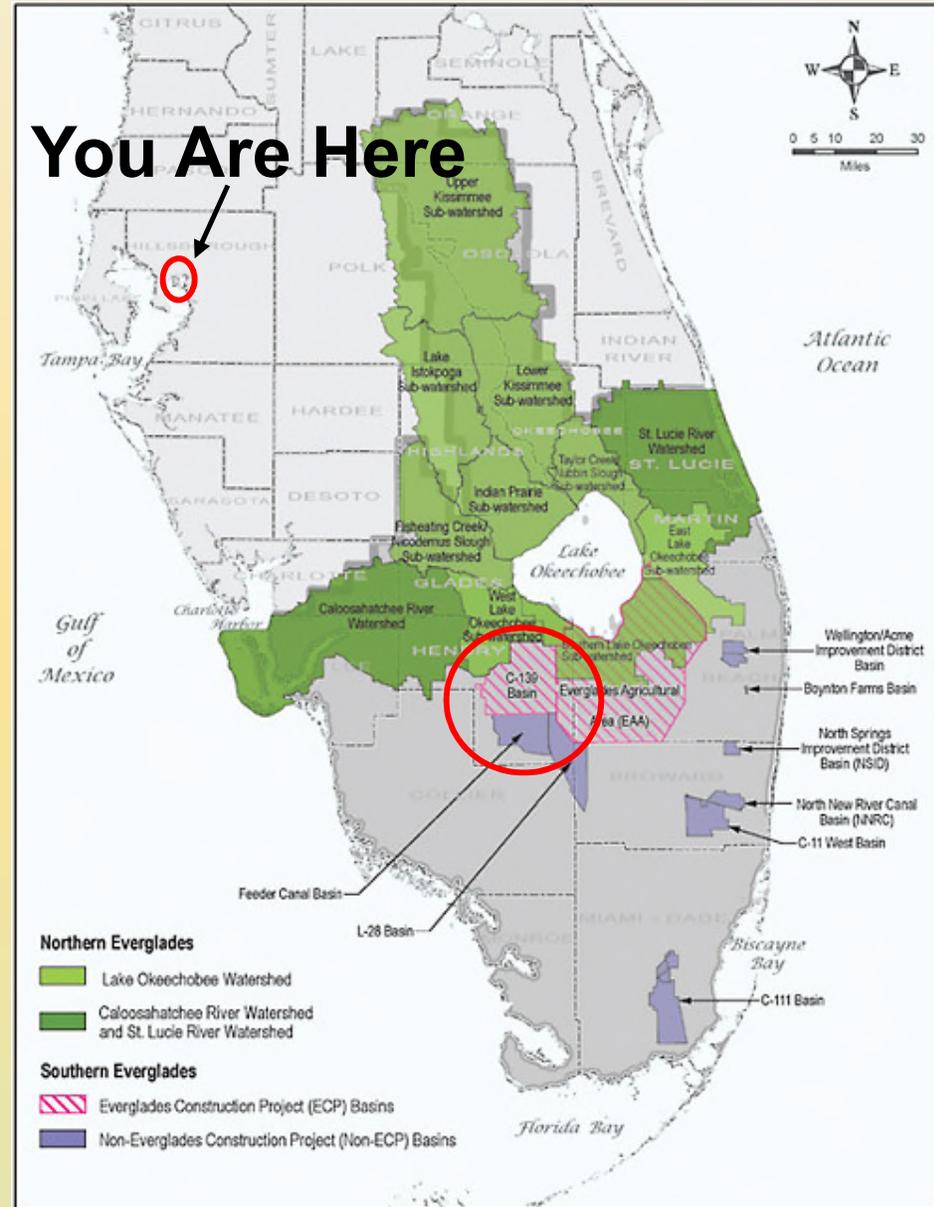


Water Quality Monitoring for the Mandated C-139 Basin BMP Program

Jodie Hansing, P.E.
Everglades Regulation Bureau
May 3, 2016

Background



Mandated C-139 Basin BMP Program

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- Everglades Forever Act (EFA) mandates the Districts BMP Program in the C-139 Basin.
- Total Phosphorus (TP) in discharges from the C-139 Basin must be maintained at historic levels.
- Rules were adopted to implement the EFA.



Mandated EAA vs. C-139 BMP Program

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- Both mandated by the EFA
- Different soil types  Different crops
- Profit margins (small businesses vs. corporate)
- Reduction in TP
 - EAA  25% TP Reduction
 - C-139  Maintain TP Levels

Mandated C-139 Basin BMP Program

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1. Permits

- BMP Plans

2. Post Permit Compliance

- Reporting requirements
- BMP Site Verifications

3. Annual Performance Assessment

- Monitoring network established for TP load

Best Management Practices

Dissolved P
Nutrient
Management



Fertilizer spill prevention



Fertilizer in root zone



Restricted Placement of Feeders

Particulate P
Particulate Matter
and Sediment
Control



Systematic canal/ditch cleaning



Barrier upstream of structure



Forage Growth

Discharge Volume
Water
Management



Rain Gauge



Control structure

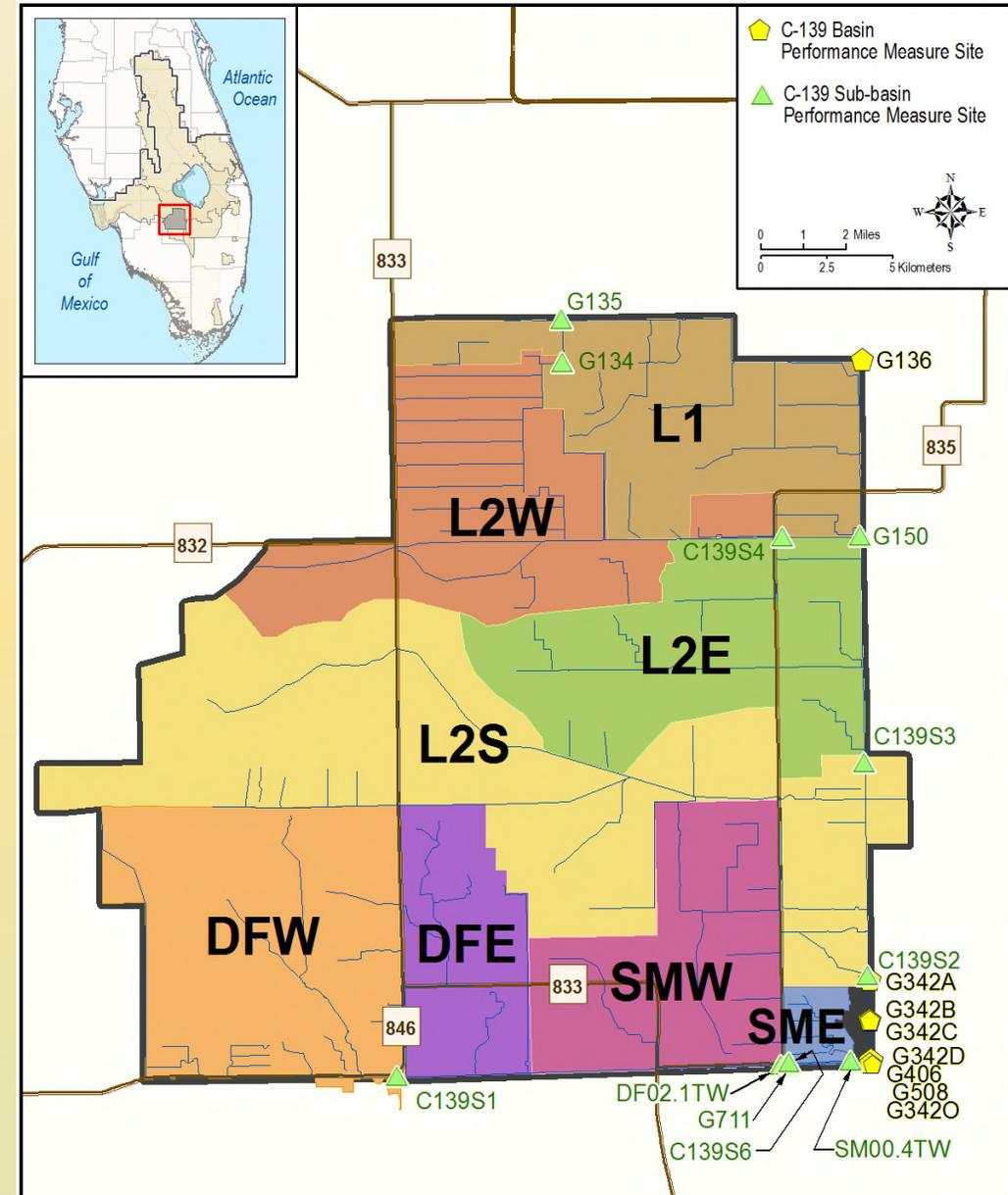


Staff Gauge

Annual Performance Assessment

6

- The monitoring network represents hydrologic areas
 - Basin level
 - Sub-basin level (upstream)
- Data collected at “Basin” stations to assess compliance (maintain historic TP load)
- Observed TP load vs. TP load from the Pre-BMP period (1980-1988)
- The methodology considers hydrologic variability



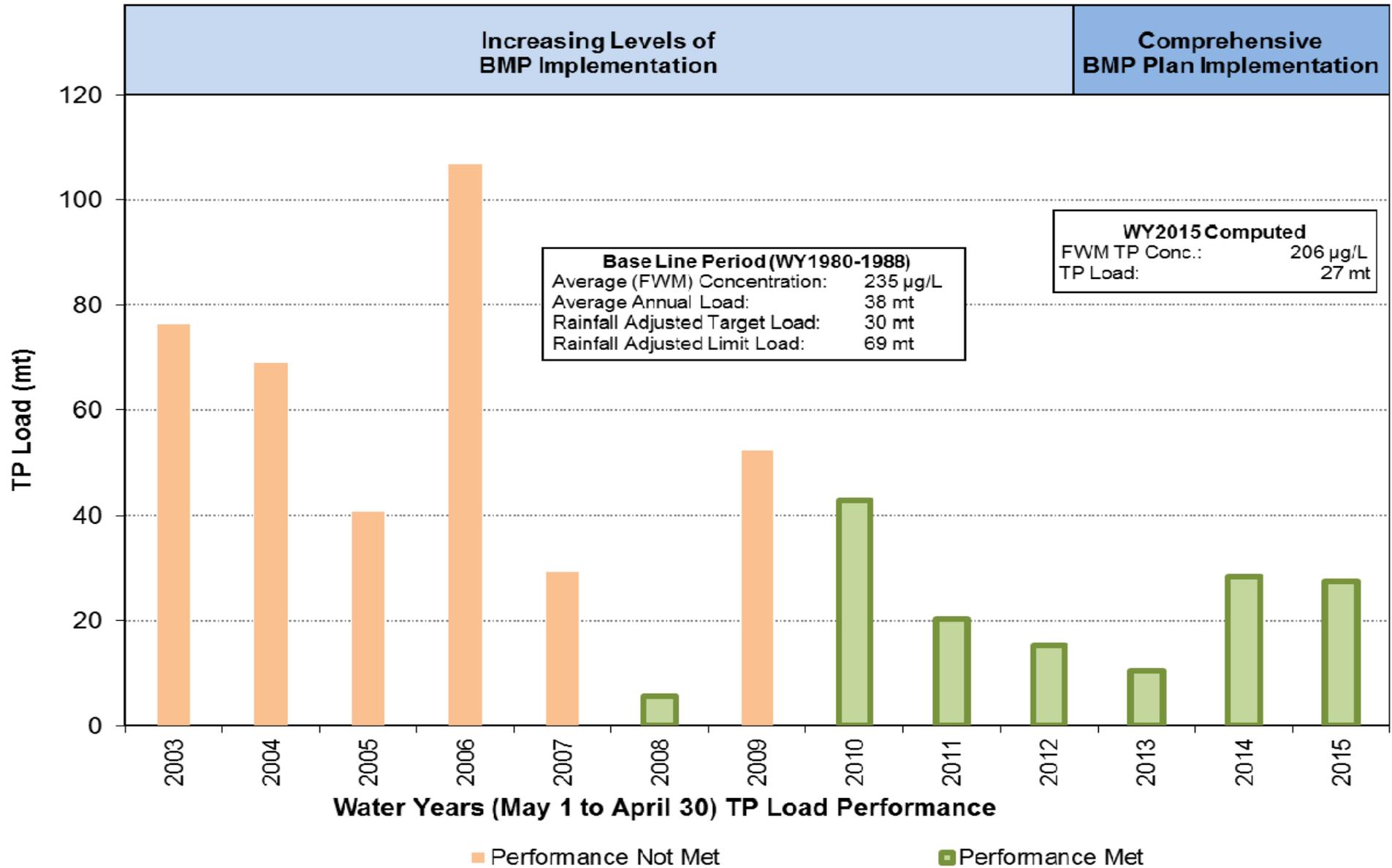
C-139 Basin and Sub-basin Monitoring

7

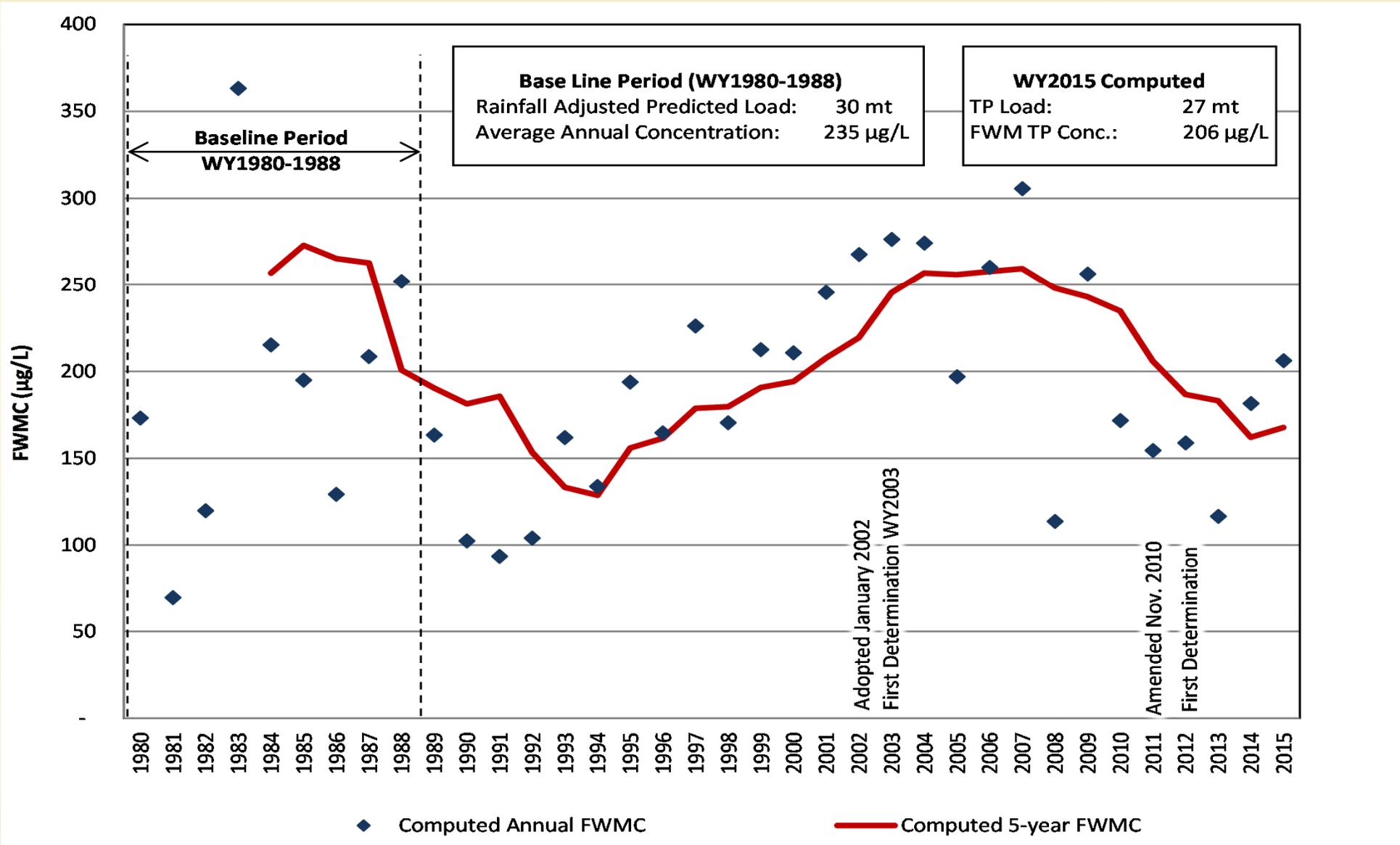


- 18 stations (8 basin, 10 sub-basin) are monitored for flow and phosphorus concentration representing 170,000 acres.
- 4 stations are monitored for rainfall.
- Phosphorus data are collected by an automatic sampler which is triggered during flow and composited weekly.
- Grab sample collected weekly for TP speciation.

How is the Program Doing?



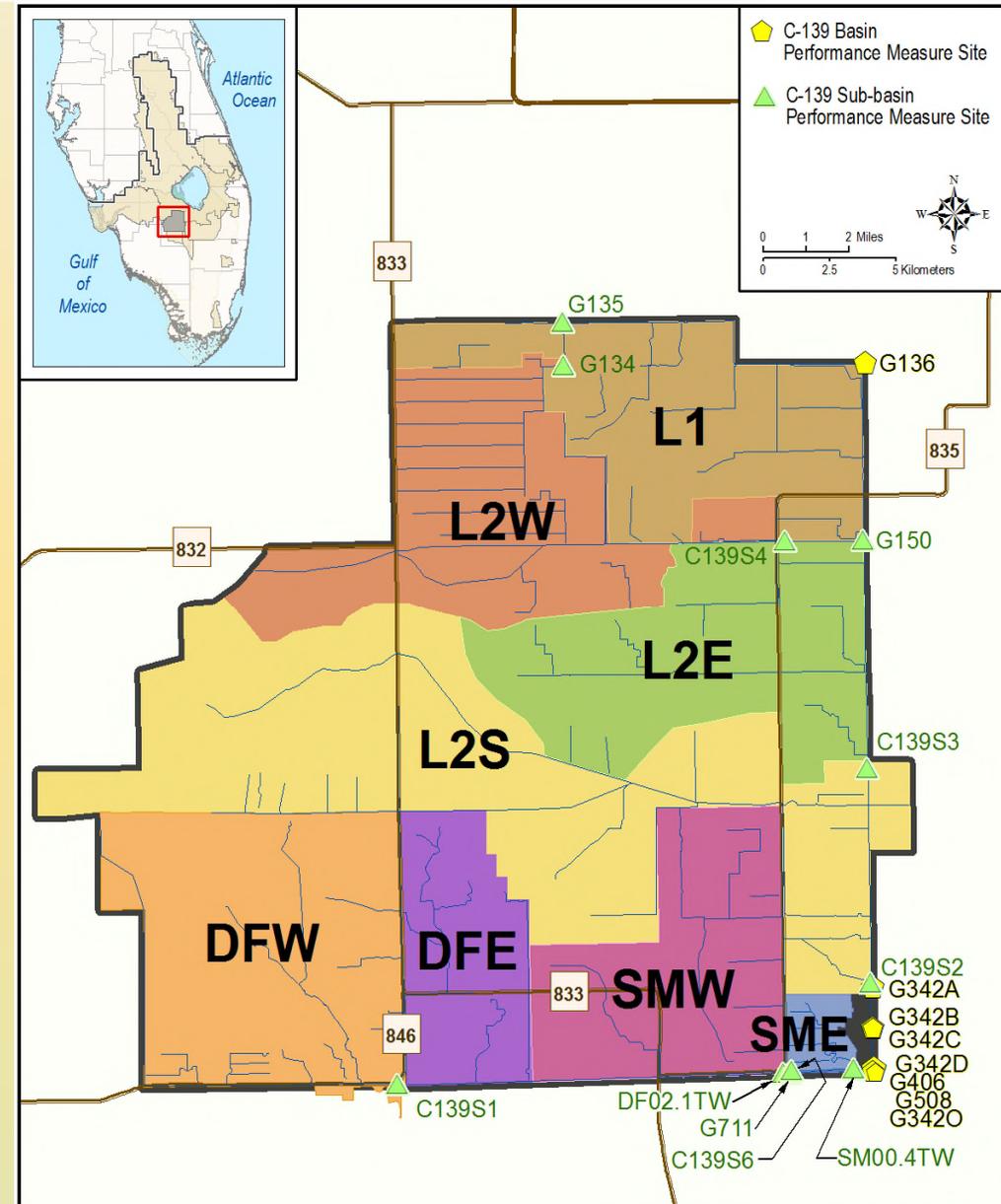
Long-term Concentration Trends



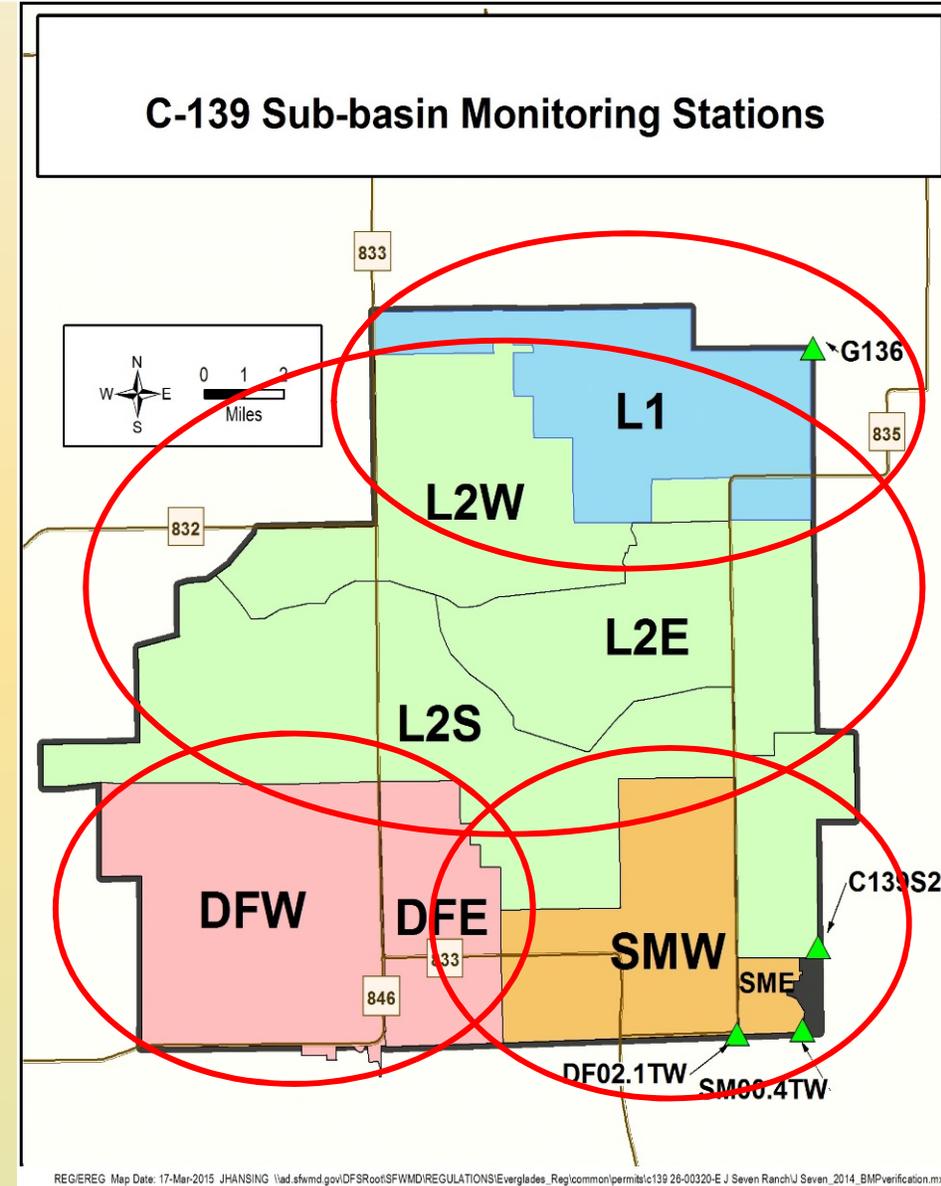
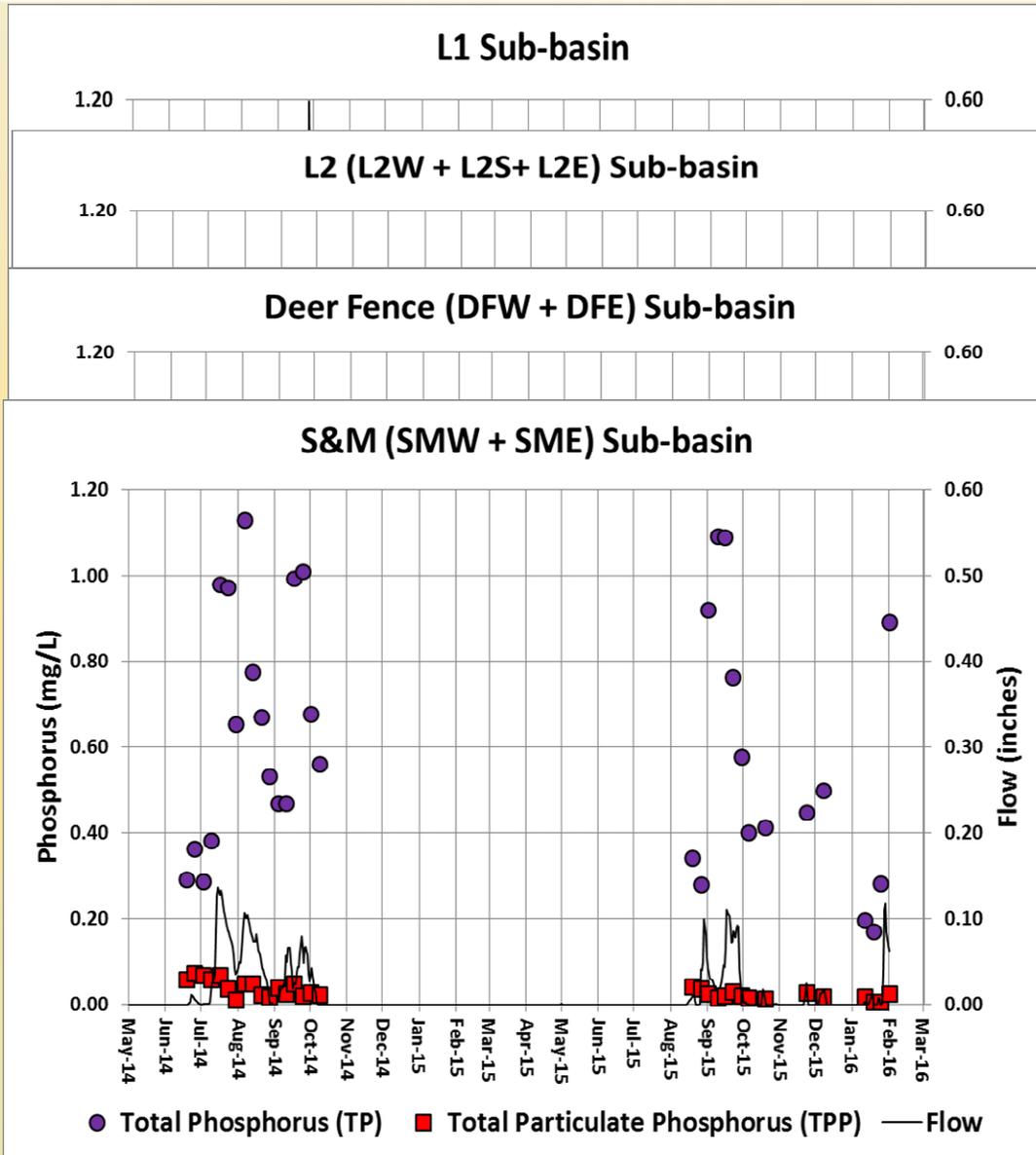
Sub-basin level (upstream) Monitoring

10

- Sub-basin monitoring is used to optimize follow-up activities and narrow in on areas of concern.
- Sub-basin data is also used as a tool for landowners to visualize water quality affects associated to activities.



Sub-basin level (upstream) Monitoring



Summary

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- A mandated BMP program is implemented by rules to satisfy EFA requirements.
- BMPs are implemented by landowners to ensure TP from the C-139 Basin does not exceed historic levels.
- Water quality and quantity monitoring is essential and is conducted throughout the C-139 Basin to assess compliance and is shared with landowners for BMP optimization.

South Florida Environmental Report (SFER) Source Controls – Chapter 4

12

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

2016 SOUTH FLORIDA Environmental Report



Pine Lake, Everglades National Park

HIGHLIGHTS

With Everglades water cleaner than it has been in generations, progress on key water quality improvement and restoration projects — plus managing above-average rainfall in the Lake Okeechobee region — marked the highlights of Water Year 2015 and Fiscal Year 2014-2015 for the Florida Department of Environmental Protection (FDEP) and the South Florida Water Management District (SFWMD). The agencies continue to implement, monitor and document a year of restoration, scientific and engineering accomplishments in the Kissimmee Basin, Lake Okeechobee, the Everglades and South Florida coastal areas in the 2016 South Florida Environmental Report.

The 2016 South Florida Environmental Report provides extensive peer-reviewed research summaries, data analyses, financial updates and a searchable database of environmental projects. The full report covers environmental information for Water Year 2015 (May 1, 2014 - April 30, 2015) and project/budgetary information for Fiscal Year 2014-2015 (October 1, 2014 - September 30, 2015). The full 2,239-page report is available online at www.sfwmd.gov/sfer.

QUESTIONS??

Jodie Hansing, P.E.
Bureau of Everglades Regulation
South Florida Water Management District
(561)-682-2147
jhansing@sfwmd.gov
www.sfwmd.gov/sourcecontrols

BMP Plan

- Combines operational and physical improvements to reduce P in discharges
- Required for each land use/crop
- A comprehensive plan totaling 35 BMP points out of which:
 - 10 points - Nutrient Management
 - 5 points - Water management
 - 5 points - Particulate matter and sediment controls
 - 15 points - Flexible

Example BMP Plan

BMP	POINTS	SAND CANE	PASTURE	VEG.	SOD	CITRUS	OTHER
NUTRIENT CONTROL PRACTICES							
Nutrient Application Control	2½			X			
Nutrient Spill Prevention	2½			X			
Manage Successive Vegetable Planting	2½						
Plant Tissue Analysis	5						
Soil Testing	5			X			
Spill Nutrient Application	5						
Slow Release Phosphorus Fertilizer	5						
Reduce Phosphorus Fertilization	5						
No Nutrients Imported via Direct Land Application	20		X				
No Nutrients Imported Indirectly through Cattle Feed	15						
Nutrient Management Plan	5-25						
PARTICULATE MATTER AND SEDIMENT CONTROLS							
Any 2	2½						
Any 4	5						
Any 6	10						
Any 8	15						
5 Points Claimed Under Certified Surface Water Reservoir ²				X			
WATER MANAGEMENT PRACTICES							
Water Detention ½ Inch	5						
1 Inch	10						
Improvements to Water Management System Infrastructure to Further Increase Water Quality Treatment by Delayed or Minimized Discharge	5						
Low Volume Irrigation	5						
Approved & Operational Surface Water Reservoir (not certified)	15						
Approved & Operational Surface Water Reservoir (certified)	10-35			X			
Temporary Holding Pond (40E-40D, F.A.C.)	15						
Overland Sheet Flow Over Entire Property	15		X				
No Point Discharge of Surface Water	15						
Tailwater Recovery System	10						
Precision Irrigation Scheduling	10						
Water Resources for Pastures	5						
PASTURE MANAGEMENT							
Restricted Placement of Feeders	2 ½						
Restricted Placement of Cowpens	2 ½						
Restricted Placement of Water	2 ½						
Provide Shade Structures away from Drainage	2 ½						
Low Cattle Density (1 head/2 acres)	5		X				
Restrict Cattle through Fencing of Canals	10						
Total			40	45			

Regulatory C139 BMP Program

- Began with increasing levels of BMPs
- Unable to meet the historical TP loads from WY2003-WY2006
- Rule Development initiated in WY2006.
- Rule Amended in WY2011.

Table 4-7. WY2003–WY2015 C-139 Basin BMP implementation summary.

Compliance Water Year	BMP Level ^a	Met Performance	Compliance Action
WY2003	Initial Implementation of Level I – 15 points	No	Go to Level II Implementation
WY2004	Implement Level II – 15 points with BMP site verifications	No	Go to Level III Implementation
WY2005	Implement Level III – 25 points with BMP site verifications	No	Go to Level IV Implementation
WY2006	Implement Level IV – 35 points with BMP site verifications	No	Initiate Rule Development
WY2007	Continue Level IV	No	Continue Rule Development Process
WY2008	Continue Level IV	Yes	Continue Rule Development Process
WY2009	Continue Level IV	No	Continue Rule Development Process
WY2010	Continue Level IV	Yes	Continue Rule Development Process
WY2011	Comprehensive BMP Plan	Yes ^b	Initiate Comprehensive BMP Plans
WY2012	Comprehensive BMP Plan	Yes ^b	Comprehensive BMP Plans
WY2013	Comprehensive BMP Plan	Yes ^c	Comprehensive BMP Plans
WY2014	Comprehensive BMP Plan	Yes	Comprehensive BMP Plans
WY2015	Comprehensive BMP Plan	Yes	Comprehensive BMP Plans

a. Increasing BMP levels/points correspond to increased source control implementation

b. WY2011 and WY2012 performance is shown for reference only. Initial performance measure determination period under amended methodology set forth in amended Chapter 40E-63, F.A.C., is WY2013.

c. First water year of performance determination under amended Chapter 40E-63, F.A.C.