

STA-1E PSTA MESOCOSM PROJECT

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STA-1E

Plan to Achieve 10 ppb Phosphorus



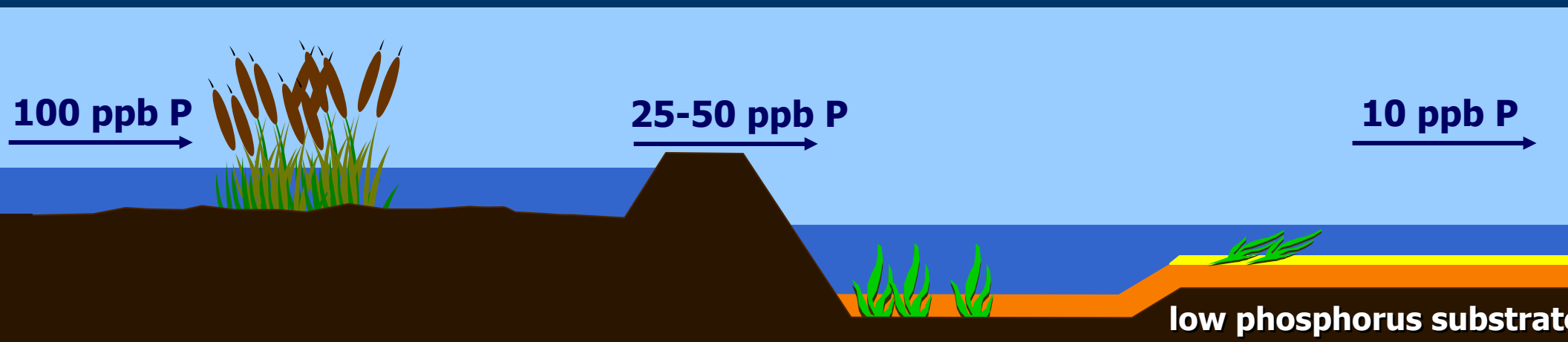
**Emergent
Growth**



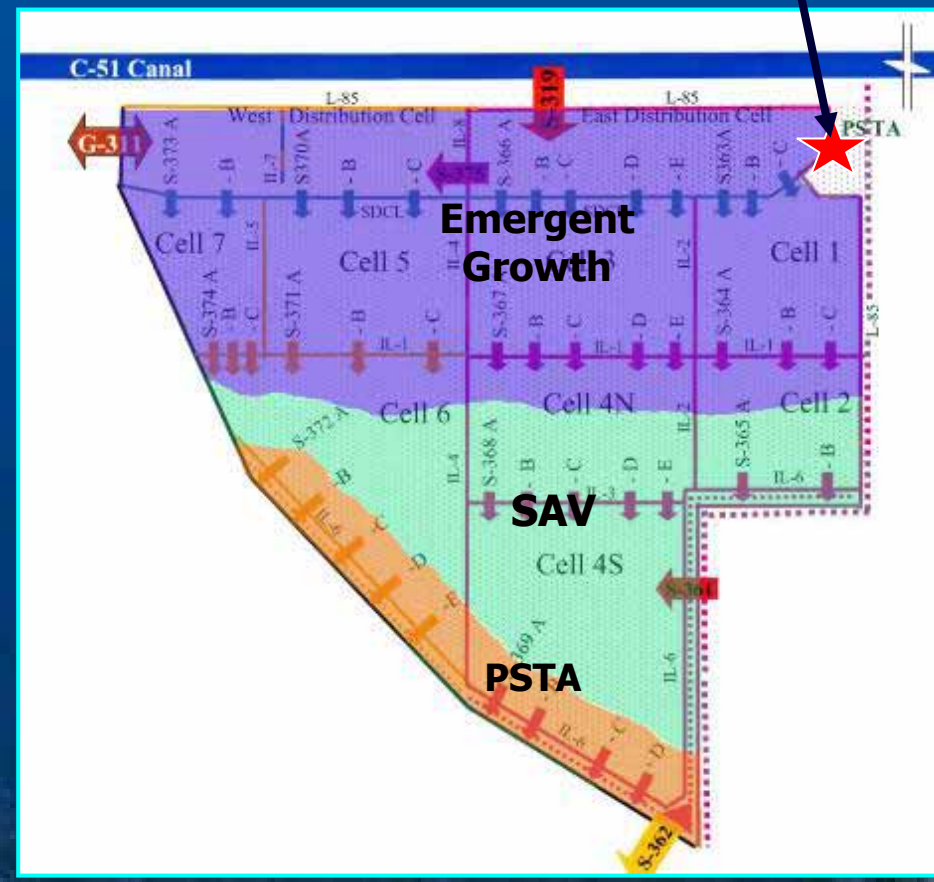
**Submerged Aquatic
Vegetation (SAV)**



**Periphyton
(PSTA)**



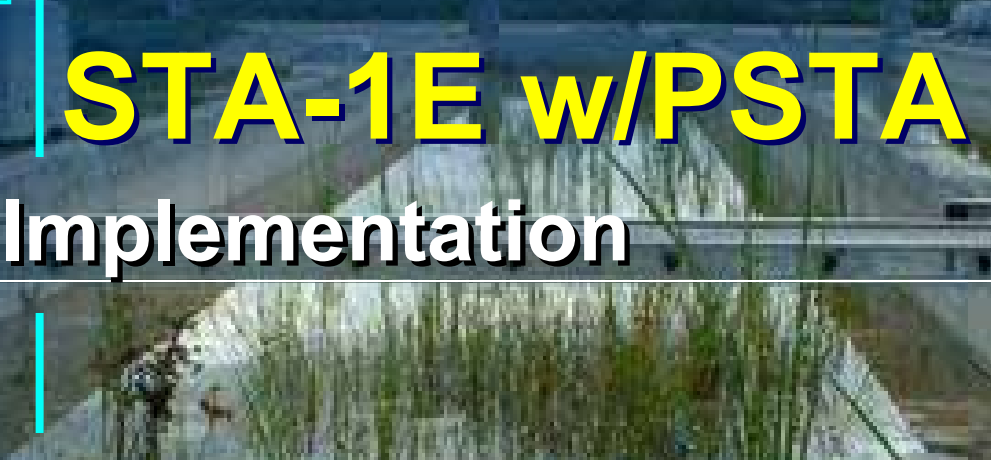
Mesocosm Facility



STA-1E

STA-1E w/PSTA

Vision for Full Scale Implementation





Overview

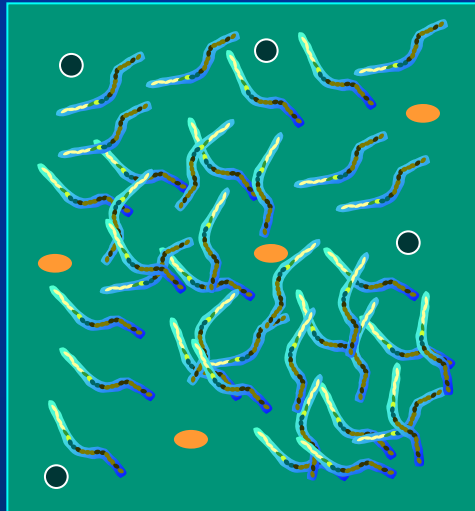
STA-1E Mesocosm Project

- Hypothesis of Periphyton Treatment Technology
- STA-1E PSTA Test Facility Layout
- Testing and Monitoring
- Results
- Summary

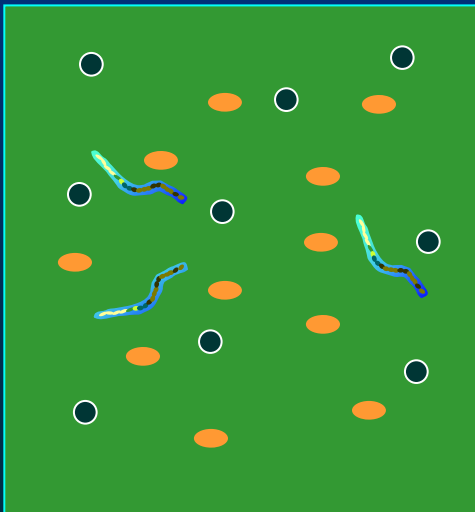
Natural System

Seasonal Dryout

**CYANO
DOMINANT**
Dry conditions
Summer/Fall

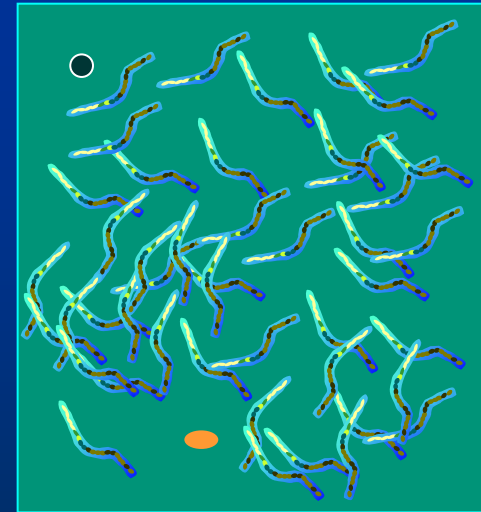


**DIATOM
DOMINANT**
Wet conditions
Winter/Spring



Corps PSTA

Repeated (forced) Dryouts
Activated Periphyton



CYANO DOMINANT
Extreme conditions



Testing the unknown

- **Substrate**
 - High calcium carbonate
 - Low phosphorus content
 - Minimal bio-available phosphorous
- **Hydraulic Retention Time**
- **Flow depth**
- **Community Size and Sustainability**

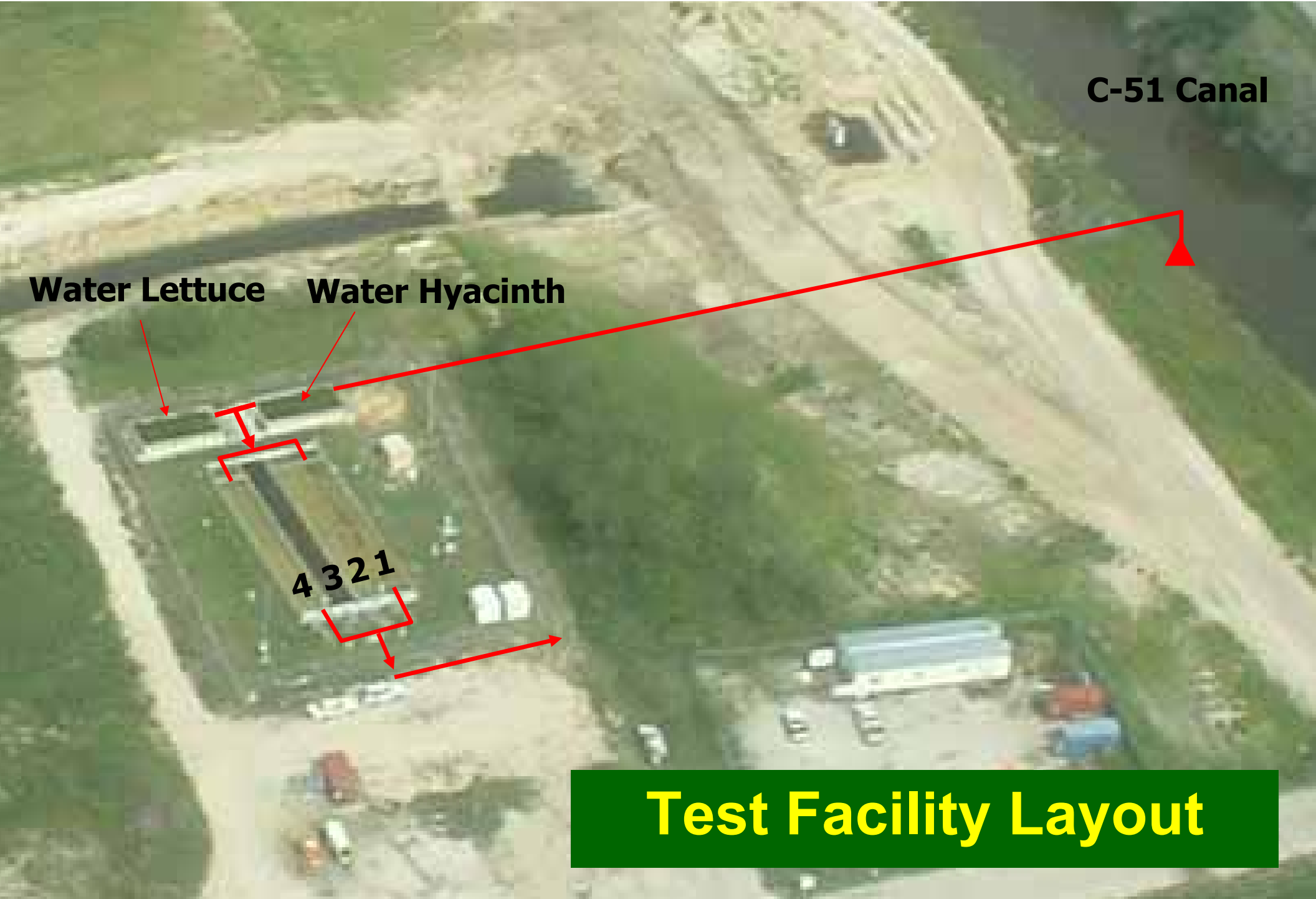
C-51 Canal

Water Lettuce

Water Hyacinth

4 3 2 1

Test Facility Layout



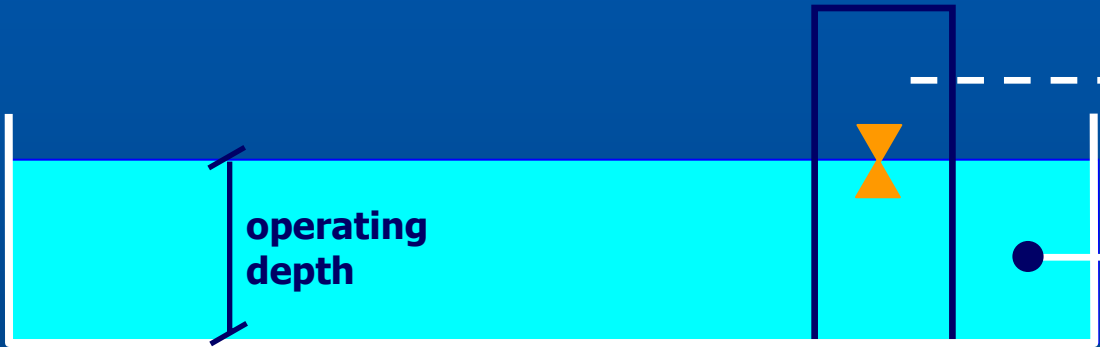
PSTA Test Facility

- 10 ft x 100 ft, maximum operating depth: 3 ft
- Cell 1 – 1' riviera sand, overlaid by 1" lime sludge
- Cell 2 – 1' Ft. Thompson Formation limerock
- Cell 3 – 6" of onsite limerock over 6" of peat
- Cell 4 – 6" limerock over 6" peat



PSTA Test Facility Water Budget

Feed:
1-11
cms/day
measured
w/rotameter



rainfall and
evaporation
monitoring

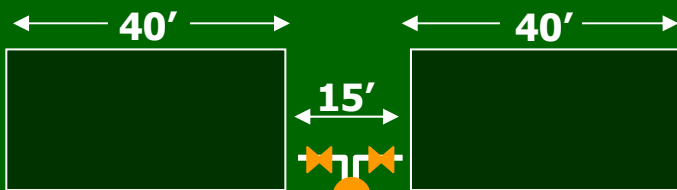


water
budget

PSTA

Water Hyacinth

PRE-TREATMENT POOLS



C-51

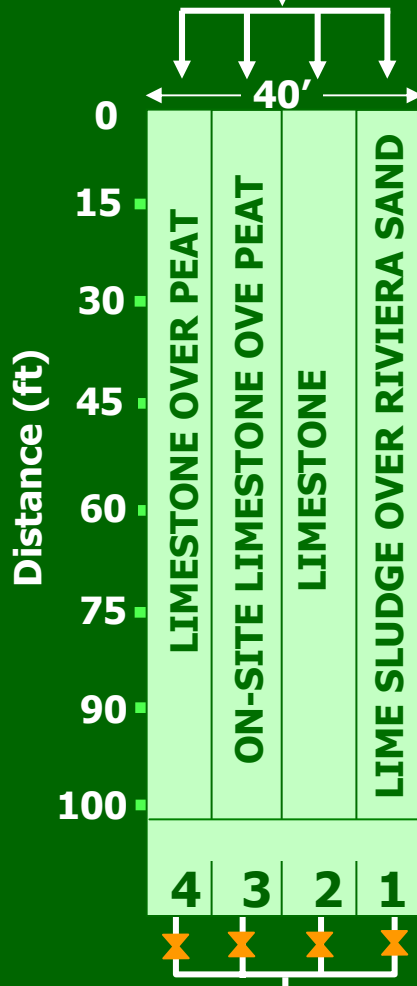
~100 ppb P



Periphyton mat



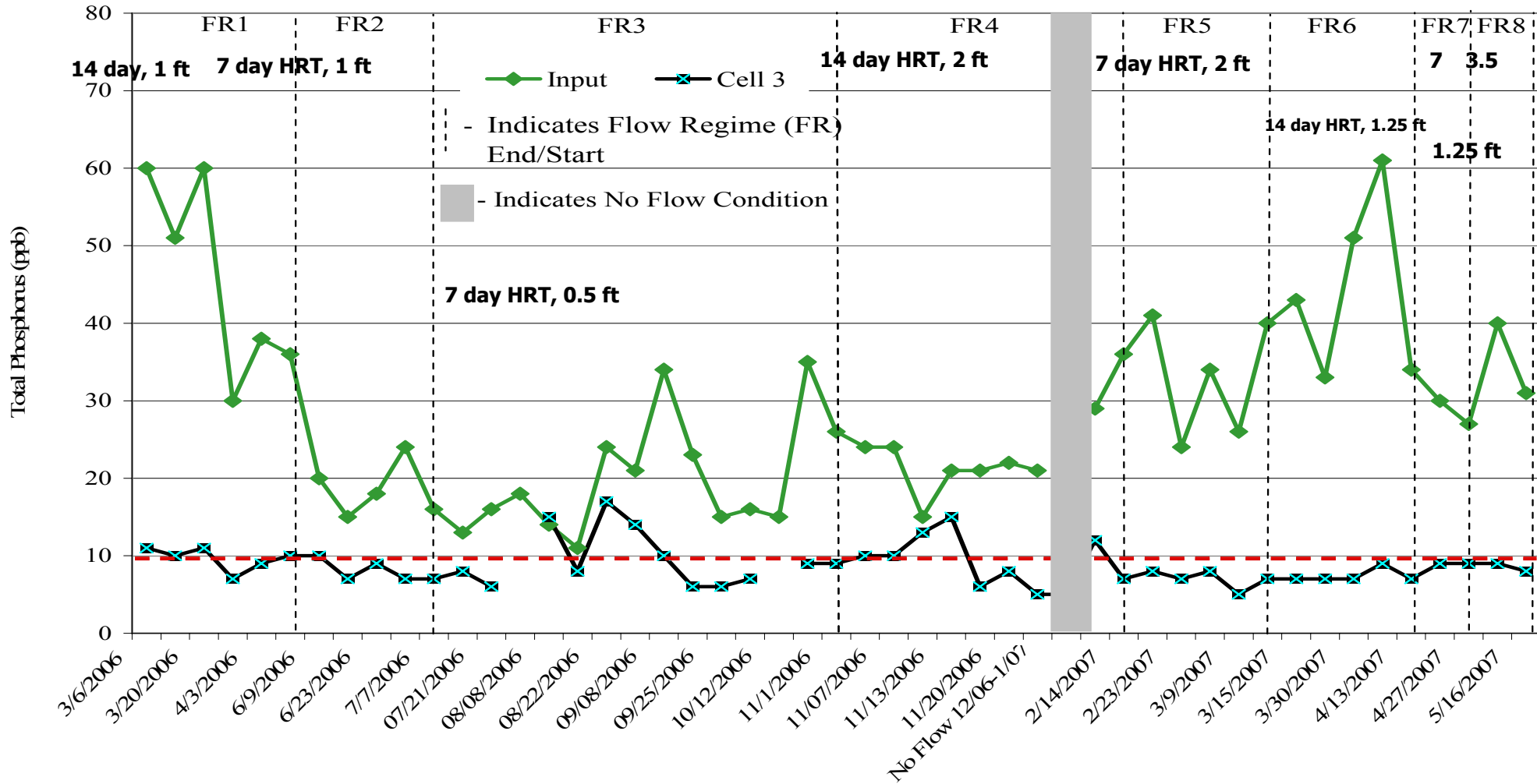
Calcareous Periphyton Mat (Cells 4 & 2)



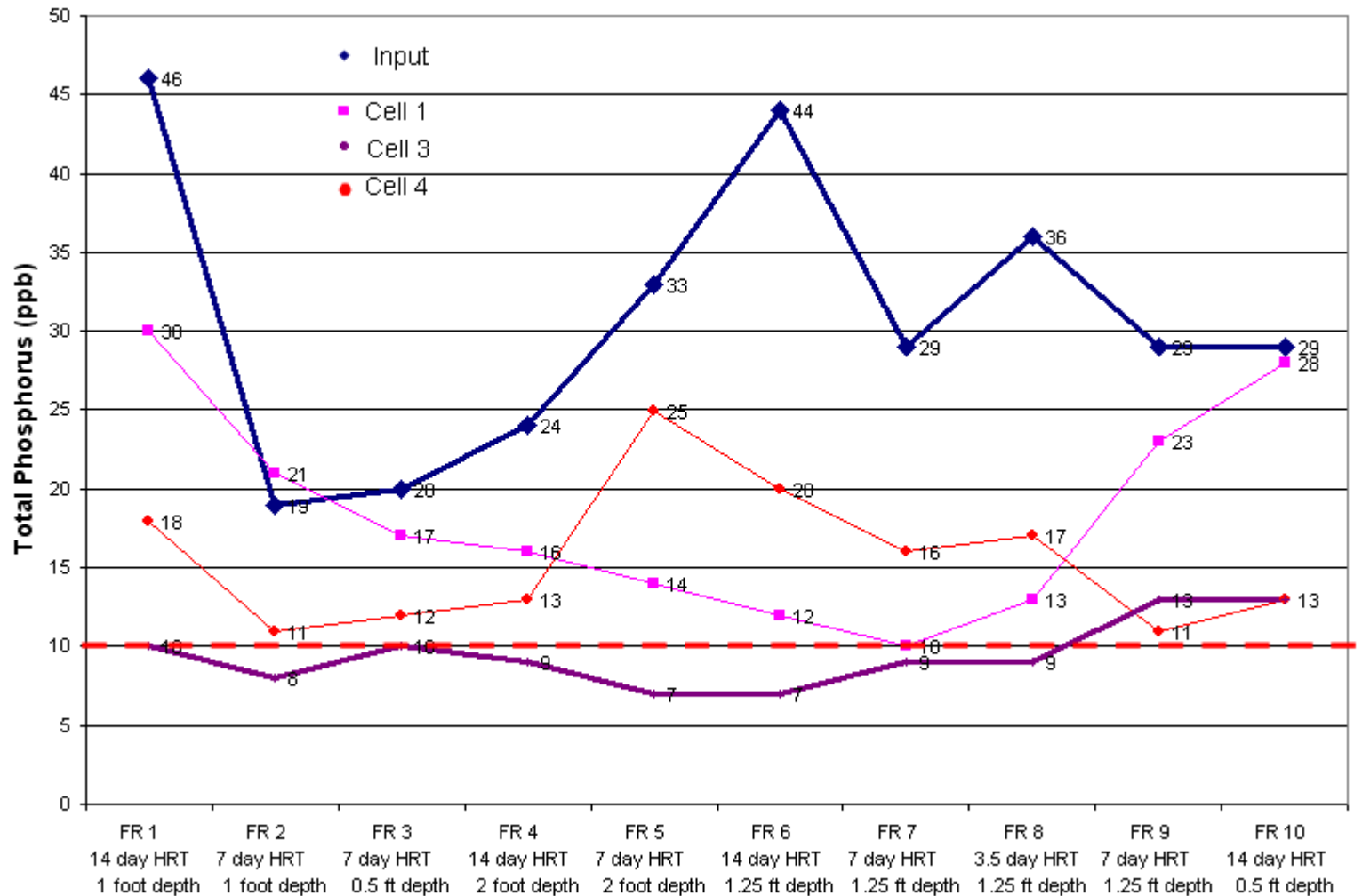
Agricultural Ditch



Phosphorus Concentration in Cell 3 (On-site Limestone over Riviera Sand) Flow Regimes 1 to 8



Average Total Phosphorus Concentrations at Input and Output of PSTA Cells 1,3 & 4 for Flow Regimes 1-10 (3/2006 – 2/2008)





Summary

- PST lowers phosphorus levels from 40ppb to 10ppb or lower
- Locally available limestone w/ lower calcium carbonate was the best performing substrate
- Results sustained at HRT of 3.5 to 14 days
- Optimum water depth 1.25 feet



Questions?

