

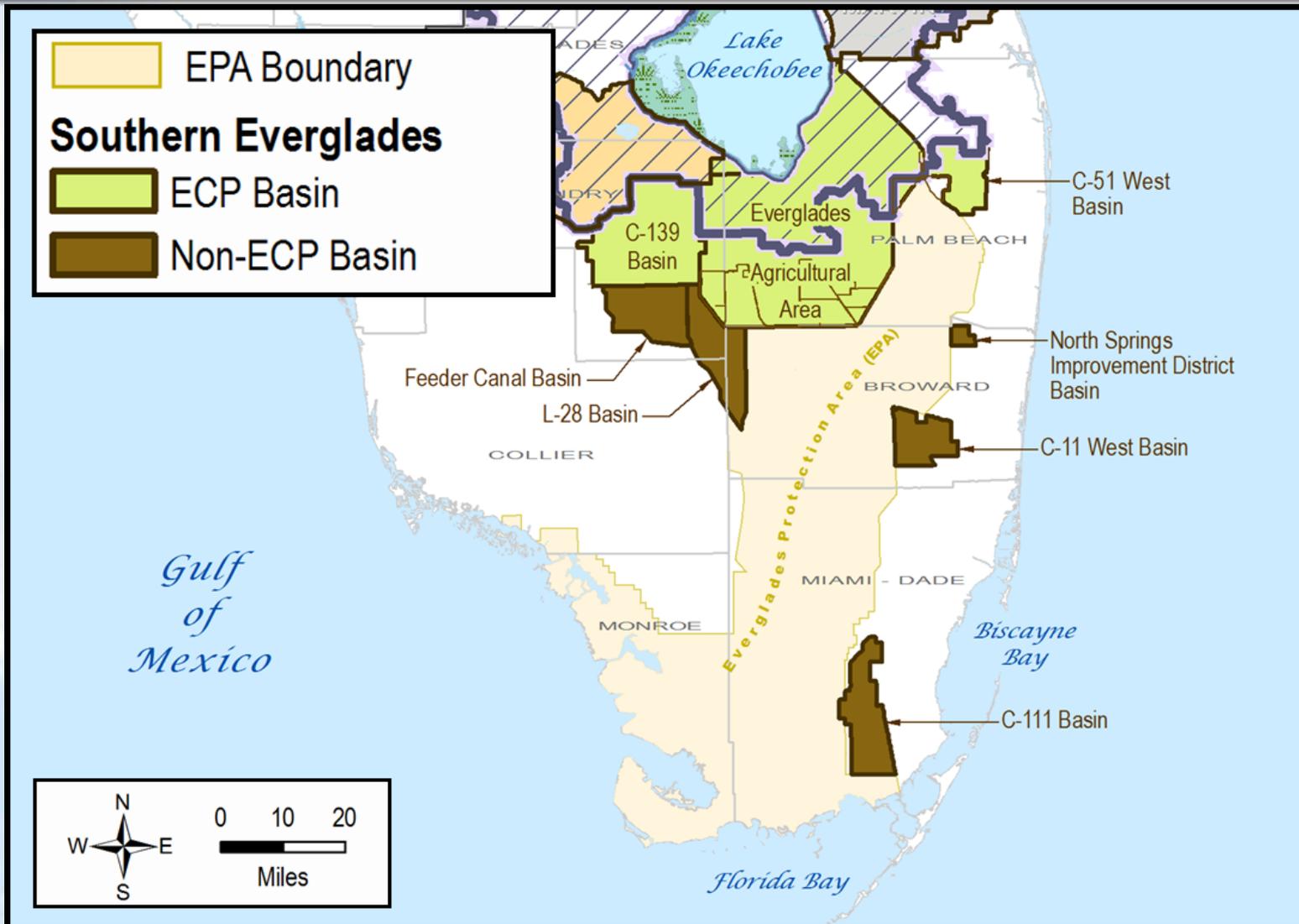
**Quarterly Public Meeting on the Long-Term Plan
for Achieving Water Quality Goals**

May 22, 2015

**SFWMD Southern Everglades
Nutrient Source Control Program Update**

Jonathan Madden, PE

Basins Tributary to the Everglades Protection Area (EPA)



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

Contents:

- EAA and C-139 Basins
 - Regulatory Compliance and Activities
 - Research and Demonstration Projects
 - Sub-regional Source Control Projects
- Non-ECP Basins
 - Regulatory Compliance and Activities
 - Project Integration

Based upon content reported in the 2015 South Florida Environmental Report Volume I, Chapter 4

WY2014 Phosphorus Data by Basin

| Basin | TP Load (metric tons) | TP Unit Area Load (pounds per acre) | TP Concentration ($\mu\text{g/L}$) |
|---|--------------------------|--|--|
| Everglades Agricultural Area | 105 | 0.50 | 94 |
| C-139 | 28 | 0.37 | 181 |
| EAA 298 and 715 Farms Diversion Basins | 21 | 1.42 | 204 |
| Feeder Canal | 7 | 0.21 | 76 |
| L-28 | 6 | 0.19 | 144 |
| C-11 West to EPA | 3 | NA | 13 |
| C-111 to EPA | 2 | NA | 6 |
| North Springs Improvement District to EPA | 0 | NA | - |

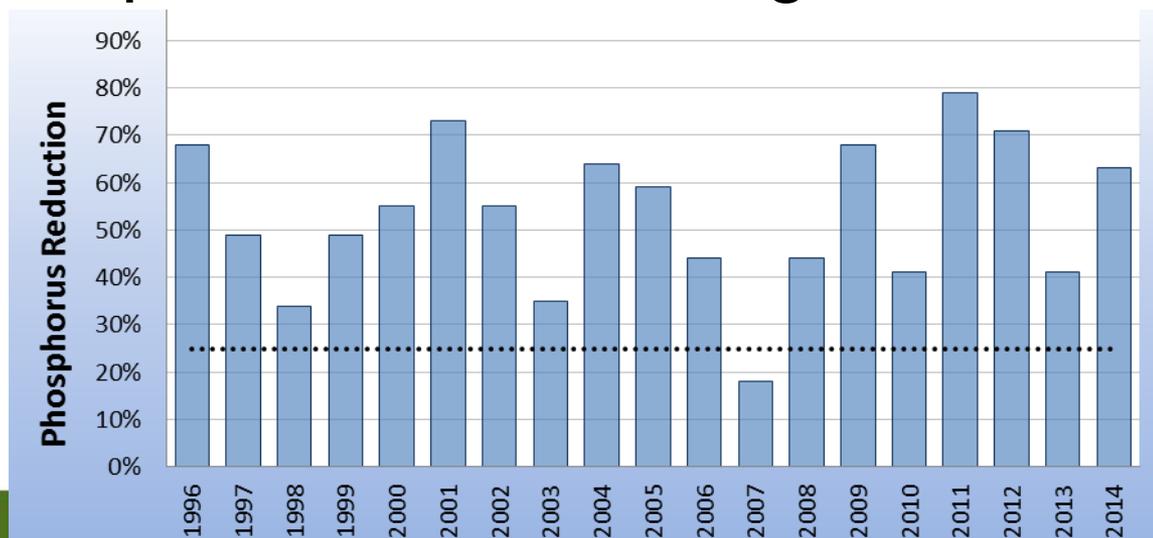
EAA Basin Source Controls

- Basin-Level Water Quality Compliance
- Permit-Level Compliance
- Research and Demonstration
 - EAAEPD Research Master Permit
 - West Palm Beach Canal Data Collection
 - East Beach WCD Canal Cleaning Demonstration
 - Sub-regional Source Control projects (S5A)



EAA Basin-Level Compliance

- EAA Basin-Level Compliance Requirement: Phosphorus load reduction of 25%
- In WY2014, BMPs in the EAA resulted in 63% phosphorus load reduction (180 metric tons)
- Since 1996, cumulative reduction of 2,853 mt which represents a 55% long-term reduction



EAA Permit-Level Compliance

- **BMP Site Verifications**
 - Verification of Comprehensive BMP Plan
 - Verification of Discharge Monitoring Plan

Nutrient Management



Water Management



Particulate Matter & Sediment Controls



Discharge Monitoring



| BASIN ID: | | 26-500-01 | CROP TYPE/LAND USE: | | RED PEPPERS | | |
|------------|---------------|--------------------|---------------------|-------|------------------------|----------------------|--------|
| STRUCTURE: | | DF20.1TN WEST WEIR | FARM NAME: | | SOUTH FARM | | |
| | | | MONTH OF: | | May 2002 | | |
| Day | Rainfall (in) | Time (hh:mm) | Start | Stop | Water Elevation (feet) | Init | Notes |
| 4 | 0.5 | | | | | | |
| 5 | 0.3 | | 1" Rainfall | | | Start elevation: 14" | |
| 6 | 1.1 | 7:00 | 20:00 | | 14.0 | | CB (4) |
| 7 | 0.9 | 7:00 | 19:00 | | 13.4 | 12.0 | CB |
| 8 | 1.0 | 6:30 | 17:00 | | 13.2 | 12.0 | CB |
| 9 | | | | 17:00 | 12.8 | | closed |
| 10 | | | | | | | |
| 30 | 0.4 | 8:00 | 20:00 | | 13.8 | | CB (1) |

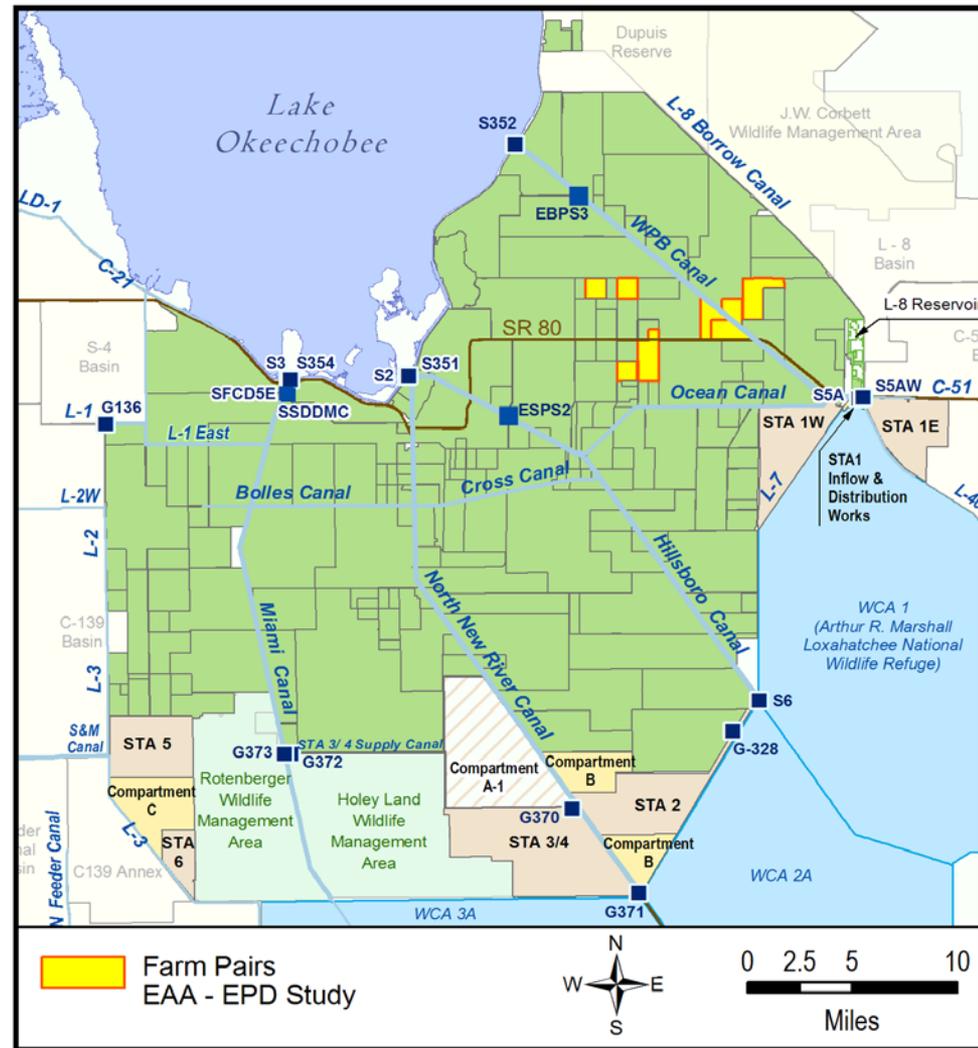
Note Codes
 (1) Harvesting
 (2) Planting
 (3) Land preparation
 (4) Start Elevation Reached
 (5) Malfunctioning
 (6) Others:

EAAEPD Research Master Permit Background

- Research on BMPs is mandated by the EFA and Chapter 40E-63, F.A.C.
- The BMP Research Master Permit is being renewed
- The revised Scope of Work (SOW) proposes continuation of the 2010 – 2015 SOW:
 - Research on the impact of alternate management practices for the control of floating aquatic vegetation (FAV) in EAA farm canals
 - Develop improved techniques for FAV management and
 - BMP education and extension services

EAAEPD Research Master Permit - Scope

- Representative sample: 4 pairs of farms (replicates)
- 2 replicates each - S5A and S6
- BMP effectiveness via an analyses of covariates
- Drainage flow, canal level, canal head difference, velocity, rainfall, and other data collected to be included in regression, if significant



EAAEPD Research Master Permit - Demonstration Status

- Calibration period finished: April 30, 2013 (3 pairs¹)
- Treatment period started: May 1, 2013 (3 pairs¹)
- Data collection includes:
 - Drainage and ambient canal water (quantity and quality)
 - Sediment analyses & surveys (fall and spring)
 - Biweekly surveys of FAV growth and spot spraying if needed with approved aquatic weed herbicides
 - Bimonthly FAV biomass survey/composition analysis
- BMP training workshops (twice per year)
- 2015 Annual report – July 2015

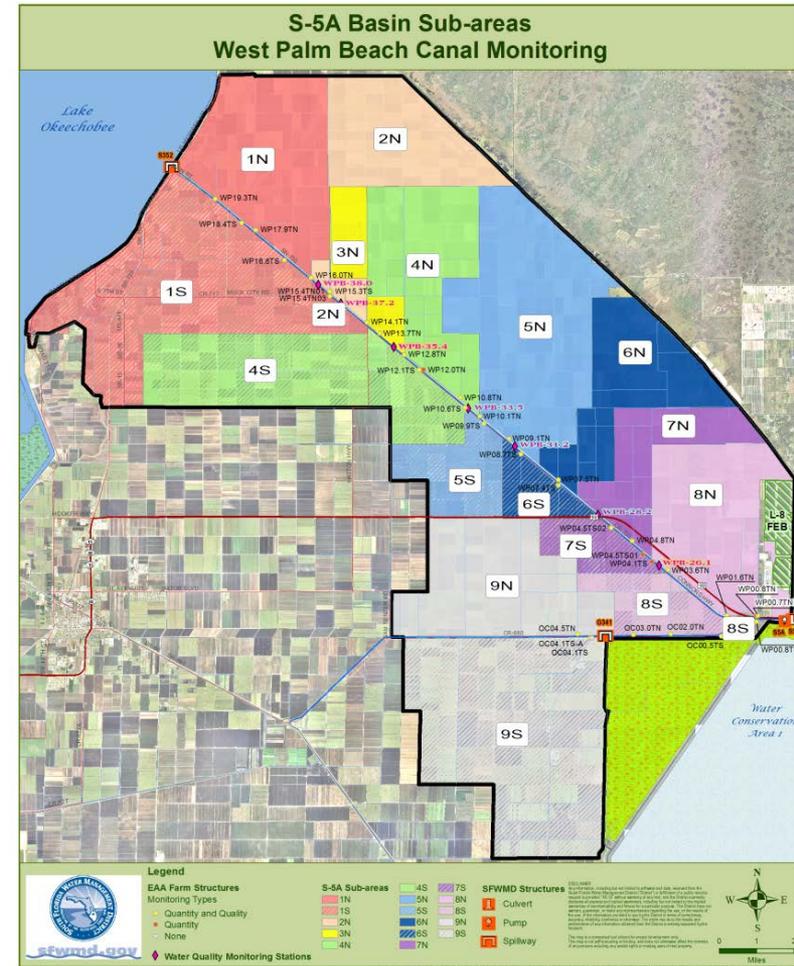
¹Farm pair 4701 and 4702 required an additional year of calibration period data collection due to a weak regression relationship at the end of second year. Treatment period for this pair started on May 1, 2014

EAAEPD Research Master Permit - Permit Status

- Permit expired: January 11, 2015
- Extension granted: April 24, 2015
- Application received: April 20, 2015
- District coordinating completion of scope
- Public workshop will be scheduled once application is complete
- Final agency action within 60 days of workshop

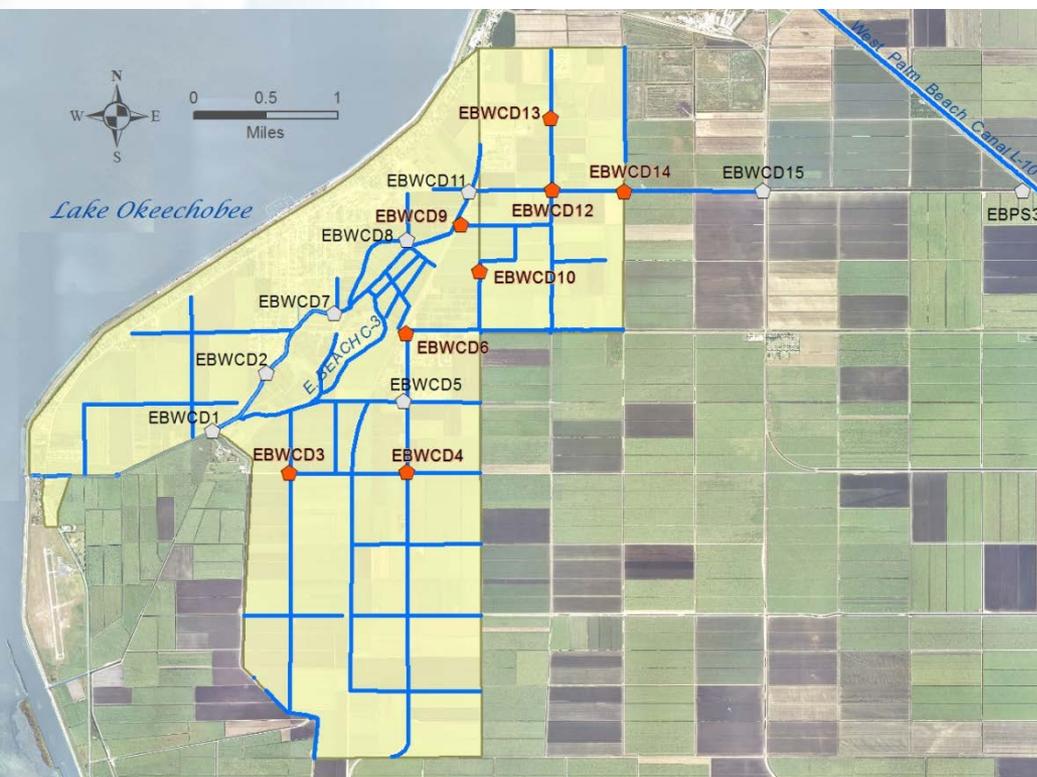
West Palm Beach Canal Data Collection Project

- Objective: to further understand phosphorus sources, transport mechanisms and sinks affecting basin phosphorus loading
- November 2012 - October 2015
- Consolidated evaluation findings expected by April 2016



EBWCD Canal Cleaning Demonstration

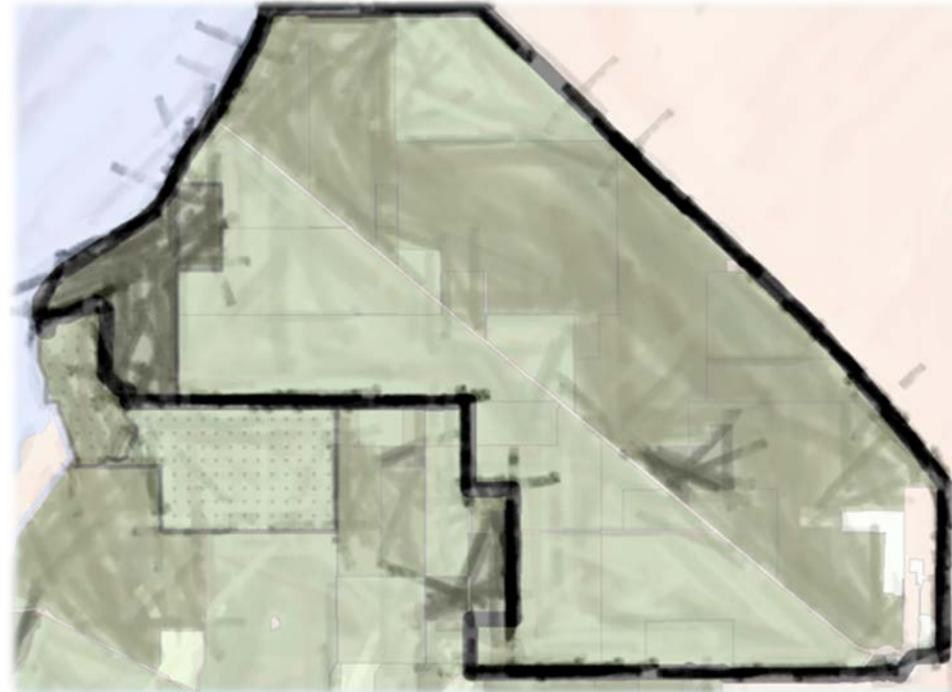
- Objective: partnership in implementing increased canal maintenance (vegetation control and sediment removal) at a regional scale paired with water quality monitoring



- EBWCD canal cleaning and reporting:
Aug 2013 - Oct 2015
- District water quality monitoring:
May 2013 - Sep 2016
- Evaluation findings expected April 2016

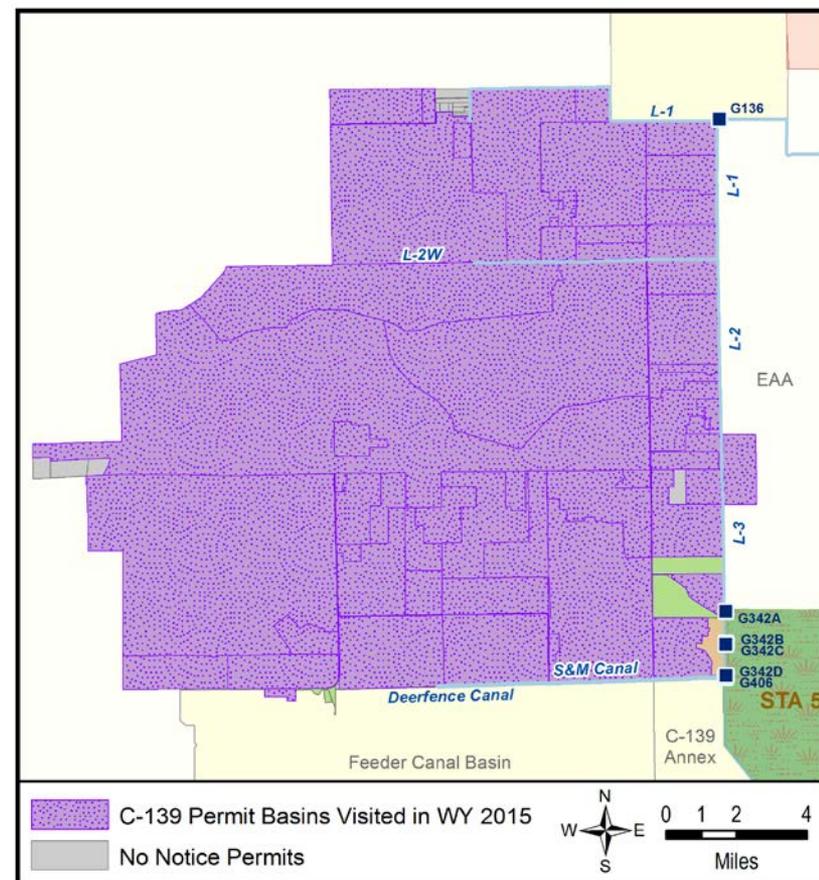
Sub-regional Source Control Projects

- Objective: to provide a safety factor for meeting water quality based limits downstream of STA1E and STA1W (Eastern Flowpath, EAA S5A Basin)
- Discussion of concepts and methods to further develop projects has been initiated
- Over and above existing permit requirements
- Projects with greatest potential to improve water quality to the downstream STAs will be prioritized



C-139 Basin Source Controls

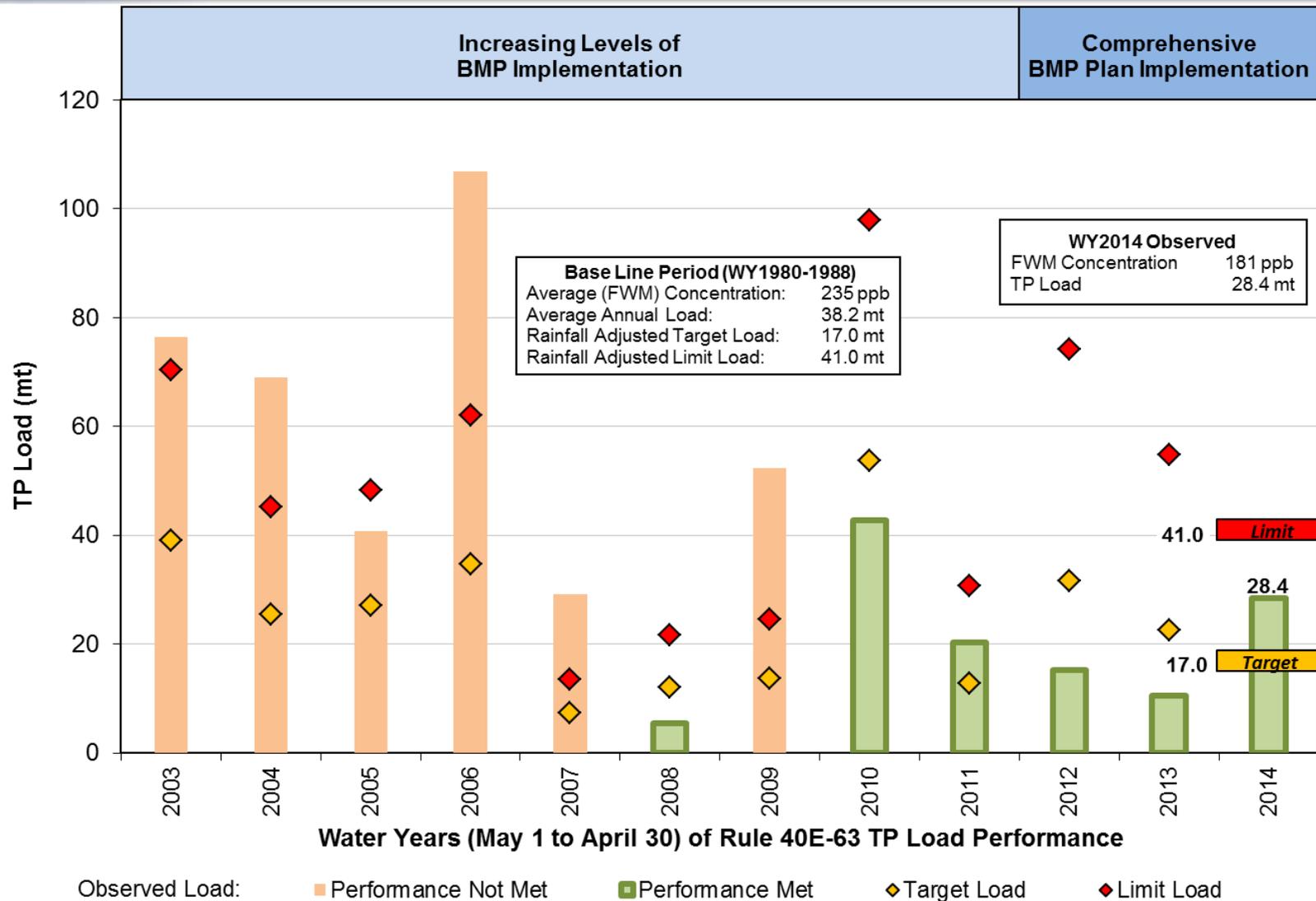
- Basin-Level Water Quality Compliance
- Permit-Level Compliance
- Sub-basin Monitoring



C-139 Basin-Level Compliance

- C-139 Basin-Level Compliance Requirement:
Do not exceed historic phosphorus levels
- In WY2014, C-139 Basin observed TP load (28 mtons) exceeded its Target (17 mtons)
- WY2015 ended April 30, and data processing required to determine performance
- Status: in compliance with water quality requirements of Chapter 40E-63, F.A.C.

C-139 Basin-Level Compliance



BMP Site Verification

- Annual BMP inspections
 - Verification of Comprehensive BMP Plans

Nutrient Management



Water Management

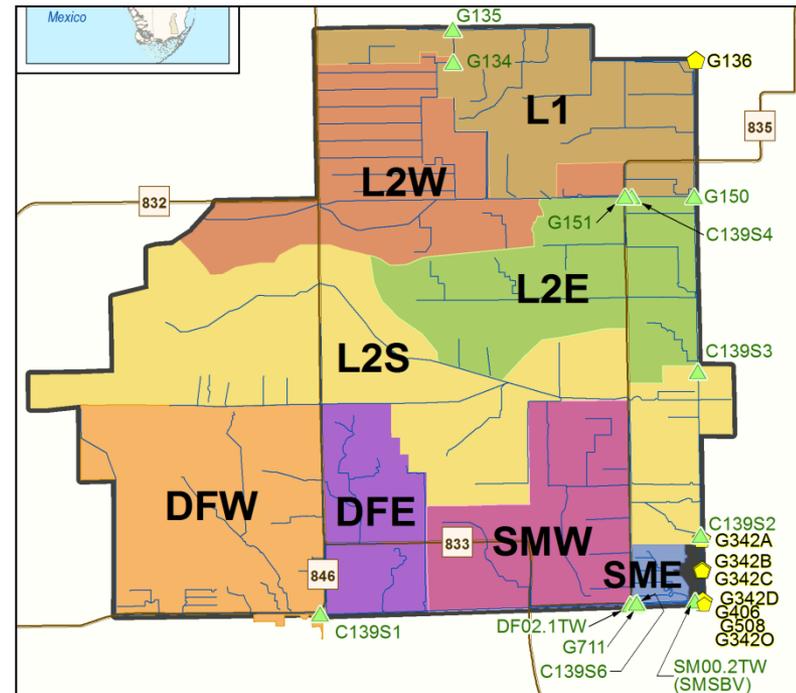


Particulate Matter & Sediment Controls



C-139 Sub-basin Monitoring

- Eight automatic sampler and flow stations
- Site monitoring challenges being addressed
- Flow and load representative of sub-basins:
 - Primary: L1 and L3
 - Secondary: L2, SM, DF
 - Tertiary: L2W, L2E, L2S, SME, SMW, DFE, DFW



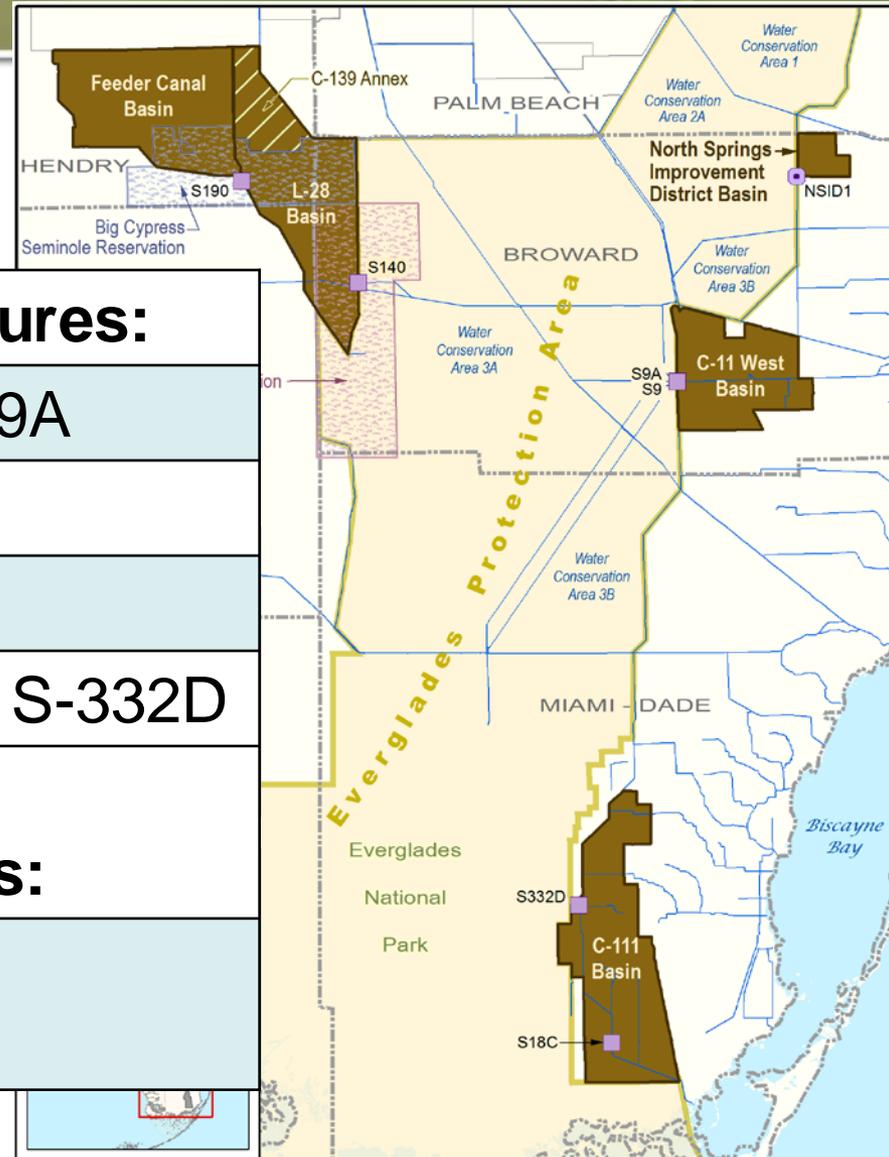
Non-ECP Basins Source Controls

Four basins with District structures:

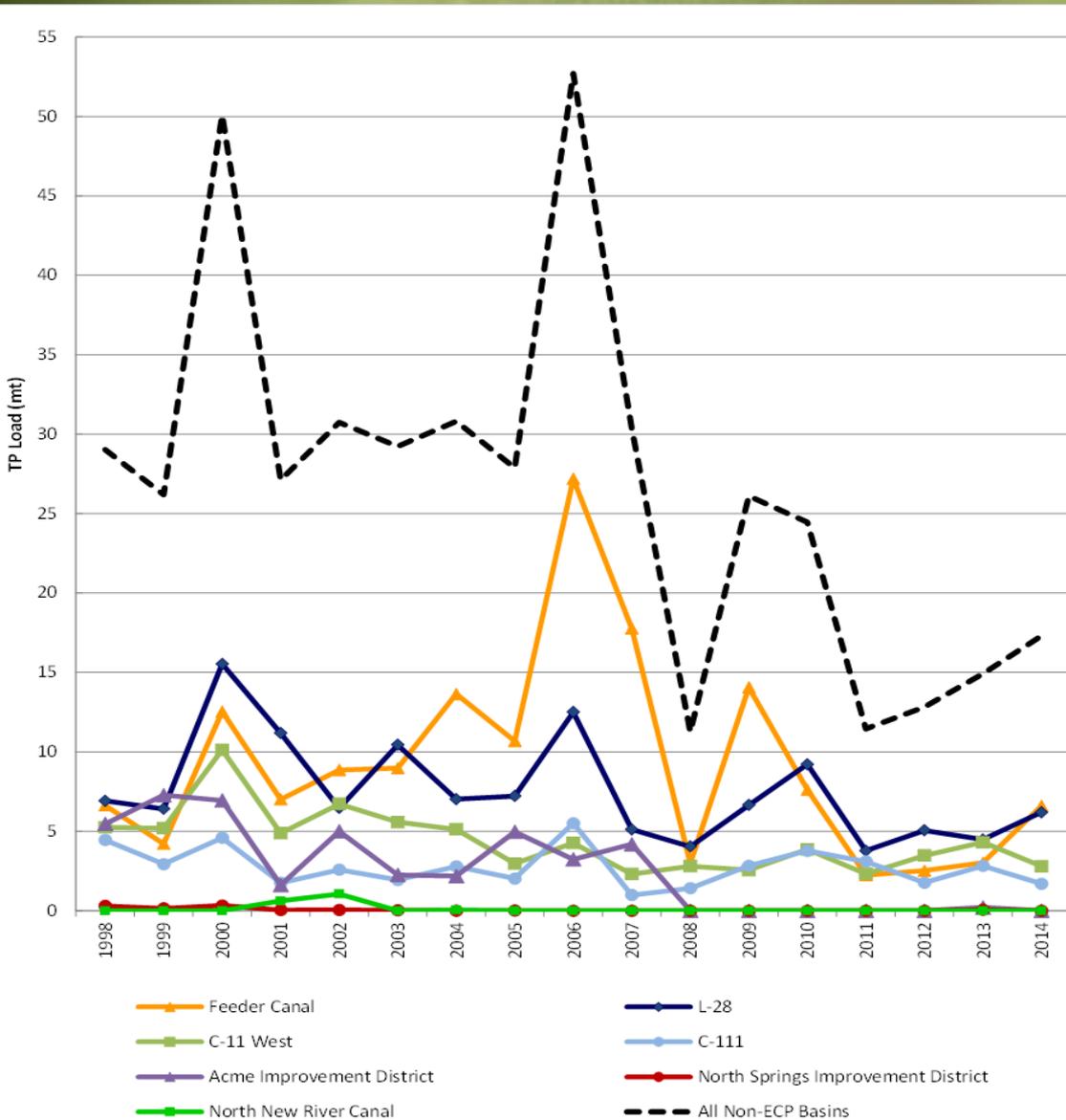
| | |
|--------------|----------------|
| C-11W | S-9 + S-9A |
| Feeder Canal | S-190 |
| L-28 Canal | S-140 |
| C-111 | S-18C + S-332D |

One structure owned by others:

| | |
|------------------------------------|-------|
| North Springs Improvement District | NSID1 |
|------------------------------------|-------|



Non-ECP Basins Phosphorus Loads



Diverted discharge:

- ACME & NSID Emergency only
- NNRC G-123 pump removed

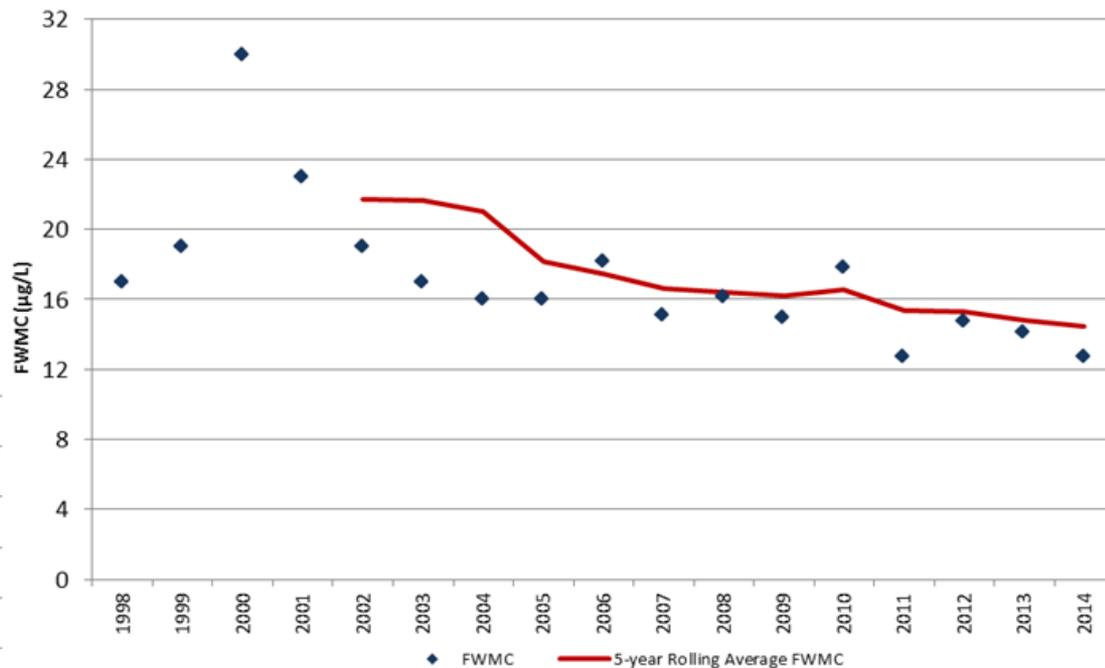
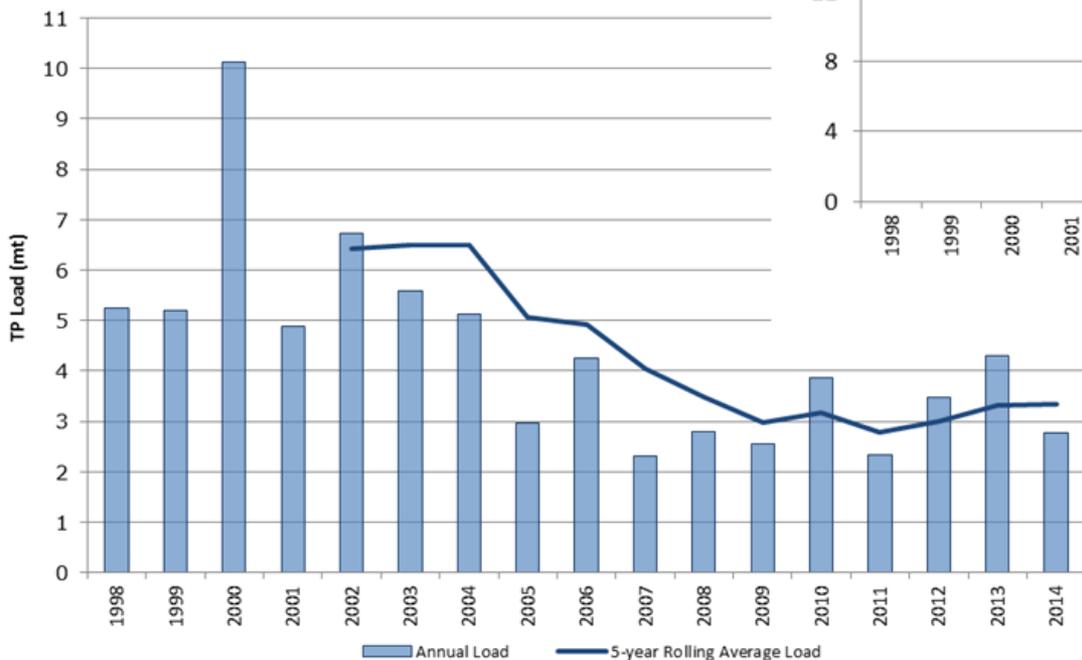
Remaining rely on:

- Water quality improvement plans
- CERP and other local projects

C-11W Basin - Water Quality

Decreasing TP:

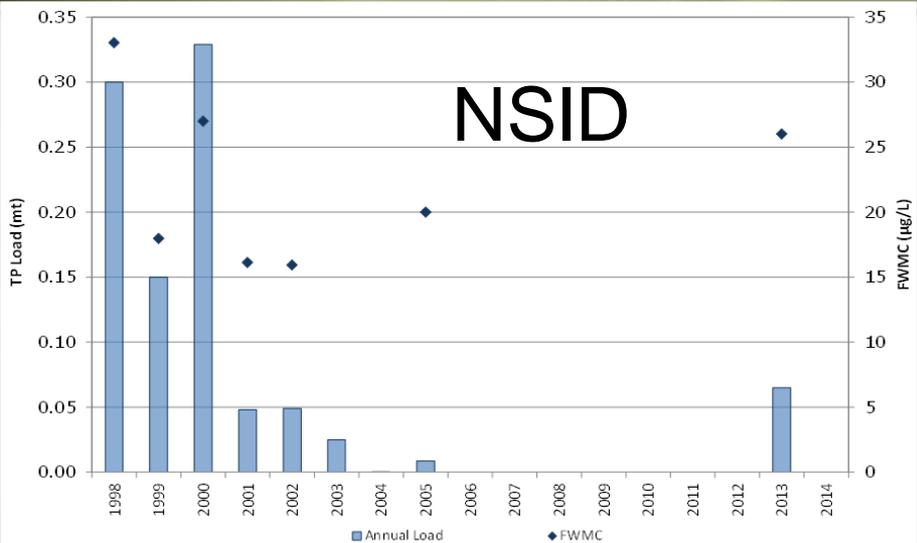
- Concentration
- Load



S-9 + S9A
WY2005-2014:

- 3 mt/yr
- 15 ppb

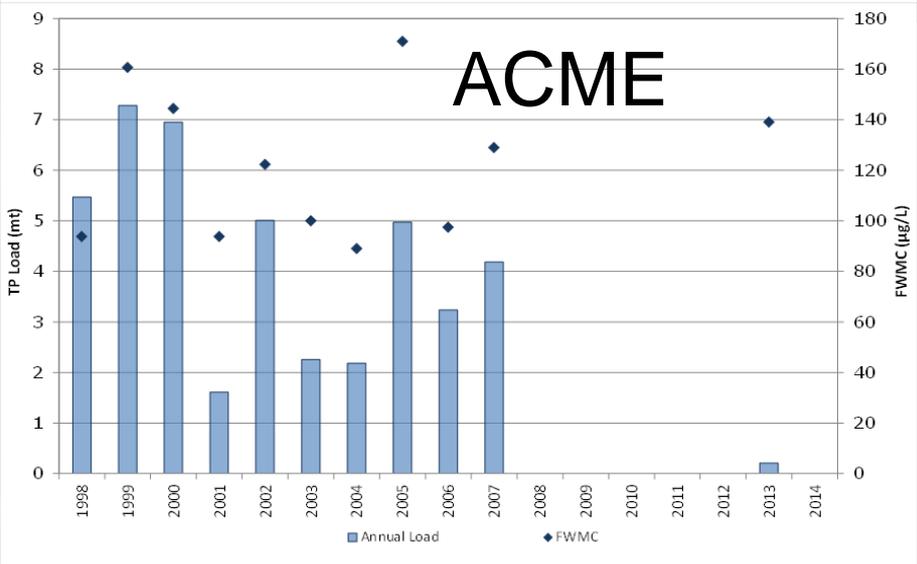
North Springs Improvement District (NSID) Basin and ACME Basin



NSID Basin Water Quality

- Historical low loads to EPA
- Diversion to Hillsboro Canal

Both NSID & ACME basins discharge to EPA only for extreme flood protection

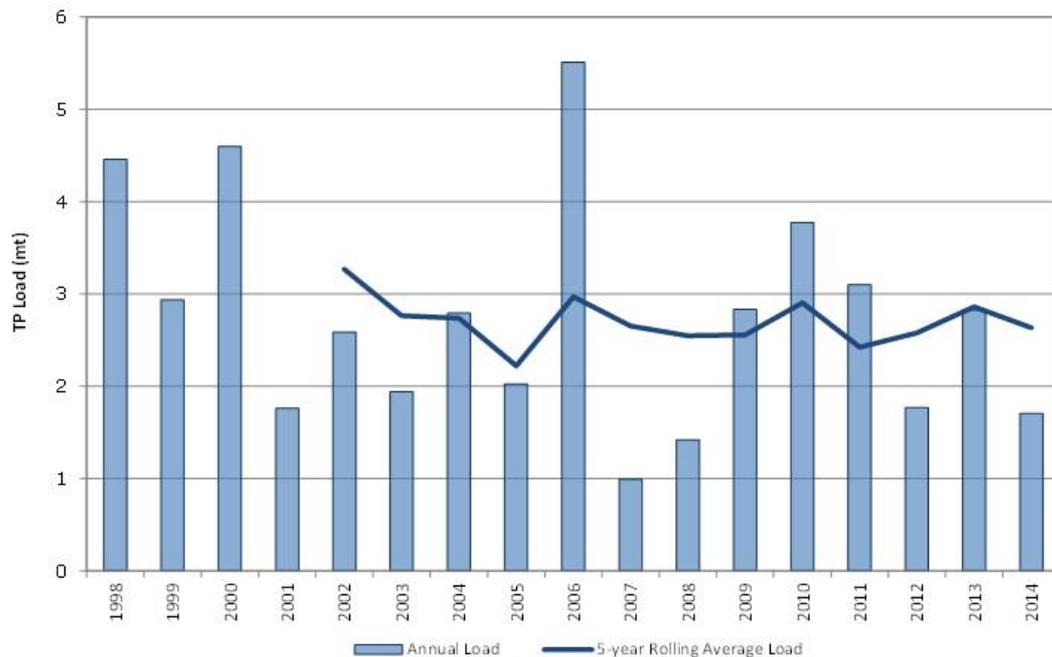
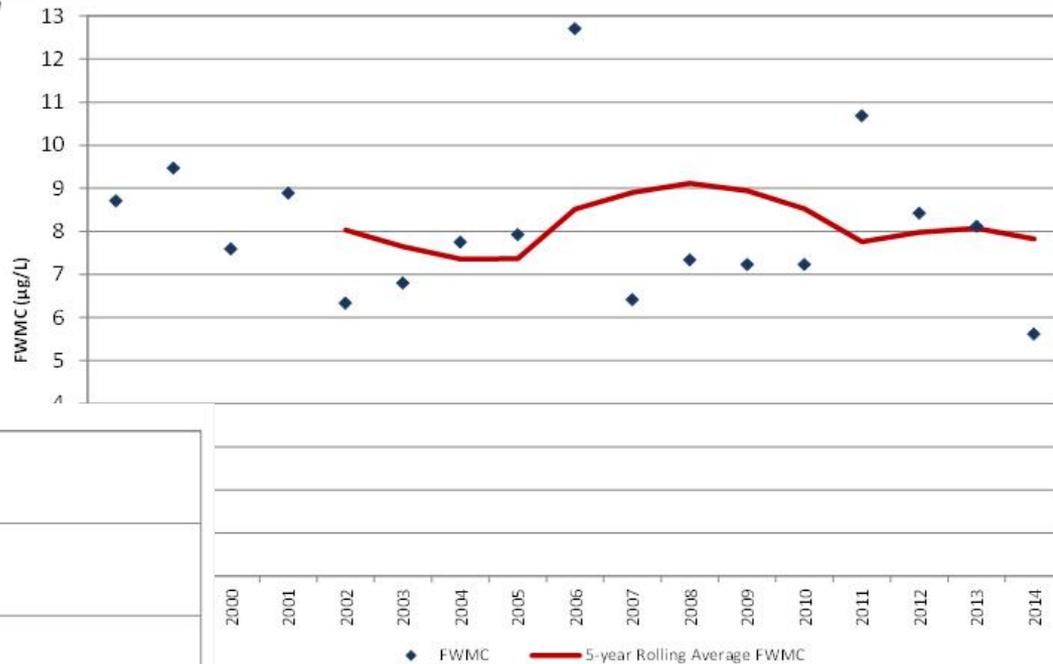


ACME Basin Water Quality

- Diversion to C-51W & STA1
- Reduction to Everglades Protection Area

C-111 Basin - Water Quality

- Discharges to EPA meet phosphorus criterion requirements of Settlement Agreement

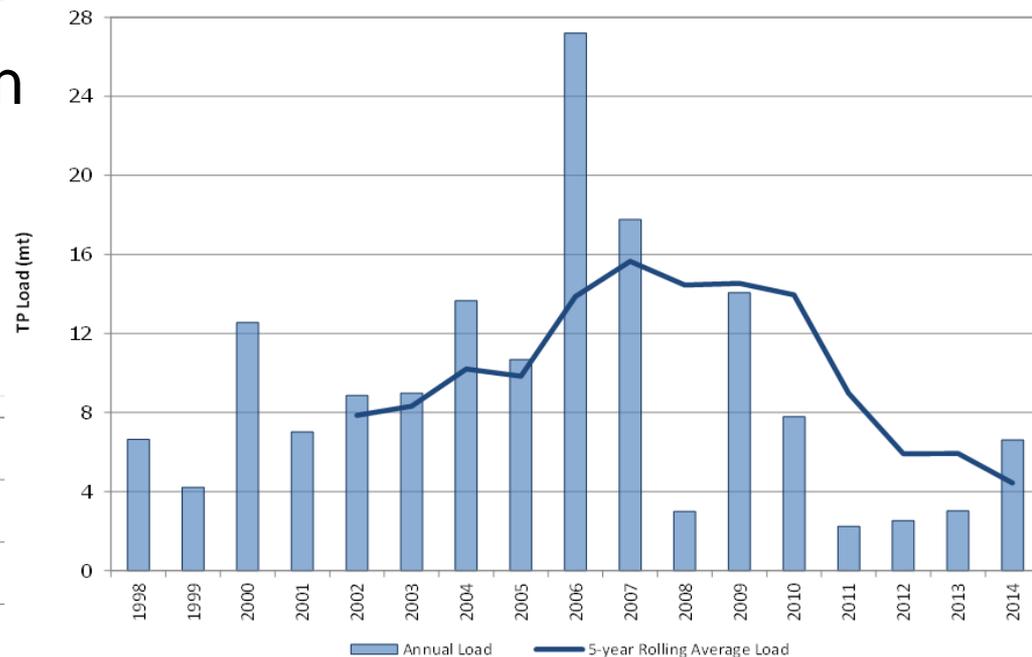
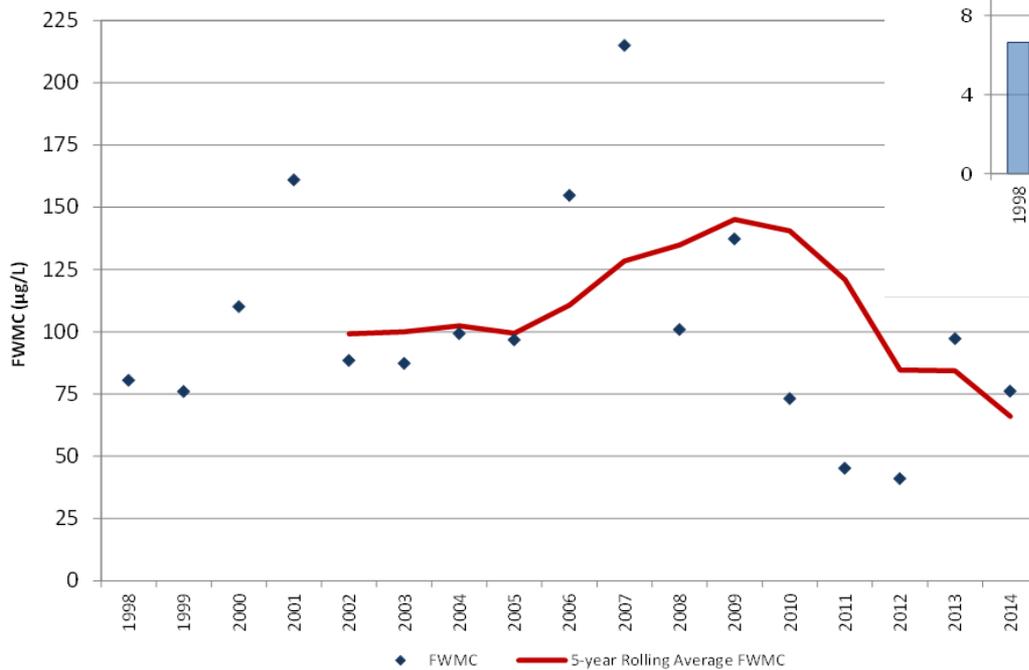


S-18C + S-332D
WY2005-2014:

- 2.6 mt/yr
- 8 ppb

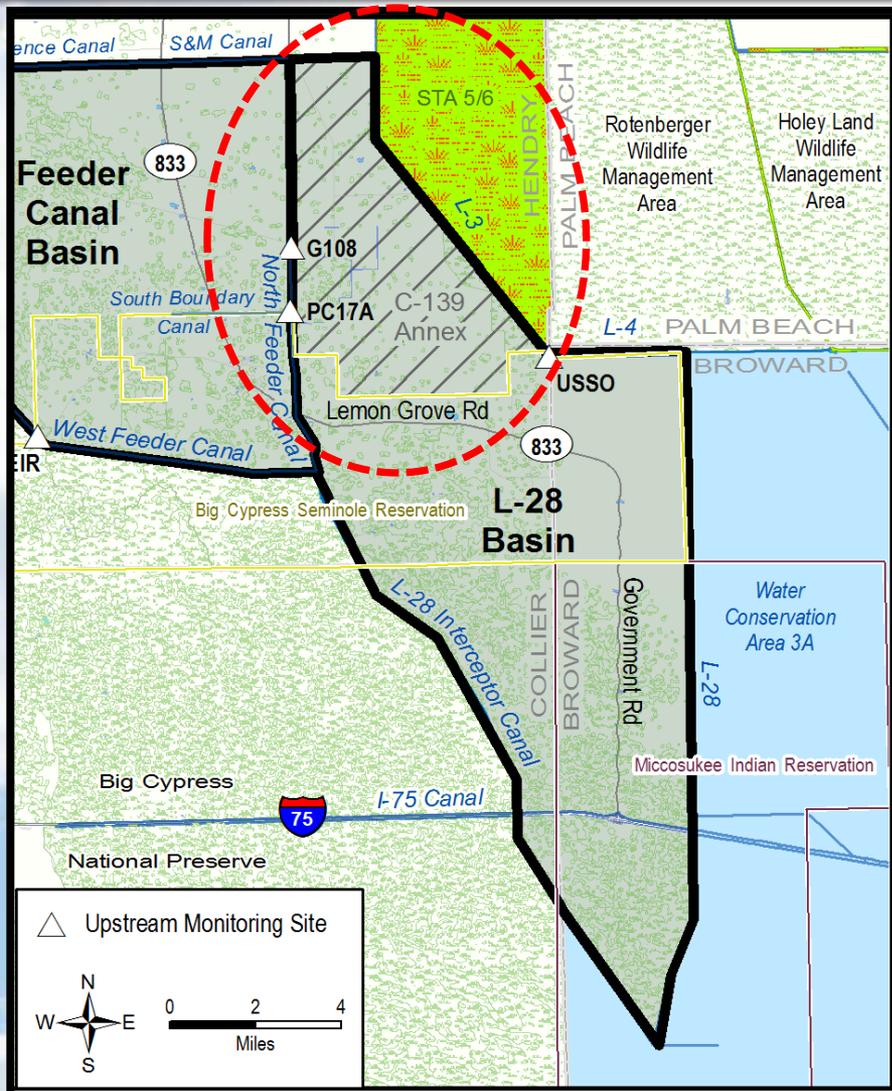
Feeder Canal Basin - Water Quality

- Seminole Conservation Plan
- Environmental Resource Permit Requirements



S-190
 WY2005-2014:
 ■ 9.5 mt/yr
 ■ 113 ppb

L-28 Basin



North: C-139 Annex

- SFWMD Property - Lease and ERP require BMPs
- Flow Equalization Basin - Restoration Strategies
- Sam Jones/Abiaki Prairie Project

South:

- Tribal and Federal lands

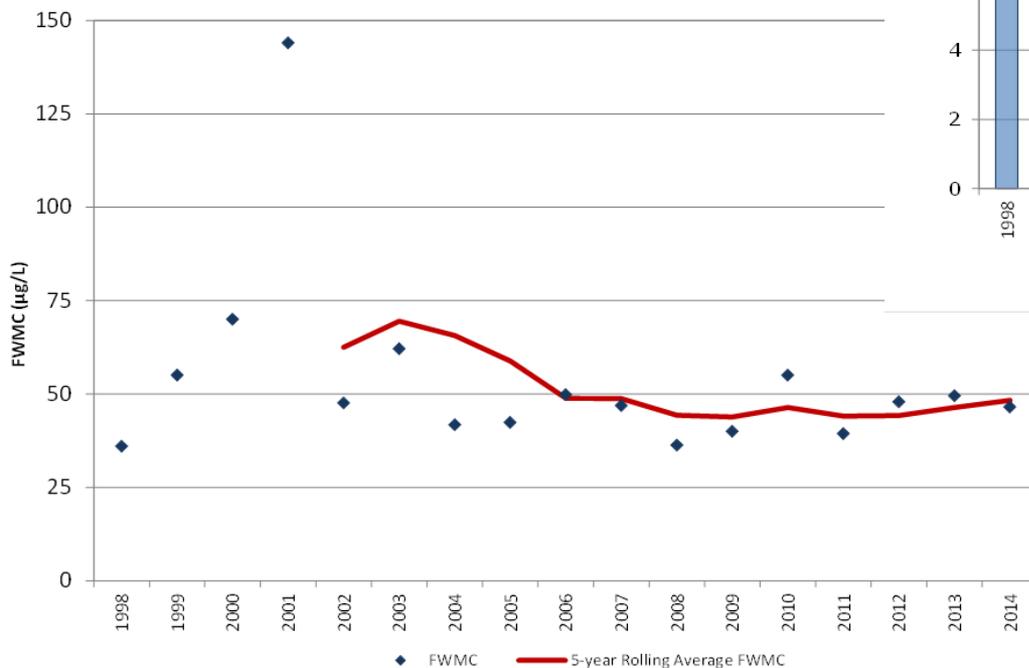
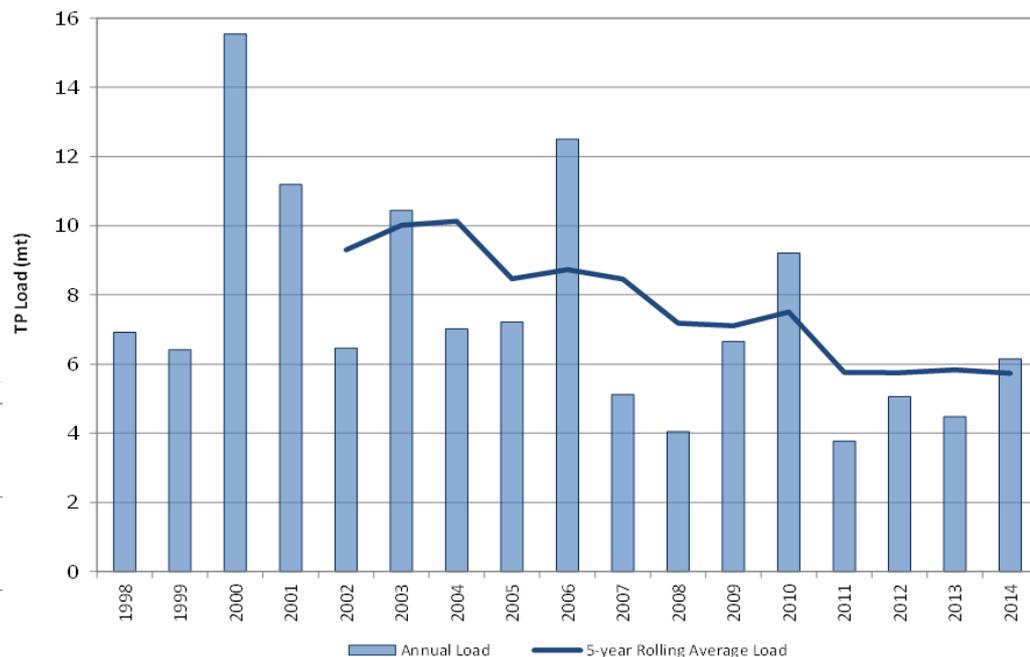
L-28 Basin - Water Quality

S-140

WY2005-2014:

■ 6.4 mt/yr

■ 46 ppb



Anticipated Activities

- BMP Regulatory Program
- BMP Research and Demonstration Projects
- Restoration Strategies Source Control Projects
- 298 District and 715 Farms Diversion Projects
- Data collection and supplemental evaluations
- Track Non-ECP water quality improvement project implementation and related projects

Summary

- Success of source control activities meeting water quality goals rely on:
 - BMP site verifications
 - Water quality monitoring (verify effectiveness)
 - Demonstration projects
 - Regional and sub-regional projects

Additional Information

- Everglades Regulation Bureau Contacts:
 - Pamela Wade, pwade@sfwmd.gov, 561-682-6901
 - Carmela Bedregal, cbedrega@sfwmd.gov, 561-682-2737
 - Jonathan Madden, jmadden@sfwmd.gov, 561-682-2617
- www.sfwmd.gov/sourcecontrols
- www.sfwmd.gov/sfer
- Questions?