

Primary Production

At FCE LTER we are interested in how the patterns and magnitudes of primary production are controlled by changing freshwater inputs to the system. We are looking at how primary production is affected by the concentrations and characteristics of nutrients and organic matter in the source water.



Cladium jamaicense (sawgrass) is the dominant freshwater plant in both Shark River Slough and Taylor Slough.



We measure the aboveground biomass of *Cladium* within 1m² plots using nondestructive allometric techniques.

Soils and Organic Matter Accumulation

The elevation gradient in the Florida Everglades system is minute but significant. Water flows gradually to the estuaries from a height of roughly 2 m at the northern boundary of ENP. Minor elevation differences also dictate hydroperiod, which strongly determines soil type in Everglades wetlands.

We are investigating how changes in freshwater flow or the content of source water control organic matter accumulation

in freshwater and mangrove wetland soils. We believe the introduction of nutrients will have a negative effect on soil elevation, as nutrients

stimulate soil respiration to exceed organic matter inputs via plant (peat marshes) or periphyton (marl marshes-shown above) production.

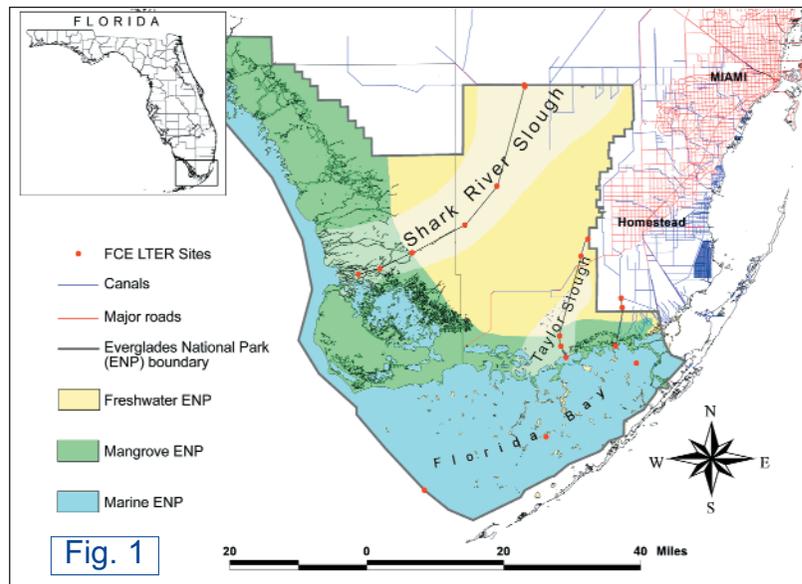


Florida Coastal Everglades Long Term Ecological Research

The majority of the FCE LTER study area is located within the boundaries of Everglades National Park (Fig. 1). An enormous Everglades restoration effort is attempting to improve the quantity, quality, and timing of freshwater flow through Everglades National Park (ENP) into Florida Bay and the Gulf of Mexico. Scientists associated with the FCE LTER are collaborating with Everglades restoration projects, exchanging information, and utilizing existing data from Everglades National Park.

Several scientific issues make the Everglades system interesting and challenging for ecological study:

- ♦ Organic matter dynamics are dominated by dissolved forms in most of the system
- ♦ Freshwater inputs are continually modified through the Everglades restoration project
- ♦ The entire system is nutrient poor and especially limited in phosphorus
- ♦ There is a large interannual variability in rainfall



The Oligohaline Zone: Where freshwater meets marine water.

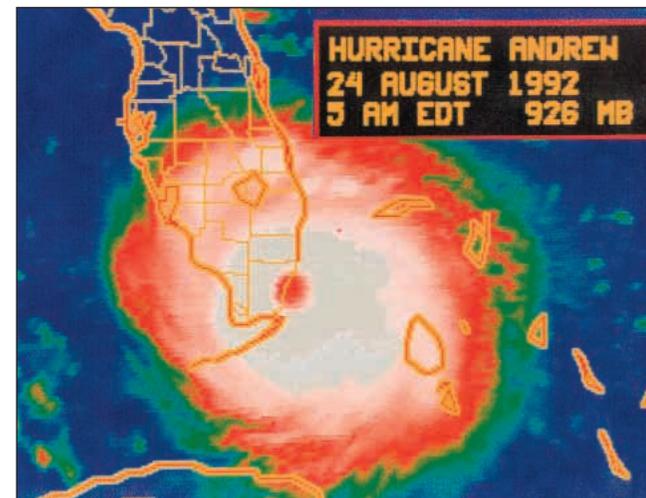
FCE research focuses on understanding ecosystem processes along ENP's two major drainage basins: Shark River Slough and Taylor River Slough. Existing data reveal a peak in productivity in Shark River Slough at the point where the freshwater, which is low in phosphorus, meets the relatively higher phosphorus marine waters of the Gulf of Mexico. This productivity peak has not been observed in Taylor Slough, which is filtered through Florida Bay, a shallow subtidal estuary that scavenges marine phosphorus before it reaches the oligohaline zone. FCE researchers expect changes in freshwater quality and quantity to alter the dynamics of the productivity peak along the salinity gradient in these systems.

Secondary production and trophic dynamics

We are sampling freshwater aquatic invertebrates and small fish using 1m² throwtraps, and sampling larger fish using boat electrofishing.



Infrared image of Andrew over Dade County at 0900 UTC August 24, 1992 Image: NOAA / National Climatic Data Center



Nutrients and Dissolved Organic Matter

Through this study, we hope to determine how freshwater flow and local ecosystem processes alter characteristics of dissolved organic matter or inorganic nutrients at any given location in the landscape. We believe this is most likely attributed to how local ecosystem processes are controlled by changes in dissolved organic matter or inorganic nutrients of the source water.

At each of our freshwater and mangrove sites, an auto-sampler collects water samples which are analyzed for nutrient concentrations, dissolved organic matter (DOM) and salinity.



Water chemistry is sampled remotely in the Shark River Slough (left) and Taylor Slough.

Long-term Changes: Disturbance and Perturbation

We are interested in determining how long-term changes in freshwater flow, which will occur primarily through the Everglades Restoration Project, will interact with long-term changes in the climatic and disturbance regimes and ultimately modify ecological pattern and process in coastal landscapes.

We believe that fires and hurricanes will have local effects at scales that depend on disturbance size, but will have little impact on long-term changes affected by sea level rise, climatic change, and Everglades restoration.



Smoke plume from a distant fire on the Taylor Slough, Everglades National Park.



Florida Coastal Everglades Long Term Ecological Research

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FCE receives additional funding from:

- ◆ Environmental Protection Agency (EPA)
- ◆ Everglades National Park (ENP)
- ◆ Florida Audubon Society
- ◆ National Oceanic and Atmospheric Administration (NOAA)
- ◆ South Florida Water Management District (SFWMD)
- ◆ U.S. Geological Survey (USGS)



Site access: Airboats are used to travel to most freshwater study sites.

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We invite inquiries from scientists and institutions interested in collaborating on any of the science described here. For more information, please see the website:

<http://fcelter.fiu.edu>

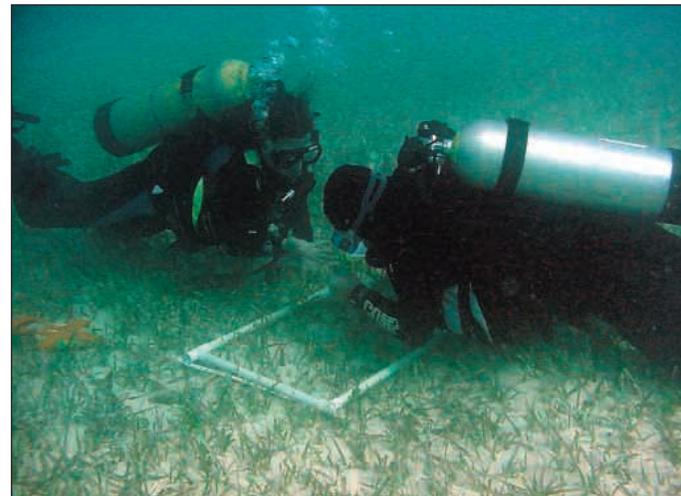


Taylor Slough restoration efforts. A new pumping structure on the canal will allow more water to be introduced to the natural head waters region of the slough.

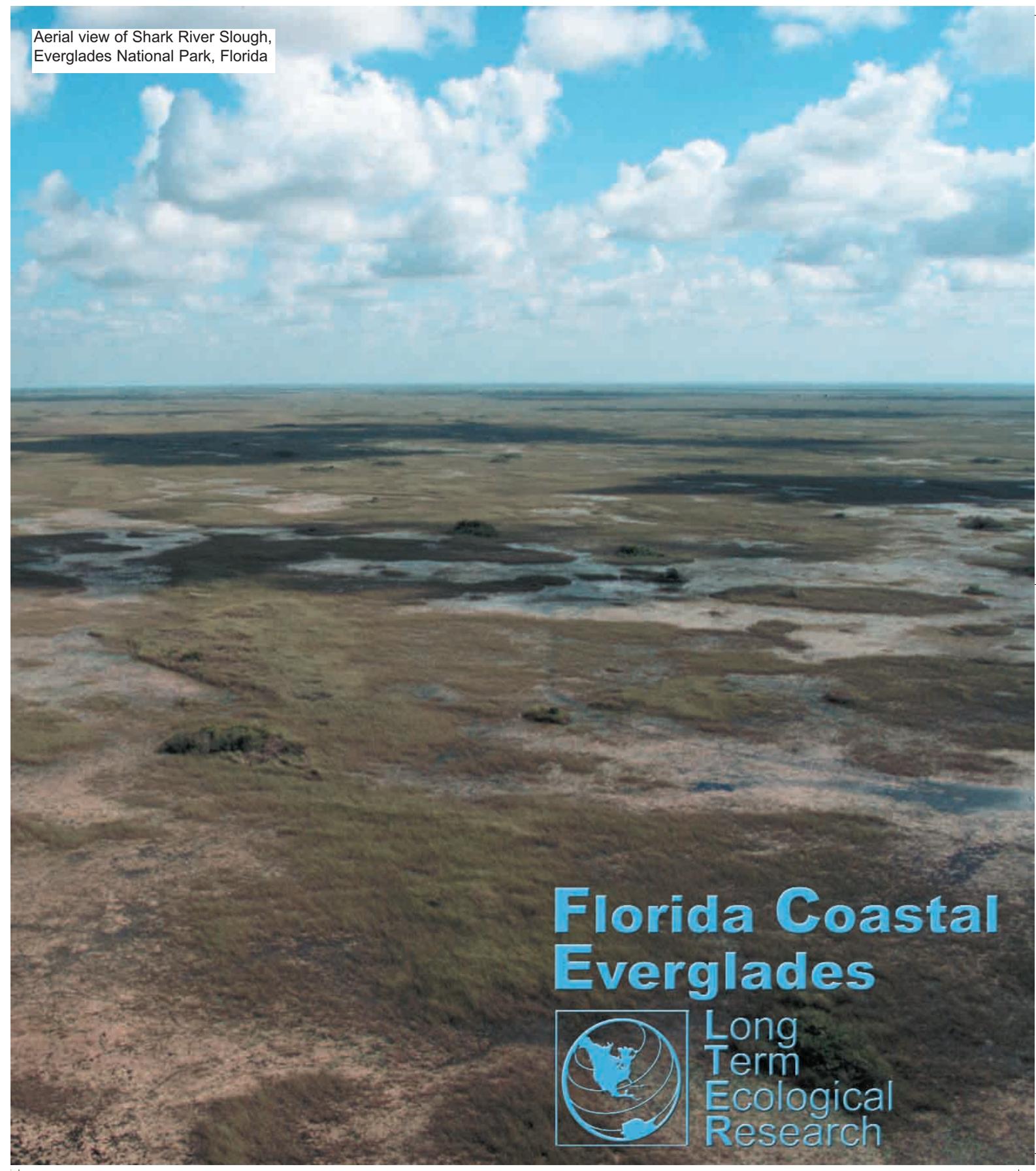
Affiliated Institutions

- ◆ Southeast Environmental Research Center, and the Departments of Biology, Chemistry, Environmental Sciences, and Geology, at Florida International University
- ◆ USGS Biological Resources Office
- ◆ Biology Department, College of William & Mary
- ◆ Everglades Systems Research Division, SFWMD
- ◆ Department of Biology, University of Louisiana at Lafayette
- ◆ Department of Environmental Science, University of Virginia
- ◆ Tavernier Science Center, National Audubon Society
- ◆ South Florida Natural Resources Center, ENP

Divers sample seagrass, the dominant primary producer in Florida Bay



Aerial view of Shark River Slough, Everglades National Park, Florida



Florida Coastal Everglades



Long
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