



Source Controls in Basins Tributary to the Everglades Protection Area

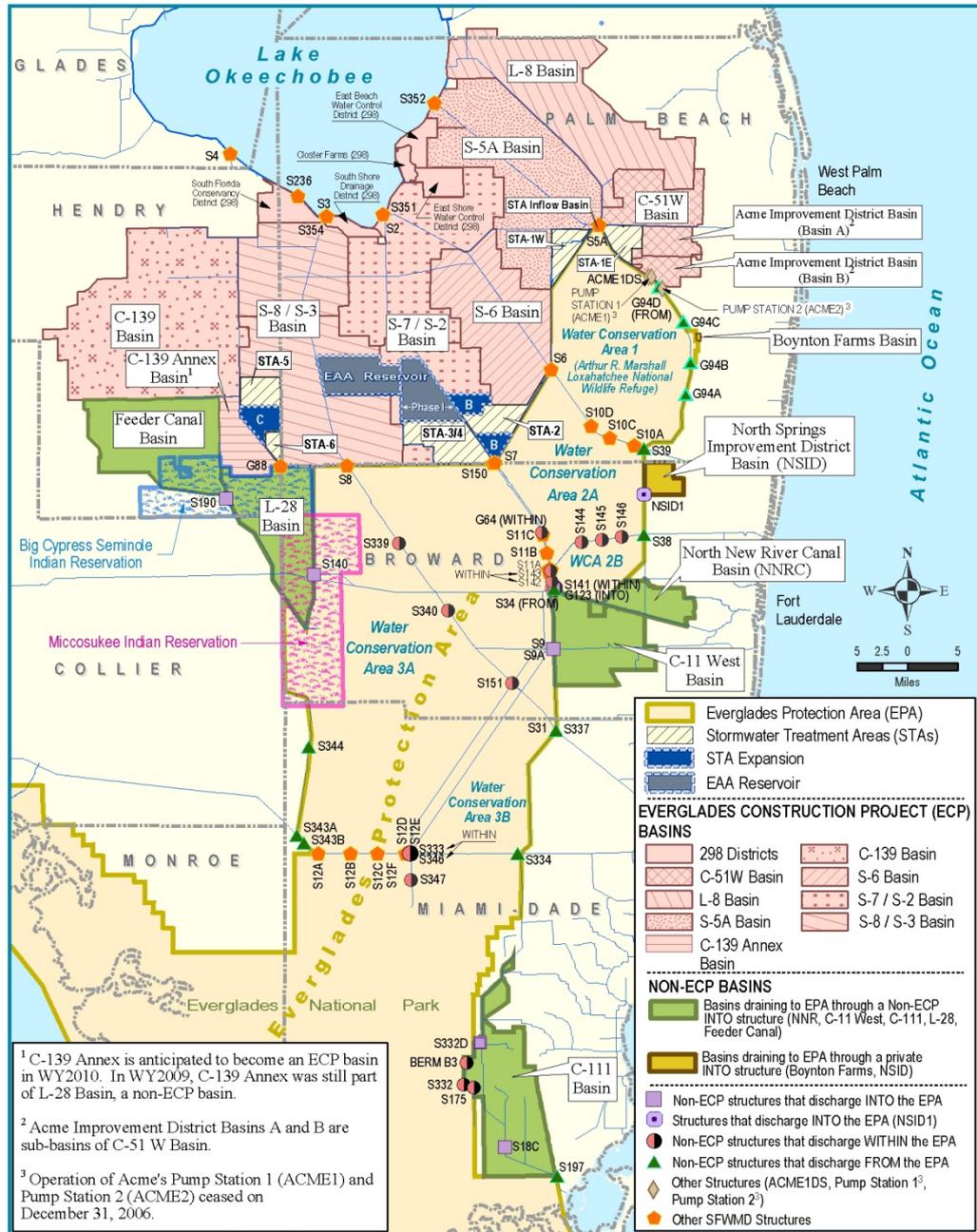
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Everglades Regulation Bureau

**9th Annual Public Meeting on the Long-Term Plan for Achieving Water Quality
Goals for the Everglades Protection Area Tributary Basins**

EPA Tributary Basins

- EAA
- C-139
- C-139 Annex
- C-51 West
- L-8
- C-11 West
- Feeder Canal
- L-28
- North Springs Improvement District (NSID)
- North New River Canal (NNRC)
- Boynton Farms
- C-111





Long Term Plan Project Objectives

The Process Development and Engineering (PDE) component of the Long-Term Plan recommends activities designed to:

“Maintain and improve upon the contribution of source controls to overall water quality improvement goals.”

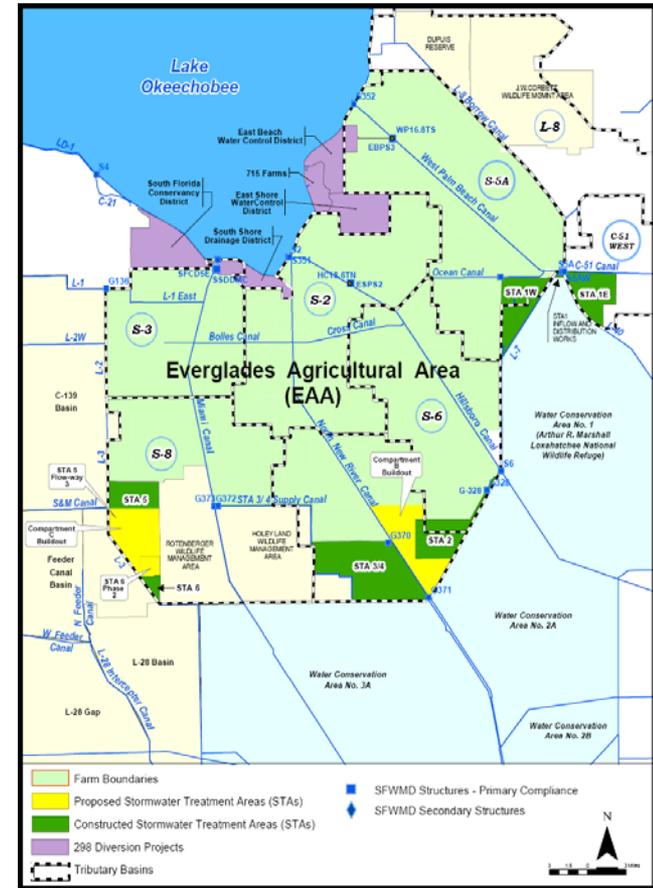
Specifically:

- Identify discharges that are candidates for implementation of cost effective source controls
- Characterize management practices on lands or processes tributary to those discharges
- Implement these source controls in concert with landowners or municipalities



EAA Source Control Projects

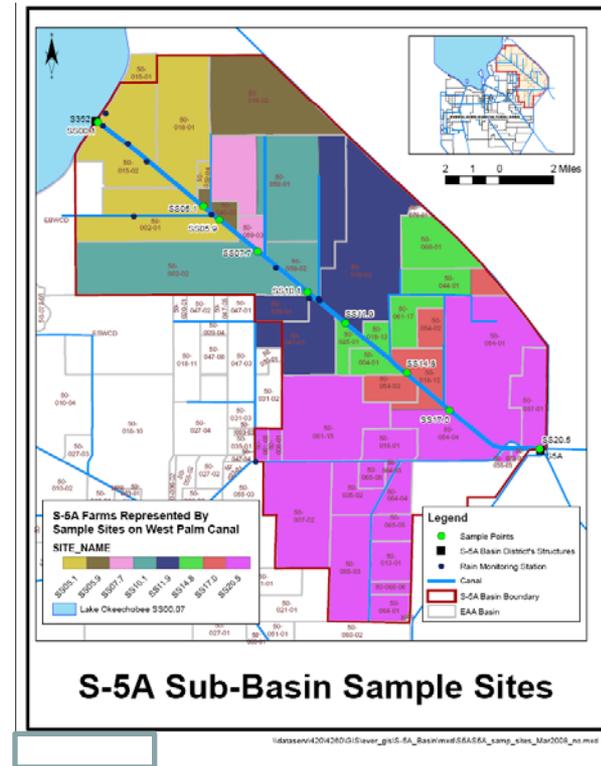
- BMP Program Implementation: Conducted BMP Site Verifications and Follow Ups for 29 Farms
- Preparing for renewal of WOD permit (Applications due by April 2, 2012; All 32 permit expire on June 30, 2012)
- Completed Draft Performance Measure Methodology for LOK Diversion Areas



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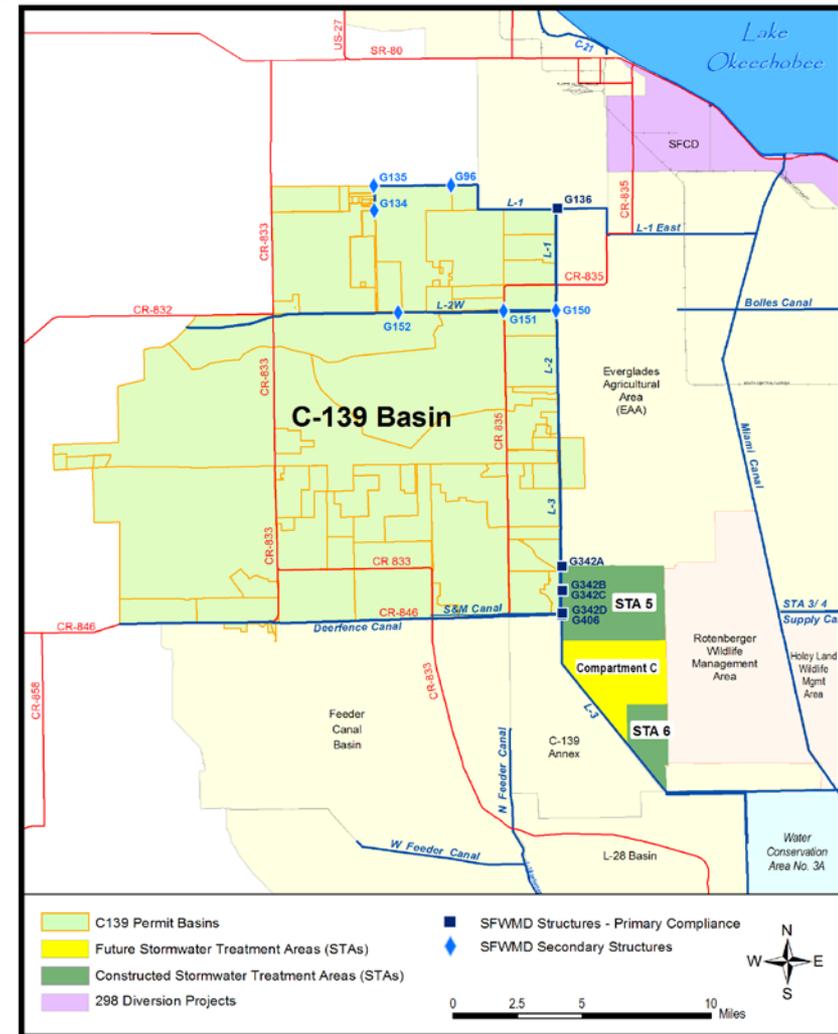
EAA Source Control Projects

- S5A Data Collection:
 - Water quality (TP, SRP, TP), flow, and sediment sampling along West Palm Beach Canal
 - 3-yr Study (2012-14)
 - Objective: Understand Phosphorus speciation and transport to support source controls and water quality improvement strategies.



C-139 Source Control Projects

- Rule Amendments became effective November 2010
- Permit renewals were completed
- BMP verification visits ongoing
- BMP Demonstration projects ongoing



BMP Verification Visits

- Annual BMP inspections
 - ✓ Verification of Comprehensive BMP Plans



Nutrient Management



Water Management



Particulate Matter & Sediment Controls



BMP Demonstration Grant

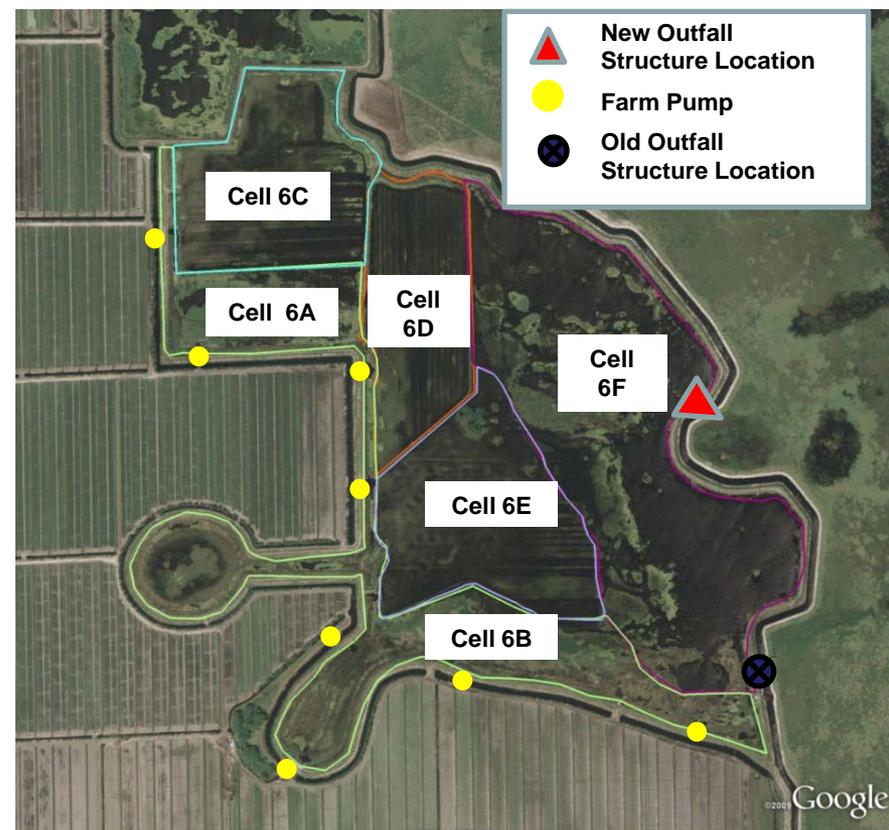
- Cooperative agreement SFWMD – Hendry Soil and Water Conservation District (HSWCD)
- Objective: to cost-share projects focused on innovation and/or optimization of traditional BMPs for phosphorus removal
- Two projects were selected for funding:
 - Above ground impoundment (AGI) optimization
 - Chemical precipitation after AGI



BMP Demonstration Grant (continued)

AGI Optimization

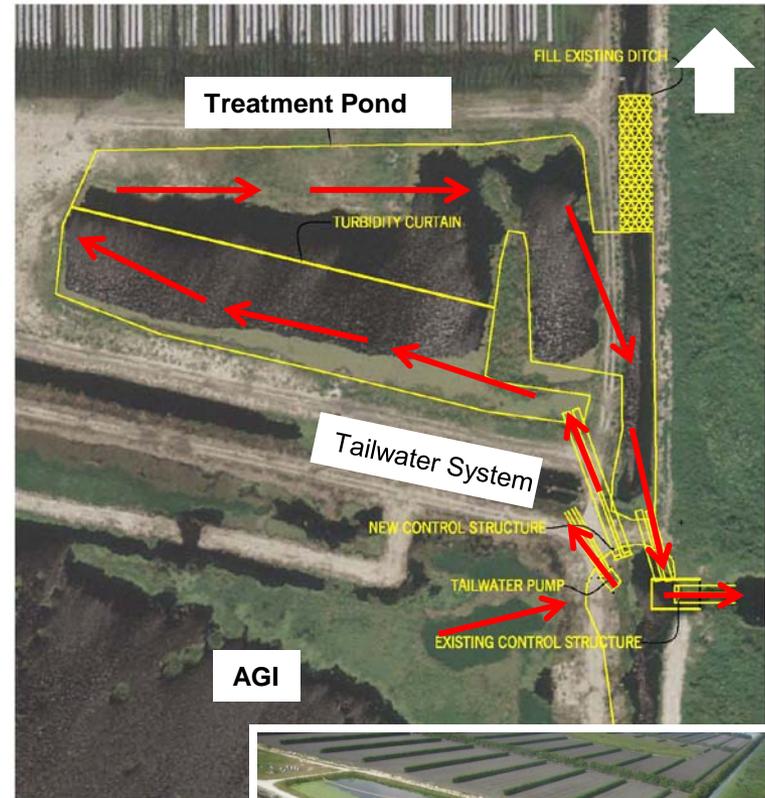
- ✓ Modifications were made
- ✓ Data collected for 12 months
- ✓ Project Findings:
 - Unexpected conditions during collection period (8 months)
 - TP load reduction: 72%
 - TP concentration reduction: 43%
 - Additional data required to quantify BMP effectiveness in long term.
- ✓ Contract amended to collect additional data from January through November 2012



BMP Demonstration Grant (continued)

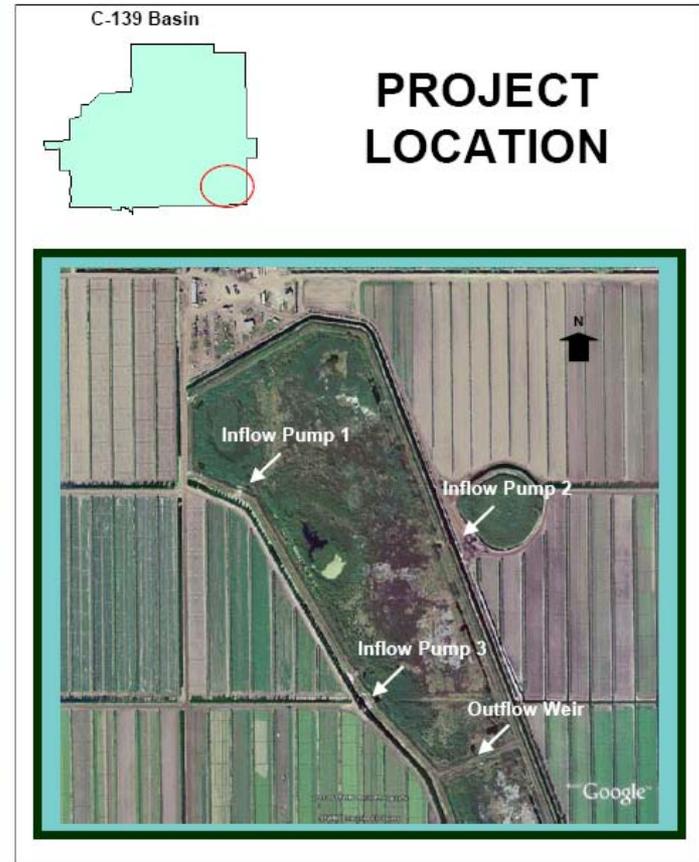
Chemical Precipitation

- Phase I – Laboratory (completed)
 - Alum
 - Aluminum Chloride
- Phase II – Field Implementation (partially completed)
- Project Findings
 - Injection pump calibration issues
 - Limited data collected (3 discharge events) – dry conditions
 - Great variability among results
- Contract amended to allow data collection from January through November 2012



UF-IFAS Southwest Florida Research and Education Center, AGI Performance Evaluation

- Objective: Quantify the P nutrient treatment efficiency of an AGI in a vegetable farm.
- Data collected for one year (flow, water quality, soils, topography, plant tissue)
- Project Findings:
 - Soil tests: some areas retain P better than others;
 - High rainfall events (dry season) resulted in reducing retention capacity;
 - AGI treatment efficiency: 20%
 - Potential modifications (structural & operational) identified to enhance P treatment.



Demonstration Projects: What's Next?

Tracer Study

- Objective: Evaluate the hydraulic efficiency of two AGIs (basic & modified)



C-139 Basin Vegetable Production Demonstration

- Partnership with the Florida Department of Agriculture and Consumer Services (FDACS) and 6 producers
- Six years: Winter 2006 to Spring 2011 (2 growing seasons per year)
- 38 harvests: tomatoes (17), green beans (16), bell peppers (2), eggplants (1), corn (1) and hot peppers (1)
- Substantial amount of data were generated
- These data are under analyses.



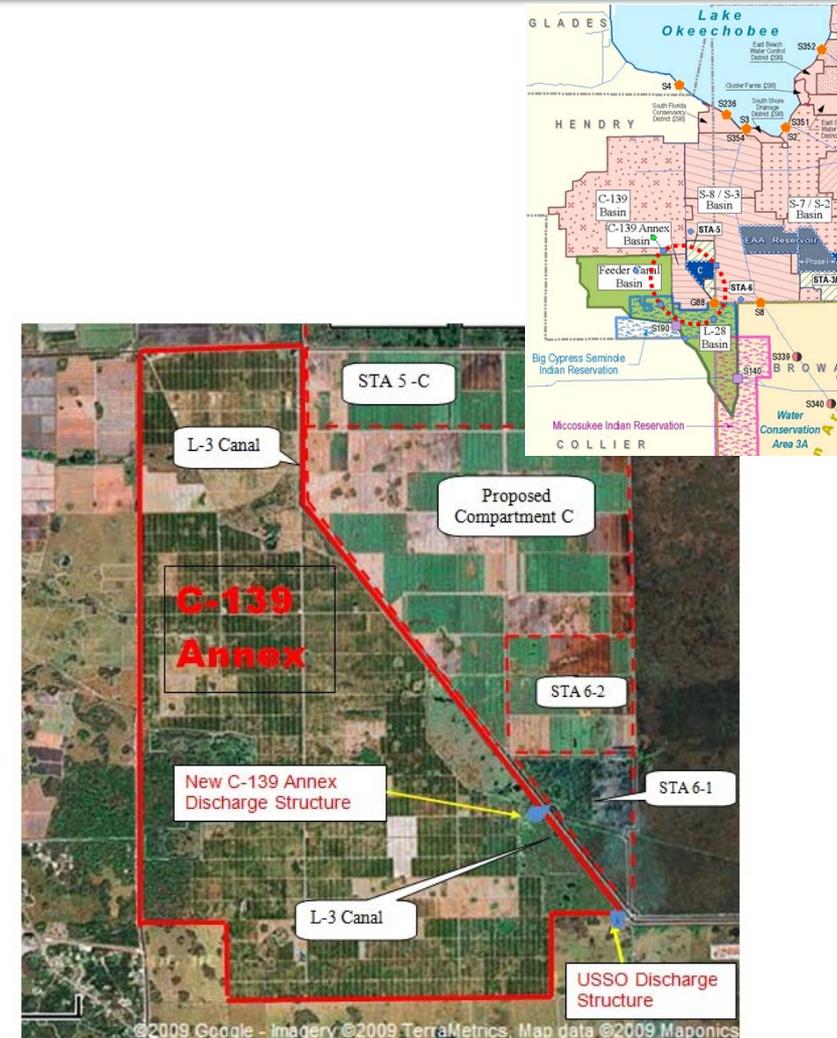
C-139 Basin Vegetable Production Demonstration: What is Next?

- Crop response to alternate phosphorus (P) application rates
- Soil test methods provide a more accurate measurement of “plant available” P in soils of high pH, Ca and Al content, ensuring that the requirements of the crop are met
- Use of soil pH amendments to “mine” unavailable soil P, preventing additional application
- Use of slow release fertilizers and split application methods (fertigation and foliar), to provide “just in time” P to the plant, preventing losses

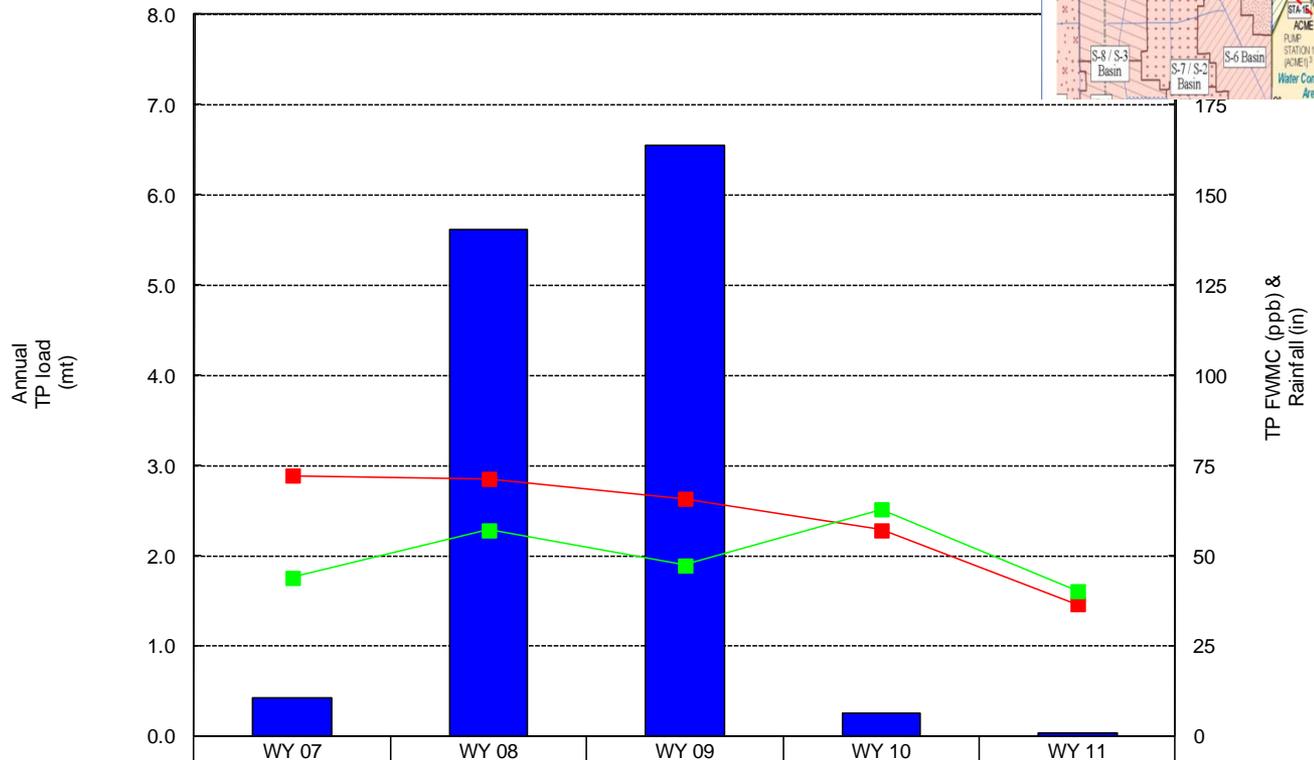
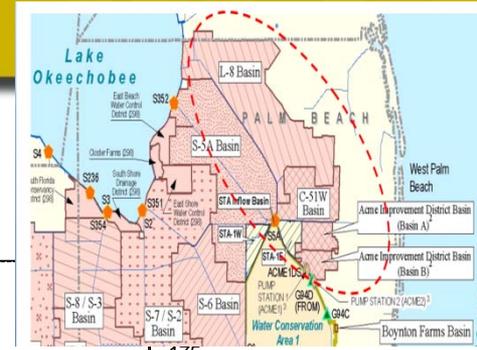


C-139 Annex Source Control Projects

- Operation of new discharge structure is on hold pending decision on future use of property (owned by the SFWMD since October 2010).
- Lease requires BMPs Implementation (citrus grove)
- C-139 Regional Feasibility Study

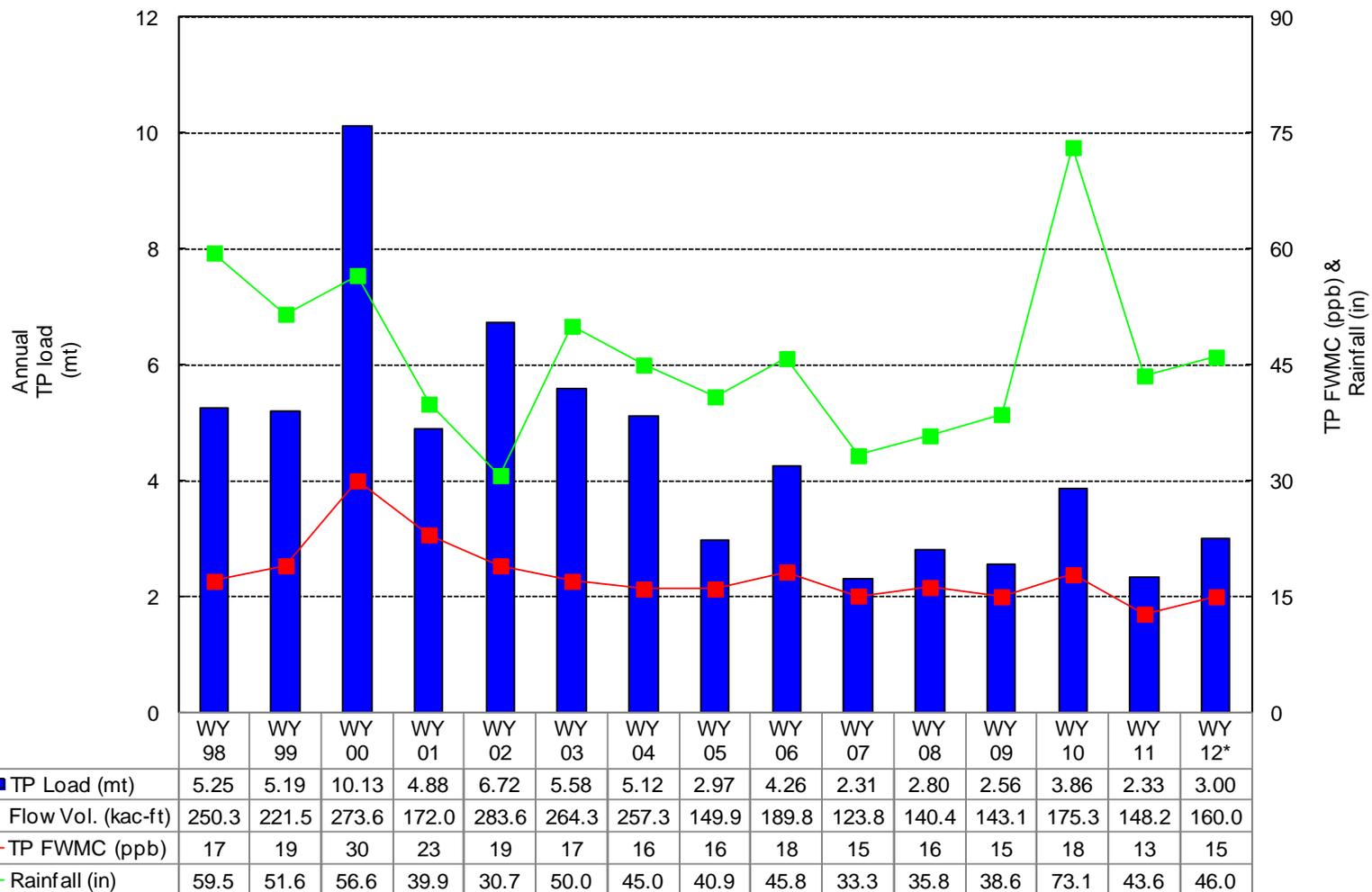


C-51 West and L-8 Source Control Projects



■ TP Load (mt)	0.43	5.61	6.54	0.25	0.04
— Flow Vol. (kac-ft)	4.80	63.78	80.59	3.56	0.86
■ TP FWMC (ppb)	72	71	66	57	37
■ Rainfall (in)	43.9	57.0	47.3	62.9	40.2

C-11 W Basin - Water Quality Results

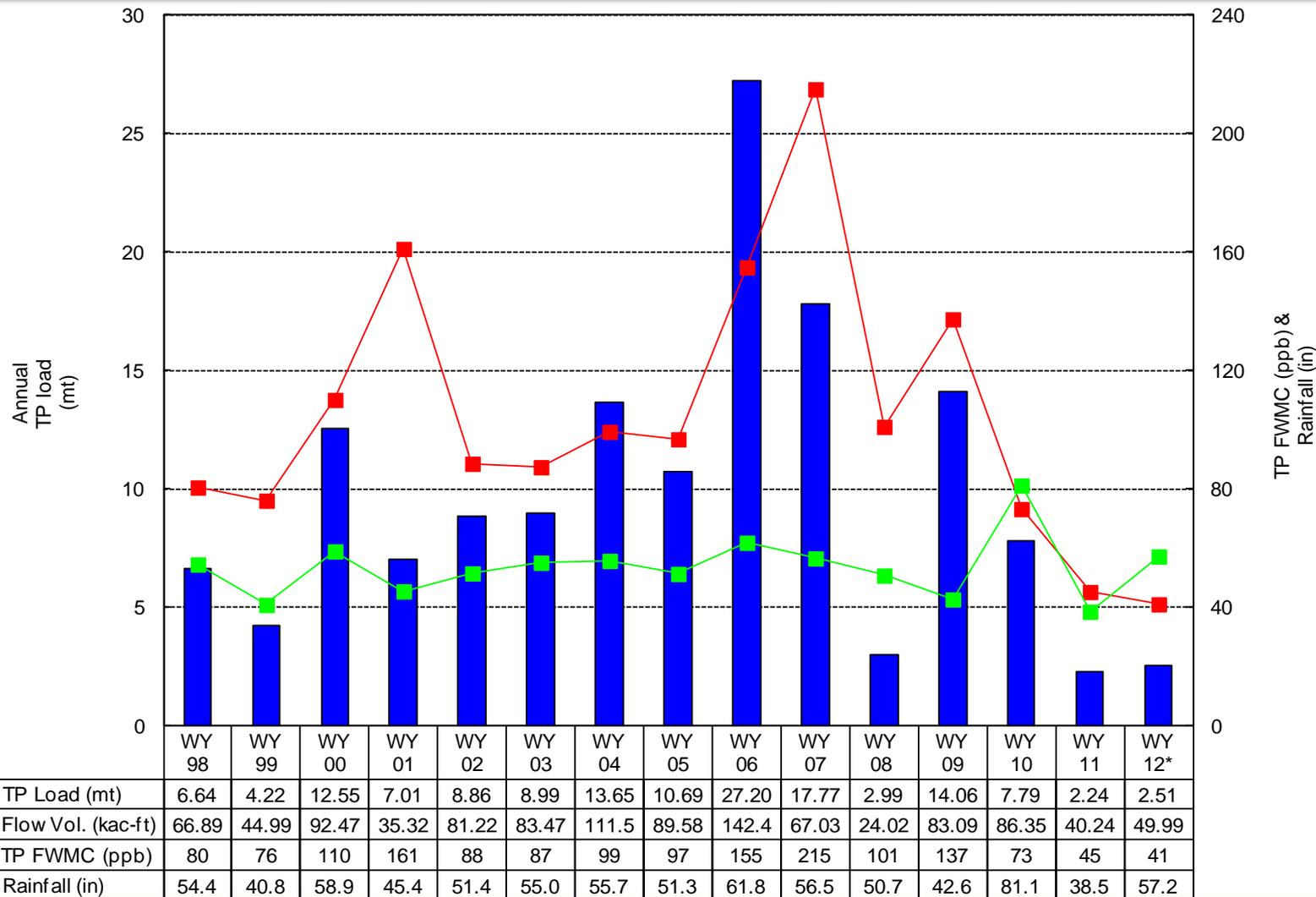


Feeder Canal Source Control Projects

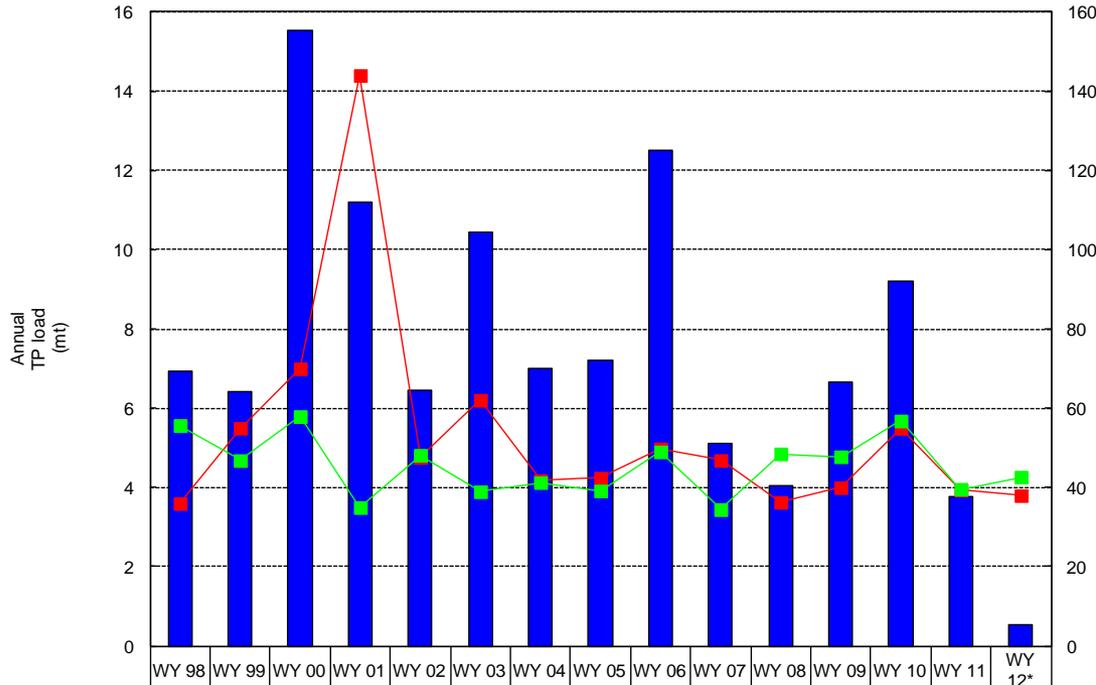
- Continued:
 - Implementation of BMPs at McDaniel Ranch
 - Supplementary Water Quality Collection and Analysis



Feeder Canal Basin - Water Quality Results



L-28 Source Control Projects



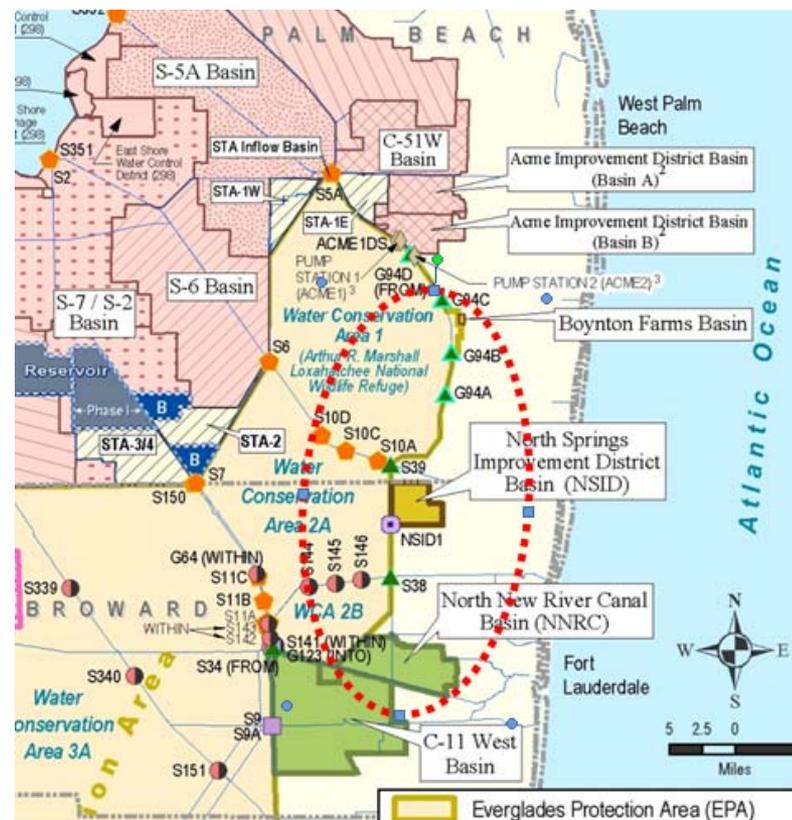
■ Annual TP Load (mt)	6.92	6.41	15.54	11.19	6.46	10.44	7.02	7.22	12.51	5.12	4.05	6.65	9.21	3.77	0.54
■ Flow Vol. (kac-ft)	155.8	94.54	180.0	62.97	109.9	136.4	136.1	137.9	203.5	88.52	90.34	136.3	136.9	77.69	11.62
■ TP FWMC (ppb)	36	55	70	144	48	62	42	42	50	47	36	40	55	39	38
■ Rainfall (in)	55.7	46.8	58.0	35.0	48.2	39.0	41.3	39.2	49.0	34.5	48.5	47.8	56.8	39.6	42.7



TP FWMC (ppb) & Rainfall (in)

North New River Canal (NNRC), North Springs Improvement District (NSID), and Boynton Farms (BF) Source Control Projects

- No flows to Everglades Protection Area:
 - NNRC: Since WY04
 - NSID: Since WY06
 - BF: Since WY08 (Last 4 pumps capable of discharging to Refuge were removed in 2011)



C-111 Basin

- C-111 Basin discharges to EPA meet phosphorus criterion requirements of Settlement Agreement





Questions