LILA Sediment Transport
Ecosystem Restoration Task Force Abstract
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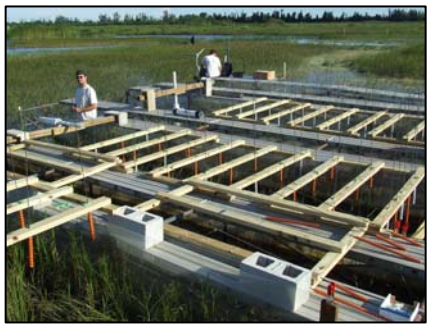
A key attribute of LILA is the ability to control hydrology. In addition to water depths, this includes the ability to manipulate and control water velocities. A central goal of CERP is the restoration of sheetflow, which is believed to have played a critical role in shaping the historic ridge and slough landscape through erosive forces. Yet it is unknown just how fast the water needs to flow before erosion occurs.

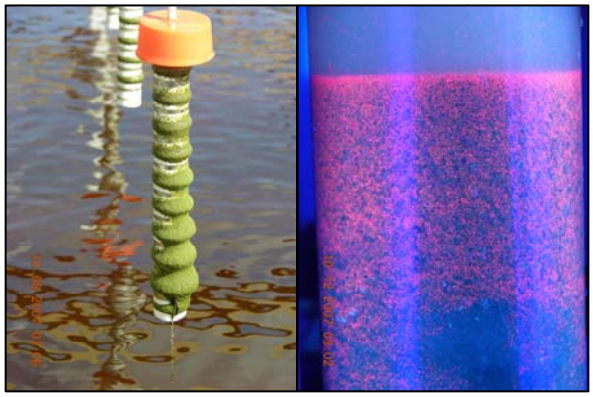
1. How Fast Does The Water Need To Flow?

The loss of the ridge and slough patterning in the Everglades is due, in part, to the building of canals and levees that cutoff the large expanse of unimpeded flow south from Lake Okeechobee to Florida Bay. When looking down on the Everglades from high altitudes (aircraft or space), the pattern of remaining historic Everglades is characteristic of an environment shaped by the flow. Today flow velocities in the Everglades is less than 1 cm per second (0.4 inches per second) and incapable of eroding soil. So how fast does the water need to flow for erosion to occur? To answer this, we use a special instrument, called a benthic annular flume, to expose natural Everglades soils to a range of increasing flow velocities while simultaneously measuring erosion. We determined that the erosion floc, a type of Everglades soil, occurs above a critical velocity of 3 cm per second (1.2 inches per second), suggesting that this is the minimum required.

2. Where Will It Go?



Were does the soil (floc) go once it is eroded? This may seem like a simple question at first but it turns out to be very difficult because all floc pretty much looks the same. Trying to determine where an individual particle came from or where it goes isn't easy. We developed a tracer that behaves just like Everglades floc, that is, where floc goes, tracer goes. The tracer has two properties that enable its recapture, it is fluorescent and magnetic. LILA was used to develop the protocols to deploy and capture the tracer in different environments.



RESULTS:

1) Velocites of 3 cm per second (1.2 inches per second) are required to erode Everglades floc.
2) Erosion of floc is more prevalent in sloughs whereas deposition is greater on ridges.