TITLE: DISSOLVED ORGANIC NITROGEN IN THE FLORIDA COASTAL EVERGLADES: MOLECULAR BIOGEOCHEMISTRY, BIOAVAILABILITY, AND POTENTIAL CONTRIBUTION TO THE MICROBIAL LOOP

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A better understanding of the biogeochemical cycling of nutrients in the Florida Coastal Everglades is a key issue regarding the restoration of the Everglades, which is expected to change the water quality throughout South Florida. In addition to rain, the main freshwater supply to Florida Bay will be derived from Taylor Slough and the C-111 Basin in the north-east section of the Bay. While it is known that these areas deliver significant amounts of nitrogen to the Bay, a significant portion of this nitrogen is in its dissolved organic form (DON). The sources, environmental fate and bioavailability to microorganisms of this DON are however, not know. Preliminary data suggest that although proteins have been detected in canal samples, labile dissolved organic matter (DOM) components were found to increase in abundance in the freshwater marshes compared to their levels in the adjacent canal waters. Leaching experiments of biomass showed the presence of such labile DOM. However, this DOM was found to be susceptible to both biodegradation and photodecomposition.

In this study we will focus on the determination of the molecular characteristics of both DOM and DON and assess the bioavailability of these materials in transects ranging from the C-111 canal and Taylor Slough to the central part of Florida Bay. Relevant water quality and spectroscopic parameters will be monitored at 11 sites on a monthly basis, while six of these sites will be sampled biannually for DOM and DON chemical characterization and bioavailability studies. Advanced analytical techniques such as pyrolysis-GC/MS, FTIR, 13C- and 15N-NMR, gel electrophoresis and LC/MS will be used in the molecular characterization effort. We envisage that this study will allow for a better assessment of the sources of DON and its bioavailability in this system.