

Restoration Strategies Science Plan Progress

**Long Term Plan
Communications Meeting
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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:

- **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
 - Evaluating issues in order to determine if the next phase should be implemented - GO/STOP
 - Further development of study and full-scale 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 cycling

Progress:

- Mesocosm results presented in 2015 SFER
- Compiling additional literature on vegetation in low P environments
- Meetings to determine scope and design of next vegetation study



Operational Guidance for FEB and STA Regional Operational Plans

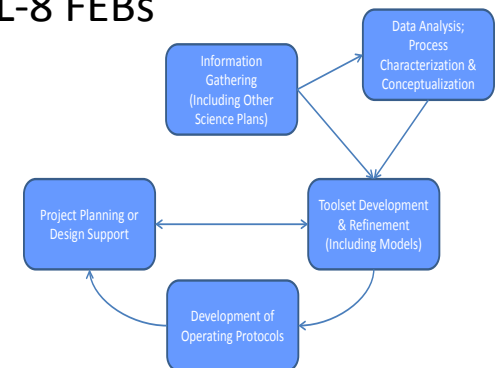
Study Objectives/Purpose

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

- Completed hydraulic field testing in STA-1W, STA-2, and STA-3/4
- Data analysis and development of user guide for hydraulic field testing
- Refining iModel optimization tool to develop Optimization Framework
- Developing preliminary operation plans for A-1 and L-8 FEBs



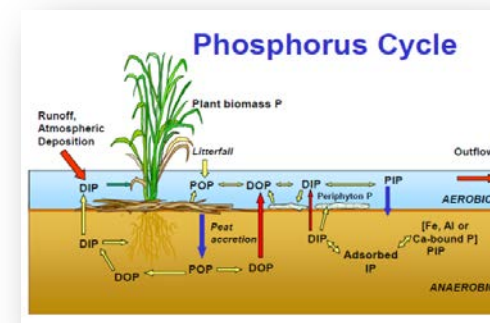
Phosphorus Sources, Forms, Flux, and Transformation Processes in the STAs

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 and analysis activities
 - Report with recommendations provided by data mining contractor
 - Additional data mining is ongoing
- Low altitude remote sensing
 - Data analysis underway for trial aerial imagery
- Avian surveys have been initiated
- Initiated a contract for P flux and vegetation measurements
- Finalizing SOW contract for internal water quality, litter, floc, and soil measurements



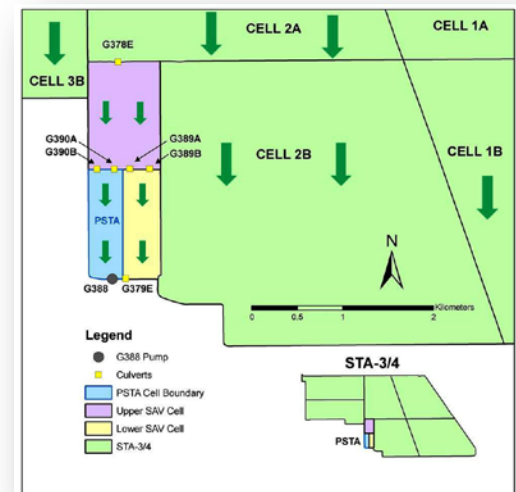
Periphyton-based Stormwater Treatment Area (PSTA): Performance, Design & Operational Factors

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
- Analyzing results from three pulse tests and associated monitoring
- Preparing interim report based on results gathered to date to determine path forward and 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 concentration in sediments and seepage to and from canals

Progress

- Preparing initial report and recommendations
 - literature review, data query, review of canal as-built drawings, and canal inspection
- For STA-1W inflow basin canal and discharge canal
 - Water quality concentration analysis
 - Annual wet/dry season and monthly mass balance
 - Storm-event based mass balance for different parameters
 - Correlation analysis for several parameters
- Developed SOW for contractual support for additional data analyses



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 for each cell
- Initiated collection of baseline data for in situ study in STA-1W and STA-3/4
- Evaluating results from wave test in STA-1W Cell 2A
- Test cell refurbishment is underway



STA Water & Phosphorus Budget Improvements

Study Objective and Purpose

- Determine sources of error in water budgets & evaluate methods to 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 completed work on improved flow ratings for POR for STA-3/4 structures (STA-2 structures completed previously)
- Continued to improve water budget tool, including the ability to incorporate seepage estimates for all cells in STA-2 and STA-3/4
- Preliminary seepage coefficients estimated for STA-2 and STA-3/4
- Finalized Test Case (STA-3/4 Cells 3A and 3B) report

Residual = Outflow + Seepage + ET + Δ Storage – Inflow – Rainfall

Sampling Methods for Total Phosphorus

Study Objective /Purpose

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

Progress

- Monitoring completed
 - G390B - inflow to PSTA at STA-3/4
 - G310 - discharge from STA-1W
- Evaluating preliminary results regarding modifications to sampling practices
 - Analysis of flow-composite sampling metadata reveals that the sampler is being triggered off of the sum of both positive and negative flow creating issues with the representativeness of data. The presence of significant amounts of negative flow can create an issue in calculating accurate flows and loads.



Questions?

