Implications of Temporal and Spatial Vegetation Patterns on Performance of the Everglades Stormwater Treatment Areas

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Vegetation Study Objectives

- Evaluate STA vegetation biomass and nutrient storage
- Provide comparisons among Emergent Aquatic Vegetation (EAV) and Submerged Aquatic Vegetation (SAV)
- Relate results to performance
Importance of Vegetation in the STAs

- Provide hydraulic resistance
- Enhance settling of nutrients
- Surface for periphyton/microbial
- Nutrient storage
- Co-precipitation mechanisms
Vegetation Study Sites

### Sampling Design

<table>
<thead>
<tr>
<th></th>
<th>SAV</th>
<th>EAV</th>
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</thead>
<tbody>
<tr>
<td><strong>Information Collected</strong></td>
<td><strong>% coverage, Species composition, Total Biomass, Total Phosphorus (TP), Total Carbon (TC), Total Nitrogen (TN), Ash Content, Total Calcium (SAV only)</strong></td>
<td><strong>% coverage, Species composition, Total Biomass, TP, TC, TN, Ash Content</strong></td>
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SAV Biomass Decline

STA-2 Cell 3 SAV

Nov. 2015

Sept. 2016

Aug. 2017

Inflow

Midflow

Outflow
Total Tissue Biomass Comparisons

- Inflow typically had highest biomass for EAV
- Midflow lowest biomass

- Midflow and outflow typically had highest biomass
- Substantial loss of SAV over three events in each location
SAV Tissue Nutrient Storage

- Species observed in STA 2 Cell 3:
  - *Chara* spp.
  - *Naja guadalupensis*
  - *Potamegeton illinoensis*
  - *Spirogyra* spp.
Nutrient Storage Comparisons

- Declining gradient for phosphorus storage from inflow to outflow for both vegetation types
- Nutrient storages were all significantly different among the two vegetation types
STA-2 Performance Comparisons

STA-2 Cell 3 (SAV)
Surface Water Total Phosphorus

STA-2 Cell 1 (EAV)
Surface Water Total Phosphorus
Summary

- **Biomass**
  - Spatial differences in SAV vs. EAV along nutrient gradient
  - Temporal loss of SAV biomass over course of study at all sites

- **Nutrient Storage**
  - Nutrient storages significantly higher for EAV compared to SAV
  - Spatial differences in SAV species, *Chara* had highest storage capacity

- **Performance**
  - Performance decline following loss of SAV biomass
  - Storm impacts complicated correlations between performance and SAV biomass loss
  - EAV biomass and performance were fairly consistent throughout study
THANK YOU

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