STA Performance Modeling
CERP / NRC Meeting

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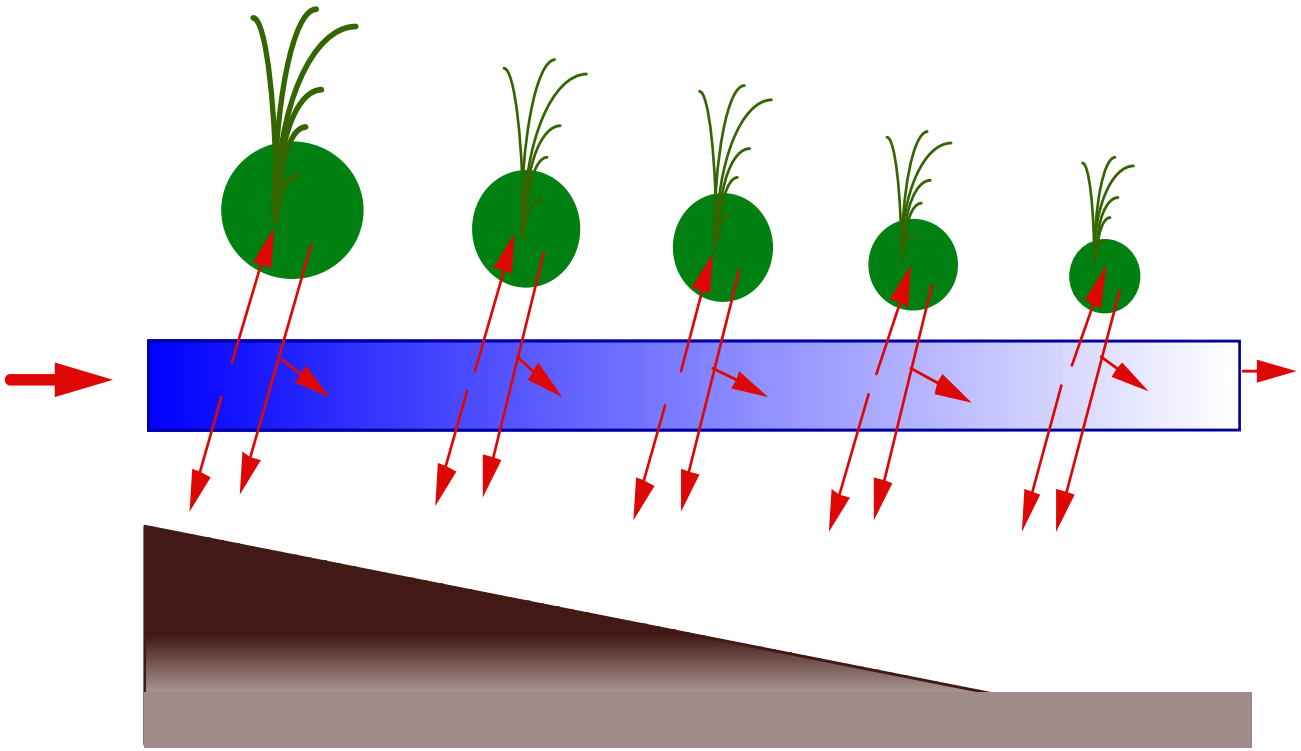
Prepared for

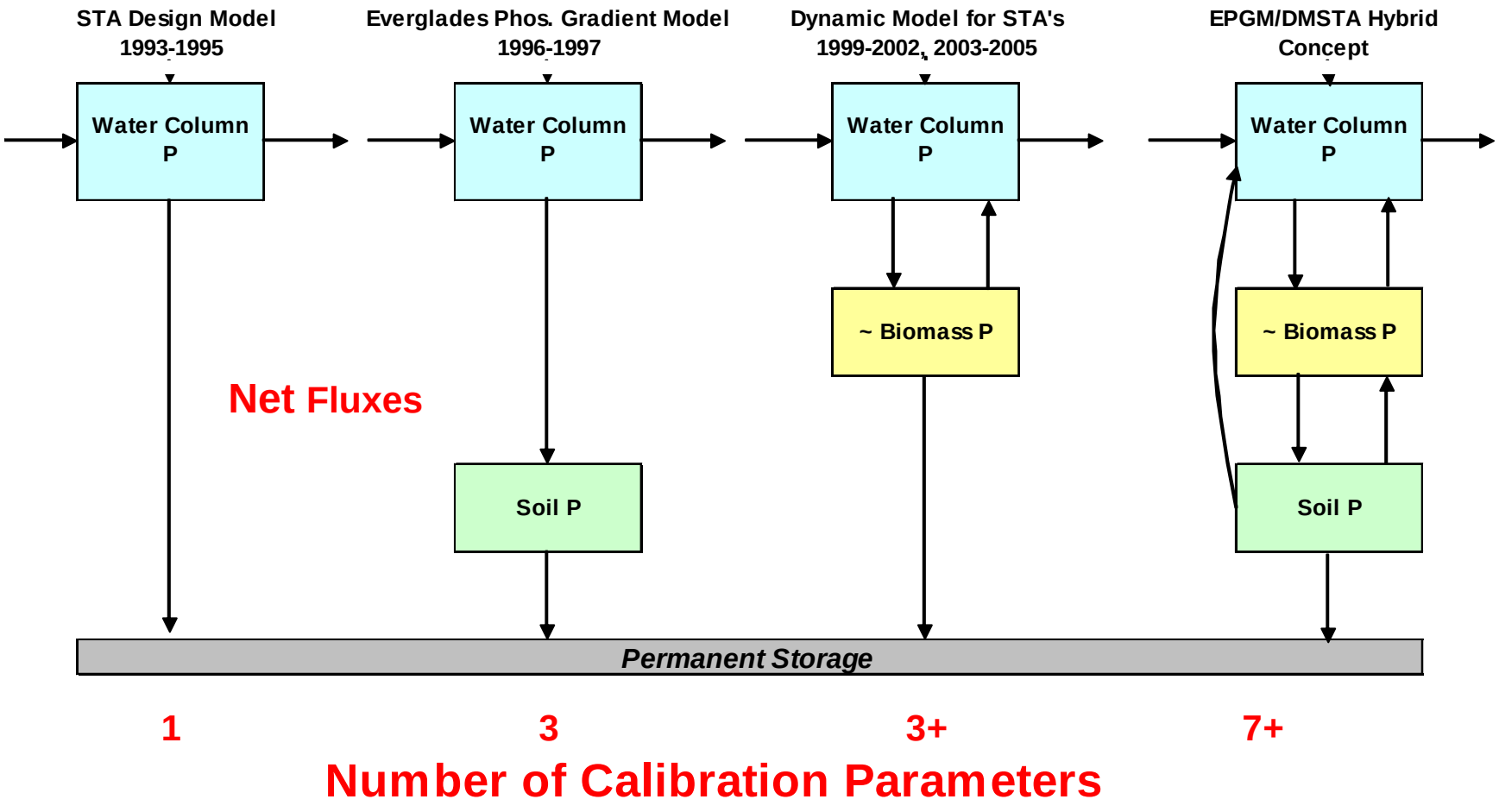
US Department of the Interior

June 8, 2009

Marsh Phosphorus Gradient



Model Evolution, 1993 - 2008



Dynamic Model for Stormwater Treatment Areas - Version 2

W. Walker & R. Kadlec for U.S. Dept. of the Interior & U.S. Army Corps of Engineers

Version Date: 6/1/2005

Select Project:

- project_examples
- project_template
- project_reservoirs
- project_eaasr_network

Retrieve Project

Run All Cases in Project

Simulate Case Network

Select Simulation Type:

- Test
- Base
- Conservative
- Uncertainty Analysis

Select Case:

- STA_0
- STA_1
- STA_2
- STA_3
- STA_4
- STA_5
- STA_6
- STA_7
- STA_8
- MARSH_1
- MARSH_2
- RES_1
- RES_2
- RES_3
- RSTA_1
- RSTA_2

Retrieve Case

Edit Input Values

Run Model

Save Case

Delete Case

Select Output Sheet :

- Model Input Parameters
- Summary of Project Cases
- Simulate Network of Cases
- Overall Mass Balance
- Mass Balances for Each Cell
- Frequency Distributions
- Reservoir Performance
- Mass-Balance Schematic
- Graphs - Cell Averages
- Graphs - Selected Cell
- Graphs - Combined Inflows & Outflows
- Graphs - Selected Variable
- Graphs - Project Summary
- Inflow Daily Time Series
- Output Time Series - Overall
- Output Series - Current Cell
- Calibration Range Check

Go to Sheet

press Ctrl-m to return to menu

DMSTA Website

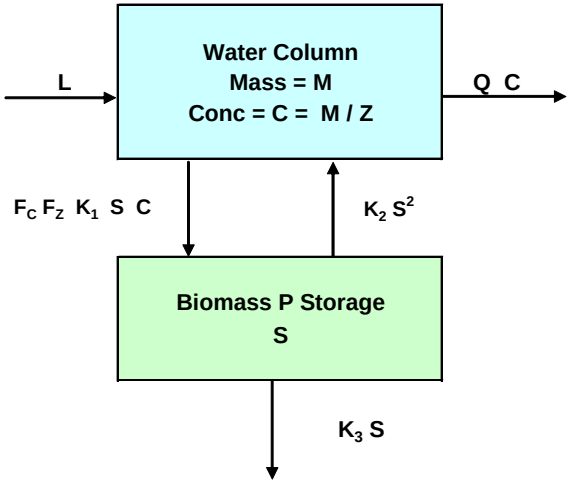
Check for Updates

Disclaimer

Project Name:	PROJECT_EXAMPLES	Project Cases:	16	Project Networks:	0
Time Series:	TS_RES	Series Dates:	01/01/65	thru	01/01/65
Current Case:	RSTA_1	Output Dates:	01/01/66	thru	12/31/74
Description:	Reservoir discharging to STA with 3 cells				

DMSTA Components

Phosphorus Cycling



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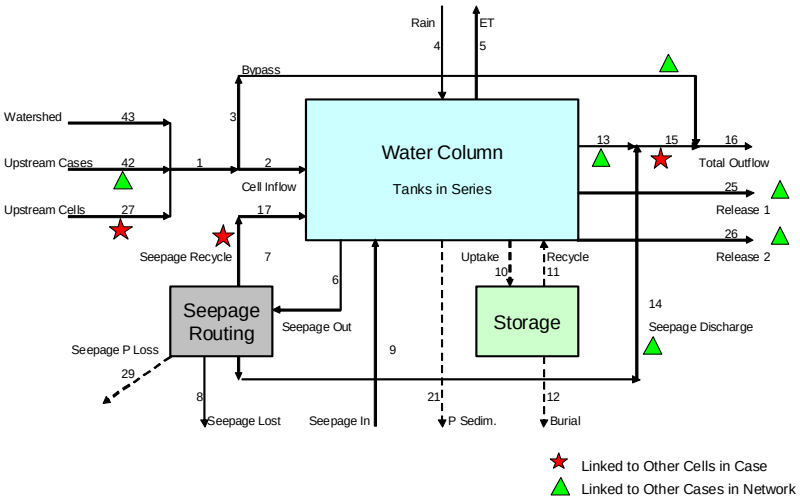
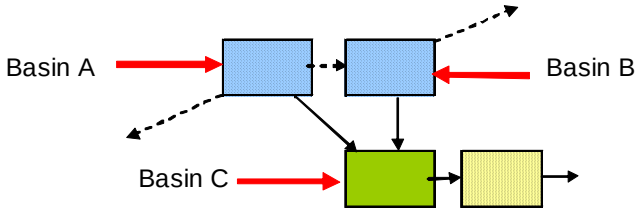
Internal Cell Hydraulics



Solid arrows are water and phosphorus fluxes. Dashed arrows are phosphorus fluxes only.

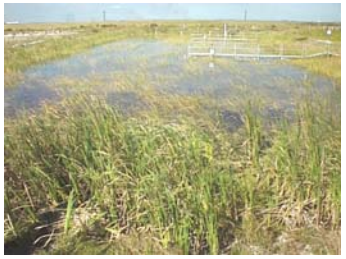
Cell Networks

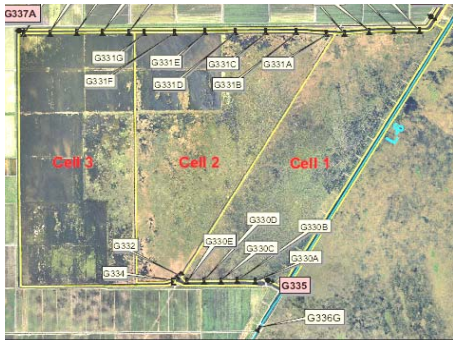
2 Reservoirs, STA & Marsh

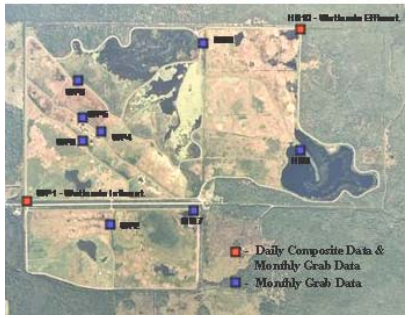


> 80 Platforms Used in Calibration & Testing

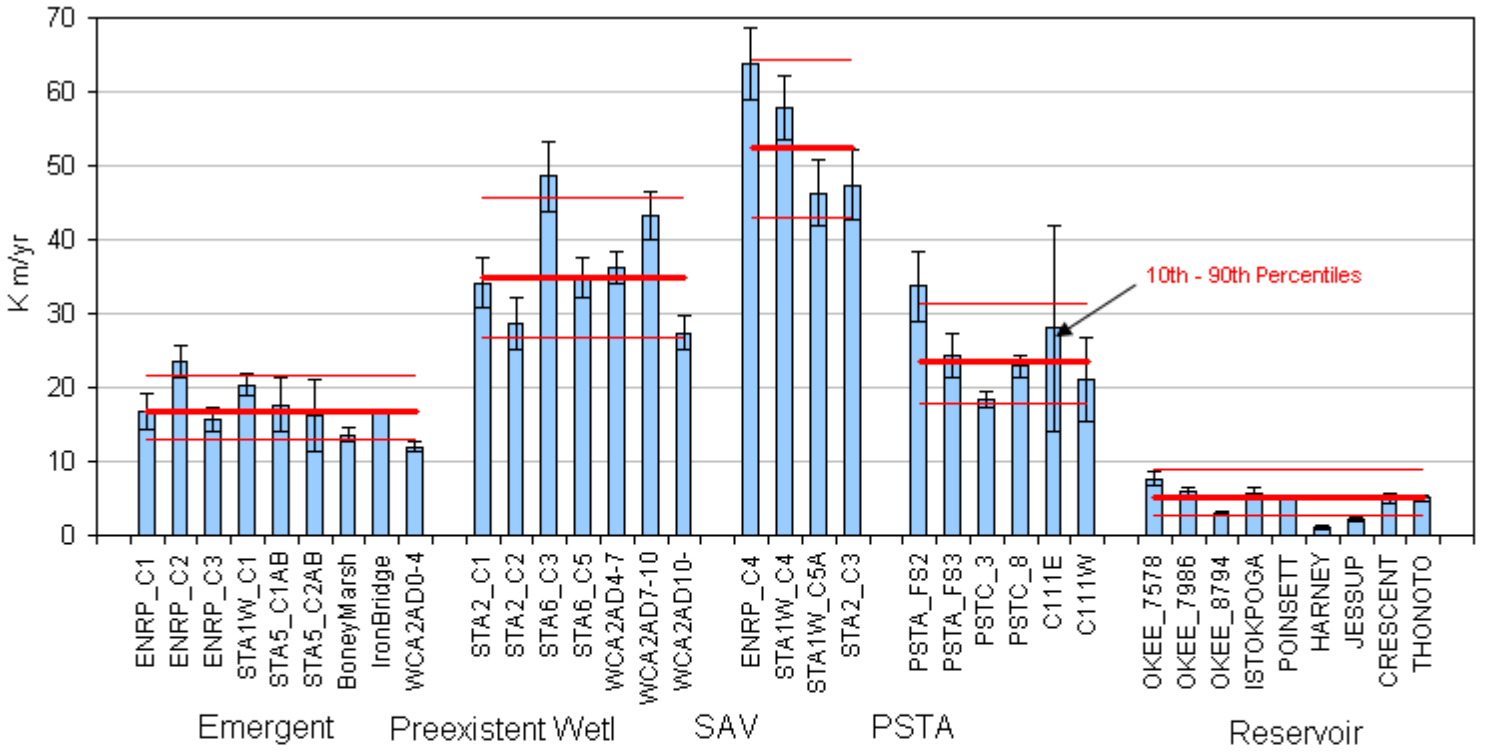
Daily Water & P Balances, .01-150 km^2, 1-30yrs





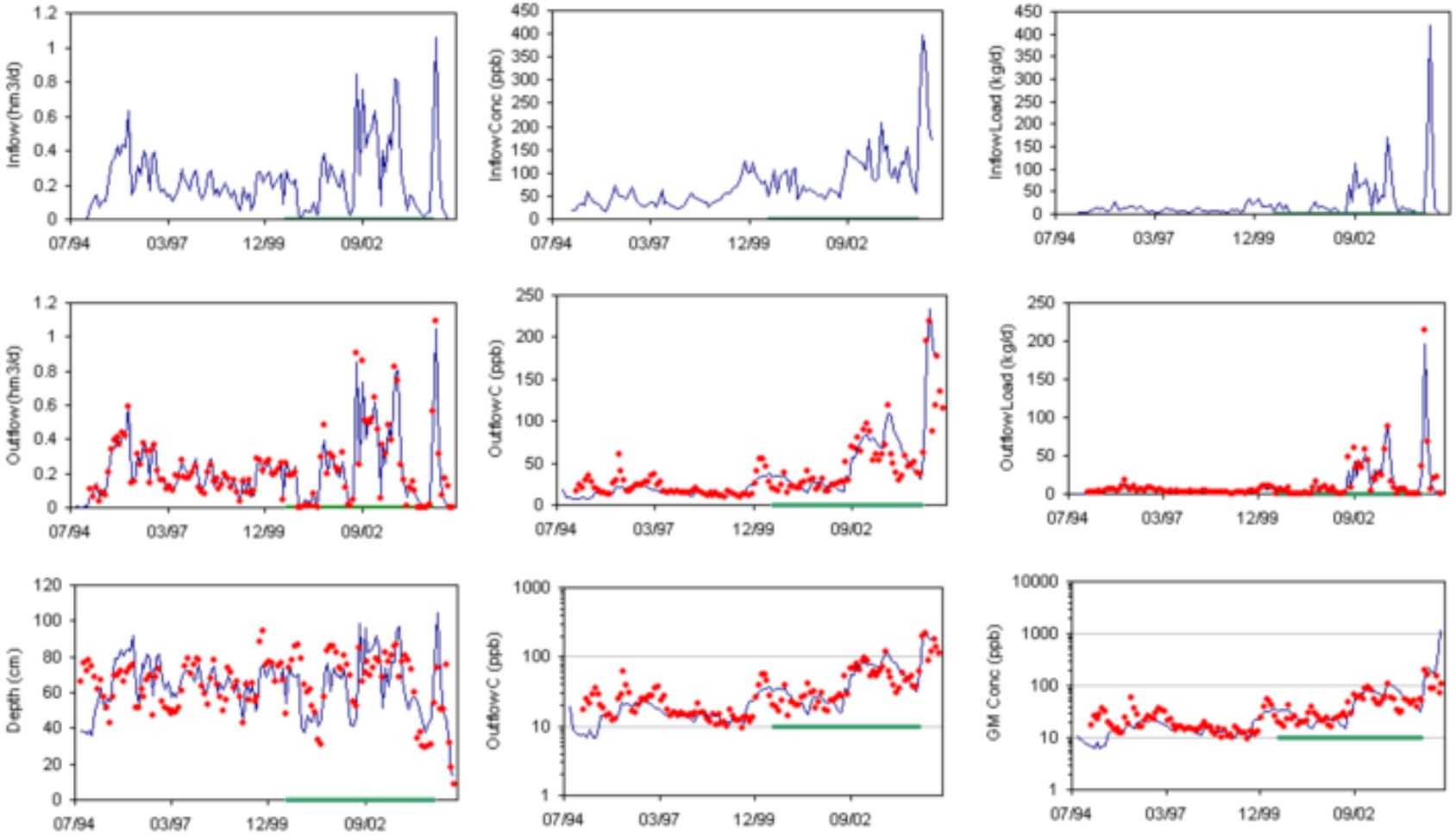


K Calibrations to Wetland Community Types

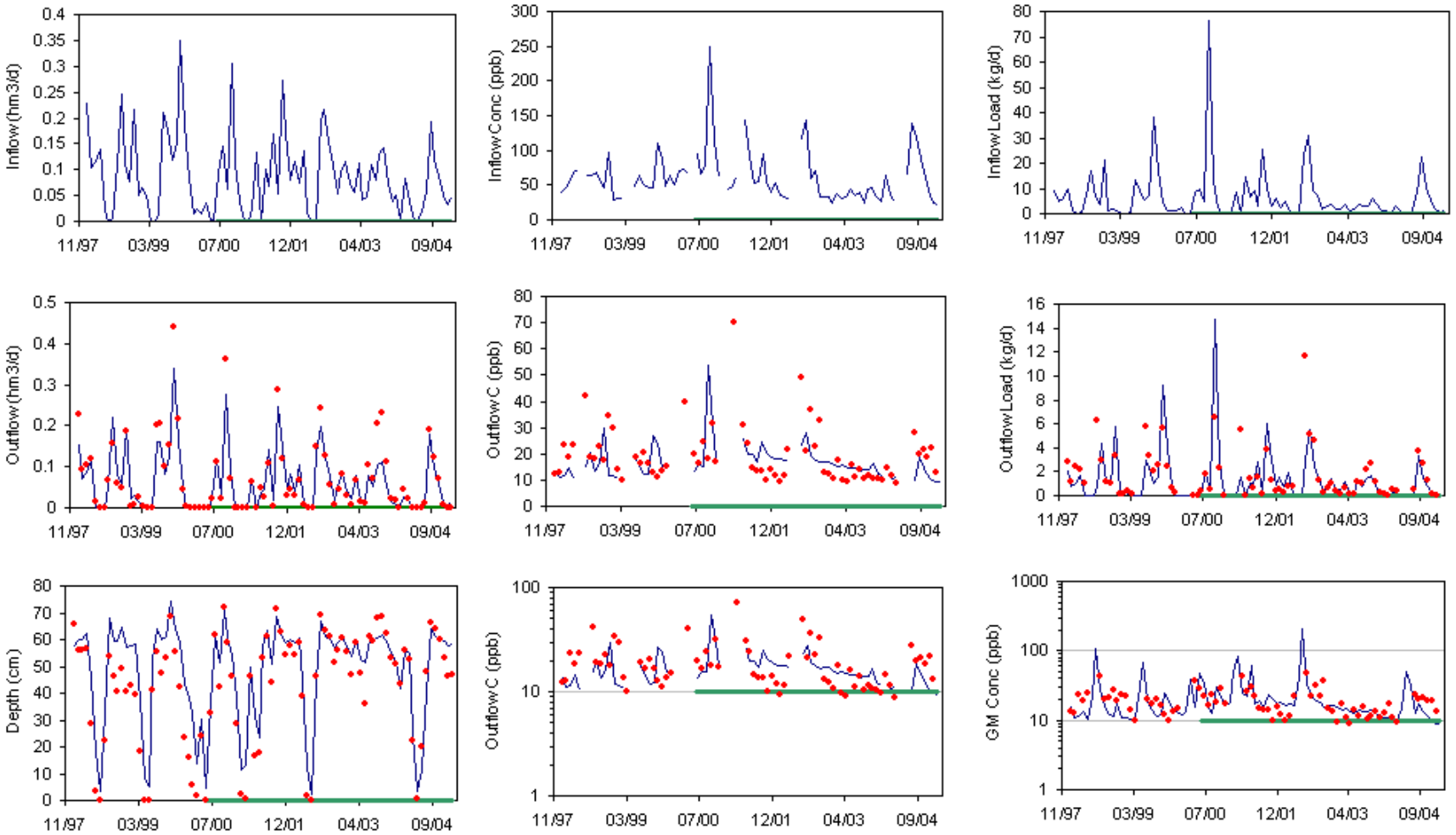


			Other DMSTA2 Parameters			
Category	Calib Set	Description	C0 (ppb)	C1 (ppb)	C2 (ppb)	Z1 (cm)
Emergent	EMERG_3	Emergent or unmanaged on previously farmed or disturbed soils	3	22	300	40
Preexistent Wetland	PEW_3	Emergent or unmanaged on previous wetland or undisturbed soils	3	22	300	40
SAV	SAV_3	Managed to promote submersed aquatic vegetation; calcitic	3	22	300	40
PSTA	PSTA_3	Periphyton treatment area on limerock/shellrock substrate; calcitic	3	22	300	40
Reservoir	RES_3	Lake or reservoir	3	150	0	0

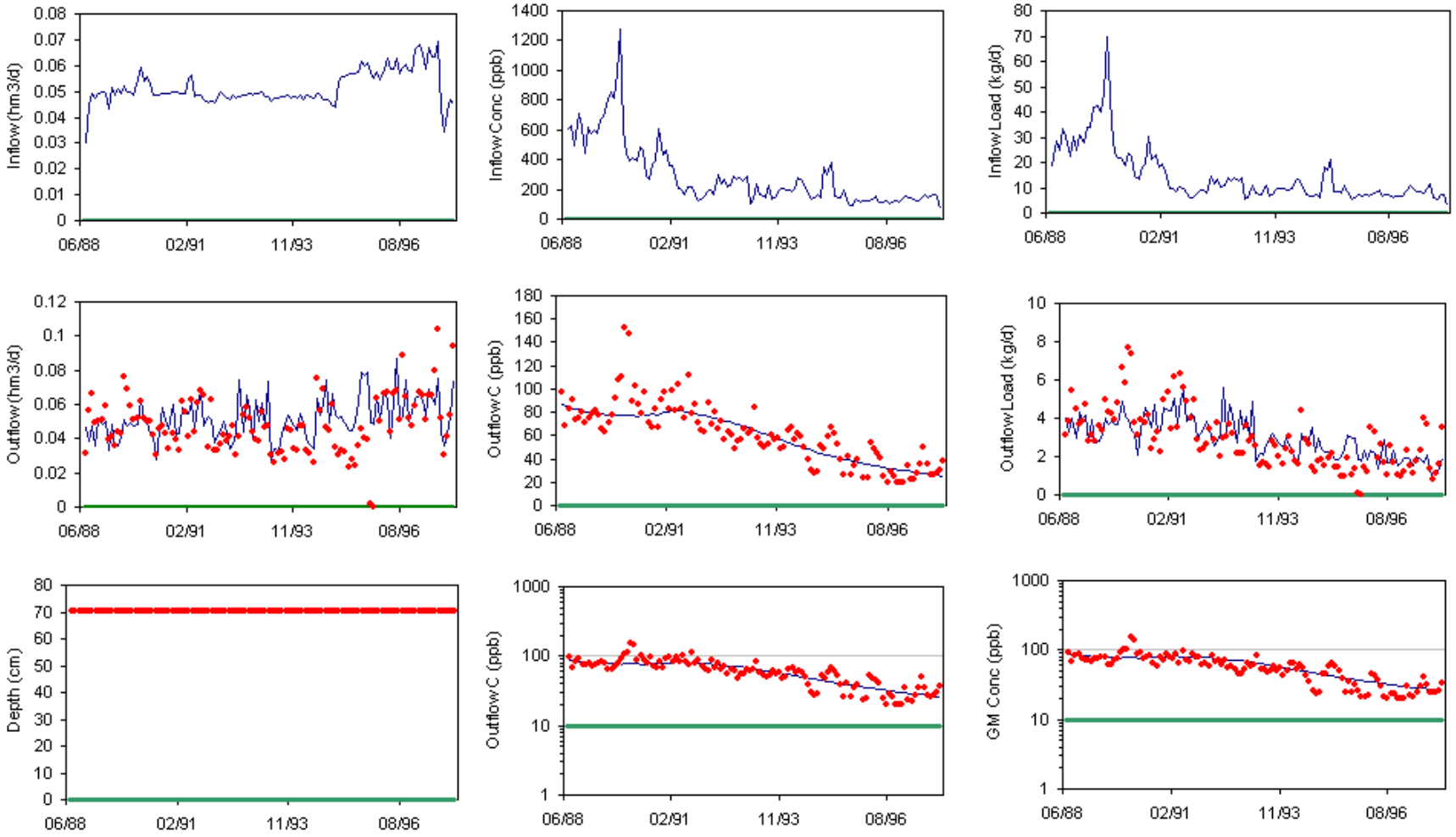
Calibration Time Series – STA-1W Cell 4 (SAV)



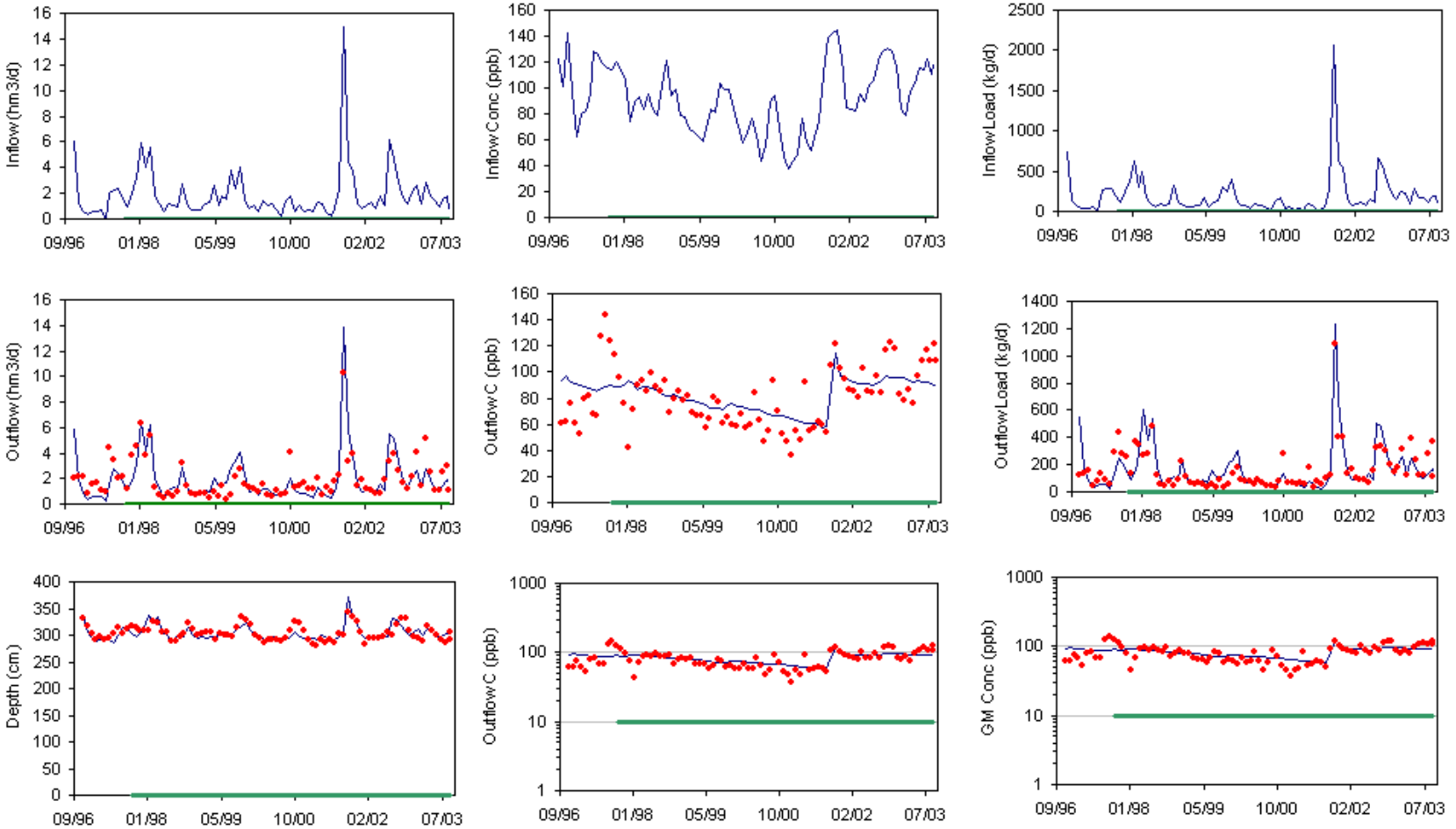
Calibration Time Series – STA-6 Cell 5 (PEW)



Calibration Time Series – Iron Bridge (Emergent)

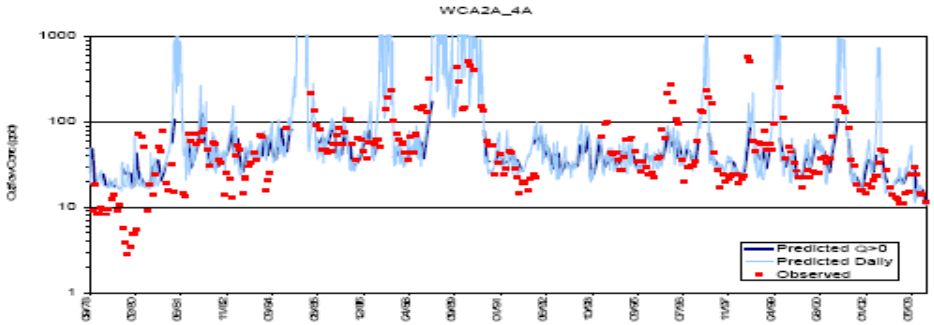


Calibration Time Series – Crescent Lake (Reservoir)

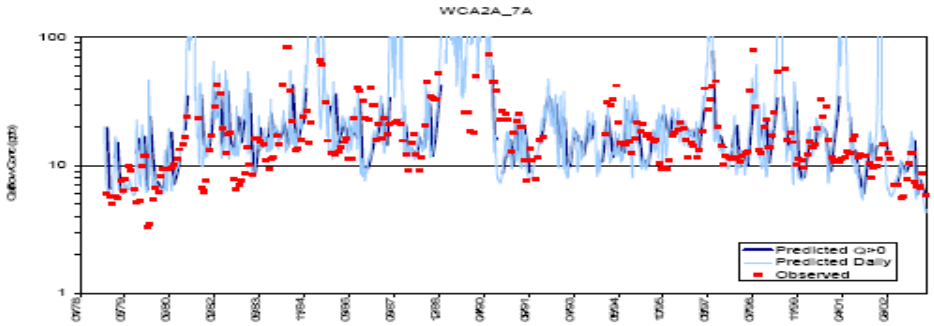


WCA-2A Gradient TP Concentrations
DMSTA Simulation, 1978-2004

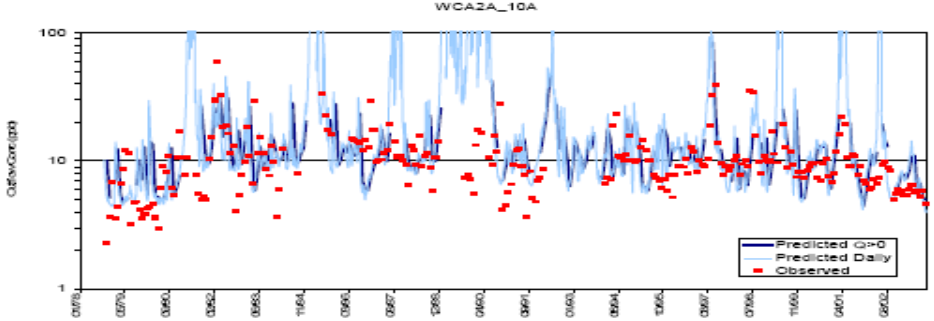
4 km



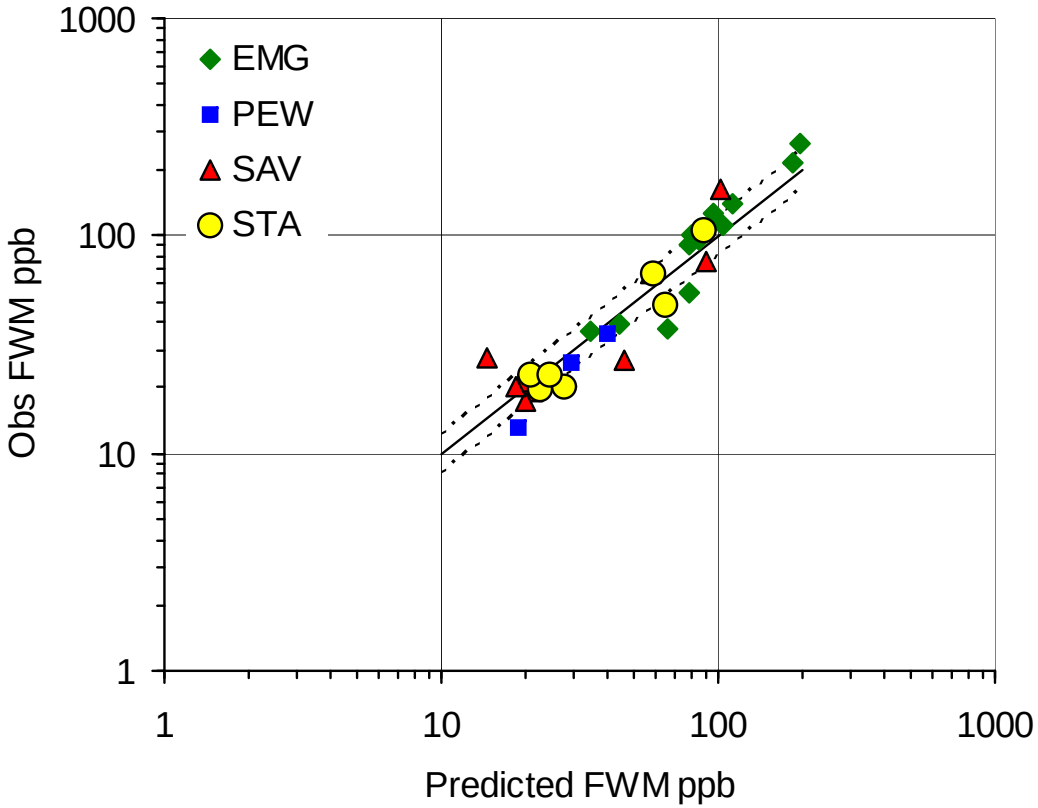
7 km



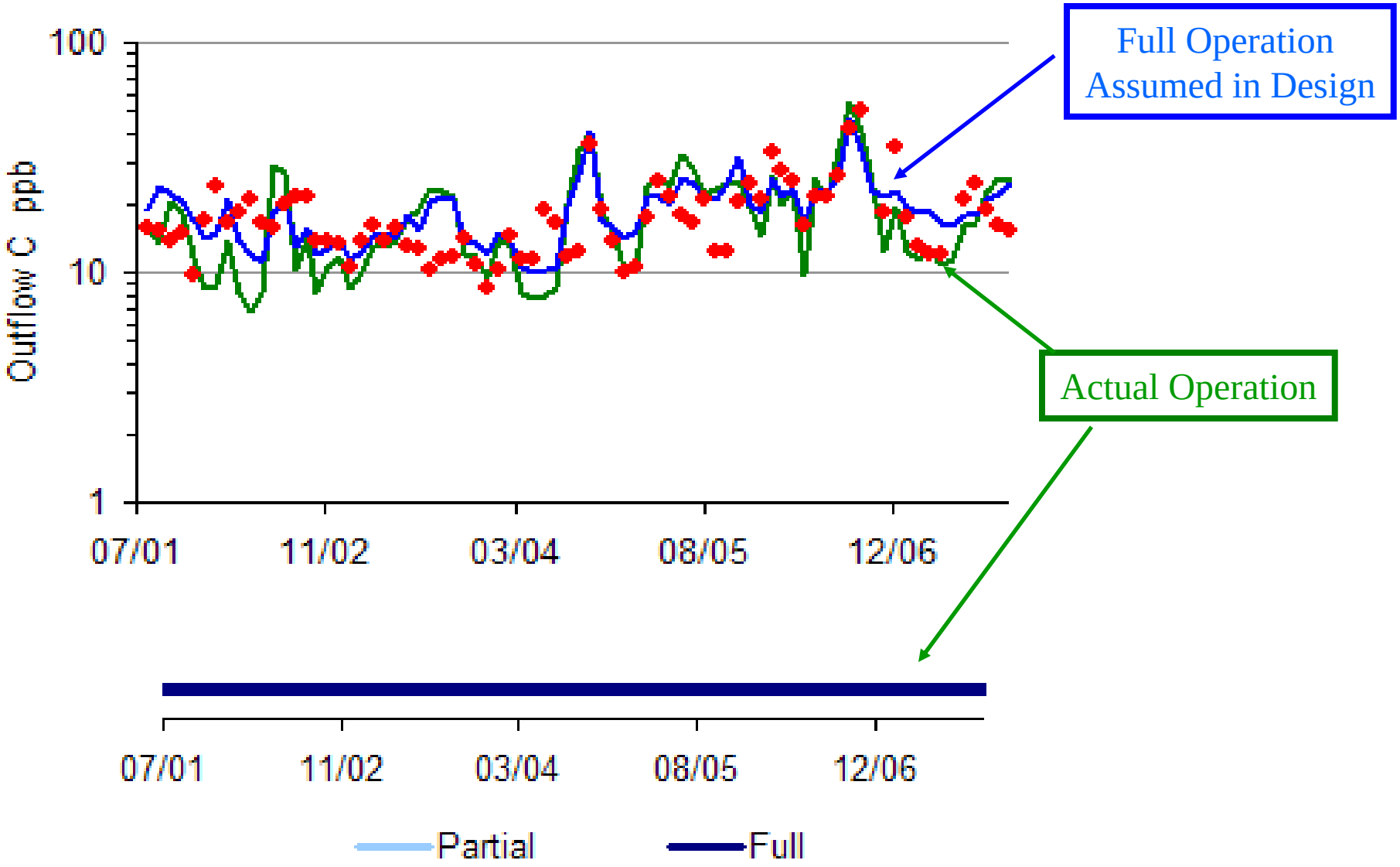
10 km



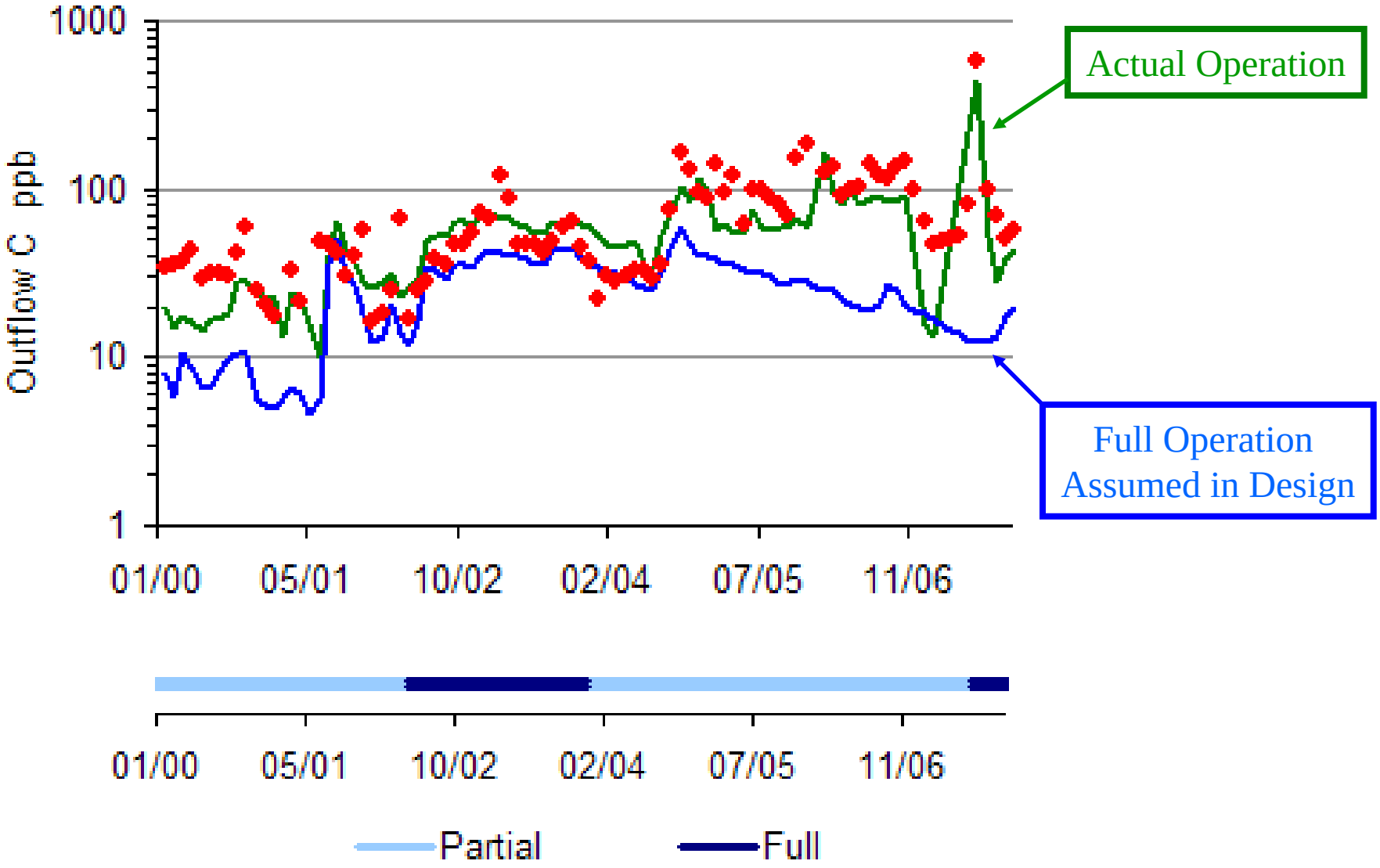
Testing Against Independent Datasets



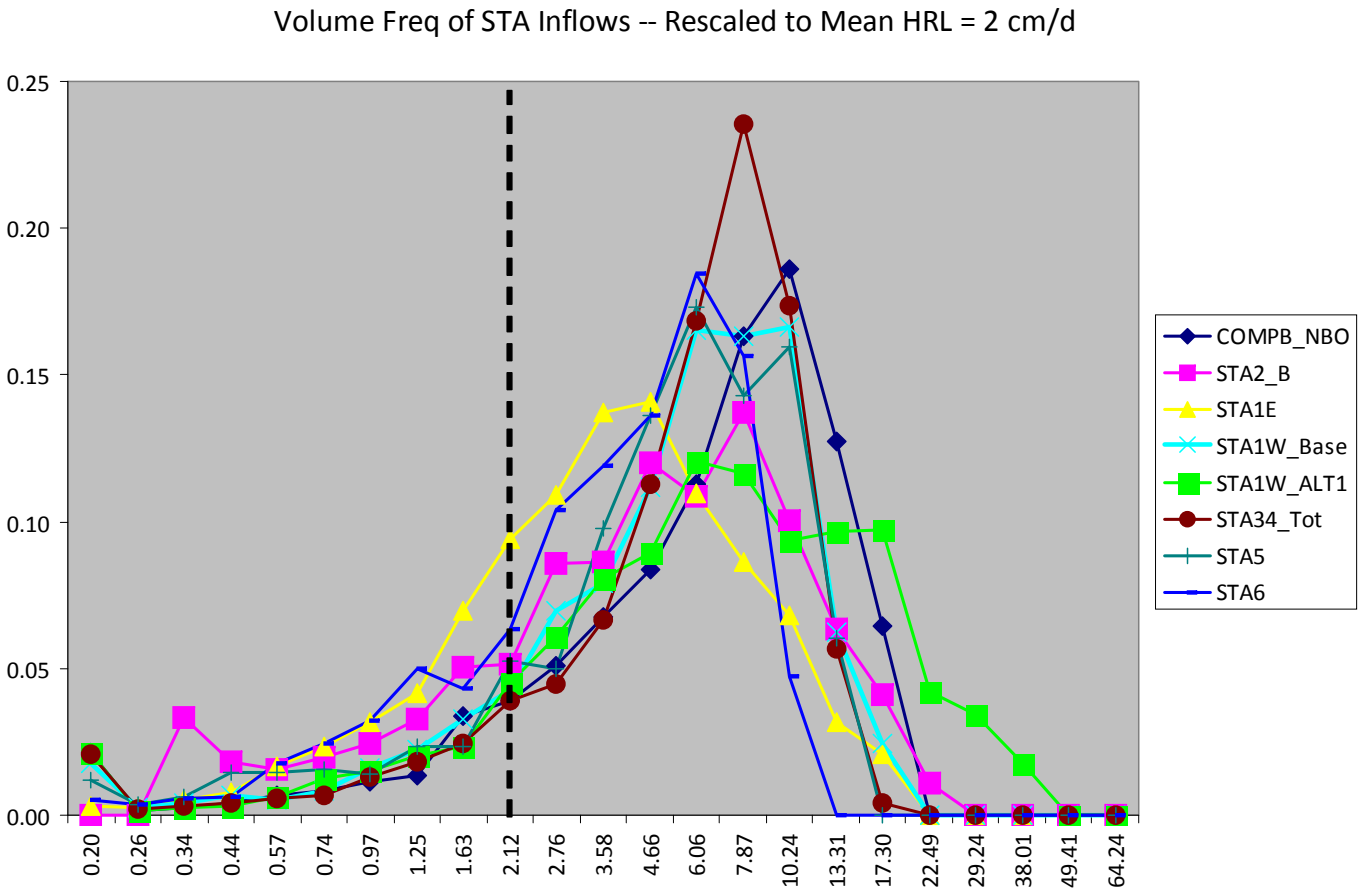
STA-2 Simulation, 2001-2007



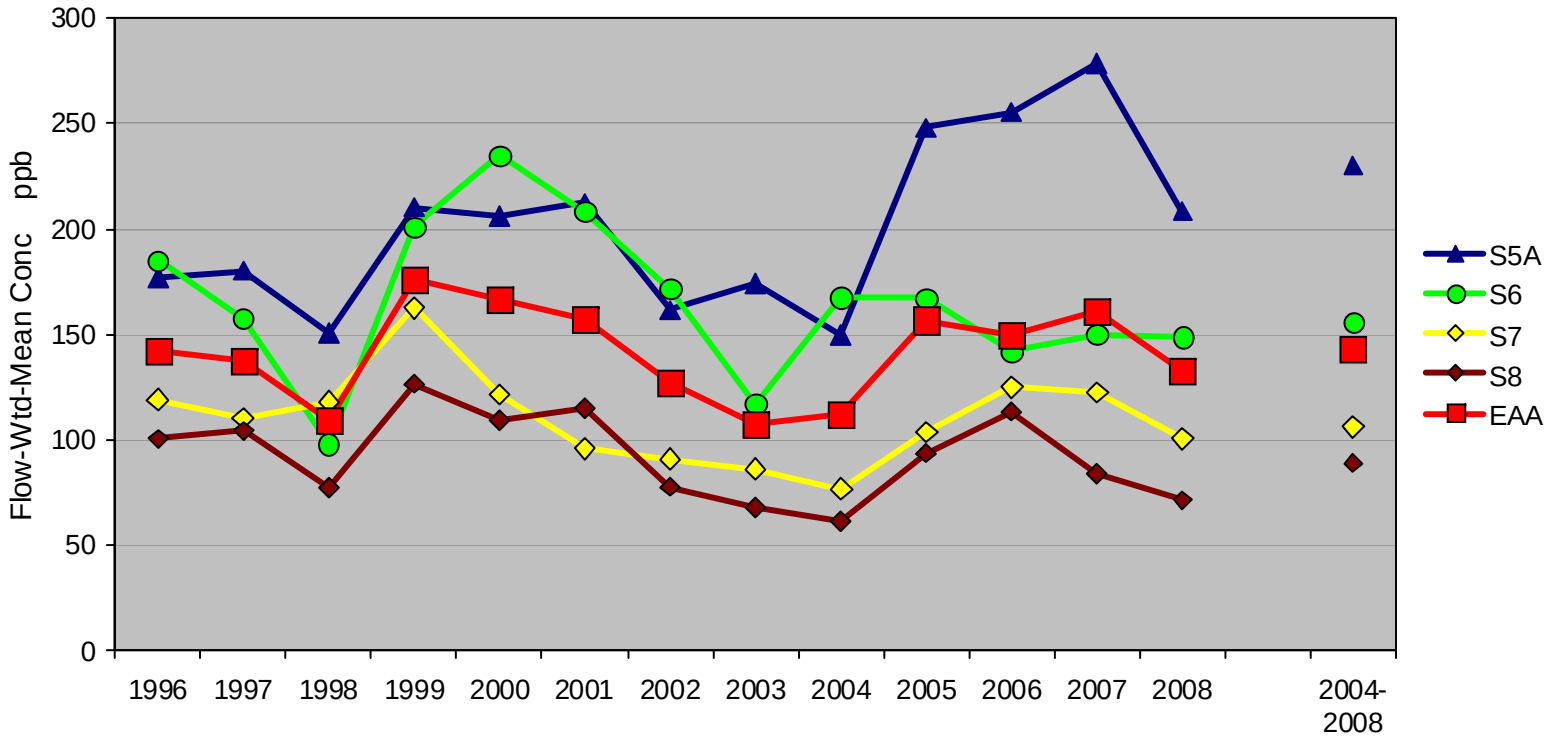
STA-1W Simulation, 2000-2007



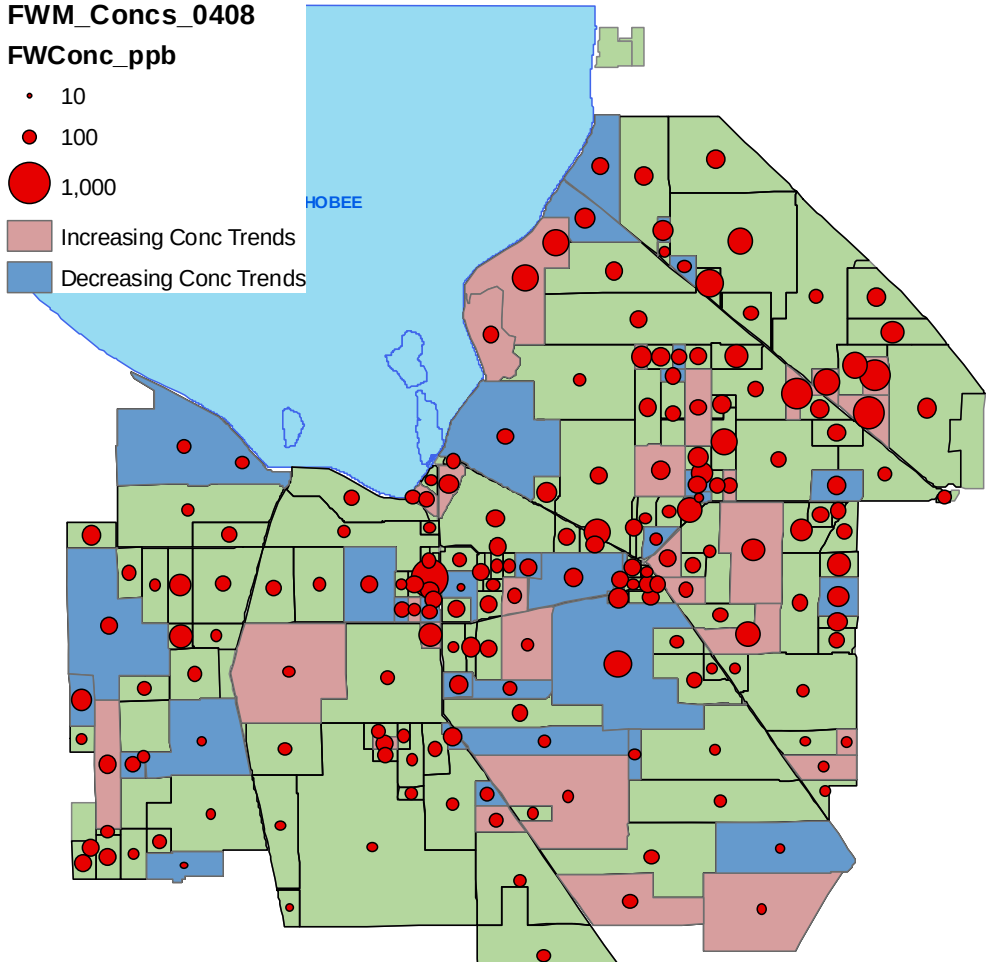
Inflow Variability



Trends in EAA Farm Monitoring Data by Basin Runoff FWM Concentration



Spatial Variability in Farm Runoff Concentrations



Achieving Treatment Goals

- Sufficient Source Controls
- Sufficient Treatment Area
- Sufficient Flow Equalization
- Internal Flow Distribution
- Operation in Design Ranges
- Vegetation Management
- Research & Monitoring