Role of Vegetation on Phosphorus Reduction in the Everglades Stormwater Treatment Areas

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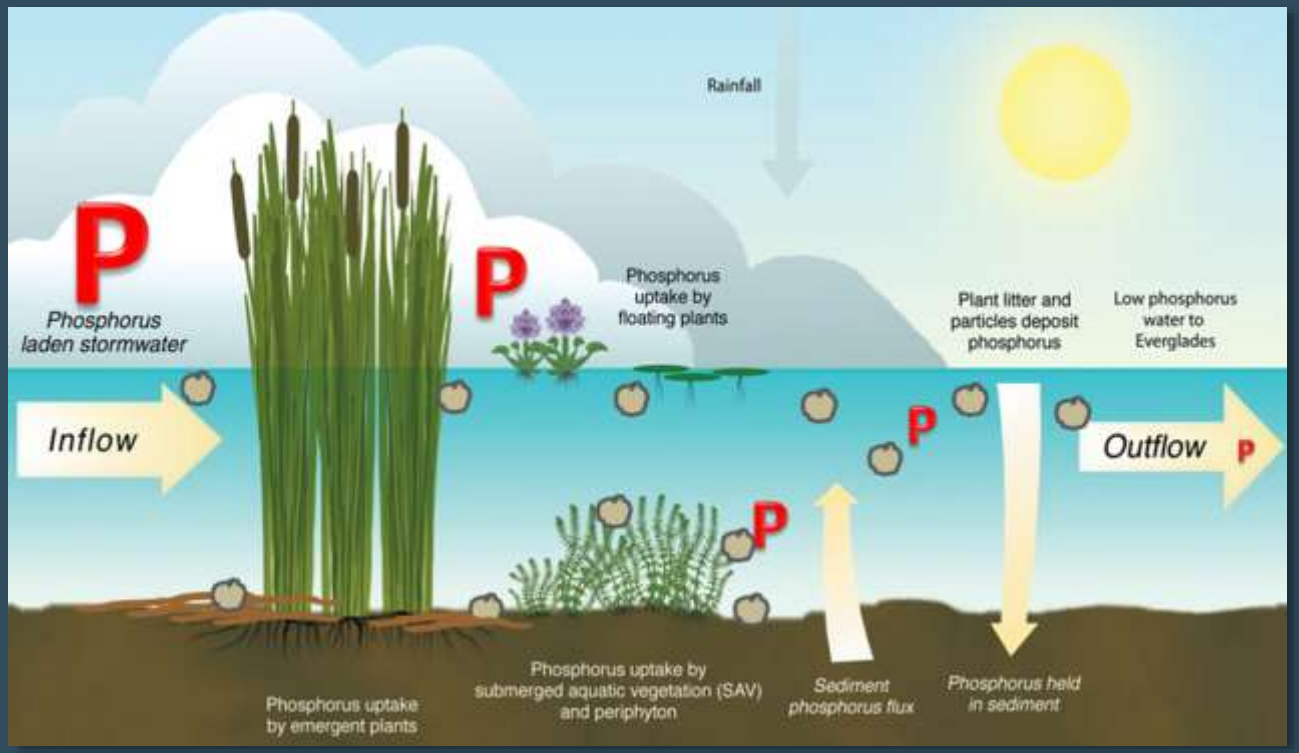
Presentation Overview

- Importance and role of vegetation in STAs
- Vegetation mapping and monitoring in the STAs
- Phosphorus Flux vegetation study initial findings

Importance of Vegetation in the STAs



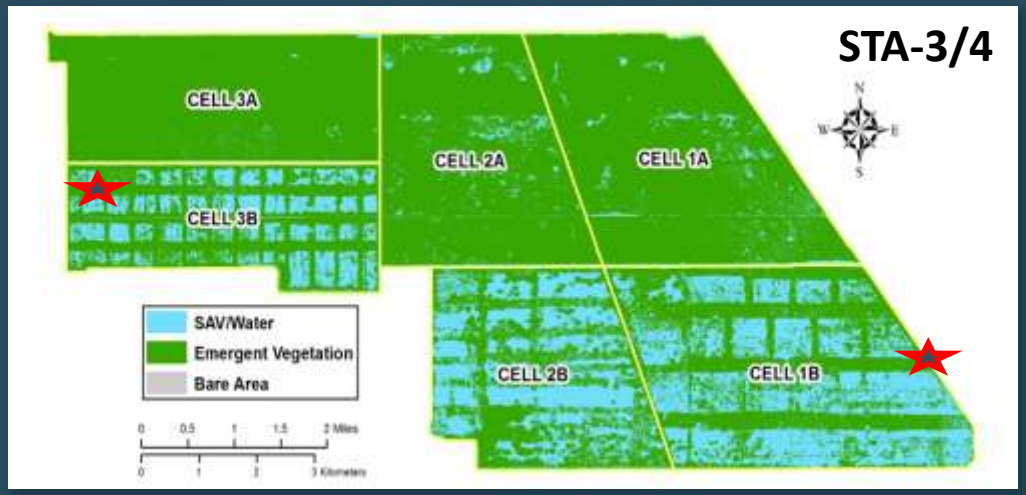
Provides:

- Hydraulic resistance
- Surface for periphyton/microbial colonization and activity
- Direct nutrient uptake and burial
- Nutrient storage

STA Vegetation Types

- Emergent Aquatic Vegetation (EAV)
- Submerged Aquatic Vegetation (SAV)
- Floating Aquatic Vegetation (FAV)

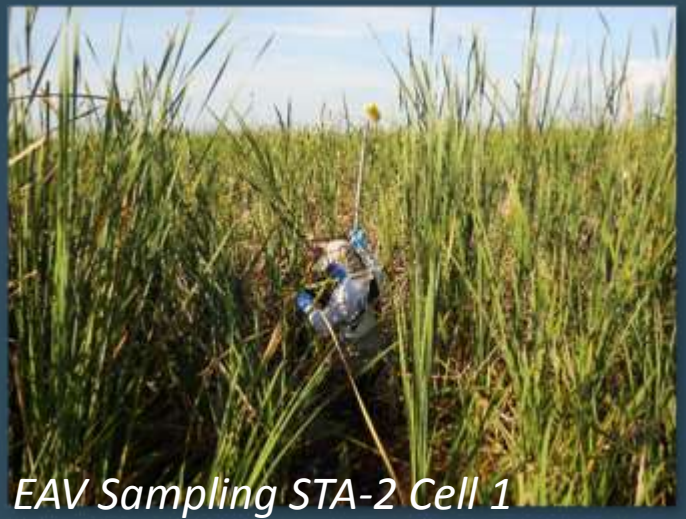
Vegetation Mapping and Monitoring



- Annual aerial mapping of EAV and SAV coverage
- Monthly flights to monitor vegetation conditions
- Bi-annual SAV ground surveys

Restoration Strategies Science Plan:
Phosphorus Flux Vegetation Assessments

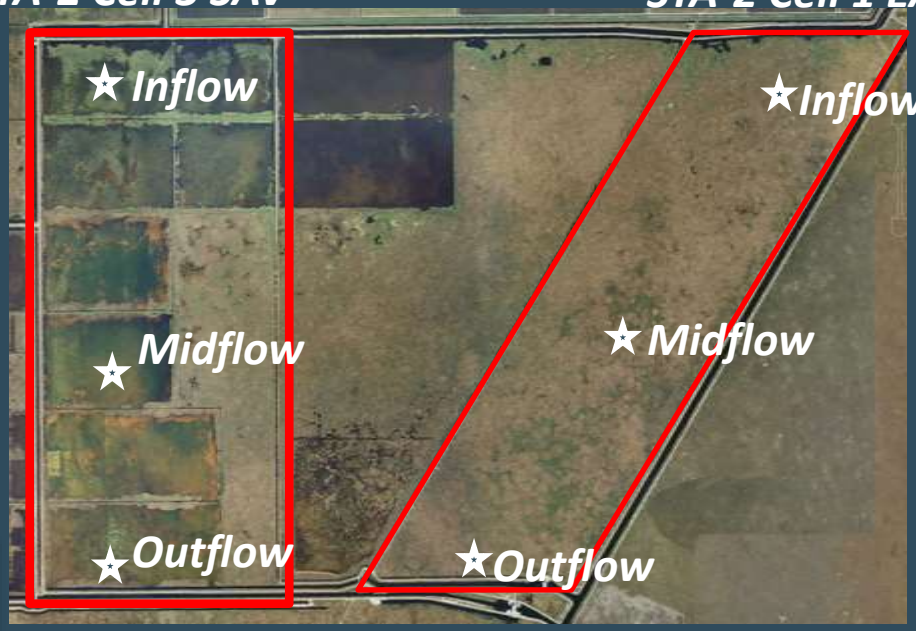
- Relate plant communities to water column P concentrations, floc and soil P storage, and P-cycling
- Bi-annual SAV harvesting and annual EAV harvesting in selected flow-ways
- First sampling events in Nov. 2015 and Sept. 2016



EAV Sampling STA-2 Cell 1

SAV sampling STA-2 Cell 3

Vegetation Study Sites

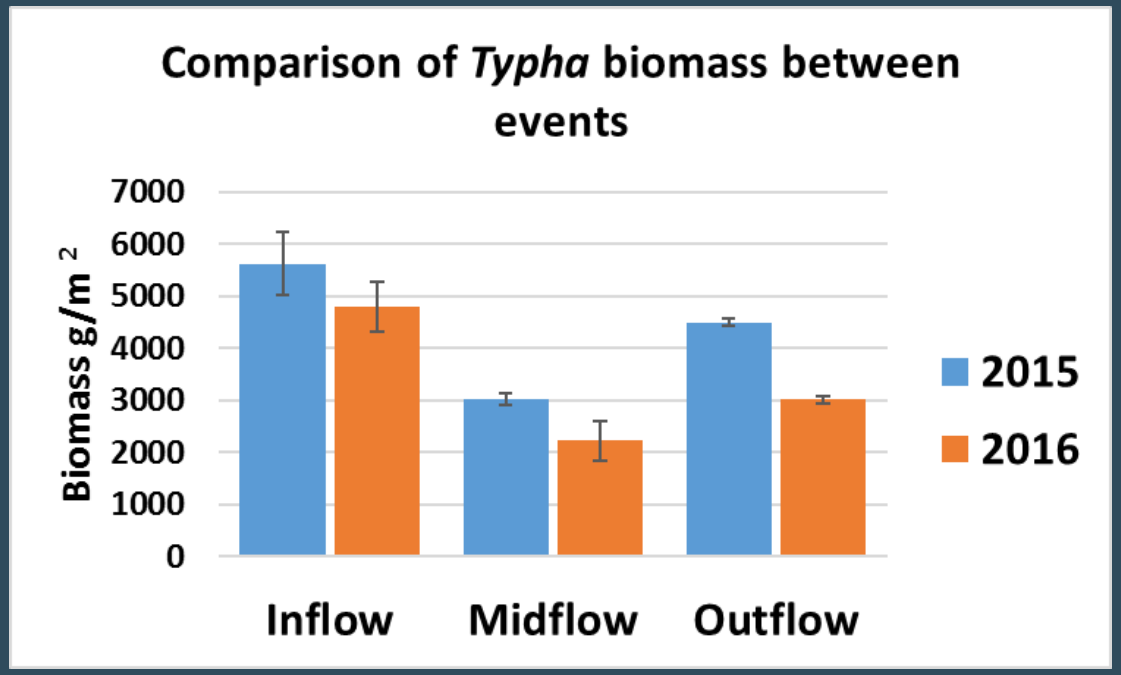


Sites	STA-2 Cell 3 SAV species
Inflow	• *Spirogyra* • *Hydrilla* • *Ceratophyllum*
Midflow	• *Chara*
Outflow	• *Chara* • *Potamegeton* • *Ceratophyllum* • *Najas*

Vegetation Type	SAV	EAV
Information collected	• % coverage and species composition • Total Phosphorus (TP) • Total Carbon (TC) • Total Nitrogen (TN) • Ash content • Total Calcium (Tca)	• % coverage and species composition • TP • TC • TN • Ash content

Sites	STA-2 Cell 1 EAV species
Inflow	• *Typha*
Midflow	• *Typha* • *Cladium*
Outflow	• *Typha* • *Cladium*

Typha Total Biomass



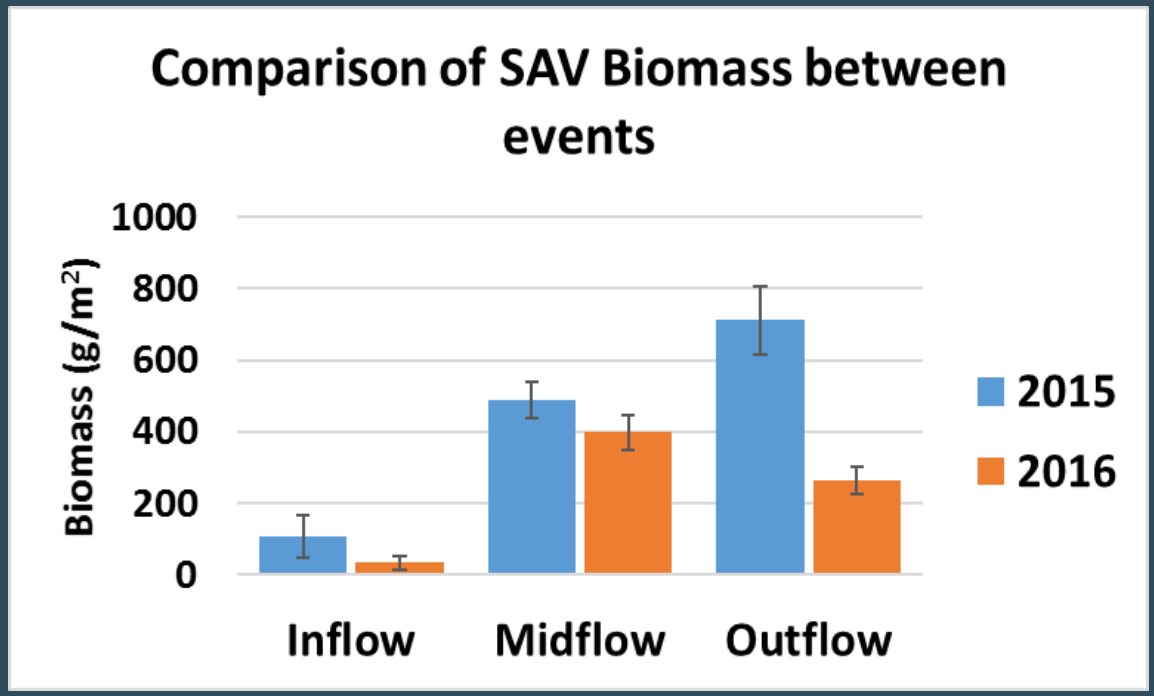
Inflow

Midflow

Outflow

SAV Biomass and Species

STA-2 Cell 3 SAV



Inflow

Hydrilla, Ceratophyllum, & Spirogyra

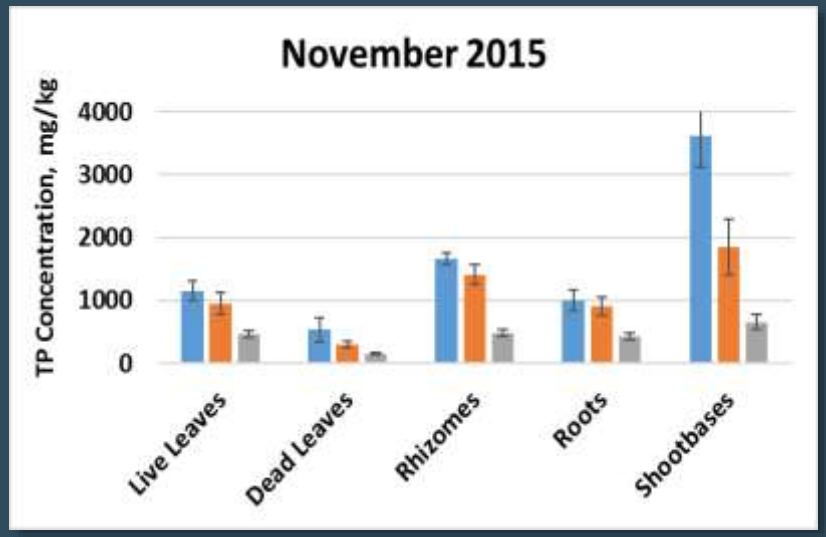
Midflow

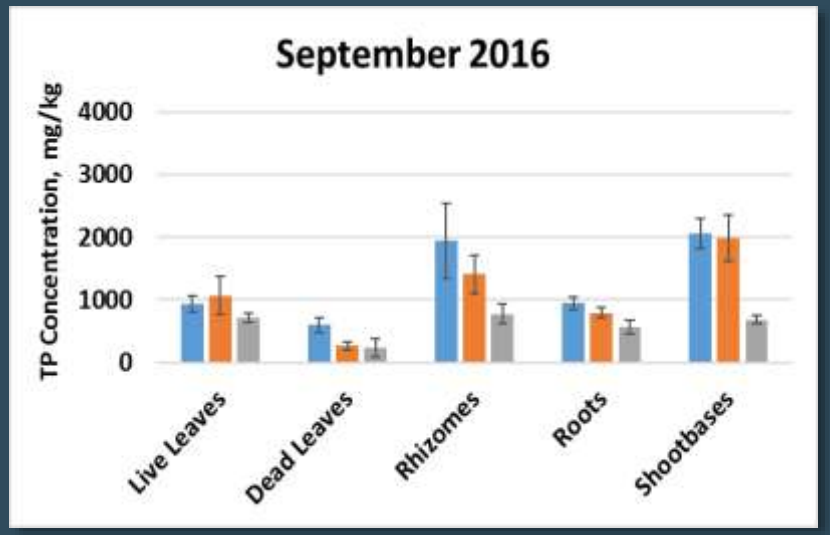
Chara

Outflow

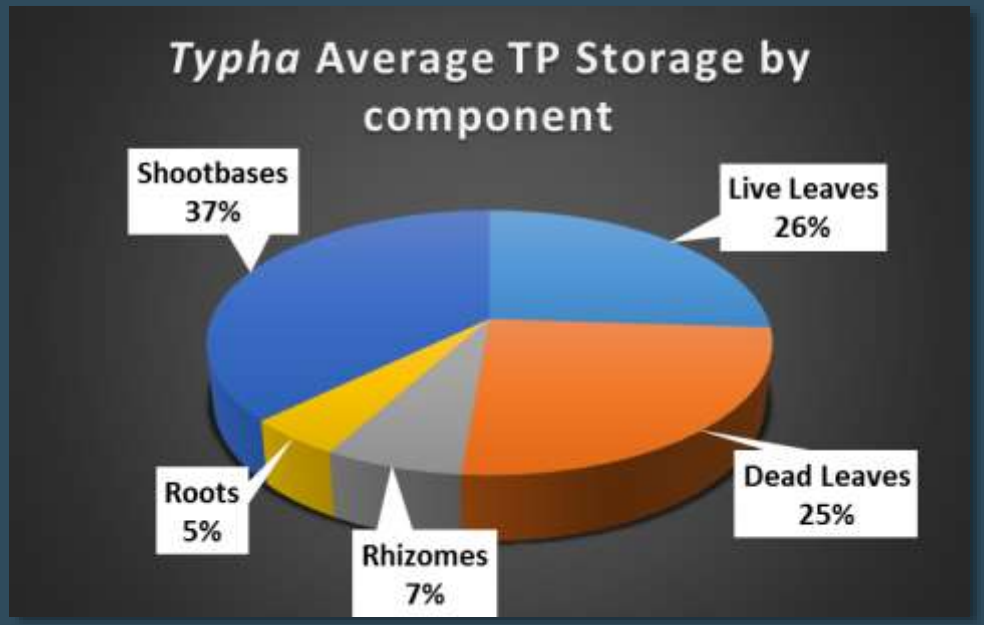
Chara, Najas, & Potamegeton

EAV Tissue TP Concentration and Storage

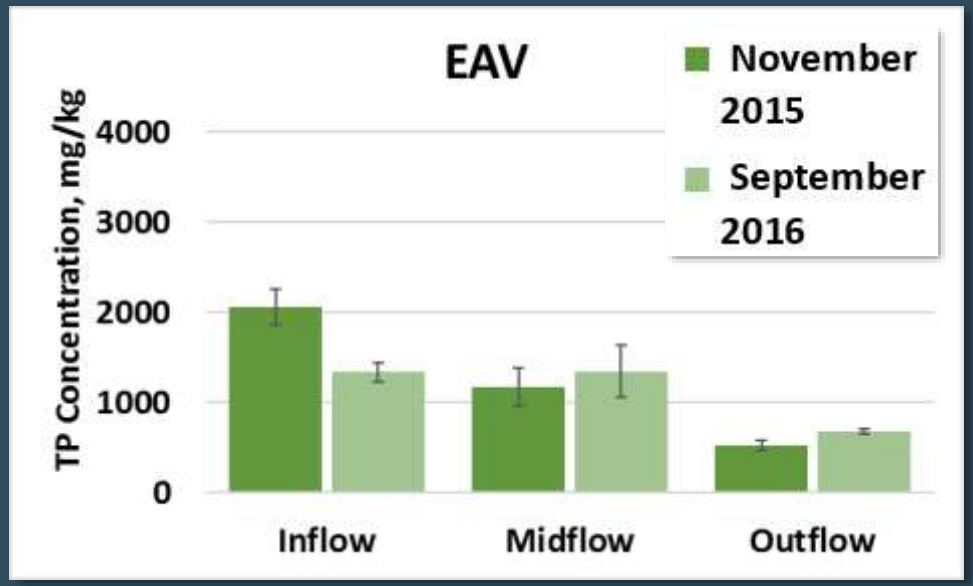


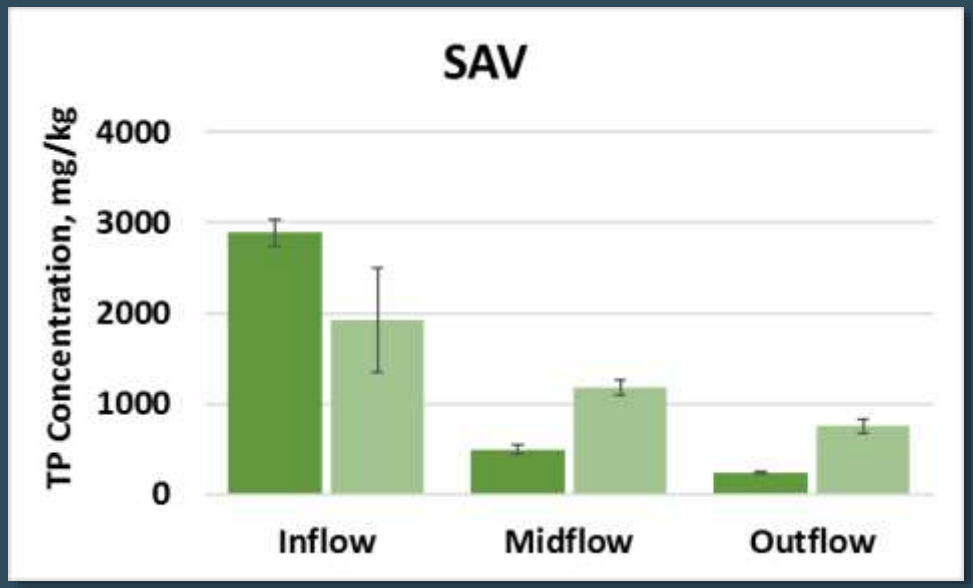


Inflow Midflow Outflow



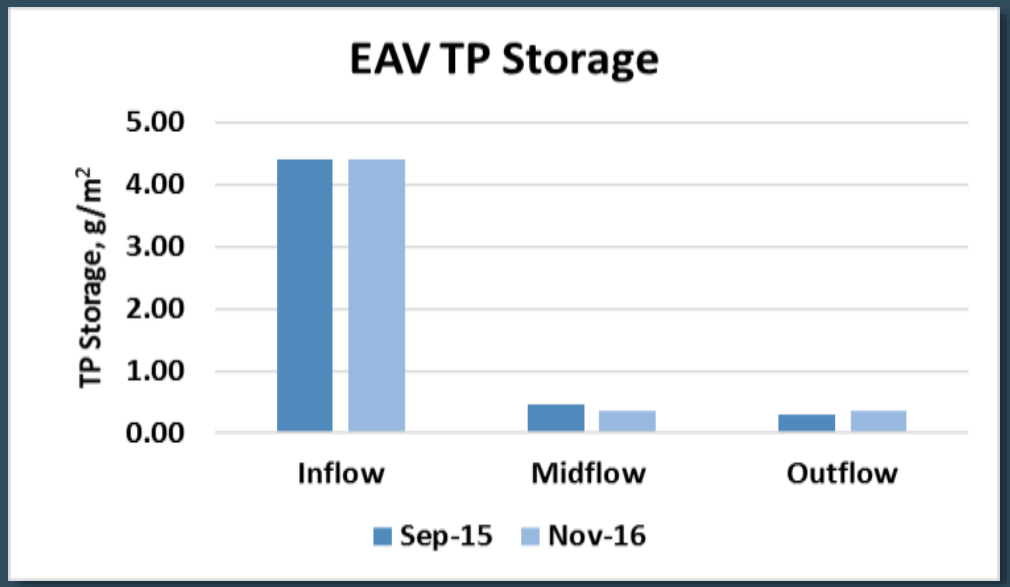
Tissue TP Concentration Comparison

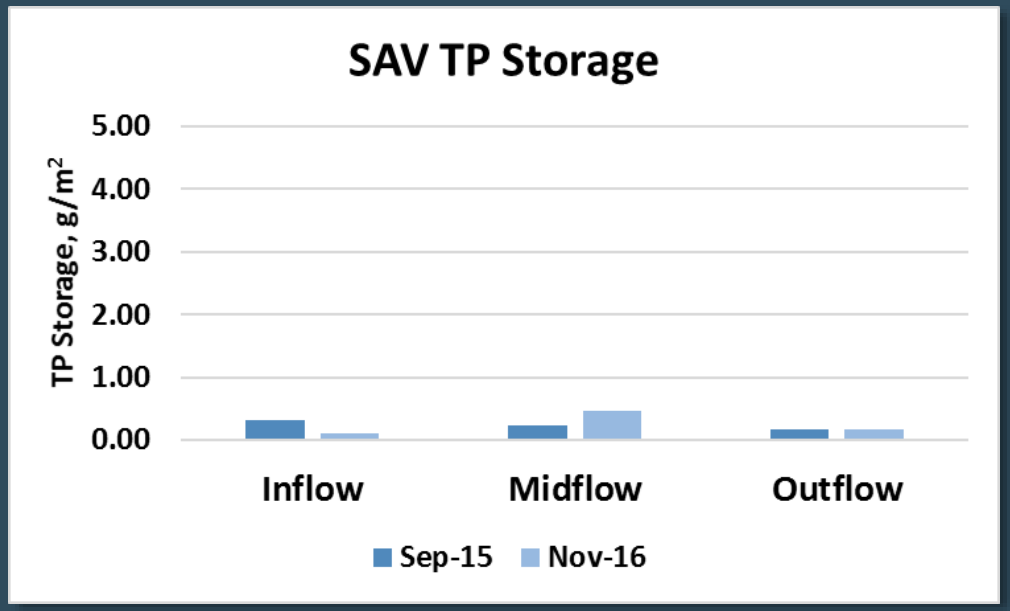




- EAV and SAV TP concentrations showed declining gradient from inflow to outflow for both events
- SAV had higher TP concentrations at the inflow compared to EAV

Tissue TP Storage Comparison





- EAV had higher TP storage at inflow compared to mid and outflow
- EAV had higher TP storage than SAV
- SAV TP storage relatively consistent spatially and temporally.

Vegetation Nutrient Analyses

Location	EAV 2015	EAV 2016	SAV 2015	SAV 2016
Total Nitrogen (g/kg)				
Inflow	10	10	32	27
Midflow	9	10	17	18
Outflow	7	8	11	17
Total Carbon (g/kg)				
Inflow	416	419	333	187
Midflow	355	421	249	203
Outflow	430	427	208	282
Ash Content (%)				
Inflow	8	8	25	27
Midflow	8	8	54	59
Outflow	6	6	67	42
Total Calcium (g/kg)				
Inflow	NA	NA	65	108
Midflow	NA	NA	205	213
Outflow	NA	NA	260	153

- TN concentrations
  - Remained relatively consistent across events
  - Declining gradient from inflow to outflow
- TC concentrations
  - Remained relatively consistent across events & vegetation types
- Ash Content
  - Higher % in SAV than EAV
- Total Calcium
  - No clear trends in SAV

Summary

- EAV biomass higher at front end of flow-way while SAV was lower at front end
- Both EAV and SAV flow-ways showed a declining gradient in tissue TP concentrations from inflow to outflow
  - SAV higher tissue TP concentration at front end
- EAV substantially higher tissue TP storage at front end and compared to SAV
- Ongoing sampling and analyses to understand role of vegetation in phosphorus reduction
  - Seasonality
  - SAV speciation including shifts over time
  - Nutrients, ratios, storage capacity

THANK YOU

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