Dike system consists of approximately 143 miles of embankment surrounding Lake Okeechobee. Rehabilitation will address seepage, embankment stability, and problematic foundation conditions and will provide authorized levels of flood risk management to adjacent communities.

### 2014-2016 Progress Highlights

The USACE continues work on thirty-two federal water control structures, also known as culverts that are considered the greatest threat to the dike due to loss of material into and around them. Replacing these structures is the current priority. To date, the USACE has taken action on twenty-one of the culverts: one has been removed, two have been replaced, and eighteen are currently under contract for replacement. The USACE plans to award contracts to replace eight additional culverts and seal off three abandoned structures by FY 2018. Work on all culverts should be finished by 2022.

The Dam Safety Modification Study report, published shortly after this document's reporting period, includes an implementation plan for actionable areas for the entire Herbert Hoover Dike system beyond the current ongoing and planned projects.

In an effort to streamline the regulatory process for the rehabilitation and repair project, the FDEP developed a comprehensive approach that will reduce the timeframe necessary to process future culvert replacement activities associated with the dike. The department estimates this proactive comprehensive approach will save over 1,000 work hours, more than \$40,000 in taxpayer money, and will result in a significant reduction in time needed for future permit authorizations.

<b>Table 6: Subgoal 3.B: Maintain or Improve Flood Protection in a Manner Compatible with Ecosystem Restoration Comprehensive Status July 1, 2014–June 30, 2016</b>		
<b>Objective</b>	<b>Projects</b>	<b>Status</b>
<u><b>Public Works Construction</b></u> <b><i>Objective 3.B.1: Maintain or improve existing levels of flood protection for the urban, agricultural, and natural environments.</i></b>	C-4 Flood Mitigation Projects [Project ID 3600]	<b>Planning:</b> Completed. <b>Construction:</b> Emergency Detention Basin and Forward pumps S-25B & S-26. <b>Completed:</b> Five (of seven) canal bank improvement projects completed. One canal bank improvement project is in construction. One canal bank improvement project is in design.
<u><b>Herbert Hoover Dike Rehabilitation</b></u> <b><i>Objective 3.B.2: Rehabilitate the Herbert Hoover Dike to provide adequate levels of flood protection to the communities and lands surrounding Lake Okeechobee.</i></b>	Herbert Hoover Dike Rehabilitation [Project ID 3700]	<b>Planning:</b> Replacement of Culverts IP-1, IP-2, and IP-3 and the Reach Wall Cutoff Wall Gap Closure are scheduled for contract award in FY 2016. Planning and design underway for replacement of Culverts KI-1, KI-2, HP-1, HP-5, and HP-6 in addition to the Reach 1 Cutoff Wall Extension Project. Dam Safety Modification Study is complete. Approval is expected in August 2016. <b>Construction:</b> Replacement of Culverts 1, 1A, 11, 16, 3, 4A, 5, 5A, 8, 13, 10, 12, 2, 12A, HP-2, HP-3, 10A, and 6 is ongoing.

## SUBGOAL 3.C: PROVIDE SUFFICIENT WATER RESOURCES FOR THE BUILT AND NATURAL SYSTEMS

The State of Florida both independently and with its federal partners under the CERP has 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. Water management districts are directed to develop regional water supply plans for areas where it determines that existing sources of water are not adequate to supply water for all existing and future reasonable-beneficial uses and to sustain the water resources and related natural systems for at least the next 20 years. The CERP authorization in 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 1, 2014–June 30, 2016) is delineated in Table 7.

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

#### Policy/Regulatory Framework

- Chapters 373, 403, and 187, Florida Statutes (F.S.).
- Additionally, the water supply planning regions shall be considered Water Resource Caution Areas for the purposes of Section 403.064, F.S., and affected parties may challenge the designation pursuant to Section 120.569, F.S.

#### Implementation Approach

The SFWMD has developed regional water supply plans for five planning regions encompassing the district. Regional water supply plans for each of the five SFWMD planning areas are updated every five years to reassess current and future water needs, water resource conditions, and water resource and water supply development projects. The goal of each plan is to meet the water supply needs of the region during a one-in-ten year drought and the needs of the environment while not causing harm to the water resources.

The planning horizon for the water supply plans varies based on when the plan was approved. The planning horizon for the current Lower West Coast and Lower East Coast updates is 2030, the Central Florida Water Initiative/Upper Kissimmee Basin and the Lower Kissimmee Basin planning horizons are 2035, and the Upper East Coast planning horizon is 2040. The plan updates include development of goals and objectives, population and water demand projections, issue identification, water source options, water supply and water resource projects, and future direction. The plans are completed in a public process under the auspices of the SFWMD’s Water Resources Advisory Commission (WRAC).

#### 2014-2016 Progress Highlights

**Kissimmee Basin:** In 2012/2013, the Kissimmee Basin was divided into two regions. The Lower Kissimmee Basin Water Supply Plan was approved by the Governing Board in 2014. The Upper Kissimmee Basin is in the Central Florida Water Initiative Regional Water Supply Planning area, which is a joint effort

between the South Florida, Southwest Florida, and St. Johns River water management districts. The Central Florida Water Initiative Regional Water Supply Plan was approved by the governing boards of the three water management districts in November 2015.

**Lower East Coast:** The Lower East Coast Water Supply Plan Update was approved in 2013.

**Lower West Coast:** In 2015, the update to the Lower West Coast Water Supply Plan was initiated and is scheduled for completion in 2017.

**Upper East Coast:** In 2016, the Upper East Coast Water Supply Plan Update was approved.

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

### Policy/Regulatory Framework

- Chapter 62-40, F.A.C.
- Chapter 62-610, F.A.C.
- Section 403.064, F.S.
- Section 403.086, F.S.
- Section 373.250, F.S.

### Implementation Approach

The SFWMD regional water supply plans outline the planning and permitting efforts that encourage water conservation and the use of alternative water supply sources. Reuse involves the treatment of domestic wastewater to appropriate standards and subsequent beneficial reuse including groundwater recharge, environmental enhancement, and irrigation. The CERP contemplates the use of reclaimed water (reuse) to help meet the freshwater requirements of the southern end of the Everglades system, including Biscayne Bay.

### 2014-2016 Progress Highlights

**Comprehensive Water Conservation Program:** The SFWMD continues to implement its 2008 Comprehensive Water Conservation program to develop a year-round conservation ethic and promote the efficient use of water. Utility per capita water use utilized in water supply plans continues to trend downward.

**Reuse:** In 2014, a total of 110 treatment facilities provided reuse within the SFWMD. These facilities reused a total of 278 million gallons per day (mgd) of treated wastewater. Most of the reclaimed water (166 mgd) was used for landscape irrigation at over 134,000 residences, 204 golf courses, 266 parks, and 78 schools.

The 2015 Reuse Inventory Report is complete and available. The FDEP maintains the largest and most comprehensive databases of permitted reuse systems in the world. Domestic wastewater treatment facilities (0.1 mgd and greater) that provide reclaimed water are required to submit annual reuse reports to the FDEP as well as the applicable water management district. These annual reports are the basis for FDEP's reuse inventory database, from which a Reuse Inventory Report is compiled and published annually.

The National "WateReuse" Association has compiled a comprehensive web database of water reuse facilities and programs in the U.S. The FDEP reuse inventory database was used to populate this national database.

**Wastewater Discharges:** In 2008, the Florida Legislature passed a law requiring wastewater effluent discharges through ocean outfalls to cease by December 31, 2025, except as "backup discharge" to a functioning reuse system. In addition, the law requires that those utilities implement 60 percent reuse of the effluent being discharged to the ocean or about 176 mgd by the 2025 deadline. The FDEP submitted a progress report on implementation of the program in July 2015. To comply with the law, the South Central

Regional (Delray/Boynton) and Boca Raton plan to expand existing public access irrigation; the Broward County North District has an agreement with Palm Beach County to use reclaimed water to serve existing golf courses in southern Palm Beach County and northern Broward County; the City of Hollywood plans to expand their existing reuse system to the extent feasible; and, the Miami-Dade Water and Sewer District plans to reuse a majority of their reclaimed water for cooling water for a Florida Power and Light Turkey Point power plant expansion as well as Floridan Aquifer recharge.

### 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.

#### Policy/Regulatory Framework

- Section 373.707, F.S.
- Section 403.086, F.S.
- In the 2016 "Water Bill" the Florida Legislature encourages public-private partnerships to accomplish water storage, groundwater recharge, and water quality improvements on private agricultural lands. According to the legislation, priority consideration will be given to public-private partnerships that: (a) store or treat water on private lands for purposes of enhancing hydrologic improvement, improving water quality, or assisting in water supply; (b) provide critical groundwater recharge; or (c) provide for changes in land use to activities that minimize nutrient loads and maximize water conservation.

#### Implementation Approach

Generally, SFWMD regional water supply plans have concluded that development of traditional fresh water sources has been maximized in many areas, and that alternative water sources and conservation will be needed to meet future needs. Alternative water supplies include saltwater, brackish water, aquifer storage and recovery, and reclaimed water projects. Alternative technologies for water supply development are more expensive than historically used freshwater water sources. To support development of alternative water supplies, the SFWMD has administered the Alternative Water Supply Development Program in coordination with the State's Water Protection and Sustainability Program to provide grants and cost-sharing funding for alternative water supply projects.

#### 2014-2016 Progress Highlights

**Program to Date:** SFWMD funding from 1997 to 2016 was \$127,010,907. Total approved SFWMD and State funding from 1997 to 2016 was \$194,591,607. Between FY2012 and FY 2016, \$9.15 million dollars in District funding was awarded to 23 projects. No state funding has been allocated since FY2009. Approximately 490 projects have been funded that made available 435 million of gallons per day (mgd) of water. Currently, over 278 mgd of reclaimed water is being reused for beneficial purposes in the SFWMD. In addition, there are 42 operational desalination facilities with a total capacity of approximately 269 mgd (all but two utilize brackish ground water as source water).

**Cooperative Funding Program:** In 2016, the District's AWS, Water Conservation, and Stormwater Management cost-share programs have been combined into a single Cooperative Funding Program (CFP). In the FY2016 budget, the SFWMD has budgeted \$9 million in one-time funding for the CFP for project construction in 2017 and 2018. Project selection will be in the summer/fall of 2016.

**Dispersed Water Management:** In 2016, FDEP provided \$47.8 million dollars to expand the Northern Everglades Dispersed Water Management Projects to create large scale regional water storage on private property.

**Minimum Flows and Levels (MFLs).** Florida law directs the SFWMD to set MFLs to prevent significant harm to water resources. Since 2001, MFLs and recovery and prevention strategies have been adopted for waterbodies covering approximately 7.2 million acres. There are currently nine MFL waterbodies within the SFWMD boundary. The SFWMD will continue to establish MFLs for the ecosystem’s priority water bodies. The Priority Water Body List and Schedule is prepared annually, approved by the Governing Board, and then submitted to FDEP for review and approval. Once MFLs, water reservations, or restricted allocation areas rules are adopted, they are implemented through the SFWMD’s consumptive use permitting and water supply planning programs.

**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 necessary to achieve the natural system benefits of each CERP project will be identified within each Project Implementation Report. Water reservations have been adopted for the Picayune Strand and Fakahatchee Estuary in association with the Picayune Strand Restoration Project, for the North Fork of the St. Lucie River in association with the Indian River Lagoon-South Project, for all surface water flowing to Biscayne Bay in association with the Biscayne Bay Coastal Wetlands Phase I Project, and for the Caloosahatchee River in association with the Caloosahatchee River (C-43) West Basin Storage Reservoir Project. The SFWMD is currently in the rule development process to establish a water reservation for the Kissimmee River Basin, which includes the Kissimmee Chain of Lakes (19 lakes total), the Kissimmee River, and its floodplain. The Kissimmee Basin Water Reservation is scheduled for rule adoption in December 2016. Restricted Allocation Area (RAA) rules have been adopted that protect natural system water for the North Palm Beach/Loxahatchee River Watershed Water Bodies and Lower East Coast Everglades Water Bodies, which protect water for the Loxahatchee River and the Everglades, including the Site I impoundment project. The RAA rules ensure that water will be available for future projects like the CEPP.

<b>Table 7: Subgoal 3.C: Provide Sufficient Water Resources for the Built and Natural Systems Comprehensive Status July 1, 2014–June 30, 2016</b>		
<b>Objective</b>	<b>Projects</b>	<b>Status</b>
<u>Water Supply Plans</u> <b>Objective 3.C.1: Plan for regional water supply needs.</b>	Regional Water Supply Plans [Project ID 3800]	<b>Reports:</b> The Lower West Coast Update was completed in 2012; the Lower East Coast Update was completed in 2013; the Lower Kissimmee Basin was approved in 2014; the Central Florida Water Initiative Regional Water Supply Plan was approved in November 2015; and the Upper East Coast Update was approved in March 2016.
<u>Reuse Water</u> <b>Objective 3.C.2: Increase volumes of reuse on a regional basis.</b>	C&SF: CERP South Miami-Dade County Reuse [Project ID 3900]	<b>Planning:</b> Local governments have conducted advanced treatment pilot studies to assess feasibility of using reclaimed water for restoration. As a result of reduced water demands, cost effectiveness and the economic downturn, no additional work related to use of reclaimed water for wetland restoration is underway. Alternative reuse strategies involving the Floridan aquifer appear more cost effective.
<u>Alternative Water Supply Development</u> <b>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.</b>	Alternative Water Supply Grant Program [Project ID 4000]	<b>Implementation:</b> 23 projects funded between FY2012 and FY2016.

## SUBGOAL 3.D: REDUCE INVASIVE EXOTIC SPECIES PATHWAYS ORIGINATING FROM THE BUILT ENVIRONMENT

The control of invasive exotic species is integral to the restoration of the South Florida Ecosystem, including America’s Everglades and the recovery of threatened, endangered, and other imperiled species. At the same time, the continuing degradation of the natural environment may enhance the spread or the rate of spread of exotic species, making timely restoration all the more critical.

The Task Force has been engaged in invasive exotic species impacts for more than a decade. Development of an Invasive Exotic Species Strategic Action Framework (IES Framework) began in September 2013 and was approved by the Task Force in November 2014.

A significant number of pathways for the introduction of invasive exotic species originate from the built environment. In some cases it is a well-intentioned pet owner releasing an unwanted pet, unaware of the damage that can be done when populations of exotic species become established in south Florida. Others plant prolific exotics that are low maintenance from a landscaping perspective, not realizing that the very thing that makes these plants easy to grow also makes them potentially invasive. Some species find their way in through our ports or even through interstate mail. Increasing awareness of the impacts such decisions and practices have on the South Florida Ecosystem will help to reduce pathways into our natural areas.

A better understanding of pathways can lead to more robust and effective measures that prevent introductions before they produce significant economic and ecological damages, while simultaneously protecting safe commerce. Securing current and potential pathways will require enhanced import screening, a component of Subgoal 2-B.1 (see page 31). In addition to screening, public outreach and education, best management practices, and partnerships are important to reducing introductions of invasive exotic species from the built system pathways.

*A Significant Number of Species are Introduced through the Built Environment. Preventing Species Entering through these Pathways is Critical to Future Success.*

### Objective 3.D.1: Increase awareness of the impacts of invasive exotic species on south Florida’s environment, economy, culture, and human health.

#### Policy/Regulatory Framework

- The Miami-Dade County Comprehensive Development Master Plan

#### Implementation Approach

Several initiatives have been developed to increase awareness of the impacts of invasive exotic species including Pet Amnesty Day events, the Everglades Non-Native Fish Roundup, a reporting hotline and database, outreach to ENP visitors, educational curriculum such as the Don’t let it Loose Guide, participation in conferences and workshops by ECISMA and associated agencies, and outreach activities associated with individual species.

## **2014-2016 Progress Highlights**

### **Exotic Species Reporting Hotline and Database Maintenance**

The FWC Nonnative Fish and Wildlife Program uses sightings, many by the public, to determine if a new non-native species may have potential to reproduce and become established. The FWC began manning the toll-free “IVEGOT1” hotline in 2011, a statewide expansion of the Python Patrol hot line for the Florida Keys. Hotline reports, combined with FWC and partner surveys and reports received from Early Detection and Distribution Maps (EDDMaps), have increased our collective knowledge of many otherwise unknown potential nonnative species issues, such as Argentine black and white tegu expansion and releases, monitor (*Varanus* spp.) distribution in Palm Beach, Broward, Miami-Dade, and Monroe counties, and recent sightings of chameleon species in south Florida. The hotline also provides a way for the public to give up unwanted exotic pets through the Pet Amnesty program. In 2015 the average reporting per day was 45 with an annual total of 8,524 reports, 741 of which were from Florida.

**Outreach:** The FWC has extended its public invasive species outreach and education plans. A comprehensive list of actions can be found at: <http://myfwc.com/wildlifehabitats/nonnatives/reporting-hotline>. Working with local city officials in Coconut Creek, ECISMA partners held the first outreach event at a commercial pet store during the reporting period.

**Southwest Florida Cooperative Invasive Species Management Area (SWCISMA):** The SWCISMA hosted its annual Exotics Workshop for agency and organization personnel as well as students and private landowners. This workshop provides an opportunity for people to learn current information on identification and treatment of invasive species in southwest Florida. Following this event, another workshop was held for individuals who may be working with large constrictor snakes in the field. During the Fall of 2015, the SWCISMA hosted an Exotic Animal Workshop for local citizens in Collier County to assist residents with identification of tegus and response protocol. The SWCISMA also hosted its first tegu survey, with 10 agency representatives in attendance.

**Volunteer Workdays:** The Miami-Dade County EEL Program hosts at least 15 volunteer workday events annually, attracting thousands of volunteers who remove invasive exotic species, plant trees, maintain trails, remove refuse and debris, and conduct other restoration tasks. Volunteers learn to identify native species and remove invasive exotic species.

## **Objective 3.D.2: Continue existing and develop new partnerships that focus on reducing pathways.**

### **Policy/Regulatory Framework**

- Everglades Cooperative Invasive Species Management Area (ECISMA) MOU
- SWCISMA MOU

### **Implementation Approach**

Pathways are ways exotic species are introduced to a new environment, either accidentally or intentionally. These include ports, pet owner releases, hitchhikers on equipment or tools, and other accidental releases. In many cases we can help reduce pathways by partnering with other agencies and private organizations. Partnerships with the Pet Industry help spread the word about being a responsible pet owner. Outreach to boating groups helps reduce the spread of aquatic hitchhikers. Initiatives to inform travelers at airports also increase awareness about bringing in items that could cause harm to both natural and built environments, including the economy. Inter-agency partnerships such as ECISMA and the Task Force, help define and coordinate the message so it can be incorporated into all the partner agencies outreach efforts.

### 2014-2016 Progress Highlights

**Don't Pack-a-Pest Partnership:** Don't Pack a Pest (DPAP) is an outreach program that delivers a simple message: *When You Travel, Declare Agricultural Items, DPAP*. The program's goal is to educate travelers about the risks associated with bringing undeclared agricultural items in to the U.S. and into neighboring Caribbean countries. The Florida Department of Agriculture and Consumer Services works in collaboration with the USDA, U.S. Customs and Border Protection (USCBP), and air and seaports to administer the program. Notable accomplishments include the production of a 60-second video, signage, and promotional materials for multiple uses and broad distribution. The video is displayed on monitors in the passport control areas at 20 U.S. international airports through USCBP's Model Ports Program with the potential to reach 85% of international travelers into the U.S. The video is also aired periodically on airlines and in airports. Over 700 signs are displayed at 50 major ports of entry in the U.S. and the Caribbean. The program has partnered with Jamaica, Puerto Rico, U.S. Virgin Islands, Cayman Islands, Turks and Caicos Islands, and the Dominican Republic. Partnerships are also underway with Panama and Haiti. Other project elements include research in the form of passenger surveys to gauge the effectiveness of the campaign, advertising in the form of billboards, digital and print advertising, and development of a website that assists travelers determine if the agricultural products they intend to put in their baggage are allowed entry into the U.S. The program is in its sixth year.

**Everglades Cooperative Invasive Species Management Area (ECISMA):** ECISMA, a cooperative interagency effort to manage and control exotic species, has continued its focus on early detection and rapid response of emerging threats. Since its inception, the group has achieved much progress toward improved coordination and cooperation among those engaged in invasive species management in the Everglades. These accomplishments include development of regional monitoring programs, standardization of data management, completion of numerous rapid response initiatives, and enhanced coordination of management and research activities, in addition to continued coordination and collaboration on long-term management efforts for melaleuca, Old World climbing fern, and other widely established species.

**Habitattitude.** Habitattitude is a national campaign developed by the Aquatic Nuisance Species Task Force and its partner organizations designed to unify government and interested parties to speak with one voice and to empower target audiences to become part of the solution by promoting their prevention behaviors. The US Fish and Wildlife Service serves as the lead federal agency, and the partnership has the significant support and involvement of two different, but related sectors: the pet and aquarium trade, represented by the Pet Industry Joint Advisory Council, and the nursery and landscape industry. Additional partners include NOAA's National Sea Grant College program and state fish and wildlife agencies.

**Python Challenge:** The FWC hosted the 2016 Python Challenge, a conservation effort that includes public outreach on invasive species and a month-long competition to remove Burmese pythons from public lands in Florida.

**Table 8: Subgoal 3.D: Reduce invasive exotic species pathways  
originating from the built environment  
Comprehensive Status July 1, 2014–June 30, 2016**

Objective	Projects	Status
<p><b>Outreach and Education</b></p> <p><b>Objective 3.D.1:</b> <b>Increase awareness of the impacts of invasive exotic species on south Florida’s environment, economy, culture, and human health.</b></p>	Miami-Dade County Environmentally Endangered Lands Program-Volunteer Workdays [Project ID 4200]	<b>Implementation:</b> The EEL Program’s Volunteer Workdays and other volunteer events run from September through June of each year, with occasional summer projects, within EEL Preserves. The EEL Program hosts at least 15 events annually, attracting over 1,000 volunteers per year who plant trees, maintain trails, remove refuse and debris, eradicate invasive exotic species, and conduct other restoration tasks. In exchange for their service, volunteers are provided an opportunity to visit natural areas that are typically not accessible to the public, to learn to identify native species, to learn how to identify and eradicate invasive exotic species, and to receive guided tours by naturalists and land managers.
	Everglades Non-Native Fish Round Up [Project ID 4201]	<b>Implementation:</b> In May 2014, the fifth Annual Non-Native Fish Round Up was held. There were 55 people registered across the three counties. 580 pounds of invasive fish were caught including a new exotic fish called the marbled pim catfish.
	Zoo Miami/Miami-Dade County Invasive Species Outreach and Educational Programs [Project ID 4202]	<b>Implementation:</b> These multiple outreach and educational programs concerning invasive species will continue in perpetuity as part of our mission. As the Conservation and Research Department expands its programs for invasive species control, more outreach opportunities will be developed and expanded.
	Public Outreach to Support Containment Efforts [Project ID 4203]	<b>Implementation:</b> University of Florida has been coordinating invasive species outreach efforts since 2011 but has not yet received any external funding directed toward this purpose.
	Public Outreach to Support EDRR Efforts [Project ID 4204]	<b>Implementation:</b> University of Florida has been coordinating invasive species outreach efforts since 2011 but has not yet received any external funding directed toward this purpose.
	Public Outreach to Support Prevention Efforts [Project ID 4205]	<b>Implementation:</b> University of Florida has been coordinating invasive species outreach efforts since 2011 but has not yet received any external funding directed toward this purpose (with the exception of a small sub award for website redesign – see below).
	Exotic Pet Amnesty [Project ID 4206]	<b>Implementation:</b> Plans for 6 events a year are underway. Citizens can also call the 888-lve-Got-1 hotline year round to surrender unwanted nonnative pets. Funding provided through a grant from ENP is supporting the program through 2015. Following the end of grant funding, FWC will be searching for additional partnerships to help support this program and staff.
	Exotic Species Reporting Hotline and Database Maintenance [Project ID 4207]	<b>Implementation:</b> This program continues and will be funded particularly by a grant from ENP up to 2015. After the grant expires, the FWC will be looking at current budget and staffing to assume the full costs of the hotline.

**Table 8: Subgoal 3.D: Reduce invasive exotic species pathways  
originating from the built environment  
Comprehensive Status July 1, 2014–June 30, 2016**

Objective	Projects	Status
<p><b><u>Outreach and Education, Continued</u></b></p> <p><b><i>Objective 3.D.1: Increase awareness of the impacts of invasive exotic species on south Florida’s environment, economy, culture, and human health.</i></b></p>	SW Florida CISMA outreach [Project ID 4208]	<b>Implementation:</b> 9 Outreach Events held, approximately 1,500 people reached. 2 Professional Trainings/Workshops, approximately 300 professionals trained, 30 private citizens. 1 Tegu Survey in Collier County with 10 agencies involved. Developed and mailed “Have you seen me” postcards with identification and reporting information for tegus and Burmese pythons in Collier County. Developed and printed Cane Toad identification sheets for private citizens to use for pet health.
	ECISMA Outreach [Project ID 4209]	<b>Implementation:</b> ECISMA informs partners, colleagues, and environmental professionals about invasive species issues through the annual Everglades Invasive Species Summit. Invasive species education efforts for the general public are realized through the ECISMA website and attendance at a limited number of outreach events.
<p><b><u>Partnerships</u></b></p> <p><b><i>Objective 3.D.2: Continue existing and develop new partnerships that focus on reducing pathways.</i></b></p>	Travelers “Don’t Pack a Pest” Partnership with Airlines [Project ID 4300]	<b>Implementation:</b> Over the four-year contract period, it is estimated that over 500 million eyes-on impressions have been achieved through this outreach campaign.
	ECISMA [Project ID 4301]	<b>Implementation:</b> Ongoing.
	HABITATTITUDE [Project ID 4302]	<b>Implementation:</b> Currently funded by Congressional appropriation nationwide, though the amount provided to the State of Florida is unknown. Partners are in the process of updating the website.
	SW CISMA Partnership [Project ID 4303]	<b>Implementation:</b> Added Glades County to SWCISMA area. Website improvements: <a href="http://www.FloridaInvasives.org/Southwest">www.FloridaInvasives.org/Southwest</a> Educational materials: SWCISMA brochure, Kids activity guide, “Don’t Let it Loose” stickers and magnets, “Keeping Your Pets Safe Around Cane Toads,” “Have You Seen Me?” Tegu and python reporting cards. Kids’ interactive game: native and non-native species identification.

This page was intentionally left blank

## SYSTEM-WIDE ECOLOGICAL INDICATORS

The Task Force has established a suite of 11 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 and the green-yellow-red “stoplight” graphics were developed specifically as a communication tool to provide a big picture view of the ecosystem’s health and response to restoration in a non-technical format. The system-wide ecological indicators and stoplight illustrations provided herein represent a summary of broader and more detailed science assessments available in companion reports, including the 2016 System-wide Ecological Indicators for Everglades Restoration, RECOVER’s 2014 Systems Status Report, and the South Florida Water Management District’s (SFWMD) 2016 South Florida Environmental Report.

Details of the process for developing each indicator were published in a special issue of the scientific journal *Ecological Indicators* (Volume 9, Supplement 6, and November 2009). The process for selecting the indicators and an explanation of how the indicators relate to other factors being monitored were described in previous biennial reports. The suite of system-wide ecological indicators was chosen for its collective ability to comprehensively reflect ecosystem response to restoration in terms of space and time (Table 1). For example, periphyton responds to change very rapidly at both small and large spatial scales, while crocodylians respond more slowly to change at intermediate and large spatial scales. As indicators, they cover different aspects of the ecosystem.

As with the 2014 report, the ecological indicator sections are brief and describe only composite results for the previous reporting period (Water Year 2014) and the current reporting period (Water Year 2016). Readers looking for more detailed information on regional status and changes in these indicators will find it within the full report (2016 System-Wide Ecological Indicators Report available at [www.evergladesrestoration.gov](http://www.evergladesrestoration.gov)).

### Hydrologic Context for Water Years 2015 and 2016

The following discussion provides a basic introduction to the south Florida water cycle and a basic description of conditions during the reporting period: Water Years 2015 (May 1, 2014 to April 30, 2015) and 2016 (May 1, 2015 to April 30, 2016). A more detailed discussion of south Florida hydrology is available in the 2016 System-wide Ecological Indicators for Everglades Restoration report.

The Everglades has a hydrologic cycle, also called a water cycle, uniquely its own. Throughout most of the continental United States to the north, water levels generally rise and fall in tune with the four seasons. There, water levels typically peak during the spring as snow melts and front-driven storms move through, and ebb in the fall at the end of the hot summer stretch. The water cycle of subtropical south Florida and the Everglades, however, is fueled by only two seasons, wet and dry, leading to a reversal of its seasonal high and low water marks. In contrast with conditions to the north, water levels in the Everglades peak in the fall, coinciding with the end of the wet season, and ebb in the spring, coinciding with the end of the dry season when large expanses of wetlands dry out.

**Table 1. System-wide Ecological Indicators**

- Invasive Exotic Plants
- Lake Okeechobee Nearshore Zone Submerged Aquatic Vegetation
- Eastern Oysters
- Crocodylians (American Alligators and Crocodiles)
- Fish & Macroinvertebrates
- Periphyton
- Wading Birds (White Ibis & Wood Stork)
- Southern Coastal Systems Phytoplankton Blooms
- Florida Bay Submersed Aquatic Vegetation
- Juvenile Pink Shrimp
- Wading Birds (Roseate Spoonbill)

### **Summer Wet Season**

The wet season begins in late spring, usually around Memorial Day. It is characterized by consistently hot and humid weather, the daily buildup of spectacular cumulonimbus cloud formations, and resultant heavy thunderstorms that are often local and short-term in nature. Other larger systems—including early season storms enhanced by lingering spring-time instability in the upper atmosphere, mid-latitude cyclones, and tropical storms—periodically spike the Everglades with regionally expansive rains.

In response to these meteorological inputs, the Everglades become flooded with an ankle- to waist-deep, slow-moving pool of water through summer and fall, leaving only the high-ground tree islands and hardwood hammocks above water. The term sheet flow is used to describe this shallow and spatially expansive wetland plain that, unlike a lake or bog, flows like a stream, only much more slowly, almost imperceptibly slowly to the human eye. Spanning from horizon to horizon, this sheet of water flows south through a maze of tree-island-dotted ridges and sinuous low-lying sloughs, giving rise to the name River of Grass coined by Marjory Stoneman Douglas in 1947.

### **Winter Dry Season**

The weather turns mild during the winter half of the year, marking an end to the regular buildup of afternoon thundershowers and tropical storms and thus initiating the dry season, an approximate 6- to 7-month period dominated by a slow shallowing of standing water. As the dry season ensues, more and more land emerges. Water first recedes from the highest perched pinelands and other tree islands. Drainage of the marl prairies follows next, leading to an eventual retreat of water into the lowest-lying sloughs and marshes. The rate of recession may be slowed or even temporarily reversed by sporadic winter rains that are typically brought on by the descent of cold continental air masses from the north. Lower winter evaporation rates also hinder the rate of recession, though it rapidly picks up again in spring as daylight hours and air temperatures increase evaporation.

Although south Florida is generally considered a wet area by merit of its abundant average annual rain total of 52 inches (with a 70/30 percent wet/dry season split) and its often flooded wetland views, drought and wildfire play vital roles in maintaining the region's unique assemblage of flora and fauna. The ecological health of the Everglades is intimately tied to seasonal and inter-annual fluctuations of the water cycle and is impacted by a combination of:

- Natural processes
  - Rainfall
  - Evaporation
  - Overland flow
  - Groundwater infiltration
- Climatic oscillations
  - El Niño/La Niña
  - Climate change
- Water management manipulation associated with operation of the Central and Southern Florida Project (C&SF) project and other drainage works for the purpose of:
  - Flood protection
  - Urban and agricultural water supply
  - Environmental protection

Each water year is different in the Everglades, and the hydrologic cycle is characterized by large interannual variation – in other words, seldom do we experience average years.

The previous two water years (WY) illustrate this variation well and are summarized next.

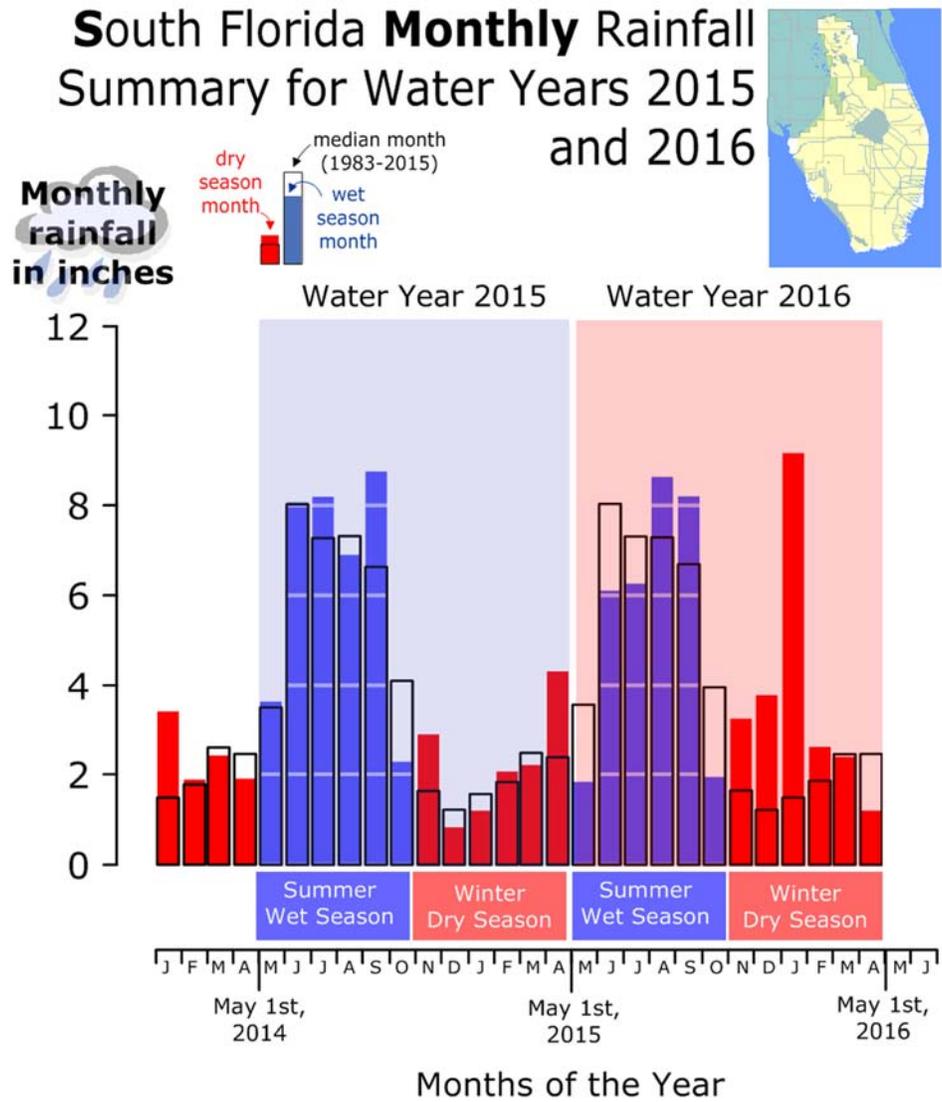


Figure 1. Summary of monthly rainfall in WY 2015 and WY 2016 throughout the South Florida Ecosystem. The graph was produced using daily rainfall data provided by the SFWMD. SFWMD meteorologists compute a daily rainfall value for the fourteen major basins and district-wide from rain gage measurements. See <http://www.gohydrology.org/p/about.html> for more information.

### Water Year Summaries

#### Water Year 2015 (May 1, 2014 to April 30, 2015)

Water Year 2015 was about as normal as they come in south Florida. Both the wet and dry season rainfall totals very closely matched the long-term averages — 38 inches of rain fell across south Florida during the six-month wet season (May through October) and 14 inches fell in the six-month dry season (November through April) that followed, for a total of 52 inches.

Accordingly, wetlands and waterways of the Everglades filled up through the wet season and receded during the dry season months. The biggest boost of rain came in September (and, in particular, in Arthur R. Marshall Loxahatchee National Wildlife Refuge (LNWR) and Water Conservation Area (WCA) 2 where 11 inches were recorded for the month) resulting in slough water depths cresting at a 2-foot depth throughout much of the Everglades by early October, more or less coinciding with the vast wetland's normal annual peak.

October had little rain to offer, even though this month historically accounts for a quarter of Florida's hurricane-strength storms. Thus, an early dry season was ushered in and the decade-long trend of anomalously low tropical storm activity continued.

### **Water Year 2016 (May 1, 2015 to April 30, 2016)**

Water Year 2016 proved to be an unusual, though not unprecedented, water year by merit of a paradoxical “double whammy” effect: a very dry summer (33 inches) followed by an extremely wet winter (22 inches) that resulted in a deceptively normal 55 inches of annual rain. On a month by month basis, however, this water year was anything but normal.

Abnormal conditions prevailed from beginning to end. The trend started with a delay to the normal onset of summer wet season rains. The two month span from early May to the Fourth of July — a period when regular afternoon rain showers usually soak in and rebound the water table out of springtime drought — registered only 60 percent of its normal rainfall amount. The ecological consequences of this summer rainfall deficit manifested in various ways throughout south Florida: instead of rising, water levels fell everywhere well into July and August, leaving wetlands parched and sheet flow non-existent through the first half of summer. To the south, the often hypersaline conditions in Florida Bay took a turn for the worse resulting in a catastrophic seagrass die-off while, to the west, a 35,000 acre wildfire spread across the desiccated Big Cypress Swamp.

The water table eventually rebounded to a semblance of its normal self by late summer, thanks to the arrival of a rainy pattern in August and September (almost 17 inches of rain were recorded over the two months). However, the rise in the water table was short-lived as upper atmosphere and westerly sheer winds from a strengthening El Niño yet again contributed to a lack of fall season tropical storms.

As fall turned to winter, the same westerly wind flow set the stage for the stunningly wet winter. Dubbed a “Super” El Niño, conditions produced above average rains in November and December (reminiscent of epic winter rains last seen in WY 1999), punctuated by a record-setting 9 inches of rain in January (6 times the monthly normal). As a result, instead of the gradual decline of the water table the winter dry season usually produces, water levels reached their annual peak in February, in most cases even higher than the previous fall peak and in some locations [i.e., Everglades National Park (ENP) and Big Cypress National Preserve] establishing historic winter high-water levels.

A series of emergency measures were taken to alleviate the unusual surplus of winter water, some of which had detrimental consequences — such as mandatory releases from Lake Okeechobee to the Caloosahatchee and St. Lucie estuaries due to the need to protect the integrity of the lake's perimeter levee currently under repair — whereas other measures were more aligned with Everglades restoration goals. Most notable in that regard were three efforts focused on sending the water southward: (1) to the east, water managers sent water through the new Tamiami Trail one-mile bridge into ENP's Northeast Shark River at an unprecedented scale, (2) to the west, the newly-constructed Merritt Pump Station went into action to spread water into downstream Picayune Strand, and (3) in the center, efforts were initiated to reintroduce long-diverted overland flows into the Sweetwater Strand watershed downstream of Big Cypress National Preserve.

Despite the lingering concerns of continued rains, WY 2016 ended on a dry note with many areas returning to near normal conditions, including Lake Okeechobee, thanks to a drier March and April.

## System-wide Ecological Indicators

### Helpful Hints for Reading the Indicators

Within the system-wide indicator tables, the “Current Status” column contains the most recent indicator information, which for most indicators is the end of WY 2016 (May 1, 2015 to April 30, 2016). The “Previous Status” column contains information for WY 2014 (May 1, 2013 to April 30, 2014). Status is shown using green, yellow, and red stoplight colors as explained below.

### Stoplight Color Legend

**Red** (R) Substantial deviations from restoration targets creating severe negative condition that merits action. **Well below restoration target.**

**Yellow** (Y) Current situation does not meet restoration targets and may require additional restoration action. **Below restoration target.**

**Green** (G) Situation is within the range expected for a healthy ecosystem within the natural variability of rainfall. Continuation of management and monitoring effort is essential to maintain and be able to assess “green” status. **Meets restoration target.**

**Black** (B) No data or inadequate amount of data were collected due to reductions in funding.

INDICATORS AT A GLANCE	Previous Status	Current Status
	Water Year 2014	Water Year 2016
Invasive Exotic Plants	Y	Y
Lake Okeechobee Nearshore Zone Submerged Aquatic Vegetation	Y	Y
Eastern Oysters - <b>Modified (Northern Estuaries only)</b>	Y	Y
Crocodylians (American Alligators and Crocodiles) - <b>Modified (DOI Lands Only)</b>	R	R
Fish & Macroinvertebrates (WCA3 and ENP only)	R	R
Periphyton - <b>Modified (no species composition)</b>	Y	Y
Wading Birds (White Ibis and Wood Stork)	R	R
Southern Coastal Systems Phytoplankton Blooms - <b>Modified (no southwest shelf)</b>	Y	R
Florida Bay Submerged Aquatic Vegetation	Y	Y
Juvenile Pink Shrimp - <b>Modified (no sampling)</b>	B	B
Wading Birds (Roseate Spoonbill)	R	R

## INVASIVE EXOTIC PLANT INDICATOR

STATUS	PREVIOUS (WATER YEAR 2014)	CURRENT (WATER YEAR 2016)
SYSTEM-WIDE	Y	Y

The status of the invasive exotic plant indicator (Doren et al. 2009) was below the restoration target (yellow spotlight) at the end of WY 2014 and remains below the restoration target at the end of WY 2016. Though there were positive results for some invasive plant species in some ecological systems, others showed negative results as measured by abundance and/or geographic distribution.

The region-wide interagency effort to manage the highly invasive tree, melaleuca, remains a national example of coordination success. Melaleuca distribution and abundance within the Everglades Protection Area decreased 54% in areas with intermediate to high infestation levels between 1995 and 2015 (LeRoy Rodgers, SFWMD, unpublished data). However, the overall geographic distribution of the species has increased and, due to a lack of maintenance control measures, populations previously under control have resurged.

Old World climbing fern continues to present significant challenges to restoration. Long-term data confirm continued increases in abundance and geographic range throughout the region. Substantial impacts to forested wetland ecosystems are attributed to the colonization of this vining fern, which displaces native plant species, degrades wildlife habitat, and promotes destructive wildfires. Expansion of Old World climbing fern is particularly severe in the floodplain swamps of the Kissimmee River basin, Everglades tree islands of LNWR, and cordgrass marshes of ENP. Current conditions in these areas do not meet restoration criteria.

Given the diversity of south Florida’s invasive species and their varied impacts, managers have to prioritize response. Science-based assessments help inform managers of predicted impacts of invasive species and associated impediments to restoration success. Management approaches that combine a variety of treatment and control techniques as a means of mitigating invasion impacts are proving useful. For example, integrating herbicide treatments, fire, and biological controls through the CERP Biological Control Implementation Project is improving overall management outcomes for some invasive species. Continued improvements in invasive species management through coordinated planning, construction, and operation phases of restoration efforts (see CERP Guidance Memorandum 062.00, 2012) are necessary to promote more cost-effective management.

The greatest threats to invasive plant management success in the Everglades are: 1) insufficient resources to address invasive species in critical areas; and 2) the continued establishment of new invasive species. Experience gained over the last two decades confirms that containing and reducing populations of highly invasive species often requires substantial initial investment of resources as well as commitment to long-term maintenance control of the populations as restoration proceeds.

**The invasive plant indicator remains below the restoration target.**

Literature Cited:

Doren, R. F., J. C. Volin, J. H. Richards. 2009. Invasive exotic plant indicators for ecosystem restoration: An example from the Everglades restoration program. *Ecological Indicators* 9S:S29-36

South Florida Ecosystem Restoration Task Force. 2015. Invasive Exotic Species Strategic Action Framework. [EvergladesRestoration.gov](http://EvergladesRestoration.gov).

## LAKE OKEECHOBEE NEARSHORE ZONE SUBMERGED AQUATIC VEGETATION (SAV) INDICATOR

STATUS	PREVIOUS (WATER YEAR 2014)	CURRENT (WATER YEAR 2016)
SYSTEM-WIDE	Y	Y

The status of the Lake Okeechobee Nearshore SAV indicator was below the restoration target (yellow stoplight) at the end of WY 2014 and remains below the restoration target at the end of both WY 2015 and WY 2016. SAV covered less than the 40,000 acre target threshold during the annual mapping exercise in both WY 2015 and WY 2016, although the criterion that 50% or more of the plant taxa present be vascular plants was met during both years. The total number of acres covered by SAV did increase slightly during WY 2016 as compared to WY 2015.

Since its establishment in 2008, the Lake Okeechobee Regulation Schedule has generally kept the lake within or below the ecologically preferred range of 12.5 to 15.5 feet above sea level. That changed in 2016 when El Niño generated very wet conditions in January and February. As a result, the lake stage went above 16 ft at the end of January and remained above 15.5 feet until the middle of March. Most of the sentinel sites when sampled in November 2015 and February 2016 had associated losses of SAV.

On the basis of annual SAV coverage data collected since 2000, maintaining lake stage within the ecologically beneficial stage envelope, both in terms of water depth and temporal ascension and recession rates, provides the best conditions to maximize nearshore SAV coverage. When lake stages have been significantly above or below the ecologically beneficial stage envelope, SAV coverage has declined. Restoration activities that provide a significant increase in water storage in the Lake Okeechobee watershed, thereby allowing the lake to more closely follow the timing and depths of an ecological beneficial stage envelope, should enhance SAV coverage and density in the nearshore region. However, even with better control of lake stage, periodic events such as tropical storms and droughts will continue to influence nearshore SAV coverage.

New performance measures are being developed for additional key ecological components of Lake Okeechobee including summer cyanobacteria abundances, January and February bluegill and redear sunfish creel data, summer nearshore *Chara* and vascular SAV areal coverage, and spring and fall epiphyte and epipelton (algae living on plant and soil surfaces respectively) abundances. These performance measures are in various stages of review through the RECOVER approval process.

**The Lake Okeechobee SAV indicator remains below the restoration target.**

# EASTERN OYSTERS (*CRASSOSTREA VIRGINICA*) INDICATOR

STATUS	PREVIOUS (WATER YEAR 2014)	CURRENT (WATER YEAR 2016)
SYSTEM-WIDE (Modified Northern Estuaries only)	Y	Y

The status of the eastern oyster was below the restoration target (yellow stoplight) at the end of WY 2014 and remains below the restoration target at the end of WY 2016. This summary reports on the status of the eastern oyster in the Northern Estuaries (Caloosahatchee Estuary, St. Lucie Estuary, Loxahatchee River Estuary, and Lake Worth Lagoon). Monitoring in Lake Worth Lagoon may be discontinued after December 2016 when funding from Palm Beach County ends.

Restoration activities that provide additional water storage in the Lake Okeechobee watershed, the St Lucie and Caloosahatchee watersheds as well as storage south of the lake will help to reduce the severity of excess freshwater discharges from Lake Okeechobee, minimize huge fluctuations in salinity, enable oyster populations to thrive, and lead to increased oyster population densities. Too much fresh water impacts reproduction, larval recruitment, survival, and growth, while too little fresh water impacts the survival of oysters due to predation and higher prevalence and intensity of the *Perkinsus marinus* pathogen.

The oysters in the Caloosahatchee and St. Lucie estuaries were impacted by too much fresh water in summer and too little fresh water in the winter in WY 2015. In contrast, large amounts of freshwater runoff and managed releases impacted the Caloosahatchee and St. Lucie Estuaries during the winter season of WY 2016. It appears that the freshwater inflows into the estuaries during winter season in WY 2016 occurred when oysters were reproductively inactive and fewer larvae were present. As a result, negative impacts on oyster populations were minimized. Mortality of oysters in the Caloosahatchee ranged between 9-26% and is deemed normal. In the Caloosahatchee River, disease levels were moderate and living densities good between WY 2012-2016. In the St. Lucie River, there were both low-salinity mortalities in both water years, as well as periods of high salinity in both water years, resulting in an increased incidence of disease. There were very few months where salinity remained within the optimal band for oysters.

The oysters in Lake Worth Lagoon and Loxahatchee River were consistently impacted by salinities that were too high resulting in high disease prevalence.

**The oyster indicator remains below the restoration target.**

## CROCODILIANS (AMERICAN ALLIGATORS & CROCODILES) INDICATOR

STATUS	PREVIOUS (WATER YEAR 2014)	CURRENT (WATER YEAR 2016)
SYSTEM-WIDE (Modified USDOl lands only)	R	R

A full system-wide status assessment for crocodilians for WY 2014 – WY 2016 cannot be provided because some survey routes have not been sampled since funding was suspended in WY 2012. However, surveys have continued on USDOl lands (LNWR, Big Cypress National Preserve, Crocodile Lake National Wildlife Refuge, BNP, and ENP).

The status of the crocodilian indicator in the areas listed above has remained well below the restoration target (red stoplight) since WY 2014 and remains well below the restoration target at the end of WY 2016. This is the first time since 2008 that the overall score for USDOl lands has remained well below the restoration target for three years in a row. There are fluctuations from year to year, but overall this result reflects low relative densities of alligators, variable alligator body condition, and low crocodile growth and survival.

Data collected for both alligators and crocodiles were used to update RECOVER performance measure documentation sheets. Performance measures are planning tools used by RECOVER to determine the degree to which proposed alternative plans are likely to meet CERP restoration objectives, or implemented plans have met restoration objectives. Documentation sheets provide technical information about the indicator and describe desired future condition and how the indicator can be used for evaluation and assessment. The alligator documentation sheet was approved in June 2014 and the crocodile documentation sheet in October 2015.

Data are being used to develop a better understanding of the relationship between hydrology, salinity, and alligator relative density and body condition and salinity and crocodile growth, survival, and survey encounter rate. Alligators show population responses to water conditions with decreasing trends in abundance immediately after a dry year and increasing trends following subsequent wet years. Alligator relative density showed declining trends in Shark River estuary and animals moved up and down the estuary in response to salinity, with fewer alligators in areas of higher salinity. Alligator body condition was related to fluctuations in water levels that are important for wetland health. Alligator body condition has declined in the Everglades since the early 2000s and is about 12% lower than in other areas of Florida. Juvenile crocodile growth and survival is higher when salinities are lower. Refined statistical techniques are allowing us to get better estimates of crocodile survival. We have also been able to examine long-term trends in crocodile survey encounter rates and identify effects of extreme events, such as the 2010 cold snap. See the 2016 System-wide Ecological Indicators for Everglades Restoration for more details and a list of publications.

**The crocodilian indicator remains well below the restoration target.**

## FISH & MACROINVERTEBRATES INDICATOR

STATUS	PREVIOUS (WATER YEAR 2014)	CURRENT (WATER YEAR 2016)
SYSTEM-WIDE	R	R

The status of the fish and macroinvertebrates indicator assessed in ENP (Shark and Taylor Sloughs) and WCA-3A and WCA-3B was well below the restoration target (red stoplight) in both WY 2015 and WY 2016. This indicator contains multiple components (see Full System-wide Ecological Indicators Report) and those in Shark and Taylor Sloughs in ENP that are sensitive to hydrological drying have been below rainfall-based expectations at most long-term monitoring sites extending back to WY 2013. This is in contrast to the same indicators in WCA-3A and WCA-3B, where they have been within expectations based on rainfall. There is continued evidence that Shark River Slough and Taylor Slough dried more than required to meet our rainfall-based restoration targets.

The regional relative abundance of non-native fish has exceeded 2% for the first time in Shark and Taylor sloughs, but not WCA-3A in this reporting period. This is the first time that non-native fish (African jewelfish, Asian swamp eels, spotfin spiny eels) have been identified as a potential cause of failure to meet restoration targets since reporting began in WY 2002. There is strong statistically supported evidence that non-native fish are impacting native species by causing decreases in both density and biomass. At their current densities, we have empirical evidence that they are re-shaping the function of Everglades aquatic animal communities. How this will ultimately affect the ability of these aquatic communities to provide critical food for iconic predators, including wading birds and alligators, remains to be learned. Completing restoration of historical hydroperiods could provide greater resilience of native aquatic communities and diminish impacts of non-native species, whose expansion and success may be facilitated by the drier environment currently prevailing as a result of past hydrologic conditions.

**The Fish and Macroinvertebrates indicator remains well below the restoration target.**

## PERIPHYTON INDICATOR

STATUS	PREVIOUS (WATER YEAR 2014)	CURRENT (WATER YEAR 2016)
SYSTEM-WIDE (Modified—no species composition)	Y	Y

The status of the modified periphyton indicator (an indicator of water quality) was below the restoration target (yellow stoplight) at the end of WY 2014 and remains below the restoration target at the end of WY 2016. The periphyton indicator is no longer calculated as originally developed because of funding limitations beginning in WY 2012 (for more information, see 2016 System-wide Ecological Indicators for Everglades Restoration report).

The modified indicator includes only two components: 1) periphyton quality [a reflection of total phosphorus (TP)] and 2) quantity (biomass). In WY 2016, because many sites still show altered or cautionary quality (33% of sites) and quantity (42% of sites), the status of the indicator was considered below the restoration target (yellow stoplight). This represents a significantly increased number of sites classified as yellow relative to WY 2014. The sampling sites with lower periphyton quality (sites with higher TP concentrations, or enriched sites) were clustered near the L-67 canal, the central WCA-3A flowpath, and near canal boundaries of LNWR and WCA-2A. Several sites in coastal areas also had lower periphyton quality, possibly driven by marine sources of phosphorus.

The thresholds used for the periphyton quality (reflection of TP) and quantity (biomass) metrics described above were refined from data that have been collected for nearly a decade for the periphyton mapping program. A third metric, the species compositional metric, discontinued in WY 2012, improves detection of water quality improvement or impairment by more than 20% because the ratio of weedy to native diatoms is the most sensitive of the three metrics to changes in TP concentration exposure. We now have a better understanding of the utility of the quality, quantity, and species composition metrics and relationships to phosphorus loading from boundary canals (Gaiser et al. 2015). Wet season compositional values for the 6 years of record are highly correlated with flow-weighted mean TP concentrations at inflow structures. The high correlation between inflow concentration and condition status across each wetland is surprising, since it includes locations well to the interior of the wetland. The full interpretation of the periphyton metric for marsh impairment must consider inflow and legacy TP, local biogeochemical processes, and other factors (hydroperiod, soil compaction, and subsidence) influencing periphyton ecology. Additional analysis level may resolve interpretation of sources for impairment. These data and findings were also reported in the RECOVER 2014 System Status Report (Section 3B) and are being used to support models for synthesis efforts. Funding for composition has resumed so we will be able to incorporate that metric in the next reporting period.

### The periphyton indicator remains below the restoration target.

#### Literature Cited:

- Gaiser, E., A. Gottlieb, S. Lee\*, and J. Trexler. 2015. The importance of species-based microbial assessment of water quality in freshwater Everglades wetlands. *In* Entry, J., K. Jayachandran, A. Gottlieb, and A. Ogram (Eds.) *Microbiology of the Everglades Ecosystem*. Science Publishers. pp 115-130.
- Trexler, J., E. Gaiser, and J. Kominoski. 2015. Edibility and periphyton food webs, specific indicators. *In* Entry, J., K. Jayachandran, A. Gottlieb, and A. Ogram (Eds.) *Microbiology of the Everglades Ecosystem*. Science Publishers. pp. 155-179.

## WADING BIRDS (WOOD STORK & WHITE IBIS) INDICATOR

STATUS	PREVIOUS (WATER YEAR 2014)	CURRENT (WATER YEAR 2016)
SYSTEM-WIDE	R	R

The status of the wading bird (White Ibis and Wood Stork) indicator was well below the restoration target (red stoplight) at the end of WY 2014 and remains well below the restoration target at the end of WY 2016. The El Niño conditions that began in July 2015 led to a much reduced hydroperiod throughout much of the Everglades during the critical summer growing season for fish that are prey for wading birds. Conversely, during the winter, record wet conditions were experienced, with exceptionally slow drying trends during the nesting season. Reversals in water level were common. This led to relatively little food for wading birds, and because water levels did not recede as usual, the prey that was available was difficult for the birds to capture during 2016. The number of nests started was very low and initiation was delayed nearly two months in comparison to most seasons on record.

Wood Storks are perhaps the species most sensitive to the conditions which support the production of larger prey fish, like sunfishes. These conditions were poor in the months leading up to the 2016 Wood Stork nesting season. In addition, this species is especially dependent upon the drying down of water levels in order to access their prey. No storks nested in the WCA of the Everglades. Relatively few storks began nesting in the coastal region of ENP, and those that did began in late February as compared with nesting in early November under predrainage conditions. Similarly, Great Egrets initiated nesting in mid- to late March, a full two months later than usual. Ibises began nesting in large numbers only in late April and early May, at least a month behind schedule.

None of the components [proportion of nesting in coastal headwaters, ratio of Wood Stork and White Ibis nests to Great Egret nests, month of Wood Stork nest initiation, mean interval between exceptional (supercolony) White Ibis nesting year] of the wading bird indicator showed much change in trend or degree in WY 2015, and although the season is not complete at the time of writing in 2016, it is clear that nearly any trends that do emerge will be downward. Although one component (White Ibis supercolony nesting) now routinely exceeds the restoration target, the other three components remain stable and are well below target levels.

The ratio of tactile foragers (Wood Storks and White Ibises) to sight foragers (Great Egrets) has shifted little in the past 5 years and is very far from the 30:1 ratio typical of predrainage colonies. Finally, during the last two years, storks have not initiated nesting until late February (2015) or March (2016). The 2016 nesting season should probably not be seen as alarming, since El Niño winters nearly always produce exceptionally poor nesting and low nesting success. Similarly, the responses of wading birds are what we would predict (trends are stable to negative) since large scale restoration of hydrological conditions that should positively affect birds has not yet taken place.

**The wading birds indicator remains well below the restoration target.**

# SOUTHERN COASTAL SYSTEMS PHYTOPLANKTON BLOOMS INDICATOR<sup>1</sup>

STATUS	PREVIOUS (WATER YEAR 2014)	CURRENT (WATER YEAR 2016)
SYSTEM-WIDE (Modified—no southwest shelf, reduced sampling frequency)	Y	R

The status of the Southern Coastal Systems phytoplankton blooms indicator (an indicator of water quality) was well below the restoration target (red stoplight) at the end of WY 2016. The status of the indicator varied throughout the Southern Coastal System in WY 2015 and 2016 but was below the restoration target (red stoplight) because of the continued degradation of water quality in Biscayne Bay and a significant trend of degrading water quality in the southwest Florida sites. Degraded water quality refers to a significant increase in chlorophyll *a* above baseline, which is indicative of increased nutrient loading, termed eutrophication. In Biscayne Bay, this increase in chlorophyll *a* has been accompanied by an unprecedented algal bloom and increasing phytoplankton blooms over the past 20 years suggesting water quality in the bay is systematically degrading and appears to be nearing a tipping point with macroalgae and phytoplankton replacing seagrass. If this tipping point is surpassed, it will be far more costly to restore Biscayne Bay than it is to protect and improve water quality now. Restoration actions that improve water quality in Biscayne Bay will help to avoid reaching that tipping point.

In comparison, phytoplankton blooms in Florida Bay are either decreasing or remaining steady suggesting that water quality in the bay is not degrading. However, the bay experienced a large-scale seagrass die-off in the summer of 2015 (see the Florida Bay SAV indicator in this report). The last seagrass die-off of similar magnitude and extent in Florida Bay occurred in the late 1980s and was followed within several years by an unprecedented and ecologically devastating phytoplankton bloom. For this reason, despite the currently good conditions of water quality in Florida Bay, we expect to see declines in this indicator over the next several years.

Data collected for this indicator are used for the RECOVER Systems Status Report for assessing water quality in the Southern Coastal Systems. In addition, they were used in assessing the impact of the C-111 Spreader Canal Western Project on Florida Bay. Operations of the C-111 project did not increase the magnitude, duration, or spatial extent of phytoplankton blooms in Florida Bay.

**The phytoplankton blooms indicator is well below the restoration target.**

---

<sup>1</sup> Please refer to the Executive Summary for an update on algal blooms in the northern part of the system.

## FLORIDA BAY SUBMERSED AQUATIC VEGETATION INDICATOR

STATUS	PREVIOUS (WATER YEAR 2014)	CURRENT (WATER YEAR 2016)
SYSTEM-WIDE	Y	Y

The status of the overall Florida Bay submersed aquatic vegetation (SAV) indicator was below the restoration target (yellow stoplight) for both WY 2015 and WY 2016. The Composite Index summarizing overall system status for SAV in Florida Bay indicates that during WY 2015-16, the SAV status regressed in several areas and improved in a few. The Abundance Index, which combines both spatial coverage and density, was good in the Northeast Zone, fair in the Transition, Central, and Western Zones and poor in the Southern Zone. For 2015 the Abundance Index was reduced by the density component, reflecting sub-optimal density in many areas, including a reduction to fair in the Western Zone, poor density in the Southern Zone and good only in the Northeast Zone. Notably, abundance remained poor in Madeira Bay and Twin Key Basin and fair in Rankin, Rabbit, Long, and Joe Bay and surrounding basins. Abundance in the Western Zone improved to good in early WY 2016.

The Target Species Index, which combines indicators for presence of ecologically valuable species and for a healthy mixed species composition, showed continued good status in only the Western Zone for both WY 2015 and WY 2016 and a decline from good to fair in the Northeast, Transition, and Central Zones and continuing status of fair in the Southern Zone. The underlying indicators reflect generally good spatial extent of SAV in almost all basins throughout the bay, including an improvement to good in Joe Bay. There were no large-scale die-off events in WY 2015. Indicators for WY 2016 were based on data from May 2015 (which represents WY 2016) and reflects conditions prior to a large-scale SAV die-off in late summer 2015. That die-off event will be reflected in the WY 2017 data collected in May of 2016. Early results from the period indicate that the Central and Western Zones will be particularly decimated by die-off in WY 2016-17 with overall declining indicator scores.

Gains in the quality of SAV habitat over the past several years are precarious and can be reversed within an annual timescale. After habitat losses from the seagrass die-off event in 1987 and a severe algal bloom in the eastern bay in 2005-2008, there was a steady rebound of the SAV community reflected in improving scores in the late 2000s and early 2010s. Especially after the relatively wet years of 2012 and 2013, the resulting in lower salinities brought favorable conditions and improving SAV status in many areas of the bay. The dry years that followed in 2014 and 2015 are characterized by a decline in SAV status and indicator scores. The extreme drought of 2015-16 will likely continue this negative trend.

**The Florida Bay SAV indicator remains below the restoration target.**

# JUVENILE PINK SHRIMP INDICATOR

<b>STATUS</b>	<b>PREVIOUS (WATER YEAR 2014)</b>	<b>CURRENT (WATER YEAR 2016)</b>
SYSTEM-WIDE	B	B

Funding was suspended in WY 2012. No data were available for assessment of the juvenile pink shrimp indicator condition at the end of WY 2016.

## WADING BIRDS (ROSEATE SPOONBILL) INDICATOR

STATUS	PREVIOUS (WATER YEAR 2014)	CURRENT (WATER YEAR 2016)
SYSTEM-WIDE	R	R

Overall, the status of the wading bird (Roseate Spoonbills) indicator was well below the restoration target (red stoplight) at the end of WY 2014 and remains well below the restoration target at the end of WY 2016, though conditions throughout Florida Bay appear to be improving for spoonbills especially in Northeastern Florida Bay (NEFB).

The total number of Roseate Spoonbill nests in Florida Bay in 2016 was 362, with a 5-year average of 344 nests. Although a great improvement over the 191 nests recorded in 2014 (5-year average of 268), the number of nests is still well below of the target of 1258 nests, scoring a red stoplight. The overall nesting location metric was scored as a red stoplight, but also showed improvement since 2014. Nest numbers in Northwestern Florida Bay remained below the restoration target (yellow stoplight) (5-year mean of 140 nests compared to the target of 210), with a slight improvement over 2014 (5-year mean of 132). NEFB showed significant improvement with 197 (5-year mean 160) nests compared to 76 in 2014 (5-year mean 98), but fell well short of the restoration target of 688, scoring a red stoplight and the overall location scored a red stoplight as well.

Roseate Spoonbill nesting success in Florida Bay continues the improving trend seen in recent years. This improvement does not seem to be due to restoration efforts to date, but rather to natural drought conditions that are favorable to spoonbills in the short-term because drier conditions help to concentrate their food. However, consecutive drought years such as have been experienced in 2015 and 2016 can otherwise have cataclysmic impacts on Florida Bay. The severe drought conditions in 2016 resulted in hypersaline conditions and a massive sea grass die-off: very similar to events that occurred during the drought of 1987-1990, after which there was a collapse of the spoonbill population. So, in the short-term, the nest success metric of the indicator is below the restoration target, but we expect this to decline further post-drought to well below the restoration target as it did following the 1987-1990 drought.

The prey metric for spoonbills was also well below the restoration target (red stoplight). This metric measures the percentage of freshwater fish species at spoonbill foraging locations. When the spoonbill prey base is dominated by freshwater species, there tends to be a higher abundance of fish and they are more available to foraging spoonbills. With the drought conditions and high salinity levels, there were virtually no freshwater species collected this year resulting in a red stoplight score for this metric.

Three of the four metrics for spoonbills were well below the restoration target (red stoplight) with the fourth being below the restoration target (yellow stoplight), so overall the spoonbill indicator is represented as a red stoplight.

**The spoonbill indicator remains well below the restoration target.**

## 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.

The duties of the Task Force are to:

- Coordinate the development of consistent policies, strategies, plans, programs, projects, activities, and priorities for addressing the restoration, preservation, and protection of the South Florida Ecosystem;
- Exchange information regarding programs, projects, and activities of the agencies and entities represented on the Task Force to promote ecosystem restoration and maintenance;
- Facilitate the resolution of interagency and intergovernmental conflicts associated with the restoration of the South Florida Ecosystem among the agencies and entities represented on the Task Force;
- Coordinate scientific and other research associated with the restoration of the South Florida Ecosystem; and
- Provide assistance and support to agencies and entities represented on the Task Force in their restoration activities.

### 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 Science Coordination Group 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 SFWMD's Water Resources Advisory Commission serves as an advisory body to the Task Force.

### Intergovernmental Coordination

The Task Force and its subgroups conduct meetings for the purpose of intergovernmental coordination. 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. In addition to its regular meetings, the Task Force has developed and employed a workshop process to enhance public engagement in such planning activities as the Central Everglades Planning Project (2011-2013) and the 2015 update of the Integrated Delivery Schedule.

### Invasive Exotic Species (IES)

At the December 2012 Task Force meeting, the Task Force directed the Office of Everglades Restoration Initiatives (OERI), Working Group, and SCG to develop a comprehensive review of current efforts to combat IES. This review indicated that an integrated approach with sustained resources was needed to be effective. The OERI brought together a diverse array of IES experts in order to develop a Strategic Action Framework. The framework was presented to the Task Force at their November 2014 meeting. Subsequent work efforts have include creation of an enhanced web-based Framework, a prioritized list of strategies, and a cross-cut budget tool.

## ACRONYMS

ACEP	Agricultural Conservation Easement Program
ARS	Agricultural Research Service
ASR	Aquifer Storage and Recovery
BMAP	Basin Management Action Plans
BMP	Best Management Practices
BNP	Biscayne National Park
C&SF	Central and Southern Florida Project
CARL	Conservation and Recreation Lands
CEPP	Central Everglades Planning Project
CERP	Comprehensive Everglades Restoration Plan
CFS	Cubic feet per second
CISRERP	Committee on Independent Scientific Review of Everglades Restoration Progress
CREW	Corkscrew Regional Ecosystem Watershed
EAA	Everglades Agricultural Area
ECISMA	Everglades Cooperative Invasive Species Management Area
EDDMapS	Early Detection and Distribution Maps
EDRR	Early Detection and Rapid Response
EEL	Environmentally Endangered Lands
ENP	Everglades National Park
EQIP	Environmental Quality Incentive Program
FAC	Florida Administrative Code
FAVT	Floating Aquatic Vegetation Technology
FDACS	Florida Department of Agriculture and Consumer Services
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FEB	Flow Equalization Basin
FEMA	Federal Emergency Management Agency
FKNMS	Florida Keys National Marine Sanctuary
FS	Florida Statute
FWC	Florida Fish and Wildlife Conservation Commission
FY	Fiscal Year
GCSSF	Governor's Commission for a Sustainable South Florida
HWTT	Hybrid Wetland Treatment Technology
IDS	Integrated Delivery Schedule
IES	Invasive Exotic Species
IES Framework	Invasive Exotic Species Strategic Action Framework
IFP	Integrated Financial Plan
IRL-S	Indian River Lagoon-South Project
LNWR	Arthur R. Marshall Loxahatchee National Wildlife Refuge
Long-term Plan	Long-Term Plan for Achieving Water Quality Goals for Everglades Protection Area Tributary Basins
LOPA	Lake Okeechobee Protection Act
MFL	Minimum Flows and Levels

## ACRONYMS

Mgd	Millions of gallons per day
Mod Waters	Modified Water Deliveries to Everglades National Park Project
NEEPP	Northern Everglades and Estuaries Protection Program
NENA	Northeast Everglades Natural Area
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NNC	Numeric nutrient criteria
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRCS	Natural Resources Conservation Service
OERI	Office of Everglades Restoration Initiatives
PIR	Project Implementation Report
PPA	Project Partnership Agreement
PPB	Parts per billion
RECOVER	REstoration COordination and VERification
SAV	Submerged/submersed aquatic vegetation
SCG	Science Coordination Group
SEFCRI	Southeast Florida Coral Reef Initiative
SFWMD	South Florida Water Management District
STA	Stormwater Treatment Area
SWCISMA	Southwest Florida Cooperative Invasive Species Management Area
SWFS	Southwest Florida Sites
Task Force	South Florida Ecosystem Restoration Task Force
TMDL	Total Maximum Daily Load
TN	Total nitrogen
TP	Total phosphorus
USACE	U.S. Army Corps of Engineers
USCBP	U.S. Customs and Border Protection
USDA	U.S. Department of Agriculture
USDOI	U.S. Department of the Interior
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WCA	Water Conservation Area
WRAC	Water Resources Advisory Commission
WRDA	Water Resources Development Act
WRRDA	Water Resources Reform and Development Act
WY	Water Year

For further information on this document please contact:

South Florida Ecosystem Restoration Task Force  
U.S. Department of the Interior - Office of Everglades Restoration Initiatives (OERI)  
c/o NOVA University  
3321 College Avenue  
Davie, FL 33314  
Telephone: 954-377-5971

For more information on the South Florida Ecosystem Restoration Program  
or to view this document online, please visit  
[EvergladesRestoration.gov](http://EvergladesRestoration.gov)