

Restoration Strategies Science Plan Progress

**Long Term Plan
Communications Meeting
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Science Plan Implementation

- Implementing detailed study plans (DSPs) for 8 studies
- Each study is led and managed by District personnel acting as Principal Investigators
- Additional District personnel are being utilized on all projects; however, certain tasks or aspects of the work are supported by external contractors selected through a competitive RFP process
- SOWs have been developed with these contractors - two private sector firms and two Florida universities
- Additional SOWs are under development

Initial Suite of Proposed Studies

1. Use of Soil Amendments / Management to Control P Flux
2. Evaluate the Use of Alternative Vegetation Occurring in Low Phosphorus Environments to Achieve Low P Discharge in STAs*
3. Development of Operational Guidance for FEB and STA Regional Operation Plans
4. Evaluate P Sources, Forms, Flux, and Transformation Processes in STAs
5. Investigation of STA-3/4 PSTA Performance, Design and Operational Factors
6. Canal Conveyance Features on STA and FEB Inflow and Outflow TP Concentrations
7. Evaluation of Impacts of Deep Water Inundation Pulses on Cattail Sustainability
8. STA Water and Phosphorus Budget Improvements
9. Evaluation of Sampling Methodologies for TP

*DSP to be developed

Use of Soil Amendments/Management to Control P Flux

Study Objective /Purpose

Determine if flux of P from the soil in an operating STA can be reduced with soil amendments or management techniques such as deep tilling or other management techniques such as a limerock cap

Progress:

- **Continued work on Phase 1**
 - **Developed Draft Phase I report**
 - **Completed literature review regarding soil amendments and management techniques**
 - **Summarized previous findings relevant to controlling P flux in wetlands**
 - **Compiled list of issues to address in order to determine if the next phase should be implemented**



Use of Soil Amendments/Management to Control P Flux

Study Objective /Purpose

Determine if flux of P from the soil in an operating STA can be reduced with soil amendments or management techniques such as deep tilling or other management techniques such as a limerock cap

Progress:

- **Continued Phase I work -Developed Draft Phase I report**
 - **Completed literature review regarding soil amendments and management techniques**
 - **Summarized previous findings relevant to controlling P flux in wetlands for these approaches**
 - **Compiled list of issues to address in order to determine if the next phase should be implemented - GO/STOP**
 - **Developing implementation cost estimates**



Evaluate the Use of Alternative Vegetation that Occurs in Low Phosphorus Environments to Achieve Low P Discharge in STAs

Study Objective and Purpose

Evaluate nutrient removal efficacy of vegetation that occurs under very low P conditions and examine major processes and mechanisms underlying P assimilation functions

Progress:

- Mesocosm results will be presented in 2015 SFER)
- Compiling additional literature on alternative vegetation
- Evaluating other STA vegetation issues for study
- Established team to develop Draft DSP



Operational Guidance for FEB and STA Regional Operational Plans

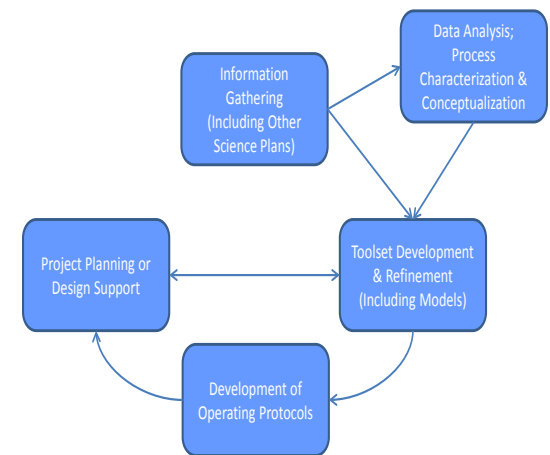
Study Objectives/Purpose

To develop modeling tools and operational protocols for FEBs/STAs to:

- Manage storage in FEBs to minimize dry out, deep water conditions, & bypass
- Manage FEB outflow and STA inflows to minimize STA outflow phosphorus concentrations

Progress

- Finalizing report on STA-2 field experiment
“Vegetation Resistance & Treatment Efficiency”
- Finalized report initial on iModel optimization tool
- “Development of Optimization Framework”
- Completed STA-3/4 Cell 2A field experiment
- Planned and supported STA-1W Cell 2A hydraulic field test
- Completed System Control and Optimization contract



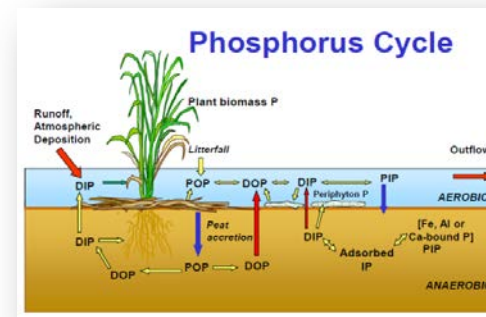
Phosphorus Sources, Forms, Flux, and Transformation Processes in the STAs

Study Objectives/Purpose

- Characterize P speciation, cycling and transport in STAs
- Compare the findings with natural areas -Water Conservation Areas
- Develop recommendations to improve STA performance

Progress

- Continued literature review on P processes
- Organic P characterization work underway
- Data mining activities
 - Preliminary presentation on data mining & analysis by contractor
 - Additional data for analysis obtained from DB Environmental
 - Data QA/QC provided
- Performing data analysis of low altitude imagery trial and provided P.O. for “box on helicopter” to obtain low altitude imagery
- Finalizing SOWs for contracts for soils analysis, P flux, & vegetation
- Developing SOP for enzyme analysis



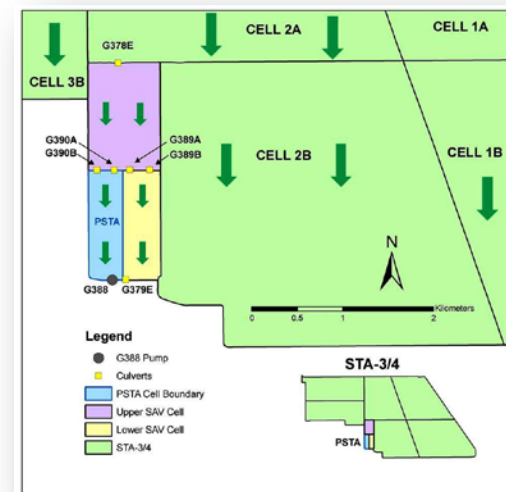
Periphyton-based Stormwater Treatment Area (PSTA): Performance, Design & Operational Factors

Study Objective/Purpose

Continue investigation of PSTA cell performance to determine design elements, operational factors, and biogeochemical characteristics that enable the PSTA cell to achieve ultra-low outflow TP levels

Progress

- Continued routine monitoring and analysis
- Performed 3rd Pulse test and associated monitoring (July 24-27)
- Compiling interim report on PSTA based on contractor and District results to determine path forward for feasibility evaluation



Influence of Canal Conveyance Features on STA and FEB Inflow and Outflow TP Concentrations

Study Objective/Purpose

- Determine whether phosphorus concentrations change when conveyed through STA inflow and outflow canals
- Evaluate phosphorus in sediments and seepage to and from canals

Progress

- **Task 1**
 - Completing literature review, data query, review of canal as-built drawings, and inspection of canals
 - Preparing Task 1 report
- **For STA-1W inflow and discharge canals**
 - Task 2 - Continued water quality data variability and trend analysis
 - Task 4 - Continued canal sediment and TP accumulation estimate based on mass balance
 - Task 6 – Initiated correlation analysis for potential influencing parameters on changes in TP and other parameters in canals



Impacts of Deep Water Inundation Pulses on Cattail Sustainability

Study Objective/Purpose

- Evaluate the influence of deep water pulsing on cattails
- Provide recommendations for STA and FEB operations

Progress

- Continued comprehensive literature review
- Continued POR hydrologic data analysis
- Began collecting baseline data for in situ study to be implemented in STA-1W and STA-3/4 (while test cells refurbished)
- and completed NDVI calculation
- Implemented contractor SOW for in situ study
- Finalized design and bid selection for test cell refurbishment activities



STA Water & Phosphorus Budget Improvements

Study Objective and Purpose

- Determine sources of error in Water Budgets & evaluate methods reduce the error
- Develop improved water budgets for STA cells in a phased approach for a test case (STA-3/4 Cells 3A and 3B) and then at other locations to meet Science Plan needs

Progress

- HDM section had completed work on improved flow ratings for POR for STA-2 structures and is now finalizing for STA-3/4 structures
- Continued to improve water budget tool including ability to incorporate seepage estimates for all cells in STA-2 and STA-3/4
- Refining seepage coefficients for STA-2 and STA-3/4
- Finalizing Test Case (STA-3/4 Cells 3A and 3B) report

$$\text{Residual} = \text{Outflow} + \text{Seepage} + \text{ET} + \Delta \text{ Storage} - \text{Inflow} - \text{Rainfall}$$

Sampling Methods for Total Phosphorus

Study Objective /Purpose

To determine which sampling regime/ method provides most accurate representation of TP

Progress

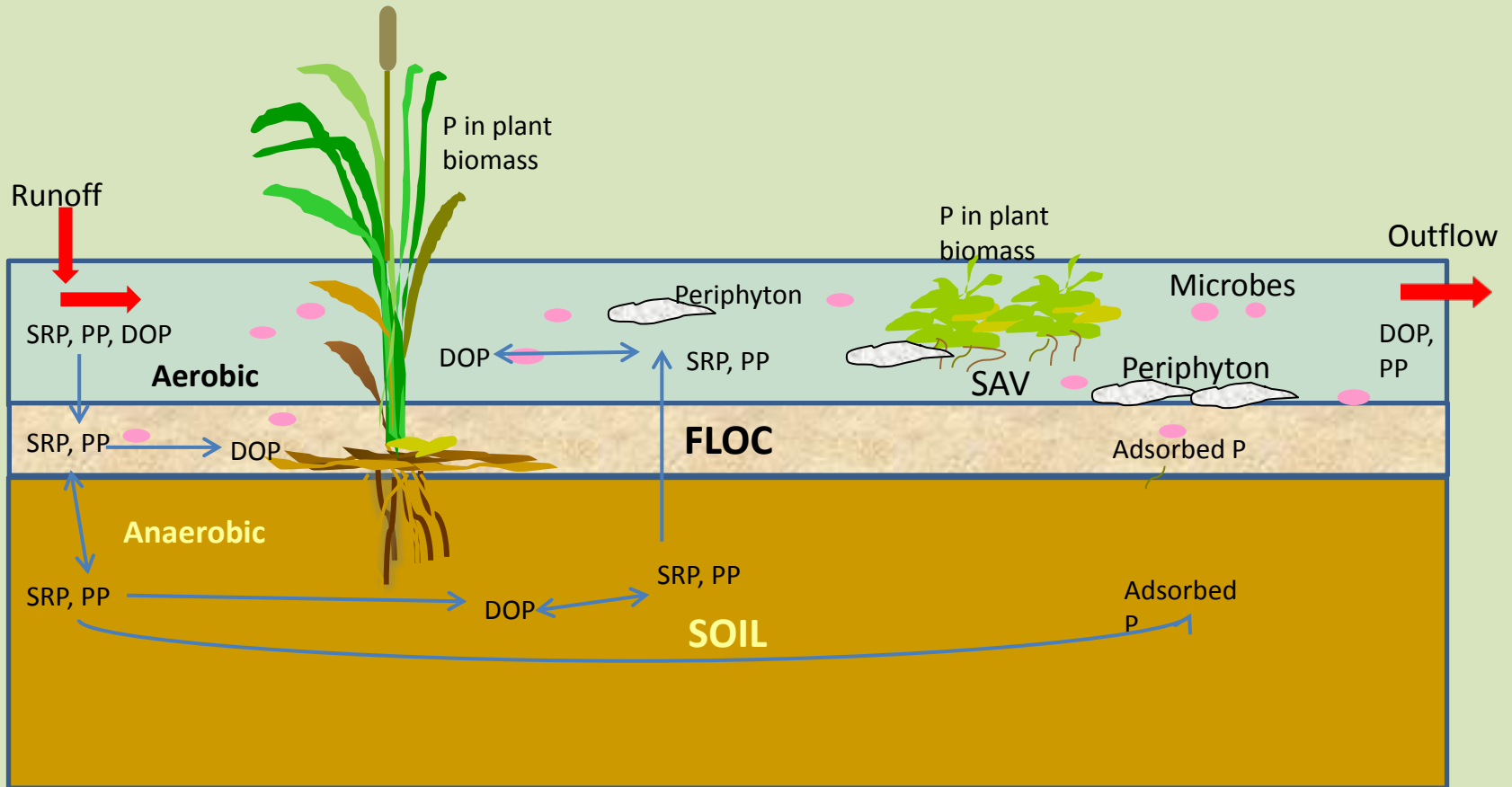
- **Monitoring at:**
 - G390B - inflow to PSTA at STA-3/4 - completed
 - G310 - discharge from STA-1W - ongoing
- **Evaluating preliminary results regarding modifications to sampling practices**
 - May lead to modification of the design for new autosampler installations



Questions?



Phosphorus Cycling in the STAs



- Inflow – comprised of inorganic (SRP), particulate-bound (PP), and dissolved organic P (DOP)
- Outflow – minimal to no SRP, reduced level of PP and DOP
- PP – can have inorganic and organic forms of P