

# Water Quality Program

## Cooperative Science

National Park Service  
U.S. Department of the Interior

South Florida Natural Resources Center  
Everglades National Park



*Within the South Florida Natural Resources Center of Everglades National Park (ENP), the Water Quality Program has the primary responsibility for analyzing and disseminating information on water quality issues. In support of Department of the Interior (DOI) parks and refuges in south Florida, Water Quality Program staff work in partnership with the U. S. Fish and Wildlife Service to track progress toward water quality restoration goals and develop cooperative projects with local universities and state agencies to improve our understanding of how water quality shapes and impacts the ecosystem. Here, we highlight some of the important projects that our cooperators are currently conducting.*

### Contaminant Assessment and Risk Evaluation

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The occurrence and fate of many pollutants, including pesticides and herbicides, within the Everglades system are uncertain. This study consists of a three-year monitoring project to assess the concentrations, temporal variations, and potential impacts of contaminants on freshwater and marine natural resources. Contaminants that are being examined include trace metals and organic compounds of urban and agricultural origin, excluding nutrients and mercury. The project will provide a baseline from which to evaluate future conditions and which will also serve in the eventual development of a long-term contaminants monitoring program for DOI lands, important for tracking effects of Everglades restoration projects.

### Removal of Major Ions, Trace Metals, and Pesticides

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Construction and operation of the Central and Southern Florida Project has introduced a network of canals and levees that has substantially altered water flows and has accelerated the spread of

polluted water into natural areas. Little attention has been given to the cycling, distribution, and removal of potential contaminants other than nutrients. This project is a two-year investigation into the efficacy of stormwater treatment areas in removing non-nutrient water contaminants. The purpose of the study is to identify major constituents, trace metals, and other chemicals that warrant analysis and, using a mass balance approach, compare contaminant concentrations in inflows and outflows.

### Sampling Methodologies for Monitoring Water Quality

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Representative sampling and rigorous quality assurance are essential for accurate monitoring and evaluation of water quality. Factors contributing to either unrepresentative samples or inconsistent quality assurance must be identified and eliminated from monitoring programs. Together, ENP and South Florida Water Management District personnel are conducting a study to assess phosphorus inputs from areas adjacent to the park and implement accurate and cost-effective monitoring networks. The team is investigating differences between total phosphorus concentrations obtained by grab and autosampling methods. The ENP inflow monitoring network will be evaluated and recommendations provided to management.

White Ibis (*Eudocimus albus*)  
photo by William Perry, ENP

## Phosphorus Retention and Sub-Surface Movement

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Water flowing into ENP has the potential to transport nutrients and disrupt the naturally oligotrophic biochemistry of the system. A series of detention basins has been established in the “Frog Pond” region east of ENP to facilitate water flow into the upper section of Taylor Slough. The goal of this study is to determine phosphorus retention rates and sub-surface movement through the detention basins into Taylor Slough. The potential ecological effects of seepage from the detention basins into the park are being assessed by identifying biotic indicators of water quality, hydroperiod, and water depth. Sites for water quality and ecological monitoring will be established within the detention basins, a phosphorus model integrating surface water and shallow groundwater systems will be developed, and water quality and community composition will be evaluated relative to canal drainage.

## Ecosystem Response Indicators

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The Tamiami Trail will be modified in the near future to allow more water into Northeast Shark River Slough. The purpose of this study is to determine current ecological and biogeochemical characteristics of the slough, including water and soil quality and community characteristics of flora and fauna, in order to track changes as more natural sheet flow is re-established. The objectives of the study are to develop a detailed ecological characterization of the Shark Slough

ecosystem, establish a monitoring network across existing hydro-period and nutrient gradients in the slough, and determine the best biological indicators of nutrient variability and hydropattern.

## Importance of Water Flow and Sediment Transport to the Everglades Landscape

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The once regular flow of water through the Everglades system scoured sloughs, which became important pathways for downstream movement of large volumes of water. Because the area south of Lake Okeechobee has been compartmentalized, flow in most of the remaining Everglades is now sporadic or non-existent. Understanding the inter-relationships of water flow, soil/sediment dynamics, vegetation structure, and landscape evolution is critical to managing restoration efforts (water quantity, timing, and distribution). Reaching this understanding requires both the acquisition of pertinent information and the development of appropriate analytical tools. Taking advantage of the removal of portions of the Tamiami Trail roadway that will increase water flow into Shark Slough, the goal of this study is to describe water flow behavior through vegetated ridge and slough systems and tree islands, quantify suspended sediment characteristics and transport rates, gather historical aerial photos and collect new remotely sensed imagery, and perfect a flow and transport model.

