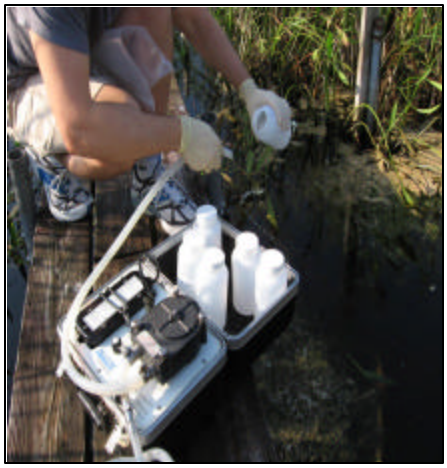
CONCEPTUAL PLAN FOR ACHIEVING LONG-TERMWATER QUALITY GOALS: STORMWATER TREATMENT AREA AND DOWNSTREAM SUPPORT

Client Name: *South Florida Water Management District.*
Type of Service: *Water Resources Evaluation, Water Quality Monitoring & Assessment, Biological/ Ecological Monitoring & Assessment*



To reduce the nutrient load of surface water entering the Everglades Protection Area, approximately 45,000 acres of treatment water wetlands have been created by the SFWMD. The Conceptual Plan for Achieving Long-Term Quality recognizes the District's need to enhance the control and monitoring of the Stormwater Treatment Areas (STAs) to optimize performance from the STAs and to conduct research aimed at documenting and minimizing possible impacts from the STA discharges on the ecosystem downstream of the STAs and other areas. It is expected that other programs, such as the Comprehensive Everglades Restoration Plan (CERP), also benefitted from the deliverables produced under this contract.

Milian, Swain & Associates, Inc. (MSA) provided the monitoring support needed to evaluate the nutrient removal efficiency of the STAs and to evaluate downstream impacts. MSA's researchers and scientists conducted routine surface water within every cell of every STA over 650 stations existed in this monitoring network. At each one of these stations MSA also conducted vegetation inventories, mapping and management surveys. Components included percent coverage and frequencies of all plant species and biomass collection of both emergent macrophytes and submerged aquatic vegetation (SAV). Soil samples were also taken to characterize the nutrient levels and mobility within the system. MSA also conducted migratory bird surveys to prevent harm to nesting birds within the STAs. These surveys were performed in accordance with SFWMD's Avian Protection Plan and the Migratory Species Act.

The Conceptual Plan focused on achieving the following goals:

1. Analysis and interpretation of performance within the STAs
    - Calculate a closed water budget for each cell of each STA.
    - Calculate a phosphorus budget for each cell of each STA. - This requires a phosphorus inventory of the storage compartments (water, soils, and plants) at over 650 stations.
2. Calculate a stage–volume relationship for each cell of each STA.
3. Assess down stream impacts of adding clean water to previously impacted areas
    - Measure nutrient reflux in impacted areas.
    - Monitor and document the nutrient front recession or reduced rate of expansion.
4. Assist the District with other projects areas where investigations are warranted.

Samples of specific studies MSA participated under the Conceptual Plan were:

- **STA 1 West, Cell 5 Sediment, Topographic and Vegetative Enhancement**
  - Evaluate the growth of submerged and emergent macrophyte vegetation.
  - Water depth monitoring
  - Surface water monitoring for Total Phosphorus, Total Suspended Solids and Turbidity
- **STA 1 West, South Test Cell Monitoring**
  - Inflow and Outflow levels of Test Cells and culvert inspections
  - Surface water monitoring for nutrients
  - SAV abundance
  - Quantify Hydrilla spp. growth before and after recolonization
- **STA 2, Cell 3, Plot A and H, Hydrilla Study**
  - Identify presence or absence of Hydrilla spp. after various herbicide treatment
- **STA 1 West, Cell 2B and 4 Sediment Stabilization and Vegetation Enhancement**
  - Monitor growth of SAV
  - Evaluated effects of rice planting for sediment stabilization
  - Surface water sampling and turbidity
  - Sediment sampling
- **Sediment Sampling in all six STAs**
  - Sediment sampling
  - Quantify submerged and emergent macrophyte vegetation.
- **Downstream Effects of Adding Treated Water to Water Conservation Area 2**
  - Water quality sampling of nutrients, Total Suspended Solids, and physical paratmeters
- **Migratory Bird Survey**
  - Monitored the Black-necked stilt (*Himantopus mexicanus*) displaying courtship and nesting behavior within the STAs
  - Documentation of all bird species observed within the STAs
- **Ground Truthing**
  - Ground truth vegetation maps produced from aerial photography and photo interpretation