

Seasonal Variations in Tree Island Hydrology at Loxahatchee Impound Landscape Assessment (LILA)



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Loxahatchee Impound Landscape Assessment (LILA)



Macrocosm

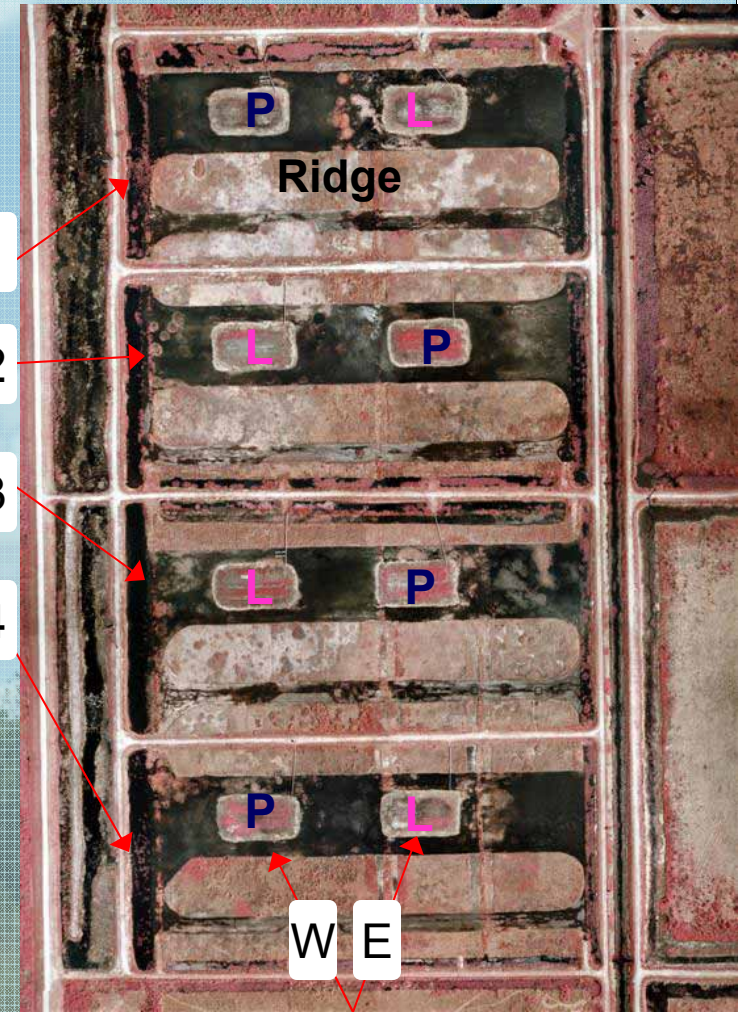
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- Created to complement ongoing Everglades research
- Army Corps and SFWMD
- Goal: Study the response of wildlife, tree islands and ridge-and-slough communities to changes in surface water level and flow

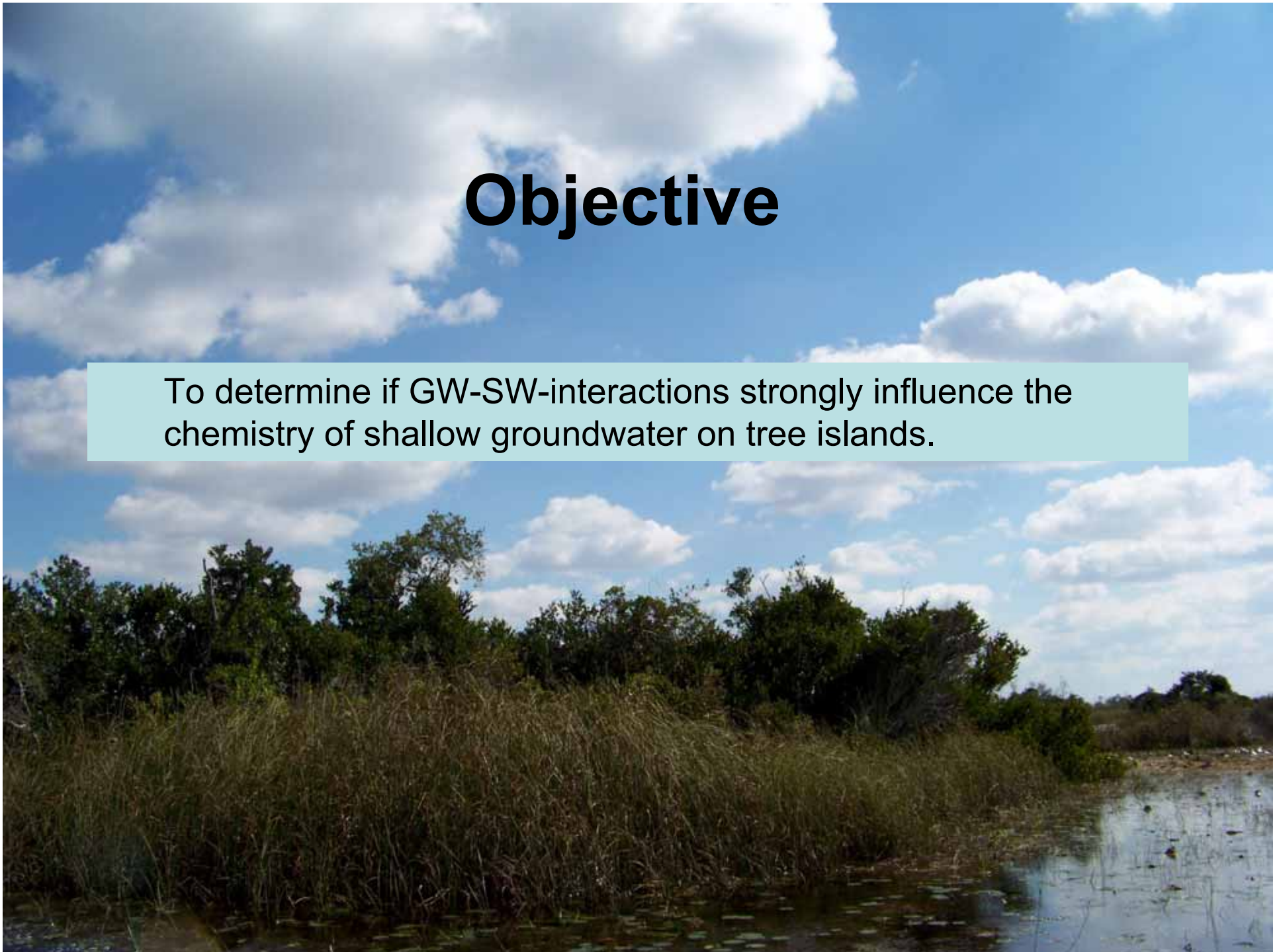


Tree Islands

M#W or M#E

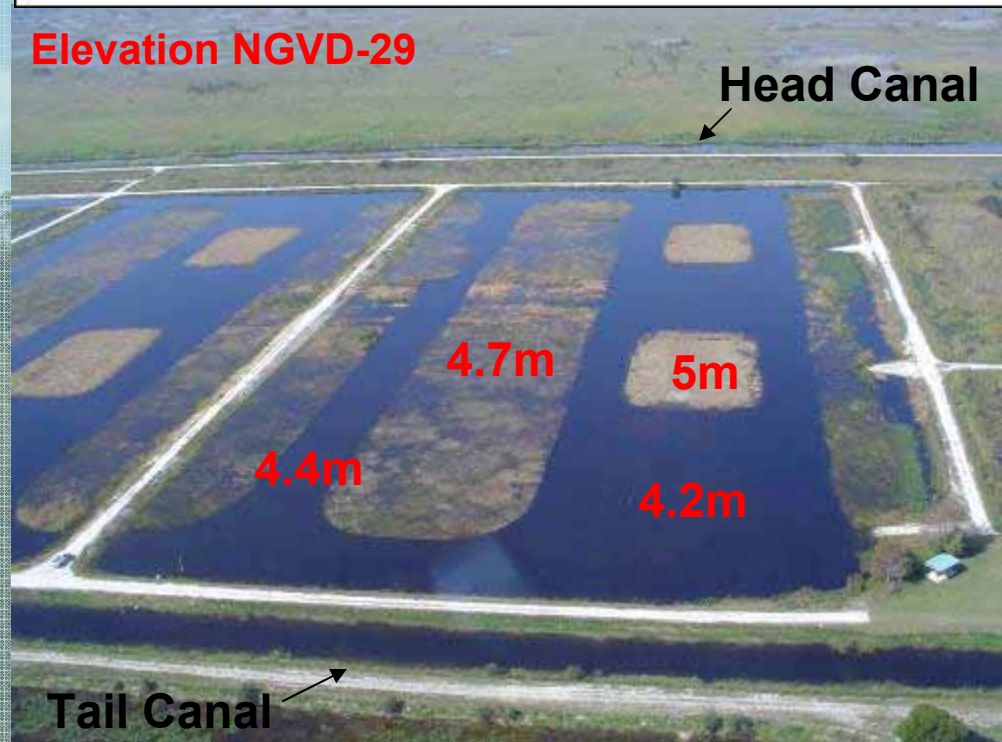
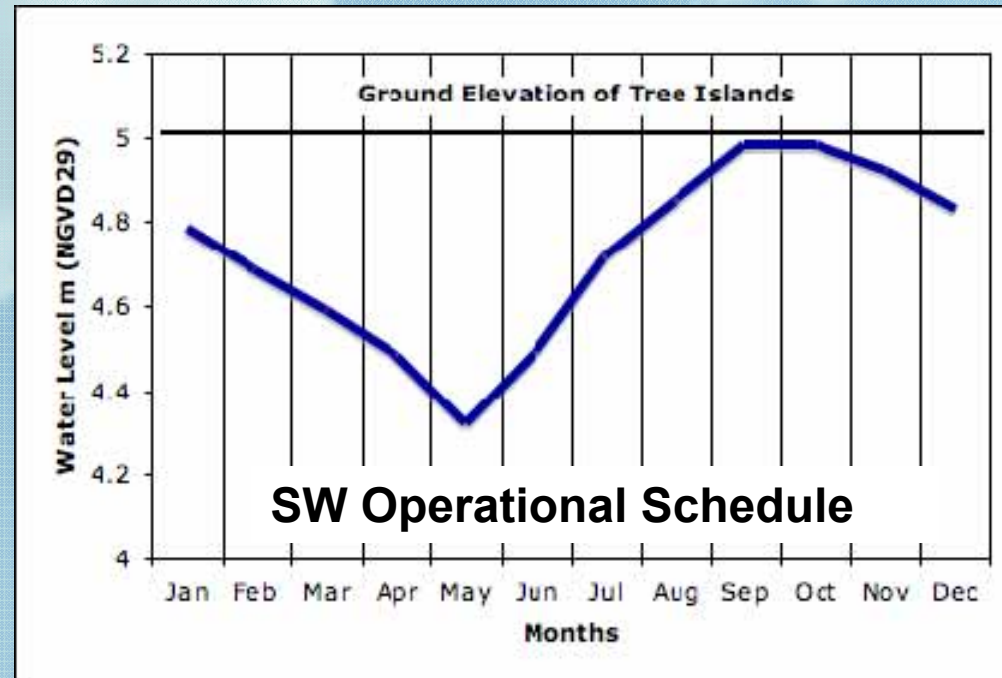
Objective

To determine if GW-SW-interactions strongly influence the chemistry of shallow groundwater on tree islands.



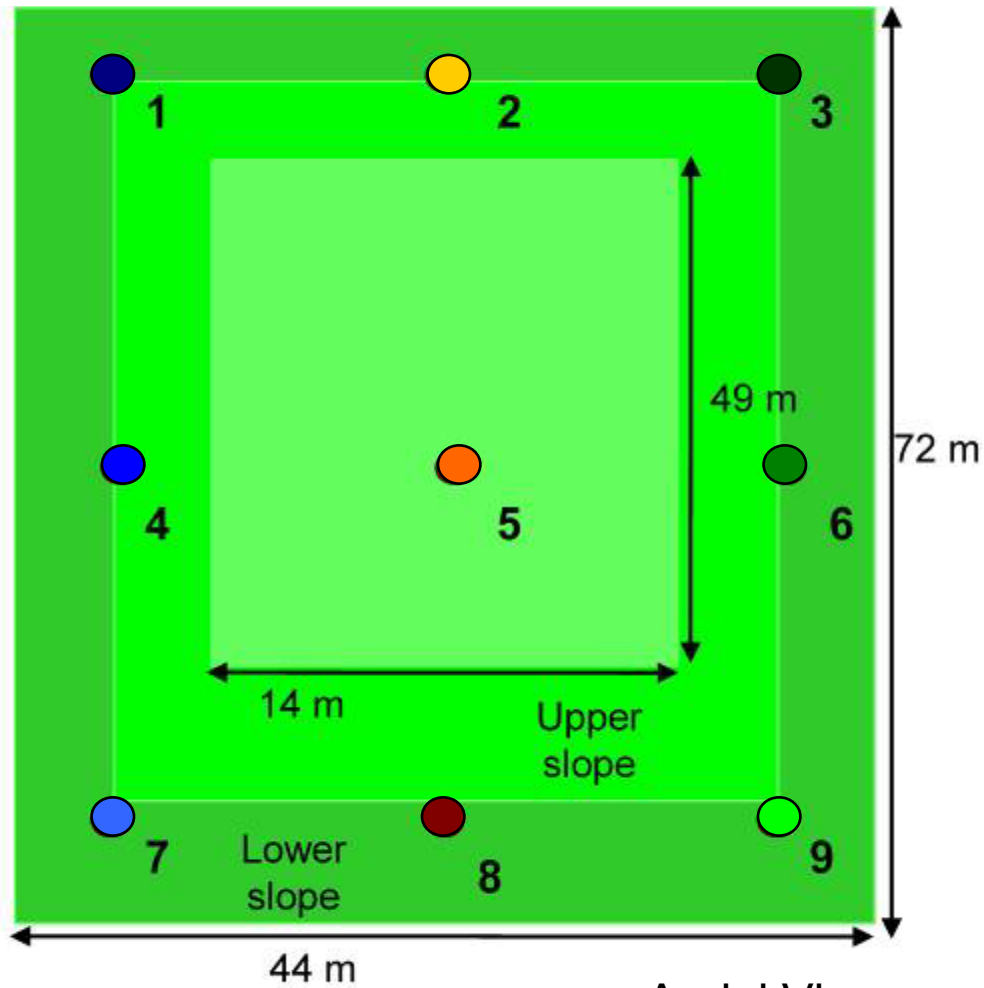
LILA Study Area

- Area 34ha
- 4 macrocosms
 - 8ha each
- 2 tree islands per macrocosm
 - Peat core
 - Limestone core
- sloughs
 - Deep
 - Shallow
- 1 large ridge



Approximate location of Tree Island

Wells



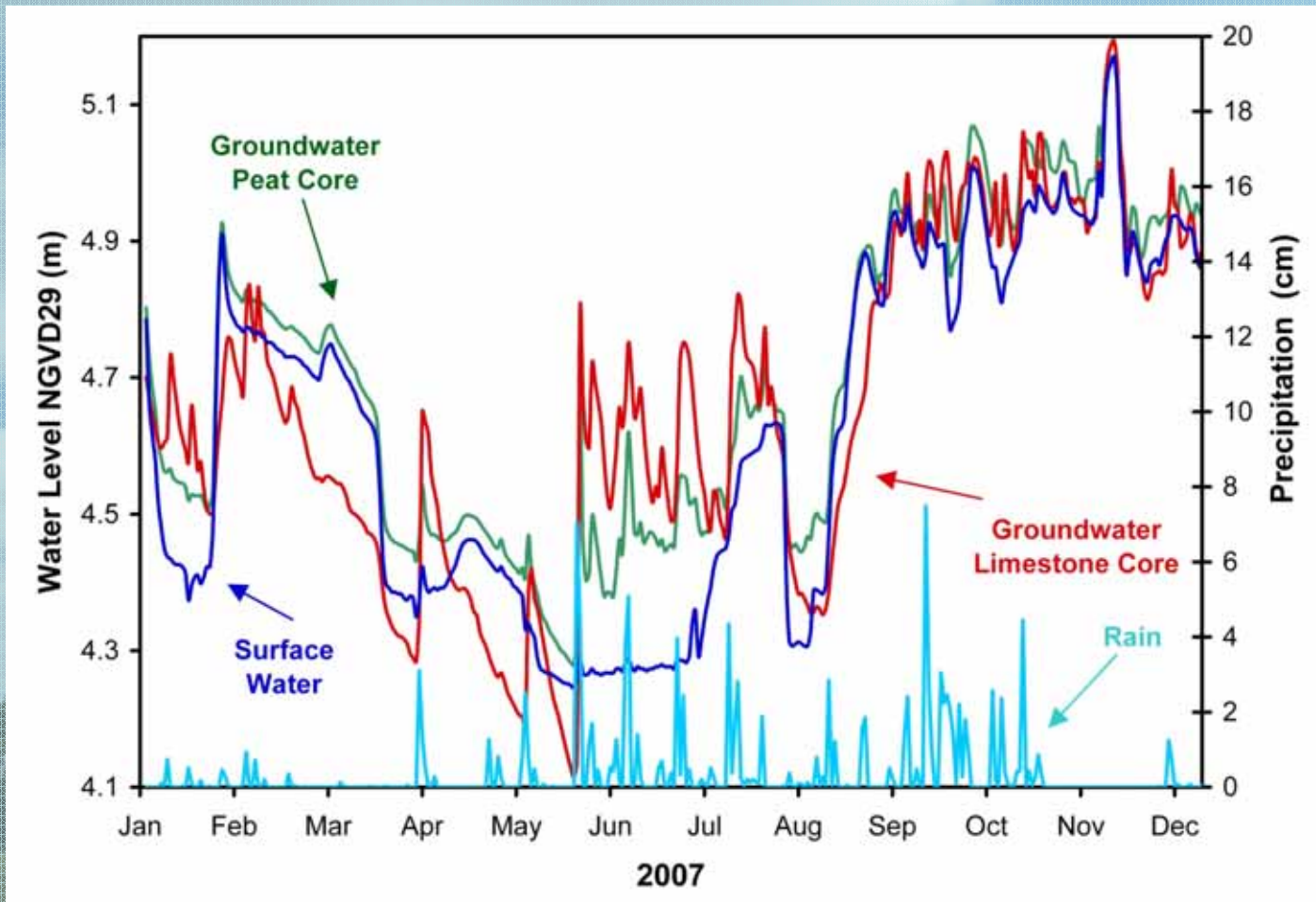
Aerial View

Not drawn to scale

 Well point



Seasonal Water Levels



January to May

- GW in P islands discharges to SW
- GW in L islands recharged by SW except when precip occurs

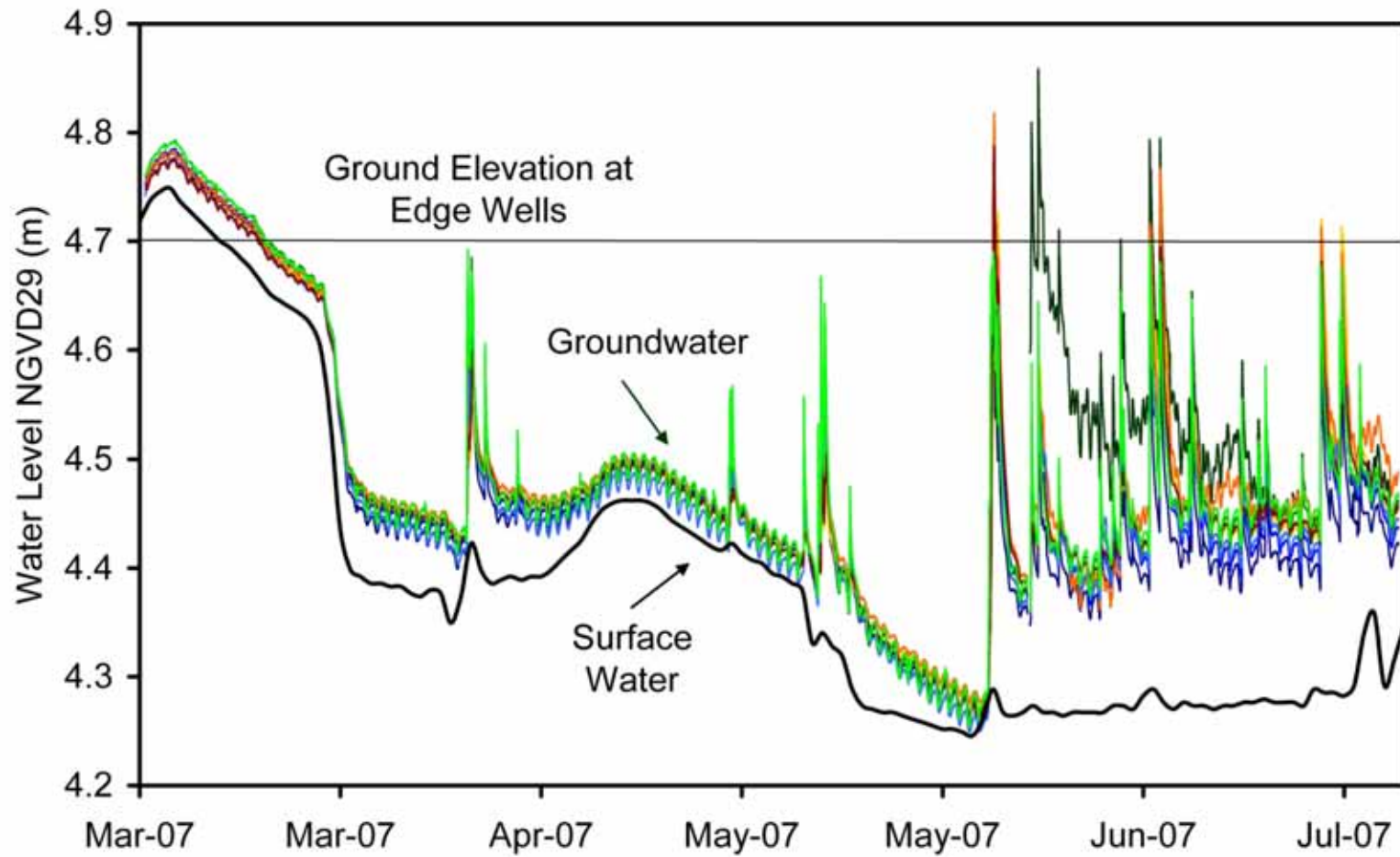
June to August

- GW levels in tree islands are correlated to rain events
- GW levels in L and P islands indicate GW discharge

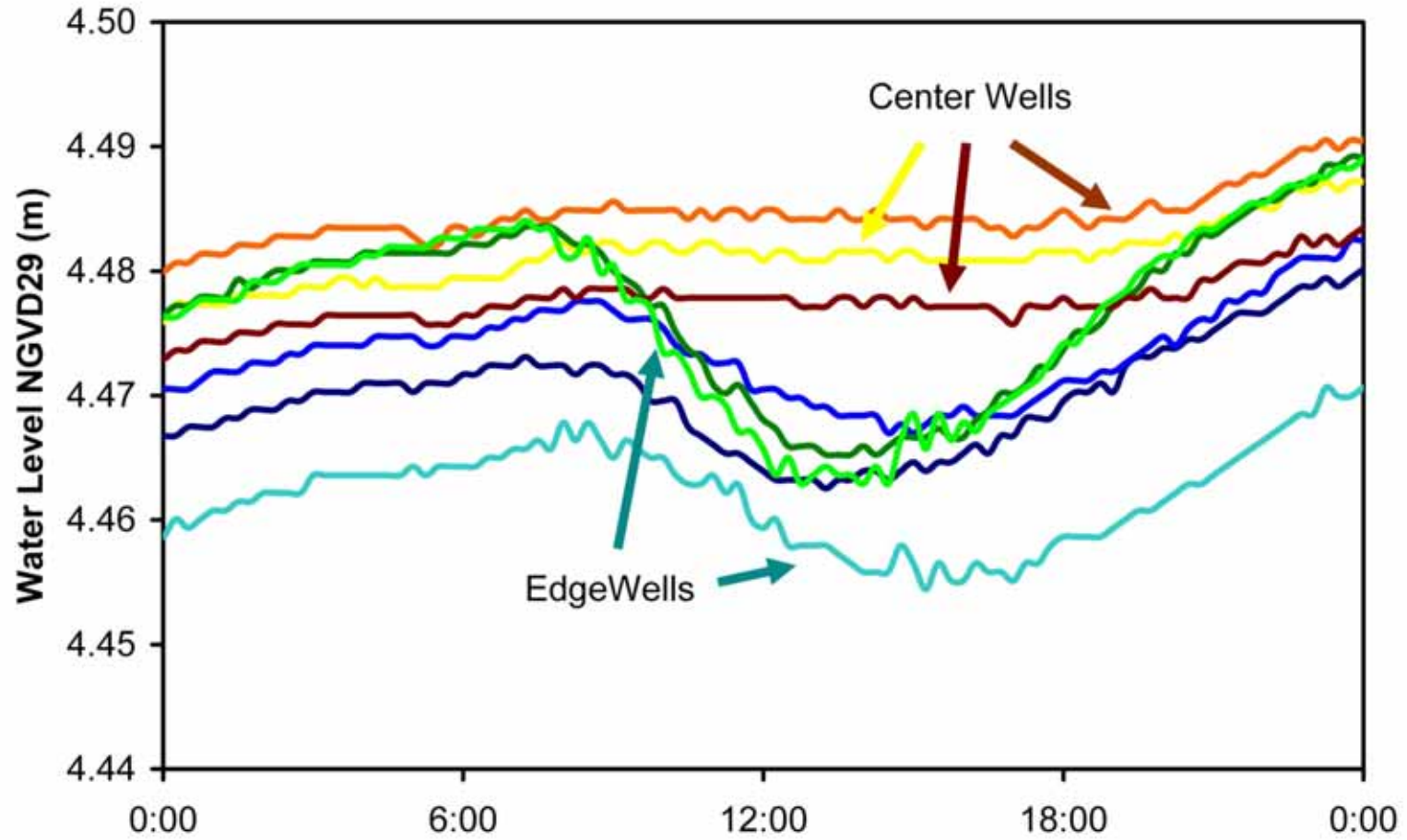
September to December

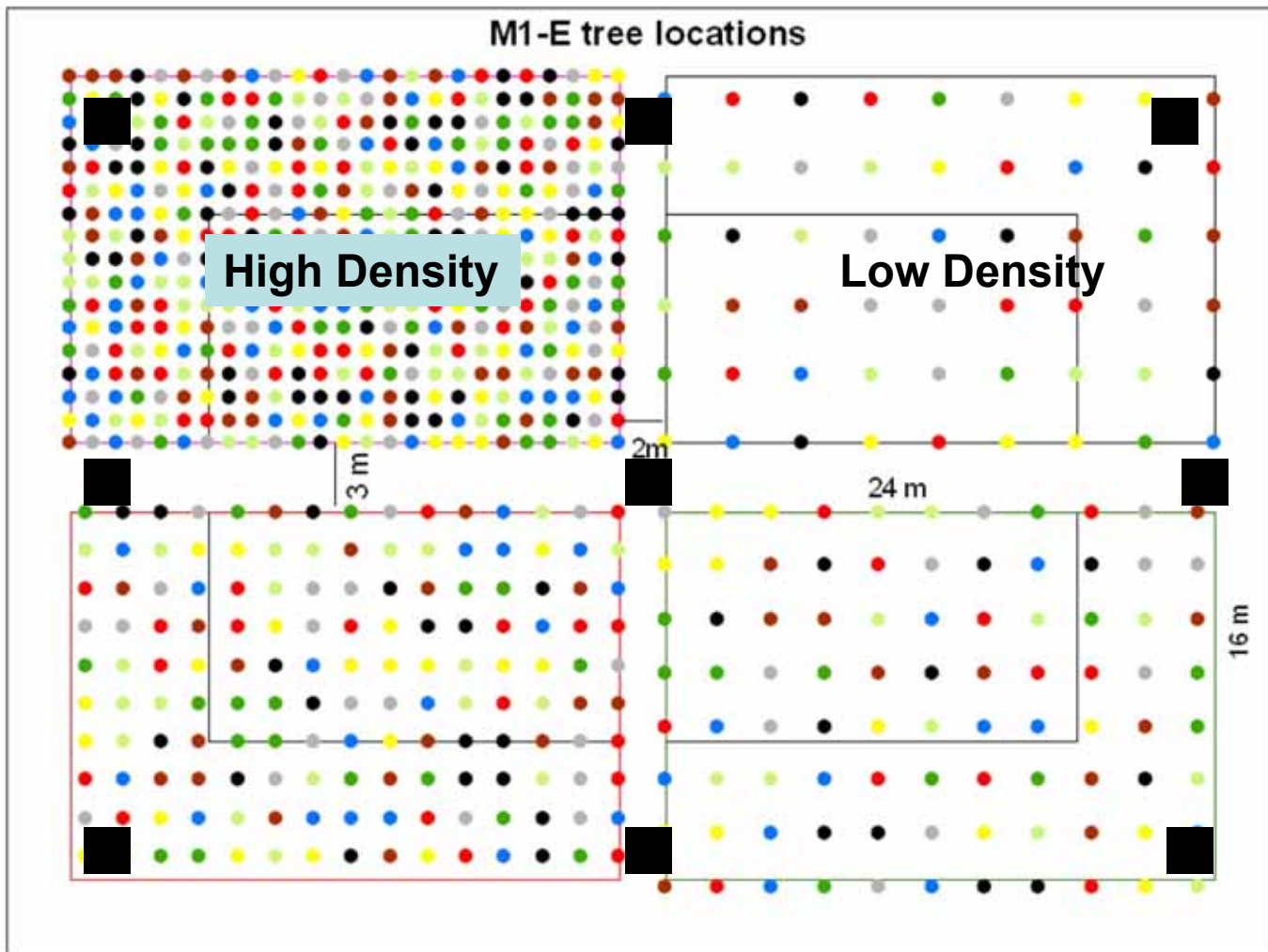
- P islands are correlated to SW levels and indicate G discharge

Peat Tree Island



Peat Tree Island



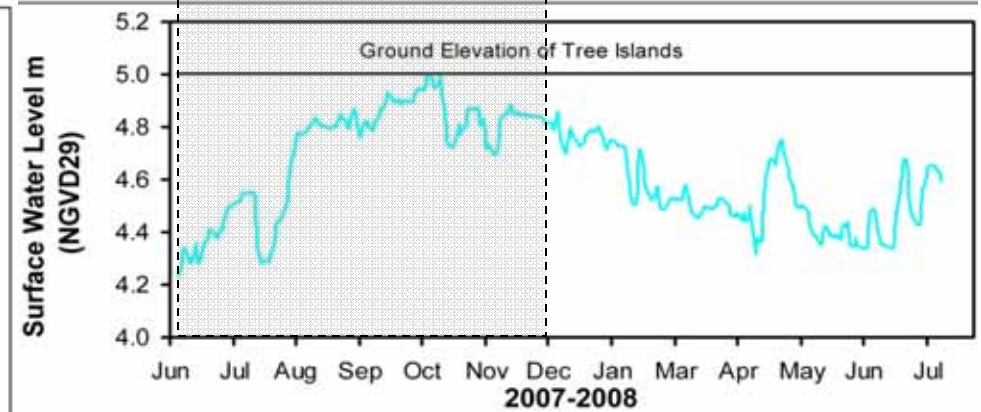
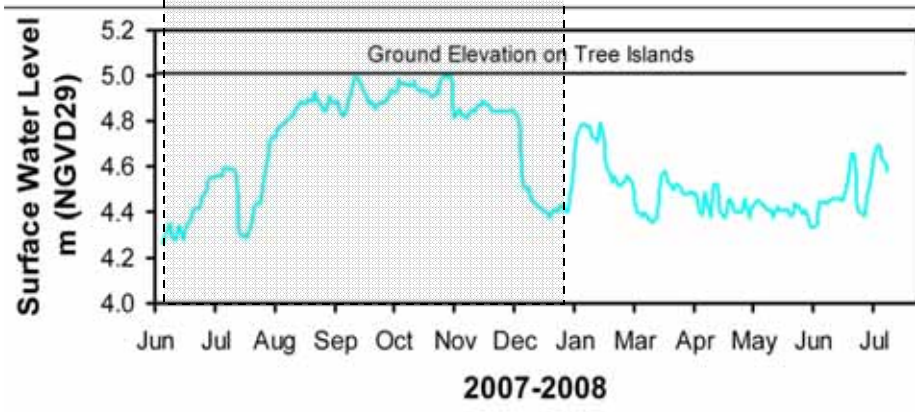
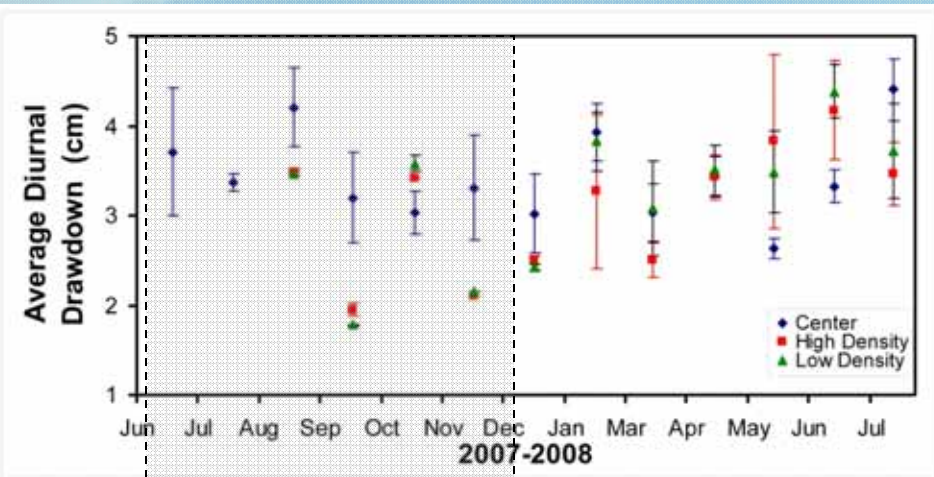
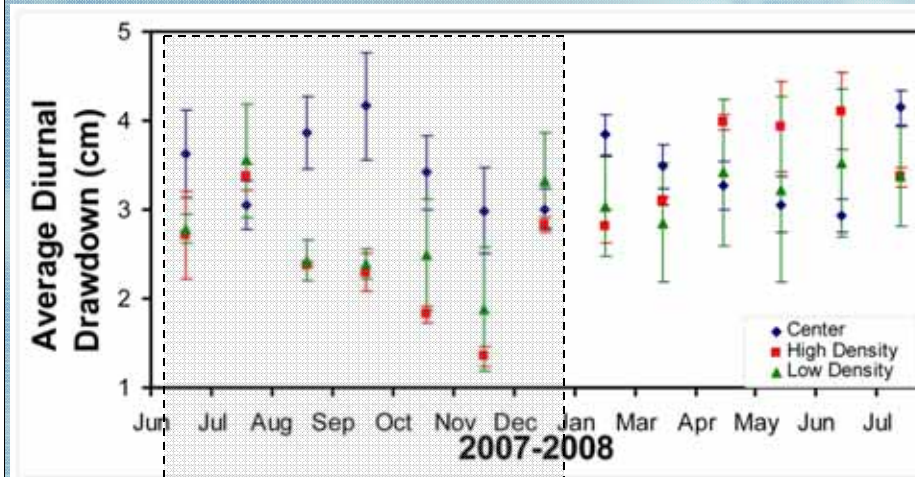


	Cell-NW	Cell-SW	Cell-SE	Cell-NE
High ground				
Spacing =	(1.00)	(1.67)	(2.33)	(3.00)
High =	209	77	40	28
Low =	216	73	48	26

Average Monthly Diurnal Drawdown

Two Year Old Tree Islands

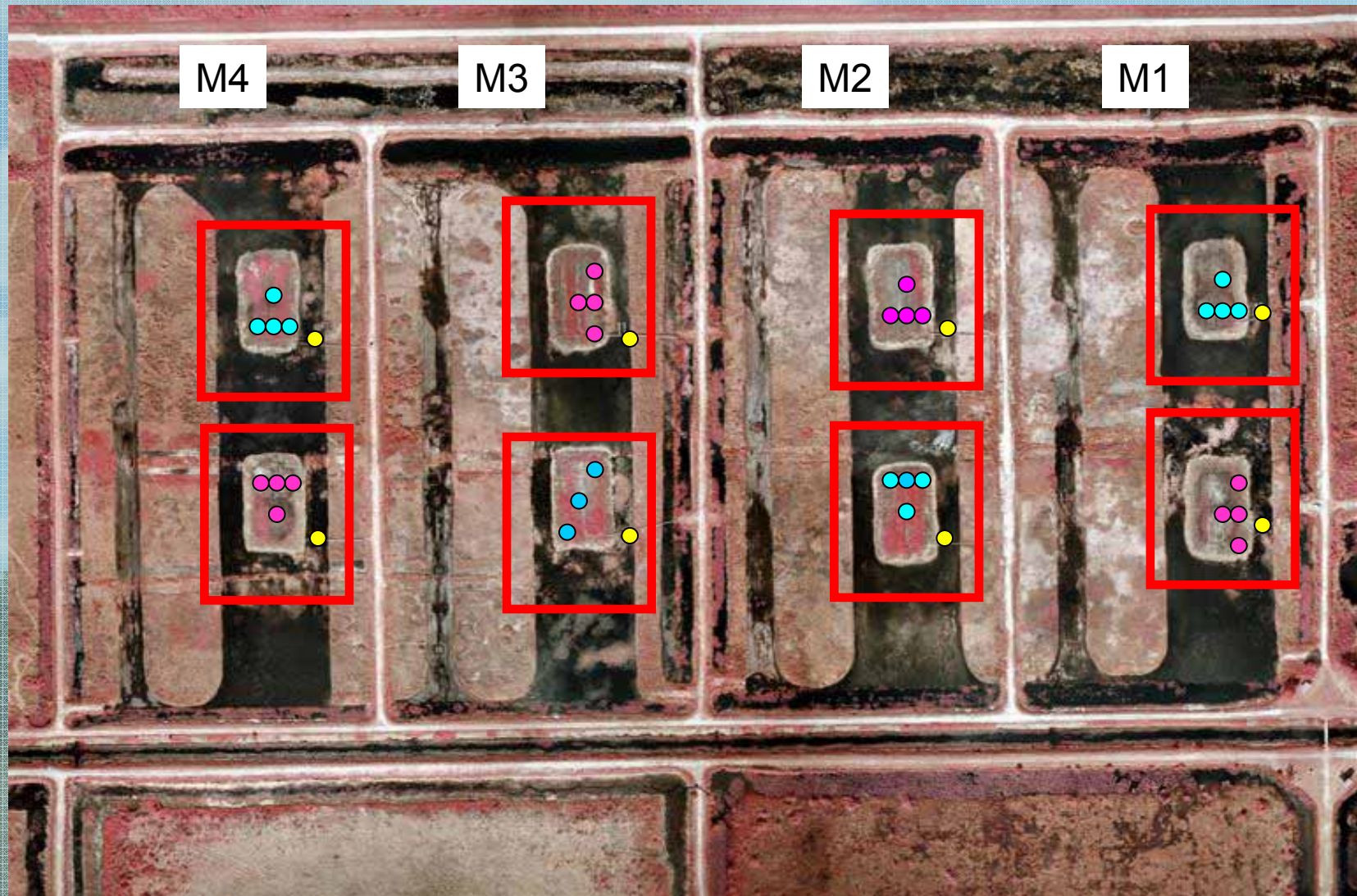
Three Year Old Tree Islands



When SW levels are high the diurnal drawdown is largest in the center wells

When SW levels are low the diurnal drawdown is greatest in the high density tree planting quadrant

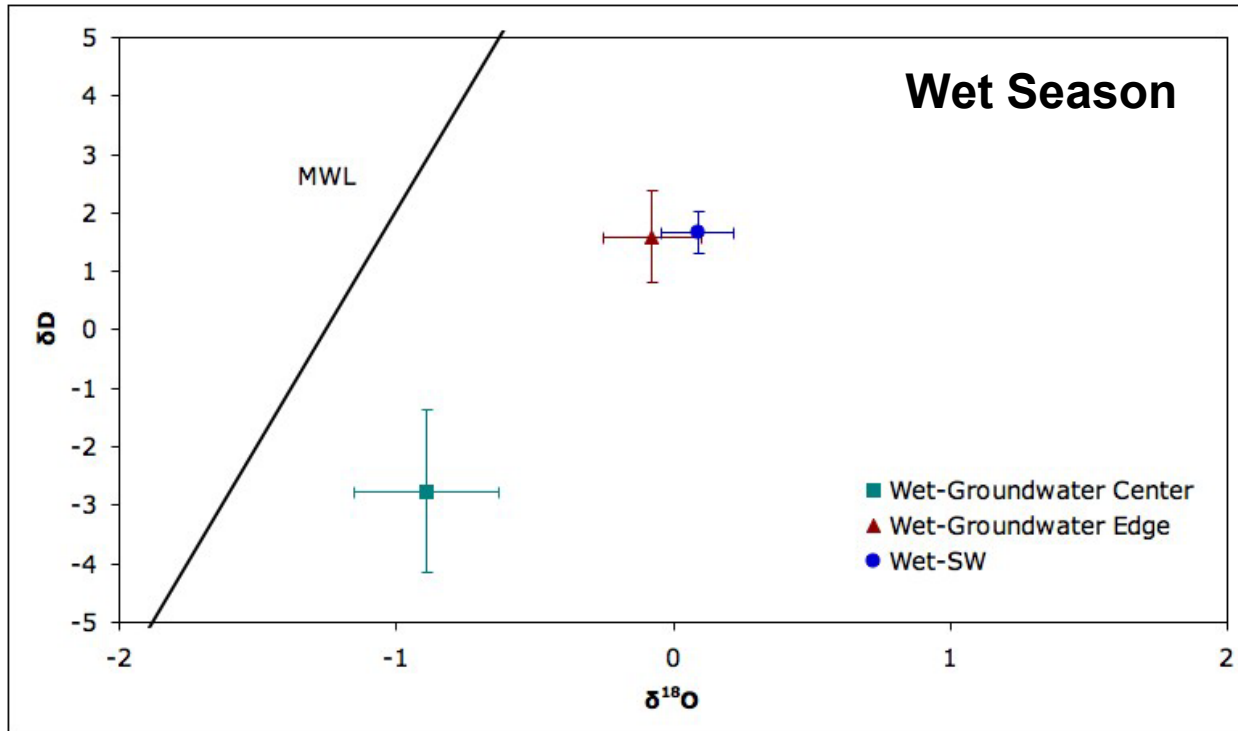
Groundwater Sampling Site



Stable Isotopes

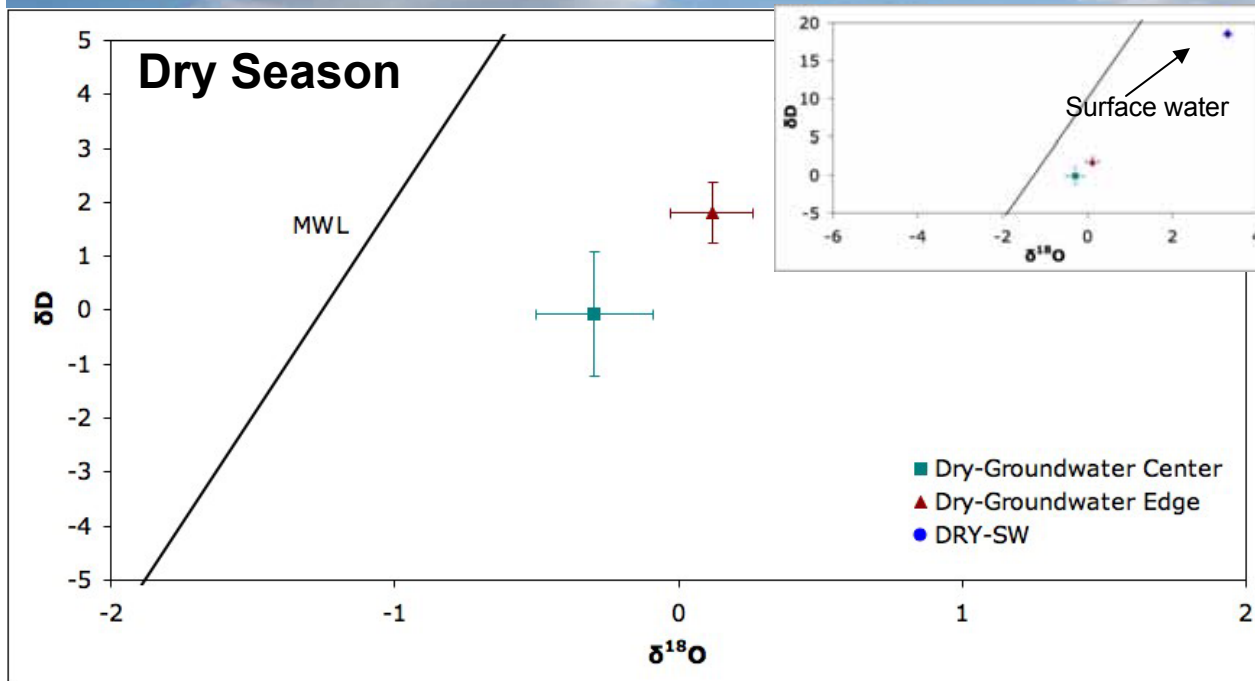
Wet Season

-GW in edge wells similar to SW and significantly different from GW in center wells

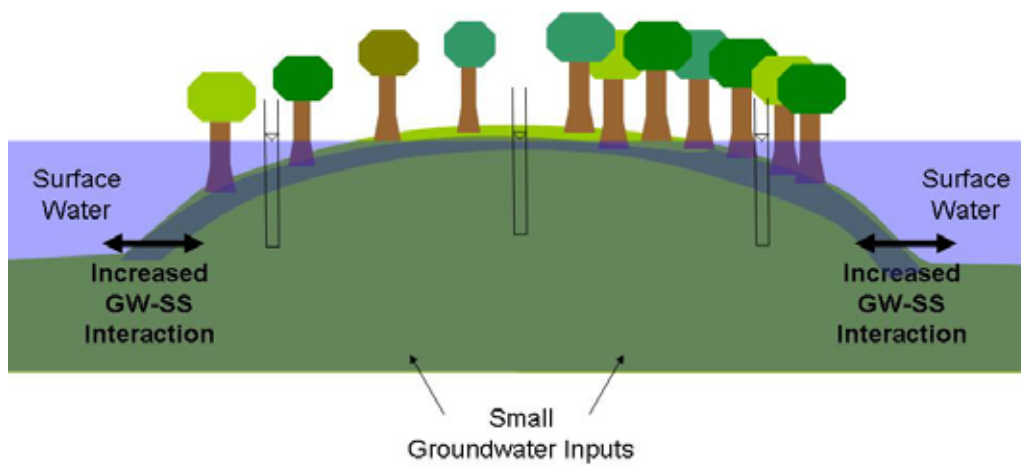


Dry Season

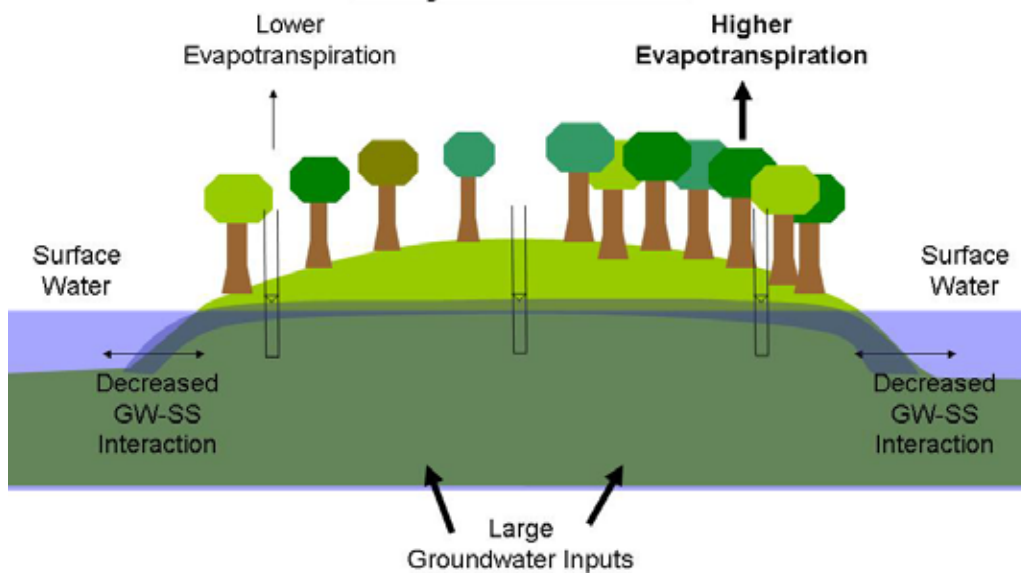
-GW in edge wells significantly different from SW and significantly different from GW in center wells



Wet Season



Dry Season



Implications of Stable Isotopes

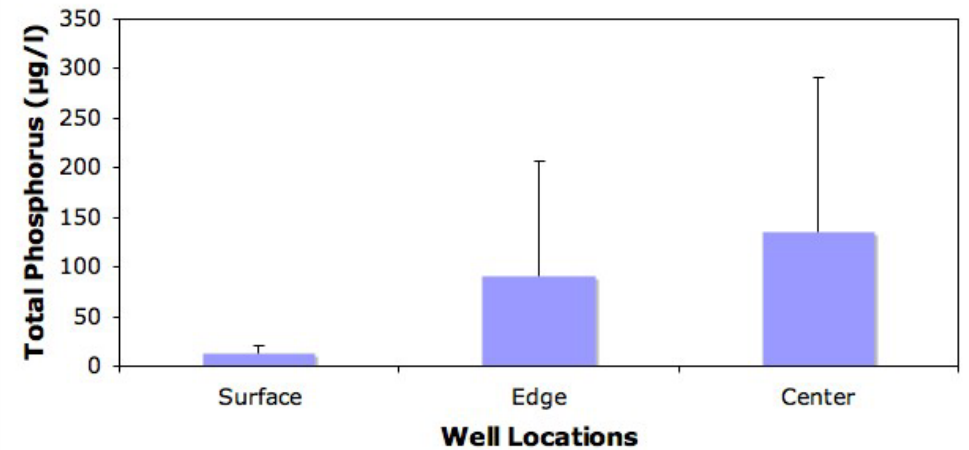
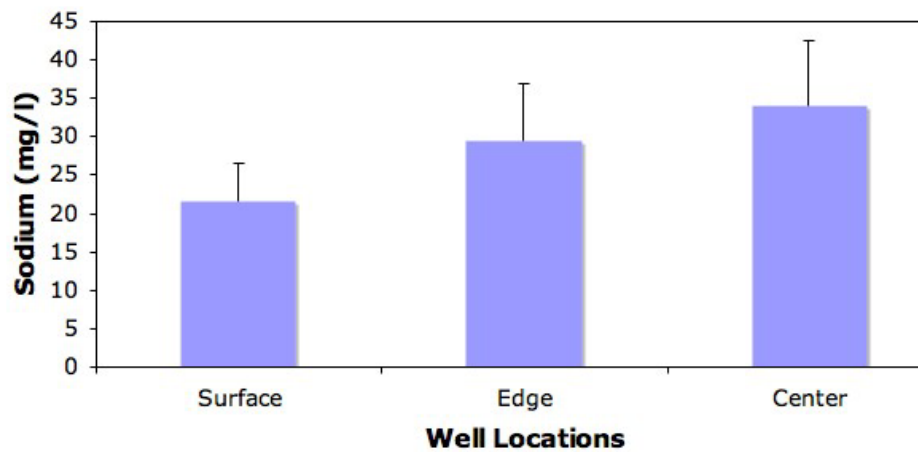
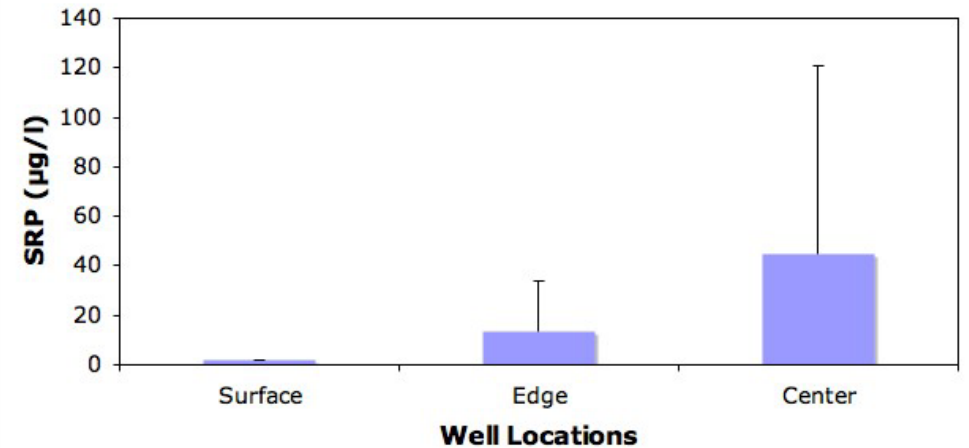
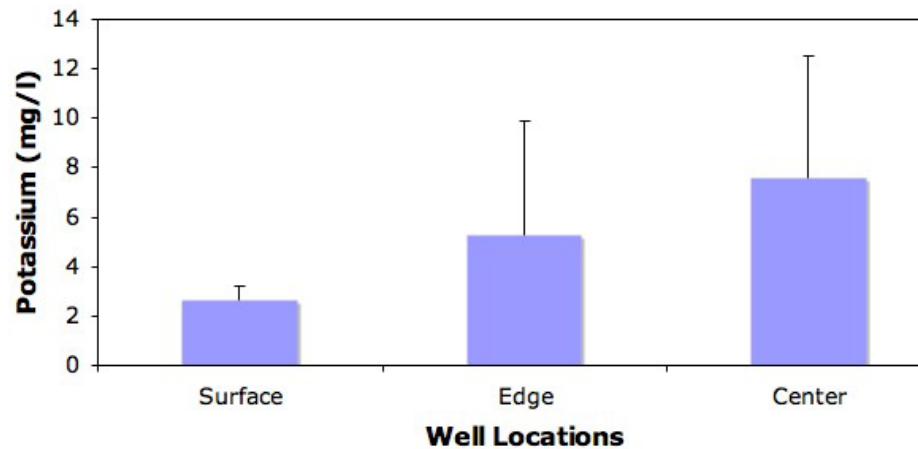
Wet Season

-Increased GW Interactions

Dry Season

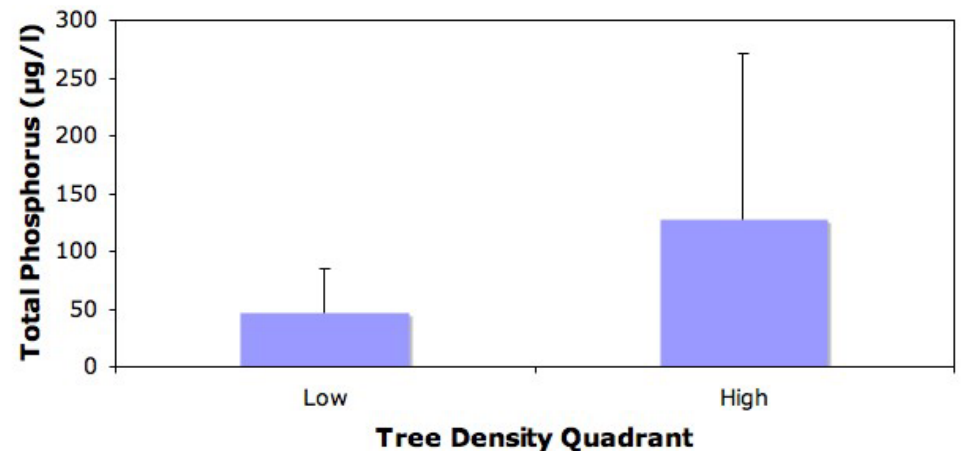
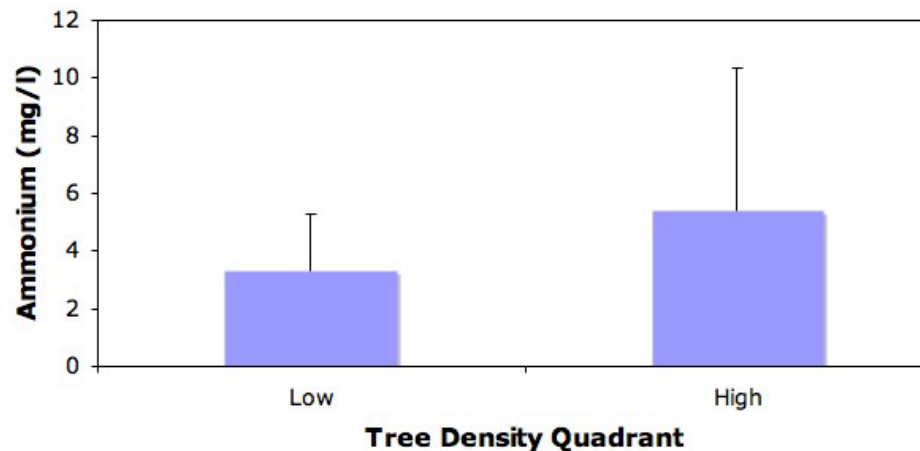
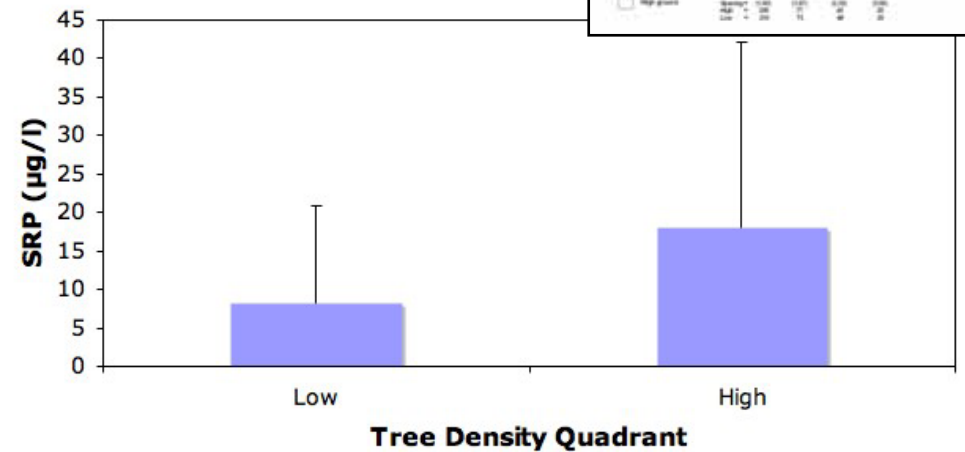
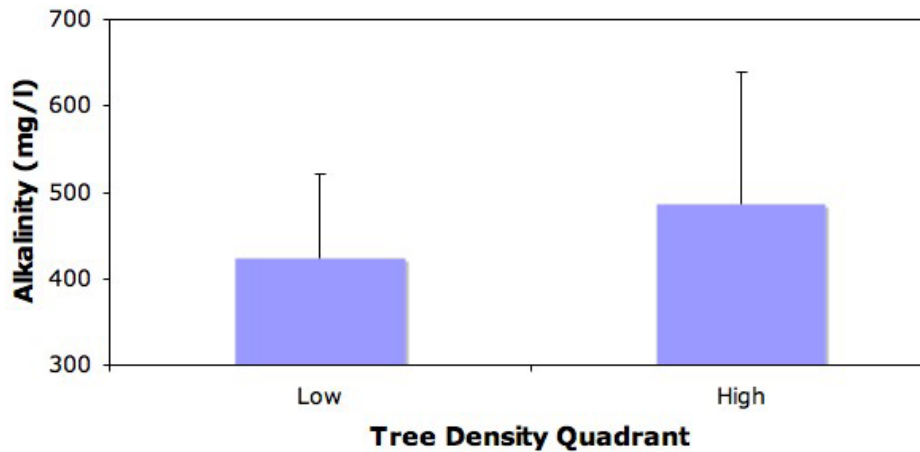
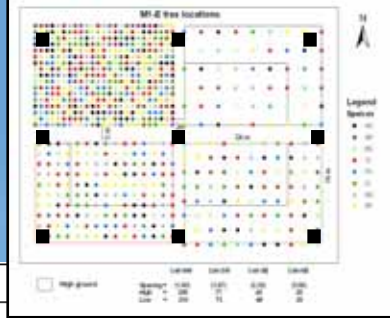
-Decreased GW Interactions

GW Chemistry Varied with Distance to Edge of Island



Significantly higher concentrations of ions and nutrients were detected in the center of the islands as compared to the edges

GW Chemistry Varied Overlying Tree Density



Groundwater under high density tree plots had significantly higher concentration of ions and nutrients

Conclusions

- GW levels in P-islands indicate year round GW discharge
- GW levels in L-islands indicate year round SW recharge except during rain events
- Diurnal drawdown is highest in center of the islands in the wet season
- During the dry season diurnal drawdown is highest in the high density plots
- Stable isotopes of GW and SW suggest increased GW-SW interactions during the wet season
- Two spatial relationships were detected in the GW chemistry
 - Increased ion and nutrient concentrations in center of islands as compared to edge
 - Increased ion and nutrient concentrations in GW in high density quadrants as compared to GW in low density quadrants