SOUTH FLORIDA WATER MANAGEMENT DISTRICT

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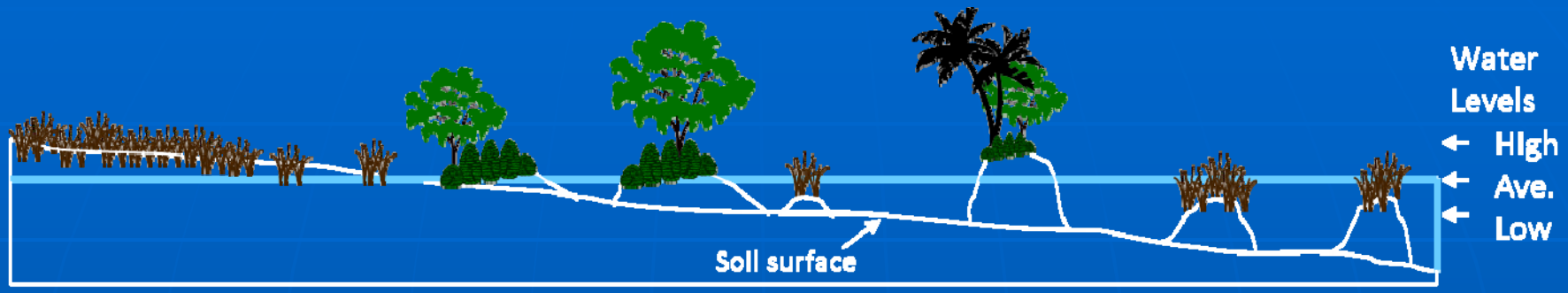
Litterfall and Tree Growth Dynamics in Pristine and Degraded Tree Islands in WCA-3A: The Importance of Ecological Functions on Tree Islands

SOUTH FLORIDA WATER MANAGEMENT DISTRICT
EVERGLADES SYSTEMS ASSESSMENT
3301 GUN CLUB ROAD, WEST PALM BEACH, FL 33406



Everglades Landscape

Tree Islands Research and Monitoring

1. Monitor the environmental factors that collectively influence the sustainability, health and distribution on Tree Islands in the Water Conservation Areas

2. Evaluate the effect of hydrology on aboveground and belowground dynamics

Management Relevance

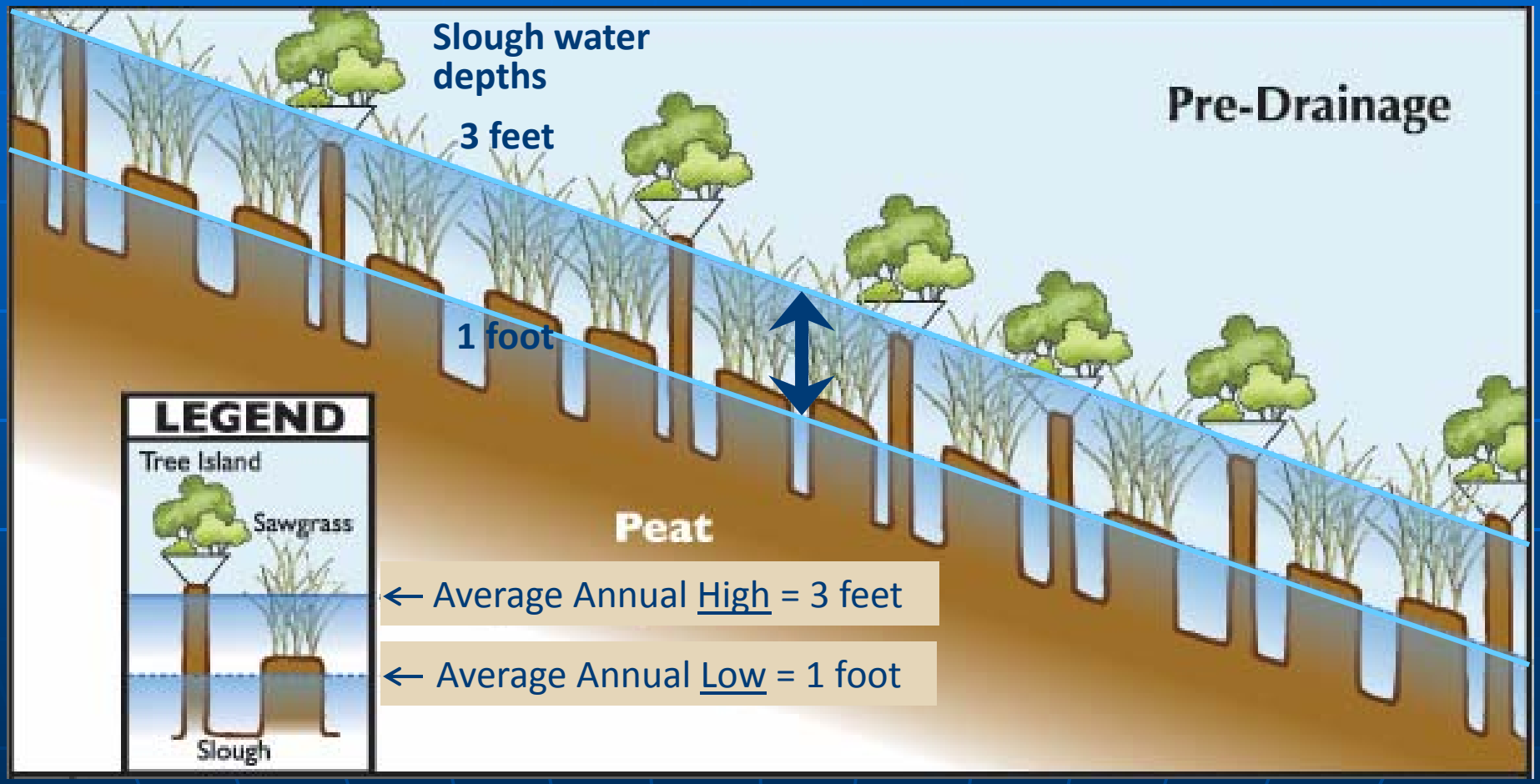
1. Establish guidelines to better manage water depths & hydroperiods in the Water Conservation Areas

2. Use Science to establish performance measures and targets to evaluate restoration success (i.e. Incremental Adaptive Restoration).

Presentation Outline

- Pre-drainage and current hydrological conditions
- Landscape features controlling tree islands hydropatterns in the Everglades
- Tree island functions affected by the hydrologic heterogeneity of the Everglades landscape

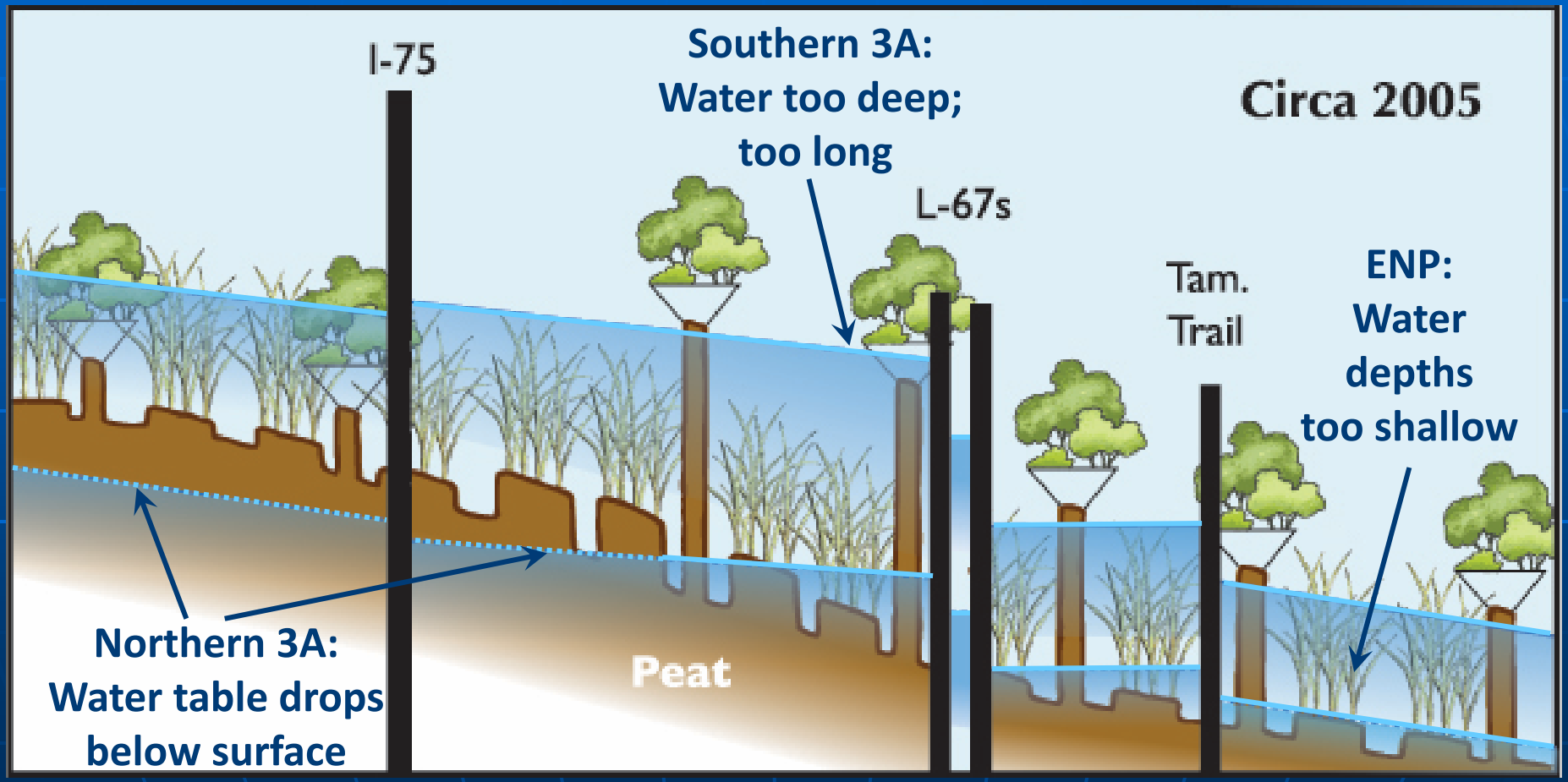
SFWMD and Tree Islands: Pre-Drainage Water Depth Regime



(Only long-term averages shown)

Source: McVoy, Said, Obeysekera, VanArman and Dreschel

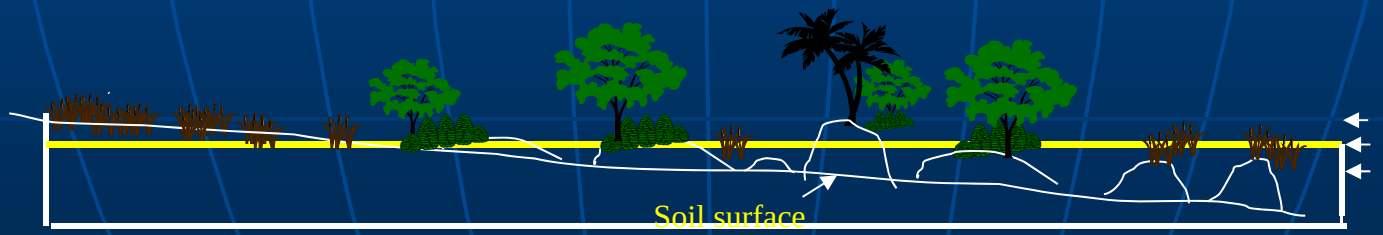
SFWMD and Tree Islands: Current Water Depth Regime



Source: McVoy, Said, Obeysekera, VanArman and Dreschel

Tree Island Basic Questions:

- What are the spatial and temporal patterns of water depths and hydroperiods needed to sustain plant diversity and optimum productivity patterns?
- What are the ecological and biological traits that best determine successful restoration trajectories?
- How results can be used to make management decisions?



Study Tree Islands

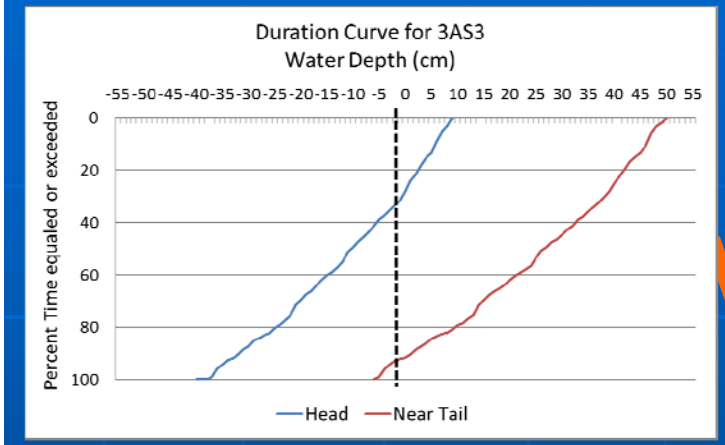
Tree Island 3AS3

Tree Island 3AS4

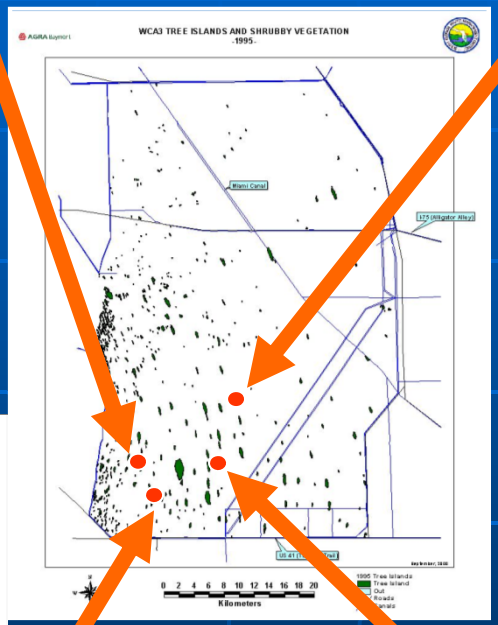
Tree Island 3AS5

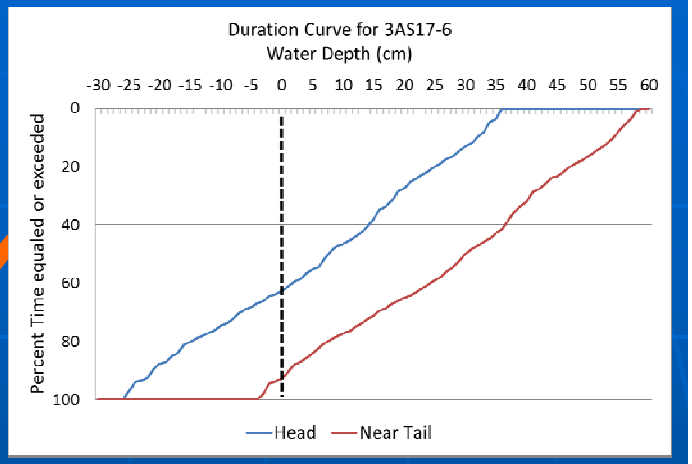
Tree Island 3AS17-6

Results: Hydropatterns (2000-2014)

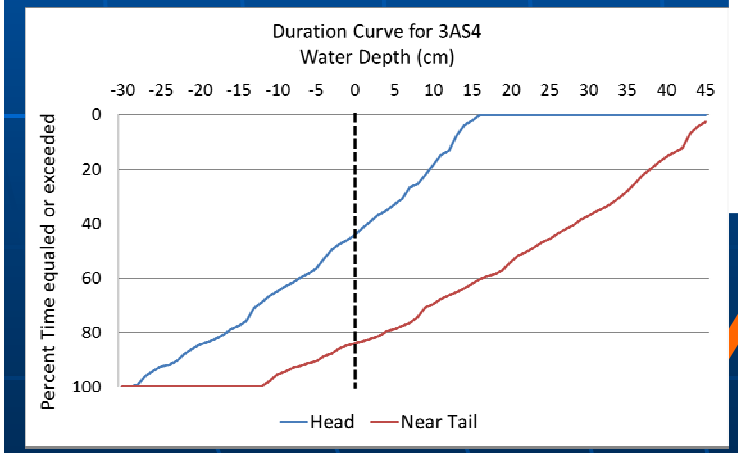


Head Av -12.4 cm & 4 months
Near Tail 24.4 cm & 11 months

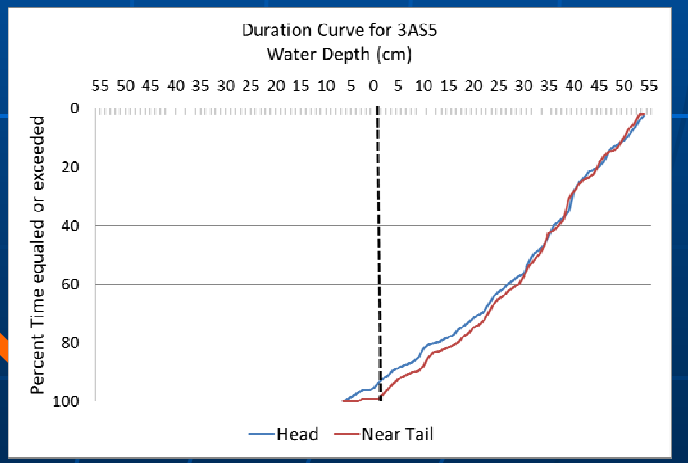




Head Av 5.2 cm & 7 months
Near Tail 27.5 cm & 11 months

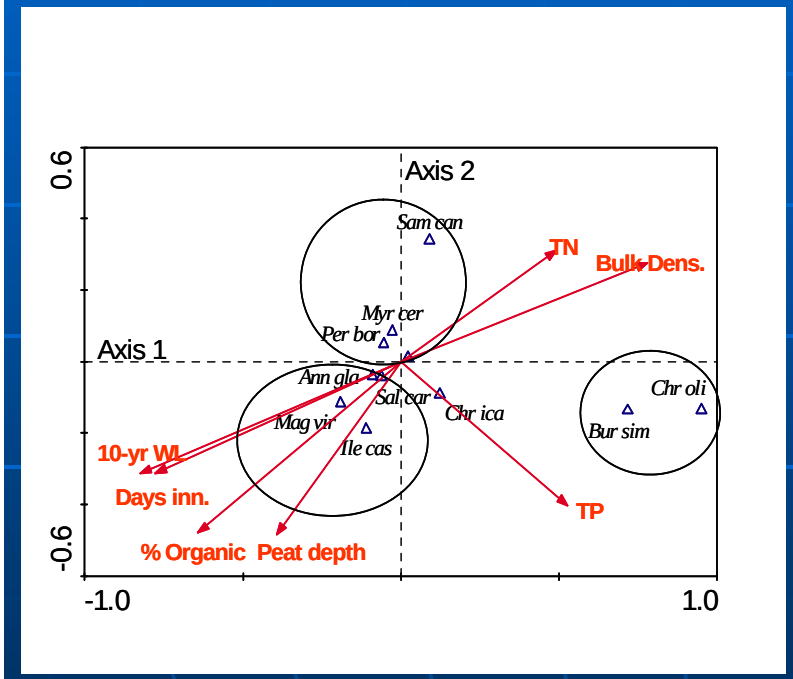


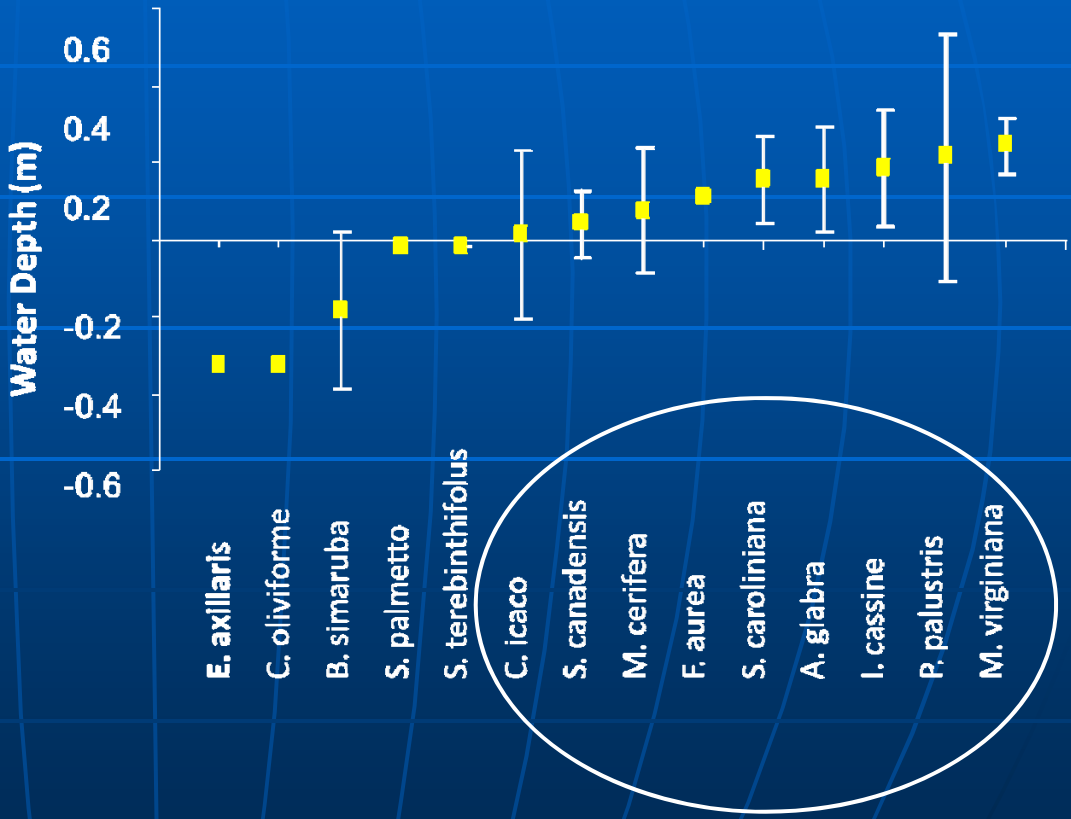
Head Av -5 cm & 4 months
Near Tail 19.7cm & 9 months



Head Av 30.6 cm & 11 months
Near Tail 30.1 cm & 11 months

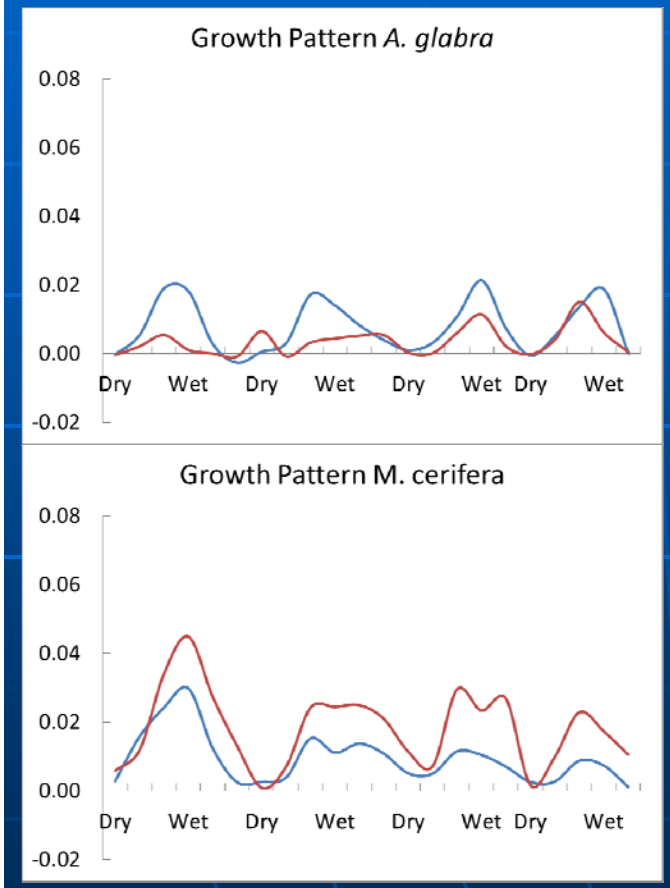
Results: Dominant Species and Water Tolerance



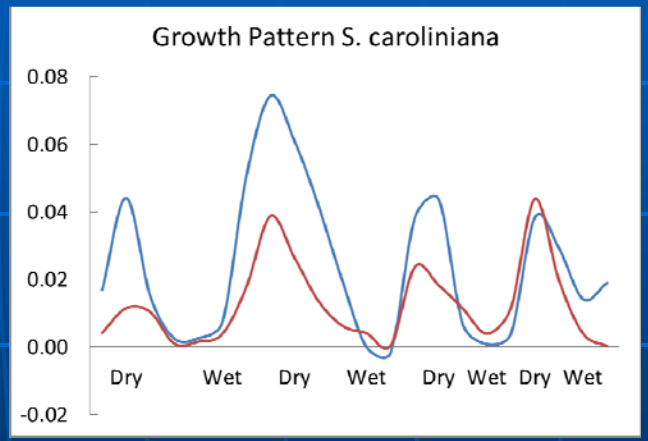


Tree Growth Rate Seasonal Patterns (mm day^{-1})

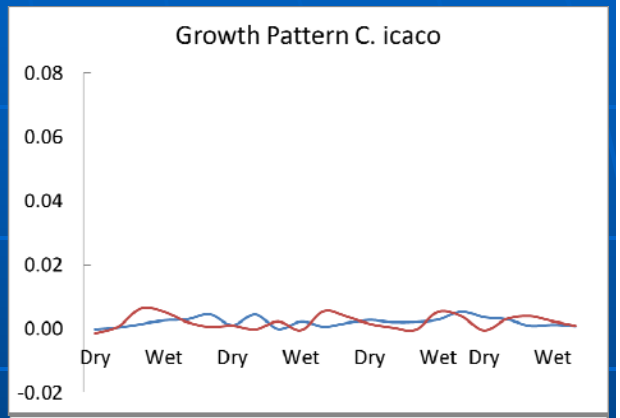
High growth: Wet season

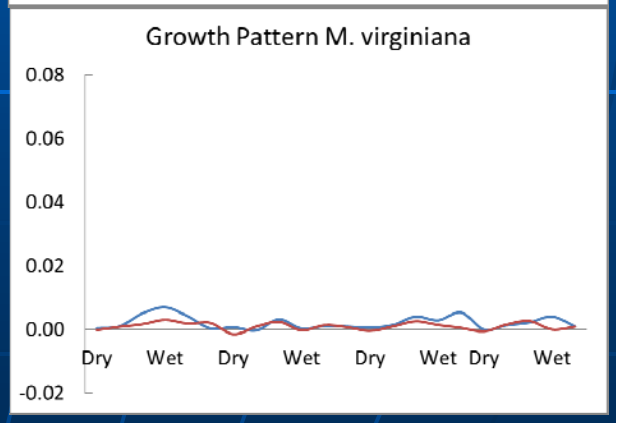


High growth: Dry season



No seasonality





Short Hydroperiod — Long Hydroperiod —

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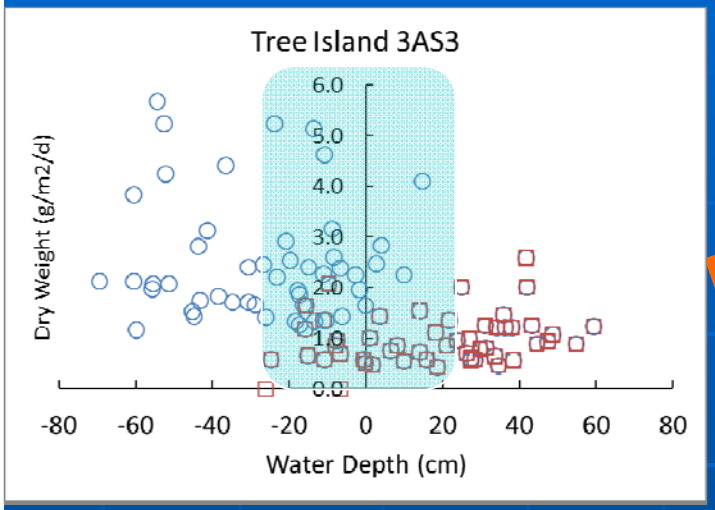
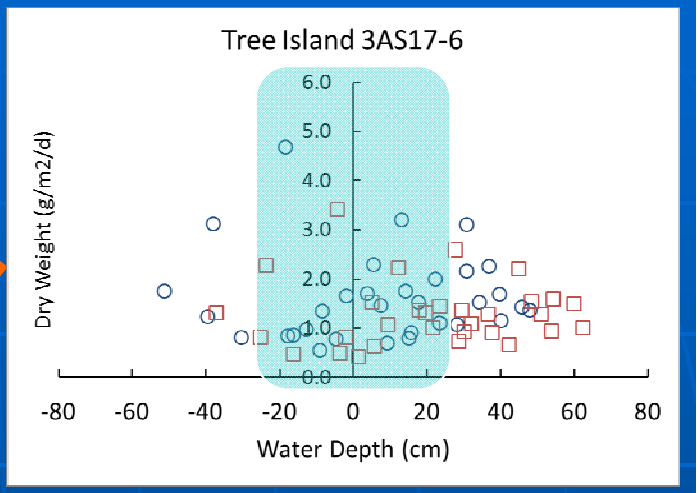
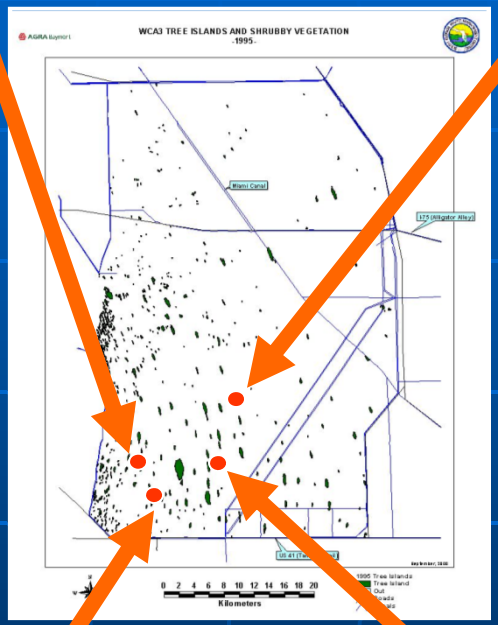
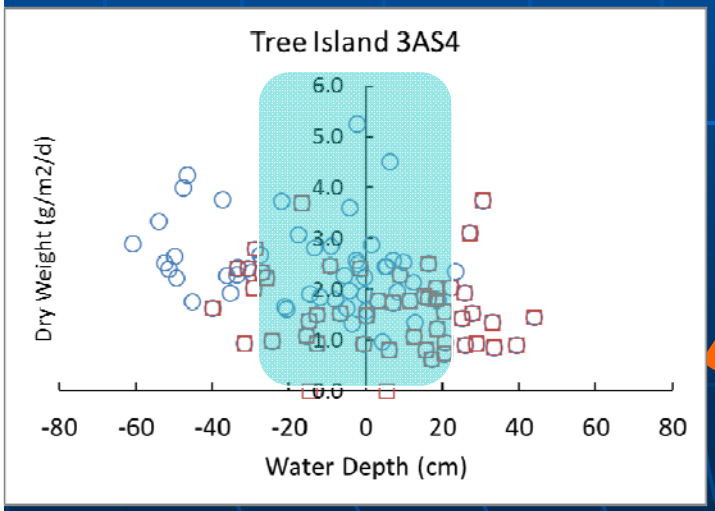
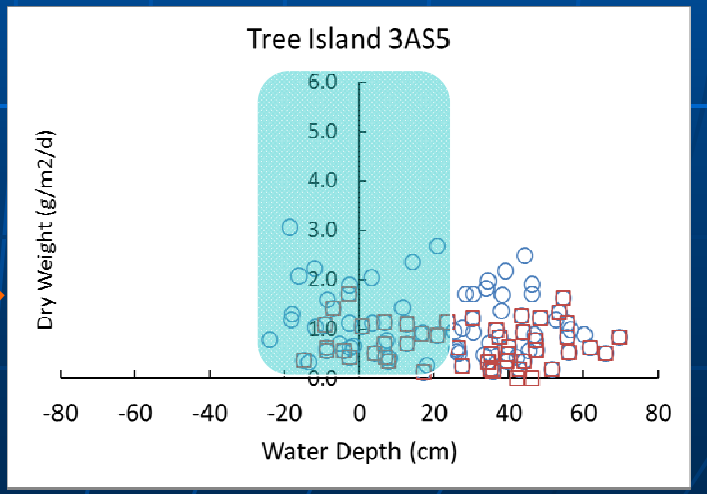
Litterfall-Hydrology Relationship









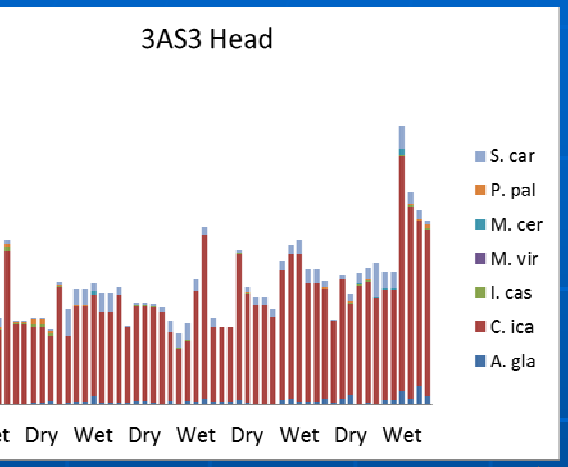


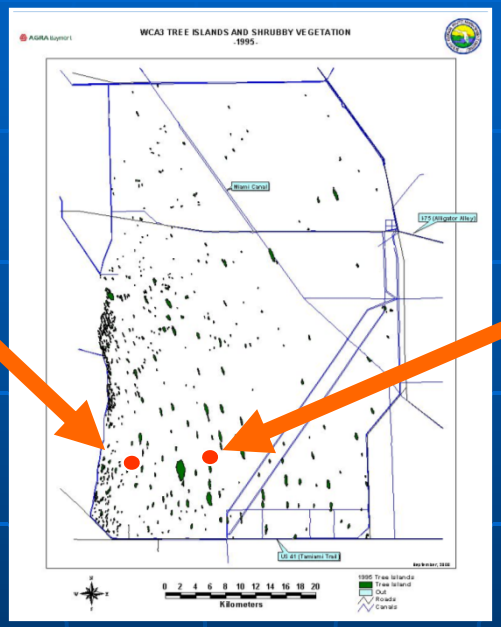
Short Hydroperiod

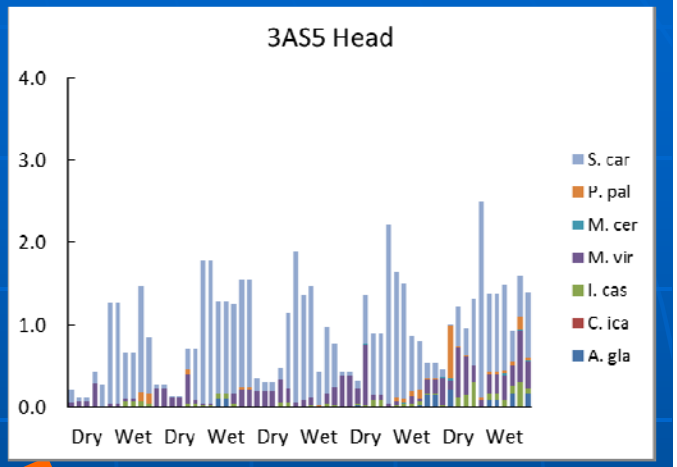
Long Hydroperiod

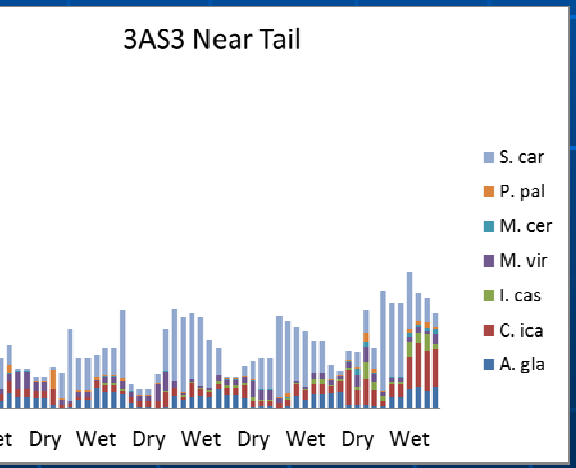
sfwmd.gov

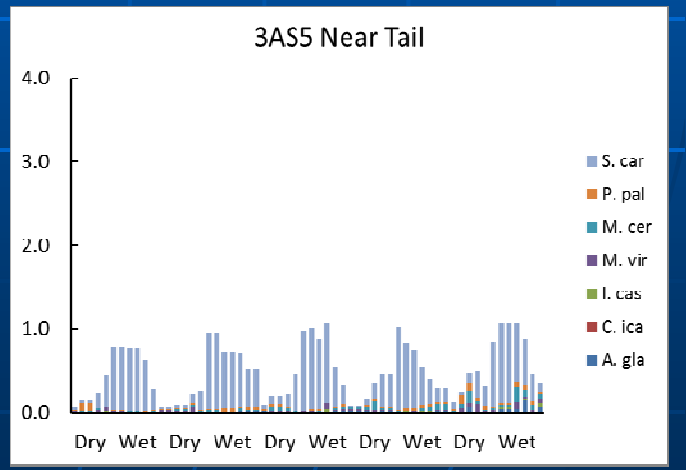
af fall (g m^2 d^{-1}): species temporal and spatial pattern



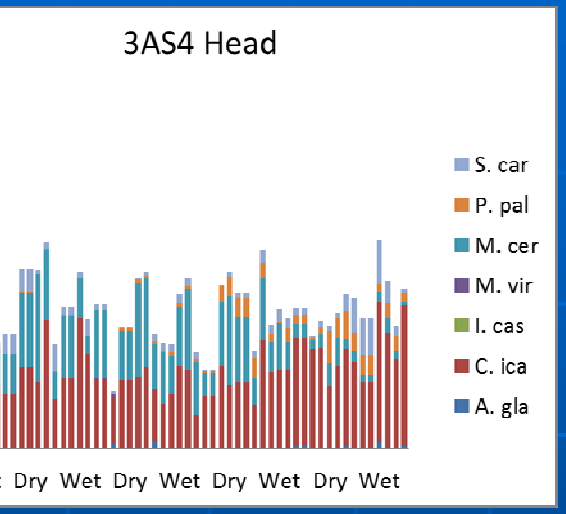


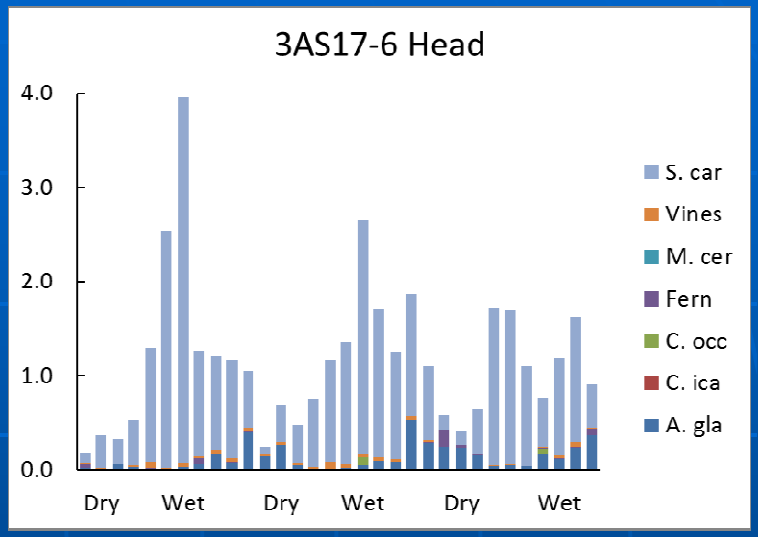


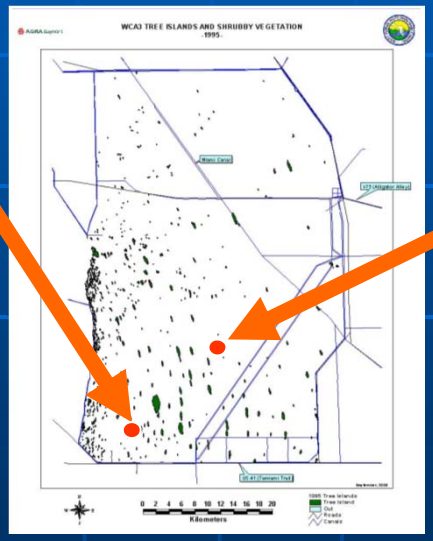


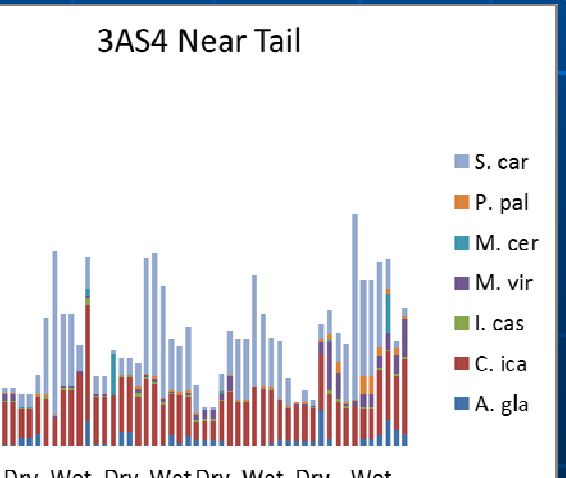


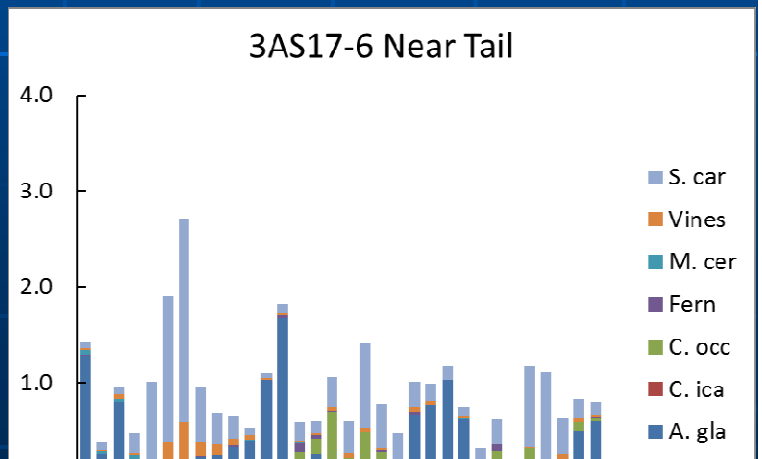
eaf fall (g m^2 d^{-1}): species temporal and spatial pattern











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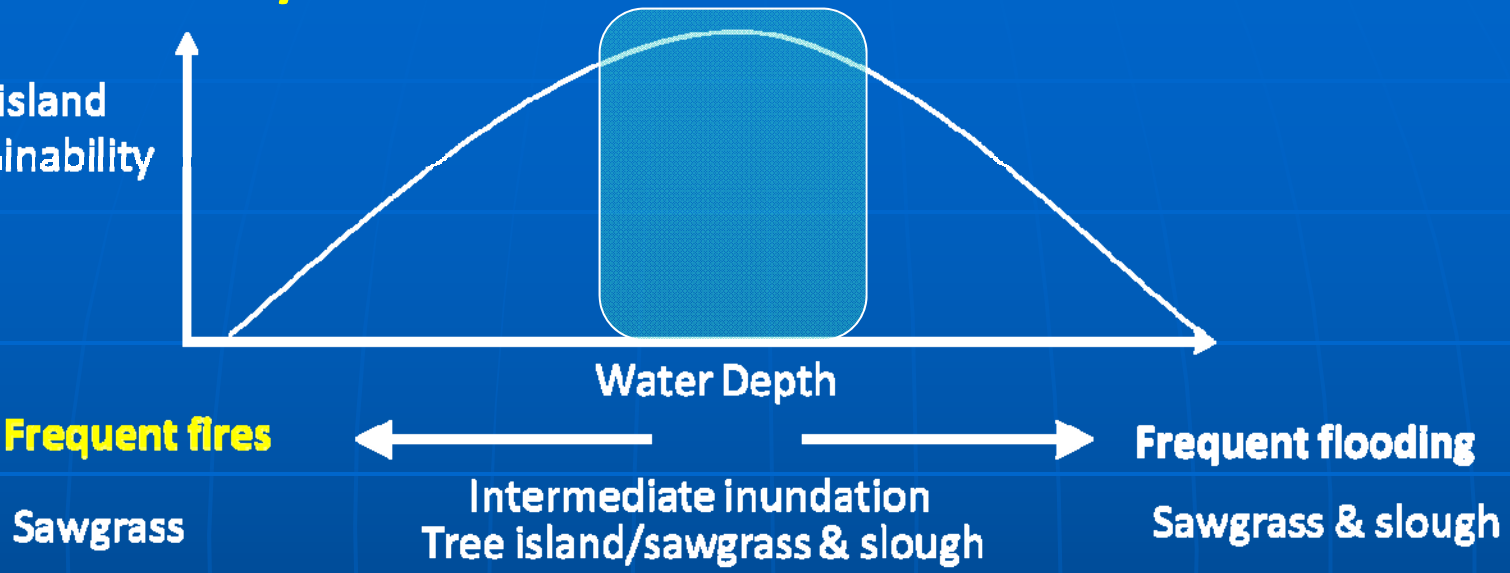
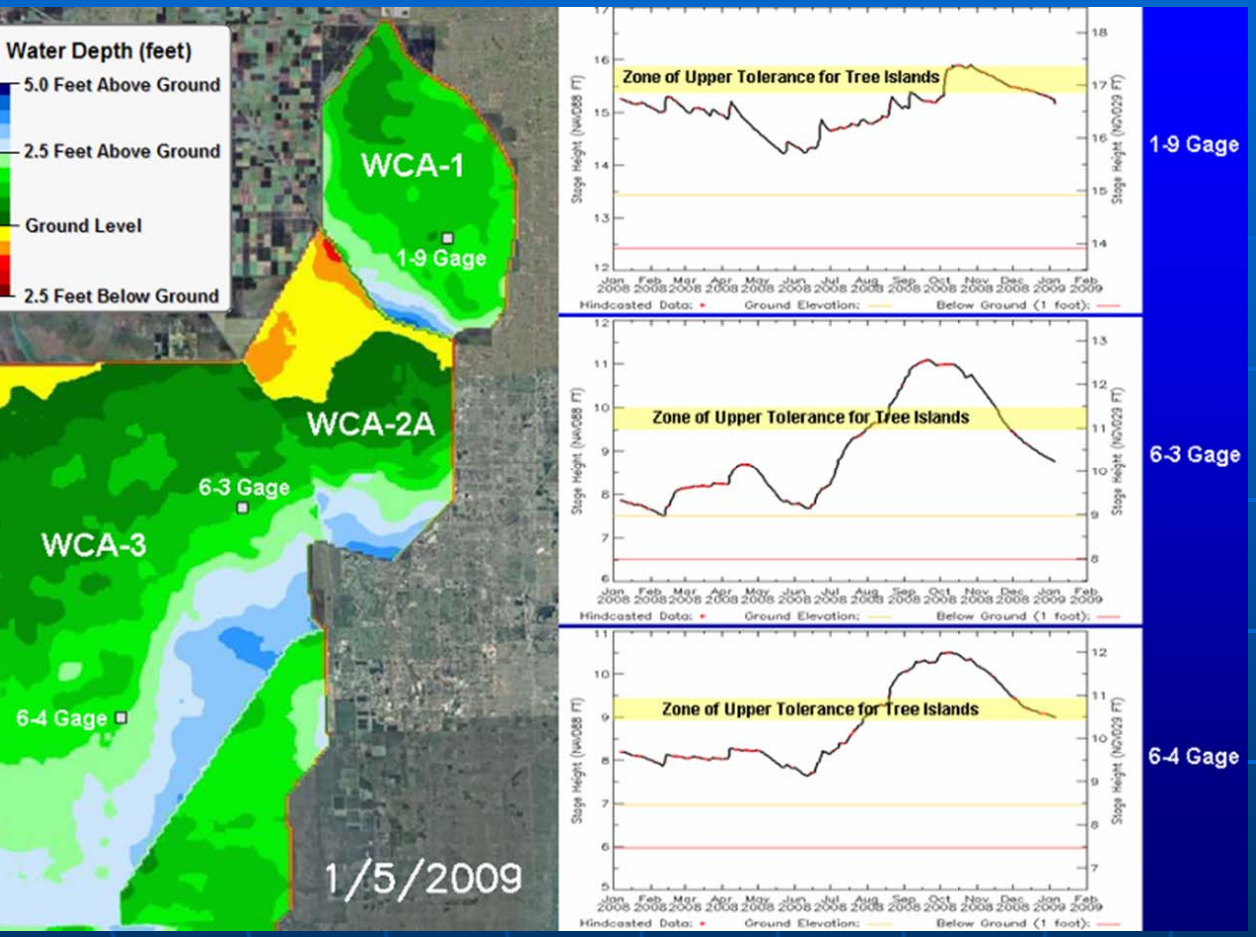


ree islands with longer hydroperiods tend to have slower tree growth rates nd lower litterfall production.

ong hydroperiods favor some species over others (i.e water tolerant species ver non-tolerant species)

ptimum tree growth and litterfall production will be sustained if a distinct et-dry cycles is maintained

Regional Flooding Tolerances of Tree Islands



nagement Relevance

ults can be used to establish tree island performance measures and targets CERP. For instance based on species composition and aboveground duction, plant community on tree island tolerate water depth between 20-