Everglades project - Response to Changing Trophic and Hydrologic

Mandate: This research project provides necessary information to support Everglades restoration through the establishment of hydrologic and ecologic needs for the Everglades ecosystem as mandated in the Everglades Forever Act (EFA), the Everglades Settlement Agreement, and the Comprehensive Everglades Restoration Plan (CERP).

Management Issue: The EFA sets criteria for the restoration of the Everglades and the establishment of hydrologic needs and phosphorus (P) criterion such that there will be no imbalance in the natural populations of aquatic flora and fauna. The Comprehensive Everglades Restoration Plan (CERP) is designed to re-evaluate and reconfigure water management throughout south Florida, with the goal to obtain natural water flow, hydroperiod, and quality to the system, thereby restoring the entire system to its native state. To meet these goals, The District is carrying out field and laboratory studies to determine the effects of changing hydrology, nutrient enrichment and food web structure on the ecology of key ecosystem components that occur in the Everglades ecosystem (periphyton, invertebrates, and plants).

Project Overview: Research and monitoring is being conducted to establish an understanding of how microbial communities respond to human-induced change and management interventions. Because of the key role of the microbial community in the Everglades ecosystem, work is designed to measure the microbially mediated processes, spatial distribution, and food web interactions. Scientific work draws on observational information (monitoring), experimental studies, and modeling to address specific statutory directives. Taken together this project will provide some of the information needed to evaluate and possibly implement improved water management practices.

Project Objective: The main objectives of this project are to address the following questions:

1. Can natural hydrology be augmented to manage/restore the microbial community in nutrient- and hydrologically impacted areas?
2. Can a nutrient-enriched marsh be successfully remediated through water quality/hydrologic management alone or is active management required?

Specifically this project will:

- Identify the environmental conditions (nutrients versus water levels, and others) that govern deviations from native periphyton biomass, community structure, and productivity
- Define quantitative relationships between periphyton and important environmental parameters in order to predict the outcome of nutrient and hydrologic remediation
- Determine the contribution that periphyton make to habitat quality in the Everglades

Application of Results: The monitoring program evaluates environmental variation along transects that span both impacted areas (particularly nutrient and water levels) and those characteristic of native conditions in all four major regions in the Florida Everglades. Ongoing field collections are being used to identify important relationships between ecosystem components and changing nutrients and water levels. Both laboratory and field experiments are being carried out to identify important environmental factors that are potentially responsible for impacting native Everglades microbial communities.