Groundwater-Surface Water interactions on Satinleaf Tree Island, Everglades National Park

Hammock  Bayhead  Bayhead Swamp

- Head
- Near Tail
- Far Tail
- Marsh

Water Flow

Elevation (m)

Distance (m)

Tail  Near tail  Head  Marsh

515 ± 5  640 ± 90  1600 ± 350  315 ± 65
1. Groundwater-Surface Water interactions

- Precipitation
- Transpiration
- Evaporation
- Regional Groundwater
- TI Groundwater
Objectives

1. To determine if evapotranspiration and seasonal surface water levels govern the hydrodynamics of tree islands

2. To determine if nutrient availability in tree islands varies with seasonal hydrodynamics and variable evapotranspiration rates as compared to the adjacent slough
Groundwater and Surface Water were collected (October 2008-November 2009). Samples were analyzed for major ions, nutrients and isotopes (δD and δ^{18}O).
4.0 Groundwater & Surface Water Levels

SW Recharge GW at all locations on the island

GW discharge from Hammock to SW
4.1 Diurnal Groundwater Signal

Diurnal Signal detected in all wells on the tree islands.

Diurnal drawdown not detected after SW reaches 1.60 m.

Diurnal signal only detected in Hammock after SW reaches 1.45 m.

June 2009
GW Temp in BH and BHS very similar.

Lowest GW temp in Hammock.
4.3 Groundwater-Surface Chemistry

- **Alkalinity (mg/L HCO₃⁻)**
- **Sodium (mg/L)**
- **Magnesium (mg/L)**
- **Calcium (mg/L)**

Data show trends from August 2008 to December 2009 for Hammock, Bayhead, Bayhead Swamp, Surface Water, and Regional GW* sites.
4.3 Groundwater-Surface Chemistry
10 sippers creates N-S and E-W Transects across the Island
Sippers were 85 cm in length
6. Sipper Results West to East

- **Hammock**
- **Bayhead**
- **Bayhead Swamp**

**Sodium (mg/l)**
- **Marsh**
- **Edge**
- **Tree Isl**

**Magnesium (mg/l)**
- **Marsh**
- **Edge**
- **Tree Isl**

**Calcium (mg/l)**
- **Marsh**
- **Edge**
- **Tree Isl**

Average Surface Water Concentrations
6. Sipper Results North to South
7.0 Conclusions

1. BH and BHS GW levels and Temp suggest that SW is recharging GW year round
2. GW level and Temp Suggest GW discharge occurred from hammock to SW from July through Nov
Dry Season  
April - July

SW Recharging GW

GW Flow Toward BH

7.0 Conclusions

Wet Season  
July - November

GW Discharge SW

GW Flow Down Steam

SW Recharging GW
7.0 Conclusions

1. GW Chemistry Suggests similar GW-SW interactions occurring on BH and BHS, where by ions are being concentrated in the GW
2. Lower ionic strength of GW in the Hammock maybe attributed to inputs of rainfall, regional groundwater or surface water
Acknowledgments

I would like to thank the Everglades Foundation and the Christina Mendez foundation for the fellowships that were used fund this project.

The field support of David Lagomasino, Danielle Ogurcak, Pablo Ruiz, Nate Colbert, Lawrence Lopez, and Mike Ross were immensely appreciated!

THANK YOU