

TITLE: SFP2002: FROM SOURCE TO SINK: ASSESSMENT AND MONITORING OF DISSOLVED NITROGEN CYCLING WITHIN FLORIDA BAY

SHORT TITLE: DON CYCLING IN FLORIDA BAY

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South Florida, is undergoing continued environmental stress which has led to the widespread deterioration of estuarine and oceanic ecosystems throughout Florida Bay and the Everglades. The proposed restoration of fresh-water, surface-flow through the Florida Everglades is expected to alter the forms, sources and ratios of nutrient inputs to Florida Bay, especially dissolved inorganic and organic nitrogen (DIN and DON). The exact biological and chemical response to such a dramatic alteration in nutrient inputs to Florida Bay are unknown. However, previous research in coastal oceans and estuaries have recognized that alteration in nitrogen cycling has the potential to promote selection and succession of phytoplankton species, change the distribution and magnitude of primary production and associated trophic levels, cause degradation of benthic habits leading to mass mortality, and destroy recreational and commercial interests. The research proposed herein focuses on the current ecological significance of DON and DIN cycling in Florida Bay, links between DON/DIN inputs from the Everglades watershed and phytoplankton community structure in the Bay, and the development of potential monitoring tools for evaluating the effects of Everglades restoration on N sources and cycling within Florida Bay.

To properly address questions pertaining to the spatial and temporal variation in DON and DIN inputs, N uptake and cycling, and phytoplankton community structure, we propose a 2 year program comprised of seasonal, baseline assessments. The Baseline Assessment study is designed to provide data on baseline conditions of DIN and DON inputs to and N cycling within the different regions of Florida Bay prior to restoration. This Baseline Assessment study will integrate chemical (elemental ratios, concentrations), biological (chemotaxonomic community composition and nutrient uptake) and stable isotopic ( $\delta^{15}\text{N}$ ) techniques aimed at determining the amount, speciation, and the origin of DON and DIN and its assimilation by phytoplankton and other organisms within Florida Bay and the lower Everglades watershed. Results of this Baseline Assessment study will be used to develop a suite of chemical and biological parameters (i.e. practical predictive tools) which evaluate ecosystem changes in response to regional and seasonal variations in N inputs (DIN vs DON) and cycling associated with the future restoration of the Florida Everglades.