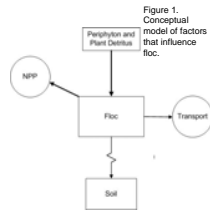


Introduction:

- The sawgrass ridge habitat consists of patches of sawgrass where soil elevation is higher than surrounding sloughs. Sloughs are deeper and contain less vegetation than sawgrass ridges which channelize water south through the oligotrophic freshwater Everglades into surrounding estuaries.
- Over the past hundred years this water flow in the slough and ridge system has been manipulated and compartmentalized resulting in a greatly decreased flow rate. As a result of these flow reductions the slough now has shallower water depths caused by an increase in sedimentation rate and an increase in macrophyte densities.
- Recent changes in water management policy aims to restore flow rates in Shark River Slough (SRS) to its estimated historical flow rates and to restore the amounts of nutrients SRS receives.
- This preliminary project and future project aim at characterizing the role that Flocculent material currently has in SRS and its role in the restoration of SRS
- Flocculent material (floc) is suspended organic material found directly on top of the soil in the Everglades. Floc is lightweight and therefore easily transported by water flow. It contains mostly detritus from plants and algae inputs from periphyton. Floc is also thought to act as a barrier preventing plant detritus and periphyton from becoming directly incorporated into the soil.



-This research project aims at characterizing factors that influence floc (figure 1):

1. The role that flow rates have on the transport of floc.
2. Since floc contains living bacteria it is also biologically active. What is magnitude of the Net Primary Productivity of floc?
3. How much does detritus and periphyton add to the biomass of floc?
4. How does floc affect sedimentation of soils?
5. In addition to this a transect study was carried out to try to "scale up" the research project to the whole shark river slough system.

Site Description:

Our flow manipulation sites are located in a slough near Gumbo Limbo tree island in Shark River Slough: Everglades National Park, Florida (Figure 2). The flow manipulation site consists of a series of walls designed to increase water flow into one of our research area (Figure 3) Another series of walls are also organized to inhibit water flow into another research area (NF) (Figure 4). We also have two control sites in the slough system encompass both the sawgrass patches (CC) and sloughs (SC) (Figure 5).

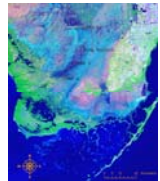


Figure 2. Left shows a landsat image of south Florida with the flow manipulation site labeled and the sites from the transect study. Landsat image compliments of FCE LTER.



Figure 4. Left. Aerial picture showing flow enhanced site and flow restricted site.

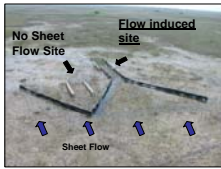


Figure 5. Right. Picture of our control site. This site includes both a slough and a sawgrass ridge.

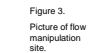
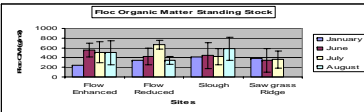


Figure 3. Picture of flow manipulation site.

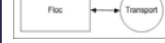
FLOC ORGANIC MATTER STANDING STOCKS

-Standing stocks of floc were collected using a soil corer.



-Floc standing stocks have remained relatively unchanged from the winter (dry season) to the beginning of the wet season (summer)

Net Transport



-Each flocculator was left in the slough for varying duration until a stable state was reached (see Figure 6). This is when mass of floc entering the flocculator equals the mass leaving the flocculator.

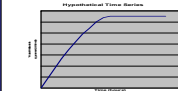


Figure 6. Hypothetical flocculator data. The mass/time at the beginning of equilibrium is the net transport rate.



Figure 7. Graph of Preliminary data from flocculators.

Water Flow Rates

-Water flow velocities were measured biweekly using a SonTek FlowTracker Handheld ADV® (Figure 8)

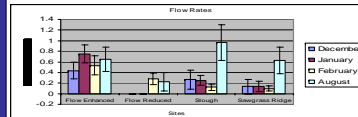


Figure 9. Chart of velocity rates of each site taken over four sampling periods



Figure 5. Flocculator partially filled with floc

-There is an increasing trend in mass over time but equilibrium could not be ascertained (Figure 7).

- We hypothesize that net transport to vary with the change in flow rates.



Figure 8. Picture showing the SonTek flow meter.

-The rates of water flow through the sloughs and sawgrass ridges greatly increased from the winter to the summer

-Modification to Flow enhancement site were carried out in August to increase water flow back to higher levels than the Slough. Due to bad weather these modifications have not yet been studied

-The flow enhanced site could help show what increasing the water flow rates in the Everglades could have on the mass movement of flocculent material down the entire Shark River Slough.

2. NPP



-NPP and Respiration were calculated using a modified light dark bottle experiment

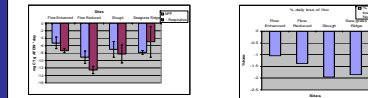


Figure 11. Graph displaying NPP and Respiration.



Figure 10. Picture of light dark bottle experiment.

-The difference in respiration and NPP can be explained by the bacteria in floc by photosynthetically active

-When NPP is scaled to the standing stock we found the lost between 1% and 2% of its organic matter a day due to respiration

Special thanks to:

We would like to thank David Iwaniec, Lynne Leonard, Alex Croft, Damon Rondeau, Sherry Mitchell-Bruker, Len Scinto, Cecilia Gordon, Tim Grahl, and everybody from the wetland ecosystem lab, Thanks to the Everglades National Park for providing funding.

1.Periphyton and Detritus Inputs



-Periphyton sloughing and detritus was collected using sediment traps

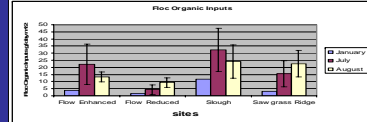


Figure 13. Chart of periphyton slough collected in each experimental site.



Figure 12. Picture of sediment trap

- There was an increase in periphyton and detrital inputs from winter (January) to the summer months (July, August).

1. Sedimentation (Future Work)



- Pins were placed in the soil from the bedrock to the top of the soil. We will annually measure the distance of top of the pins to the soil surface to calculate soil elevation change (Figure 14).

- We hypothesize that floc will contribute to soil elevations only during severe droughts were the slough completely dries up. This will cause the floc to become incorporated into the soil.



Figure 14. Picture showing pin, sediment trap and flocculator. Fluorescent Dye was added to show direction of flow

THE BIG PICTURE, SCALING UP, AND FUTURE WORK

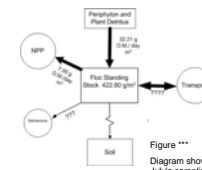


Figure *** Diagram showing data from July's sampling trip.

What is going on?

-Everyday the floc gains 32.21 g O.M./M2 and loses 7.00 g O.M./m2. Where is the other 24.89 g O.M./m2 going?

-is it going to the soil? Is there a negative net transport? Or could macrovertebrates be eating floc?

-Can the trends in the floc dynamics explain the trends seen in the transect study

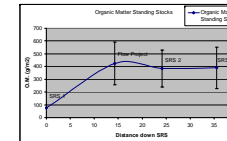
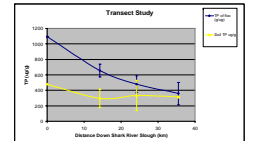


Figure *** (left) Graph showing O.M. Down Shark River Slough

Figure **** (right) Graph showing nutrient concentrations of floc and soil down Shark River Slough.



Transect Study.

-There appears to be a steady state in floc O.M. standing stock from Flow Project to SRS 3.

-The nutrients of floc does appear to decrease down Shark River Slough. However the soil does not show such a drastic decrease in nutrients. Is this caused by the rapid turnover rate of floc due to respiration?