2007

FCE II Project Summary: Coastal Oligotrophic Ecosystems Research

Florida International University

FCE II: COASTAL OLIGOTROPHIC ECOSYSTEMS RESEARCH

PROJECT SUMMARY

Intellectual Merit: Approximately 50% of the U.S. population lives within 80 km of the coast. As human populations proximal to coasts increase, demands for the natural resources and services that coastal ecosystems provide will also grow, further stressing these ecosystems. The Florida Coastal Everglades LTER (FCE) is an excellent laboratory for understanding how coastal ecosystem dynamics respond to, and influence, human activities. Oligotrophy is a defining characteristic of FCE, and our estuaries are biogeochemically "upside down" because the source of limiting nutrients is the ocean, not the watershed. Our conceptual approach for FCE II is an evolution of our earlier concept based on what we learned during FCE I. In FCE II, our conceptual emphasis will be on: 1) oligohaline ecotone dynamics; 2) hydrologic, climatological, and human drivers that affect those dynamics, and; 3) processes that regulate biophysical inputs to the ecotone from upstream freshwater Everglades marshes and the estuary proper. The overarching theme of FCE II follows this evolution of ideas:

> **In the coastal Everglades landscape, population and ecosystem-level dynamics are controlled by the relative importance of water source, water residence time, and local biotic processes. This phenomenon is best exemplified in the oligohaline ecotone, where these 3 factors interact most strongly and vary over many [temporal and spatial] scales.**

We will continue tracking the flow of water from canals to the ocean along 2 transects in Everglades National Park. FCE II will have several new initiatives, including new research hydrology (particularly groundwater hydrology) and human dimensions. Everglades Restoration is the experimental, BACI-style template for FCE, and in this next round of funding a major restoration project will remove a key levee at the head of one of our transects. This "Grand Experiment" will cause a considerable increase in freshwater flow to only one of our transects, and our FCE II central hypotheses are directed at understanding the results of this major change. We will continue our close involvement with the many existing modeling efforts in south Florida—to avoid redundancies—and we will expand our "dynamic budget" simulation modelling to the ecotone regions in FCE II, thus filling a critical between-ecosystem simulation gap. Finally, in FCE II we will continue to carefully balance continuity (which is critical to any successful long-term program) with support for new ideas and initiatives by expanding our program leadership to include both FCE I PIs and "rising star" junior faculty.

Broader Impacts: FCE will continue to be based at FIU, a majority-minority public university that is one of the largest Hispanic-serving institutions in the U.S. (≈37000 students). The FCE student group is large, active, and diverse, and we will continue our commitment to graduate education in FCE II. FCE I Ed & Outreach included a strong K-12 program in which 89% of all students impacted were Hispanic. We will strengthen this program and our outreach to the South Florida community (which is over 60% Hispanic), and FCE II will also include 3 new Ed & Outreach initiatives: 1) high school curriculum development; 2) enhanced mentoring, and; 3) bilingual outreach. Our user-friendly, information-rich website will continue to be our primary outreach portal (http://fcelter.fiu.edu). In FCE II, we will further our goal of linking FCE science with Everglades Restoration to provide reliable, continuous, and growing knowledge transfer from basic ecological theory to the development of more effective environmental management and restoration/rehabilitation programs. The FCE II "Grand Experiment" is an excellent example of how this knowledge transfer can directly enhance future restoration efforts.