



Source Controls in Basins Tributary to the Everglades Protection Area

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Everglades Regulation Division

7th Annual Public Meeting on the Long-Term Plan for Achieving Water Quality
Goals for the Everglades Protection Area Tributary Basins

February 25, 2010

EPA Tributary Basins

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



SOUTH FLORIDA WATER MANAGEMENT DISTRICT



¹ C-139 Annex is anticipated to become an ECP basin in WY2010. In WY2009, C-139 Annex was still part of L-28 Basin, a non-ECP basin.

² Acme Improvement District Basins A and B are sub-basins of C-51 W Basin.

³ Operation of Acme's Pump Station 1 (ACME1) and Pump Station 2 (ACME2) ceased on December 31, 2006.



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.”

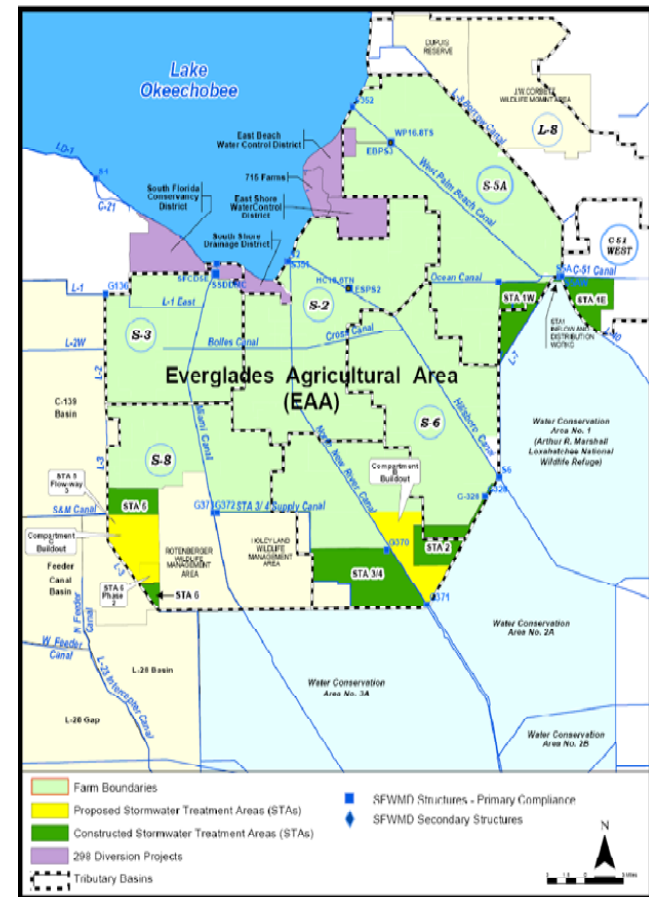
Specifically:

- 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

1. BMP Program Implementation
2. BMP Research under the EAA-EPD Research Permit
3. East Beach WCD Synoptic Water Quality Data Collection
4. Performance Measure Development for LOK Diversion Areas



1. BMP Program Implementation

- Ongoing BMP verification visits
- Prioritized (competing demands e.g., C-139 Basin, rule development)



Canal cleaning

Water Management and Monitoring Plan



Spill Prevention

Laser Leveling



2. BMP Research Under EAA-EPD Permit

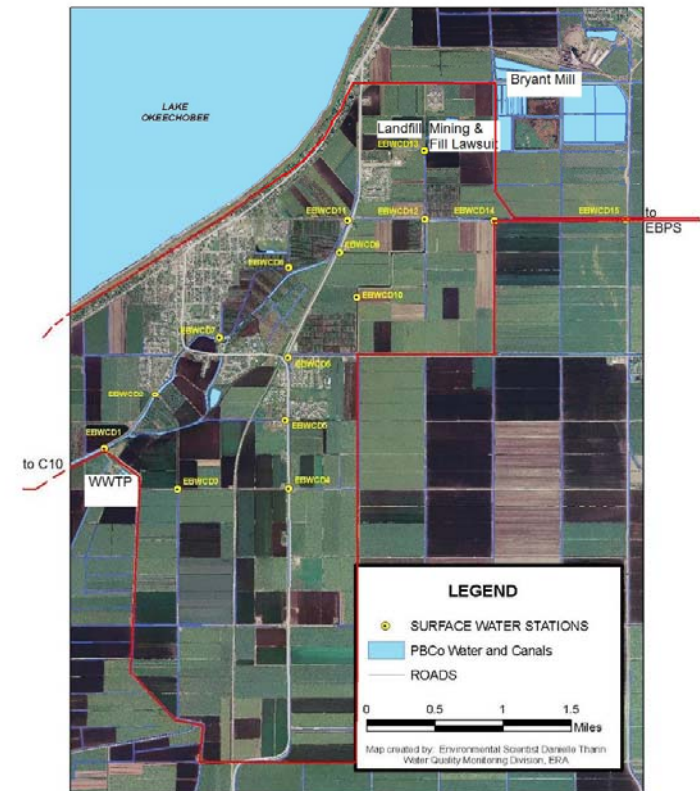
- The BMP research permit modification was approved on January 11th, 2010.
- The Master Research Permit is valid for 5 years.
- The updated Scope of Work (SOW) proposes to:
 - Research the impact of alternate management practices for the control of floating aquatic vegetation (FAV) in EAA farm canals
 - Develop improved techniques for FAV management, and
 - BMP education and extension services (UF/IFAS)



3. East Beach Synoptic Water Quality Data Collection

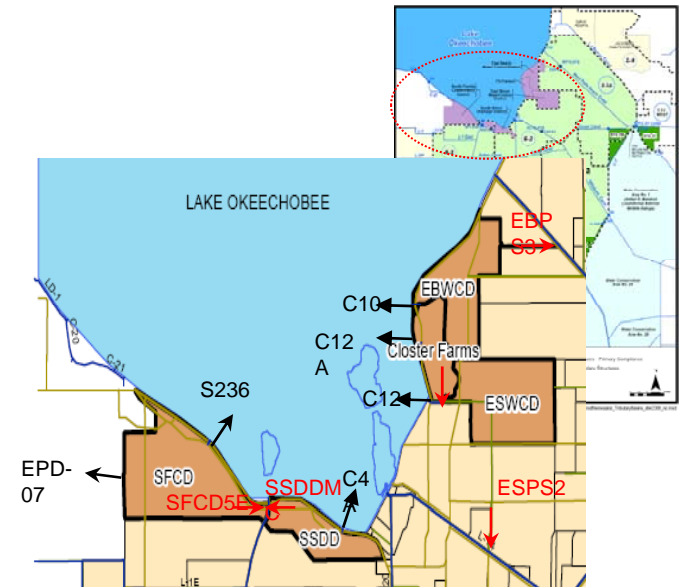
- Urban and agricultural area
- Understand potential phosphorus sources for an effective strategy
- Initial synoptic effort 01/08 to 09/08
- Constraints:
 - Data reflected dry conditions
 - All data from no flow days
- Current Second year of data (water quality and quantity) collection (01/09 to 09/09)
- Data are under evaluation

EAST BEACH WATER CONTROL DISTRICT SYNOPTIC SURVEY



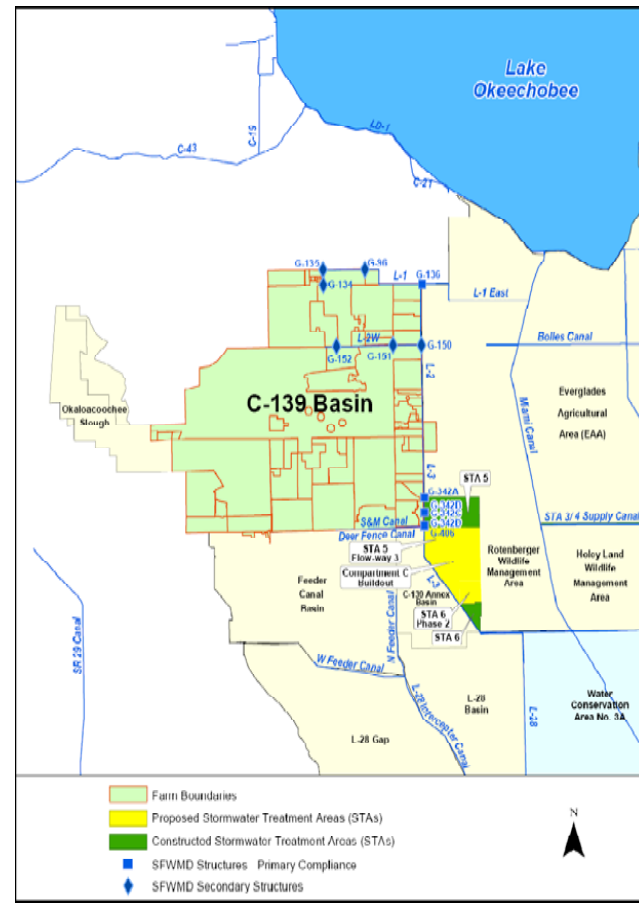
4. Performance Measure Development 298 Diversion Districts and Closter Farms

- EFA mandates: “Conduct modifications described in the Everglades Construction Project”
- Objective: reduce TP historic loads by 25% based on BMPs, and reduce TP historic loads discharged to the Lake Okeechobee by 80% based on diversion
- Status:
 1. Developed preliminary performance methodology based on 3-yr target, annual limits; and for Lake discharges a two-tiered cumulative and individual analysis
 2. Incorporating comments from FDEP and refinements to methodology



C-139 Source Control Projects

1. BMP Program Implementation
2. Rule Development
3. District-funded BMP Demonstration
4. Supplementary Water Quality Collection and Analysis
5. Regional Feasibility Analysis



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1. Program Implementation

- Annual BMP inspections
- BMP implementation continues to improve:
 - Documentation on P nutrients applied and application rates
 - Completion of above ground surface water impoundments
 - Methods for implementation of nutrient application control, spill prevention, and sediment controls



Controlled Application Methods



Plastic Mulch



Canal Cleaning



Impoundments

2. Basin Rule Development - Background

- Rule development was initiated in May 2007
- The C-139 Basin had been out of compliance with the water quality requirements of Rule 40E-63, F.A.C., for four times.
- Seven Public Rule Development Workshops and seven Technical Working Group Meetings
- A first draft for internal review was distributed on November 20, 2009
- Two follow-up workshops to discuss amendments
- One-on-one meetings with stakeholders on request



2. Basin Rule Development - Summary

- Water quality performance measures
 - Better fit rainfall to runoff relationship
- Comprehensive BMP Plans
 - Implementation of water management, nutrient management and particulate matter and sediment control BMPs
- Out-of compliance
 - Improvement Activities will be based on the proportional share of the load
 - District sub-basin monitoring or permittee monitoring



2. Basin Rule Development - Current

- A second draft was distributed on 02/11/10
- Clarification and some revisions in response to stakeholders questions and comments
- A follow-up workshop is scheduled for Wednesday, 02/17/10 at the District Clewiston Field Station
- Draft Rule and workshop agenda are posted at: www.sfwmd.gov/rules
- Comments are needed no later than the workshop date to meet the objective of having the Rule adopted by August 2010



3. 1 BMP Demonstration: Vegetable Production - Background

- Optimize phosphorus nutrient application for vegetables
- Seven year demonstration project (2005 - 2011)
 - Implemented by UF-IFAS, Southwest Florida Research and Education Center (SWFREC)
 - Partnership agreement with FDACS
- Five vegetable producers
 - Effort and risk to crops
 - Crops: Tomatoes, green beans, peppers, hot peppers



3.1 Vegetable Demonstration - Update

- Weather Impacts on the results
 - 2008 – 2010 results affected by freezes
 - 2009 – 2010 some of the demonstration sites were lost
- Data are being collected and status reports produced
 - Recent results generally verify early findings
- Reports available on request
 - Separate presentation once 2009-2010 data are analyzed.



3.2 BMP Demonstration Grant

- Cooperative agreement SFWMD - HSWCD
- Objective: to cost-share projects focused on innovation and/or optimization of traditional BMPs for phosphorus removal
- Open competition process
- Two projects were selected for funding:
 1. Surface water impoundment (AGI) optimization
 2. Chemical precipitation after AGI
- Activities started in December 2008
- Total Cost: \$265,035



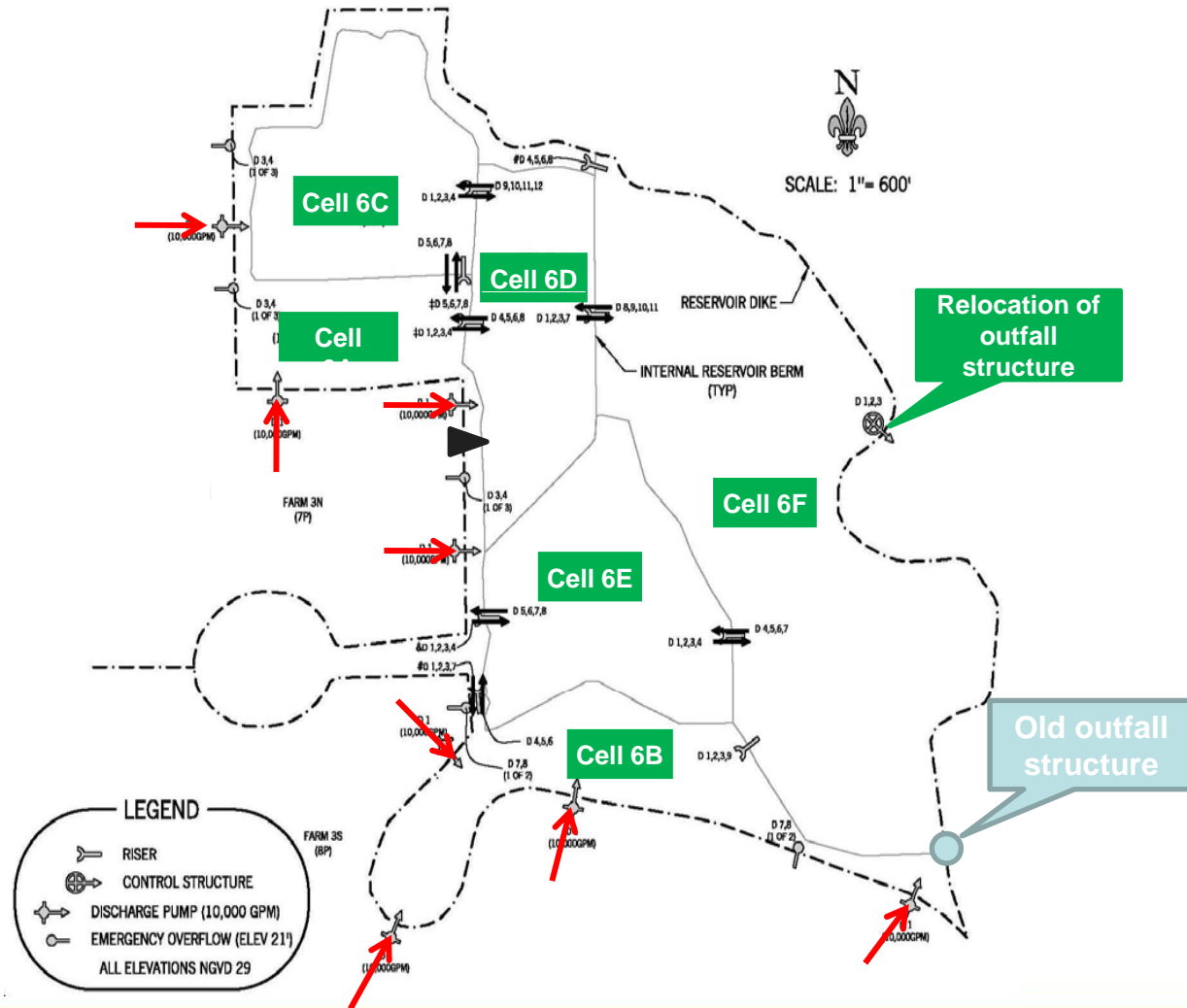
3.2 BMP Demonstration Grant (continues)

1. AGI Optimization

- Relocation of outfall structure away from inflow structures
- Small internal berms were created to ensure storage and detention time are achieved (circuitous route)
- Water quality and quantity data are collected during discharge events (one year).



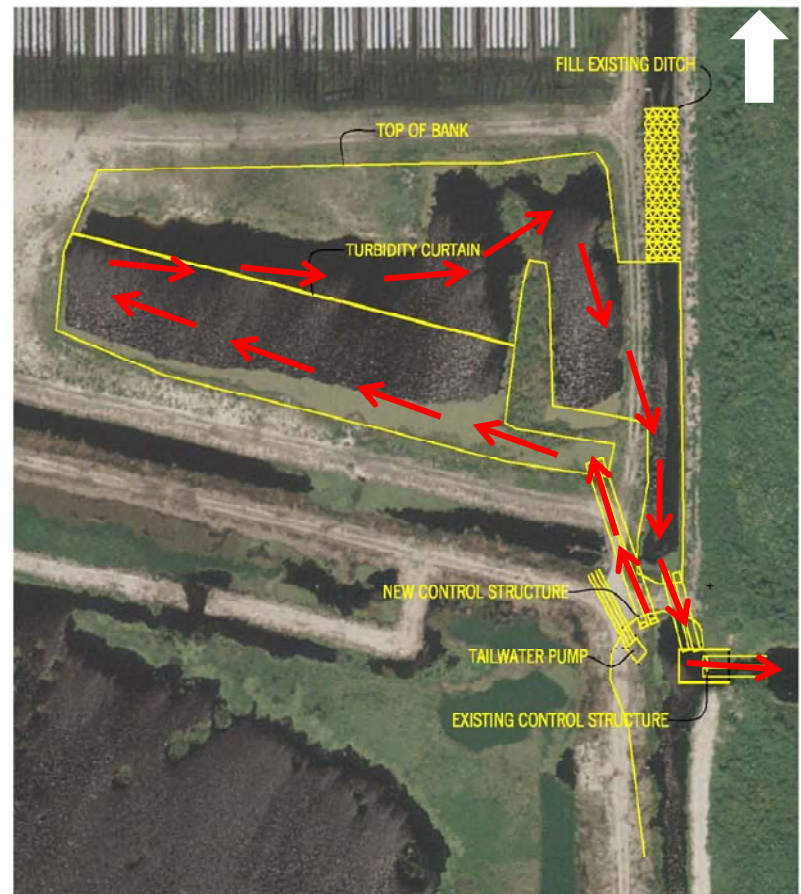
3.2 BMP Demonstration Grant (continues)



3.2 BMP Demonstration Grant (continues)

2. Chemical Precipitation

- Phase I – Laboratory
 - Aluminum Chloride
 - Alum
- Phase II – Field Implementation
 - Construction of treatment pond
 - Water quality and quantity data collection is scheduled to start mid February 2010 (one year).



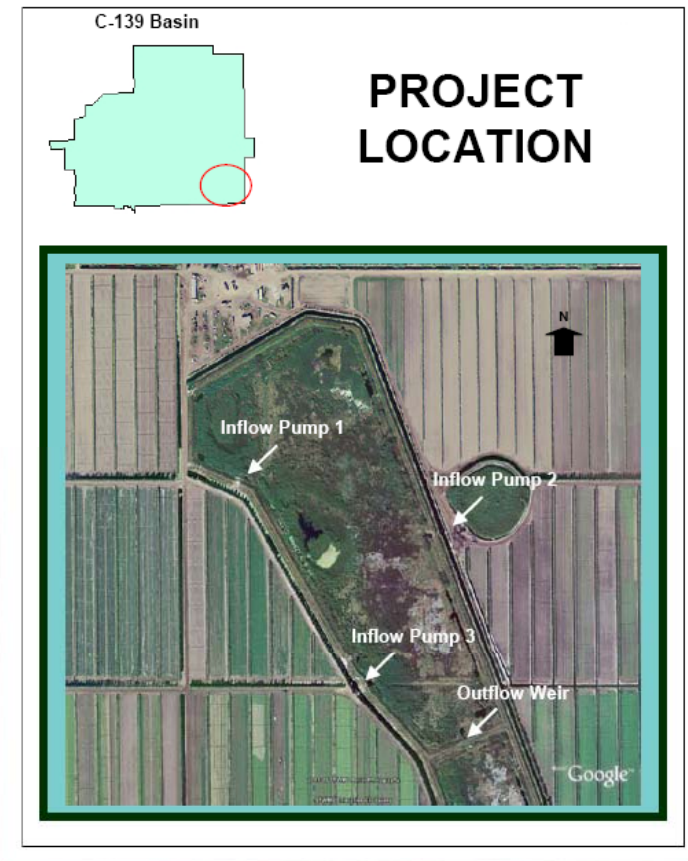
3.2 BMP Demonstration Grant (continues)



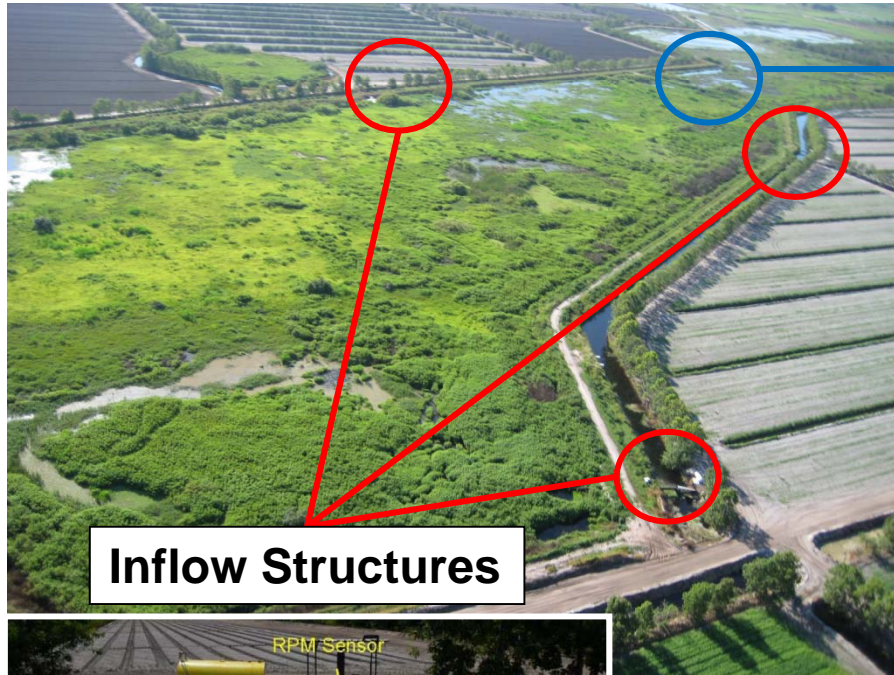
3.3 UF-IFAS Southwest Florida Research and Education Center, AGI Performance Evaluation

Project Manager: Ximena Pernet

- Objective: Quantify the phosphorus nutrient treatment efficiency of an AGI in a vegetable farm.
- Project started in June 2009
- Monitoring system components installed and operational on July 20, 2009
- To date, soil samples and topographic data have been collected.
- Plant sampling and tracer study will be completed by October, 2010.
- Quarterly Report 2 – end of February



4.3 UF-IFAS SWFREC, AGI Performance Evaluation (continues)



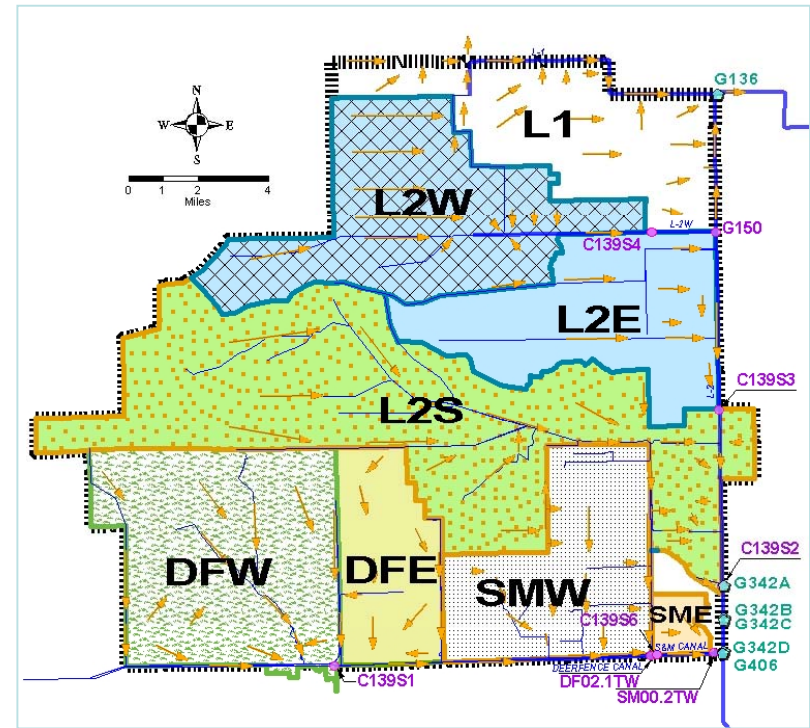
Inflow Structures

Outflow Structure



4. Supplemental WQ Collection and Analyses

- The supplementary monitoring network started in 2006 (primarily grab)
- Evolved into a permanent stations (autosampler and flow)
 - 9 permanent monitoring locations representing 8 sub-basins
 - TP autosamplers and daily flow
 - Weekly grab samples or TP, TDP, and SRP (when autosample weekly composites are collected)
- 2010 Analysis report under development



5. C-139 Regional Feasibility Study

- **Study includes C-139, L-28 and Feeder Canal Basins**
- **Purpose is to determine the feasibility of Regional and/or Sub-Regional projects for improvements of Water Quality leaving the basins**
- **Calibrated and verified Mike-She/Mike 11 model of region delivered 2/1/10**
- **Next steps are to define alternatives and analyze with model beginning May 2010**

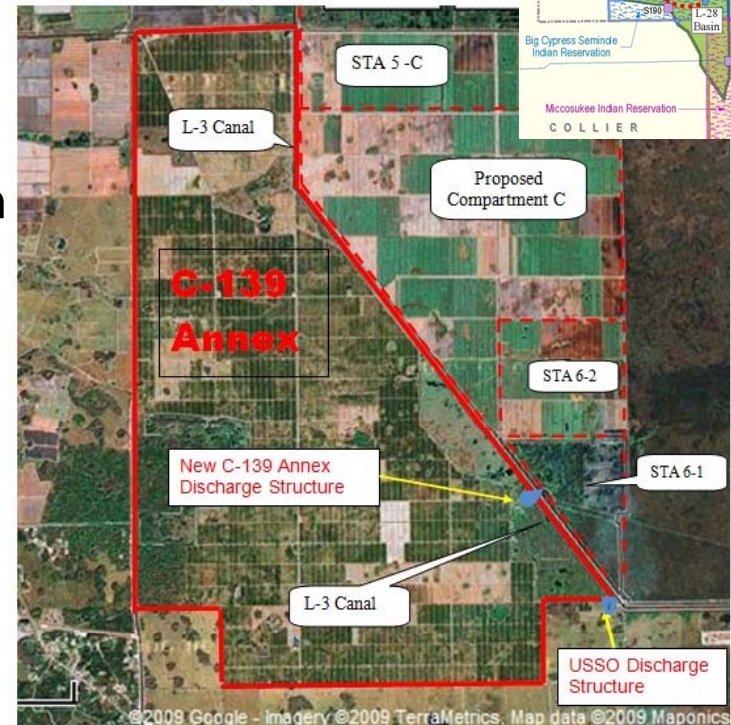
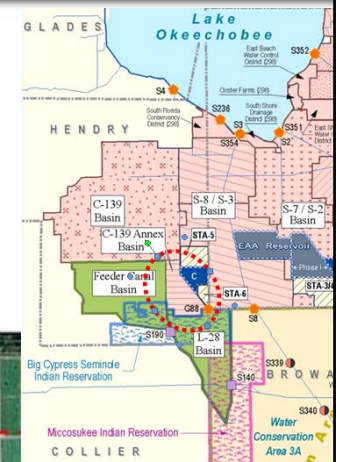


C-139 Annex Source Control Projects

1. Diversion of Flows to STA-6

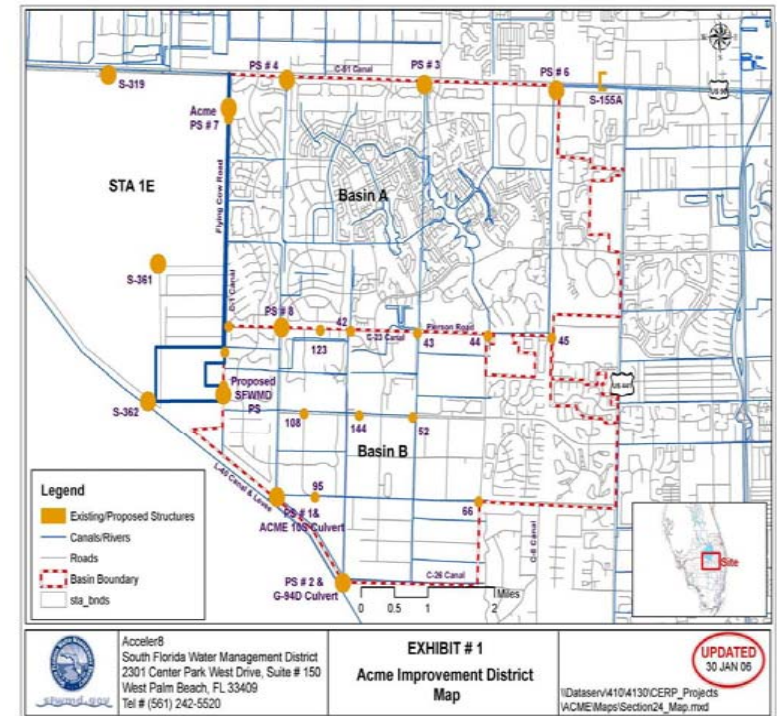
- Diversion work (new discharge structure) is completed
- Negotiation of Environmental Resource Permit (ERP) for operation of new structure ongoing
- ERP to include BMP implementation, water quality monitoring and TP discharge limit requirements

2. Regional Feasibility Study

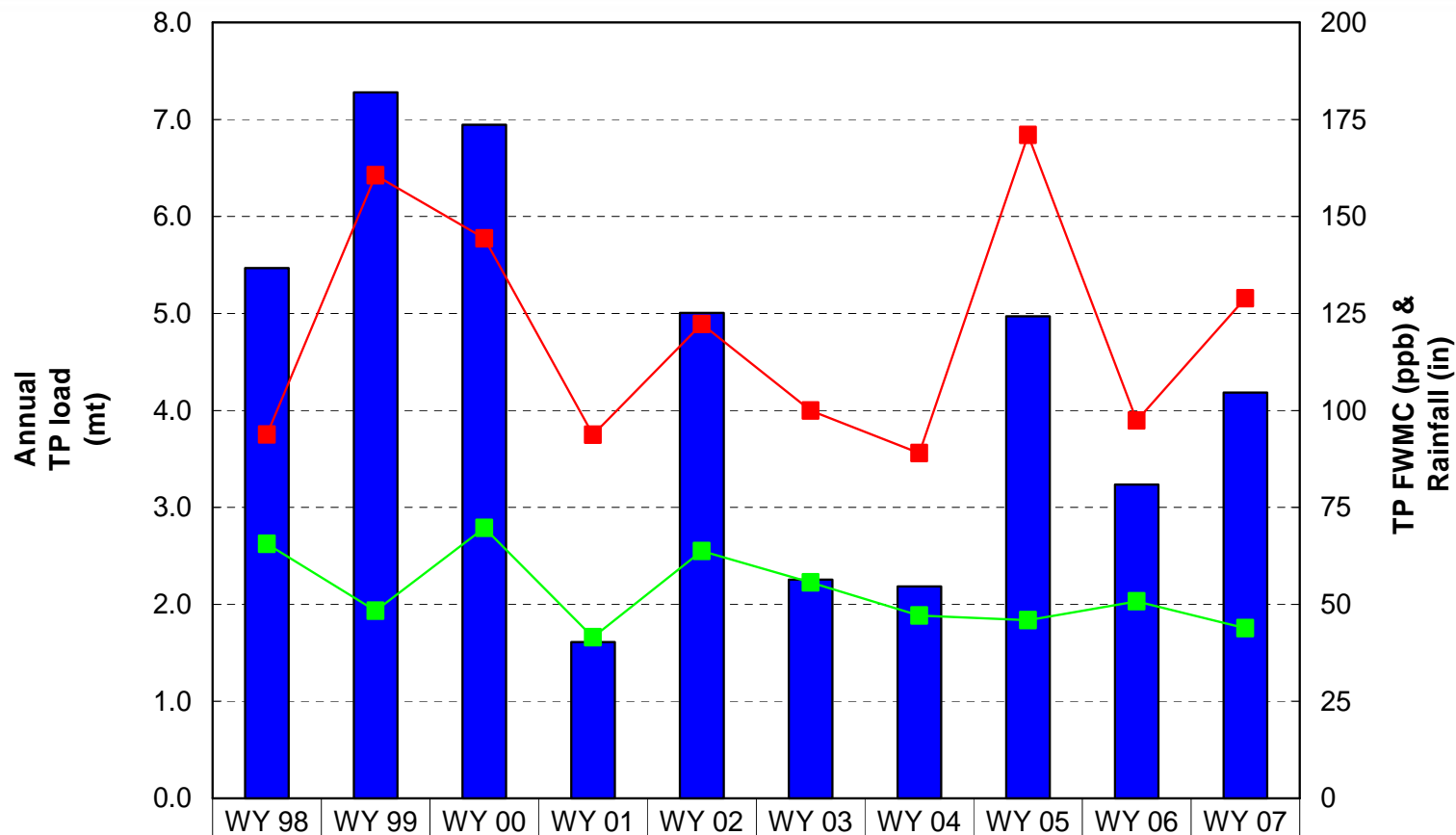


1. ERP Program

- Acme ERP provides for BMP implementation, water quality and flow monitoring at control structures that discharge to the C-51 West Canal and within Acme Basin B
- Revised Pine Tree WCD ERP to provide for BMP implementation and water quality monitoring
- Regulates discharge to the C-51 West Canal from water control districts located to the north

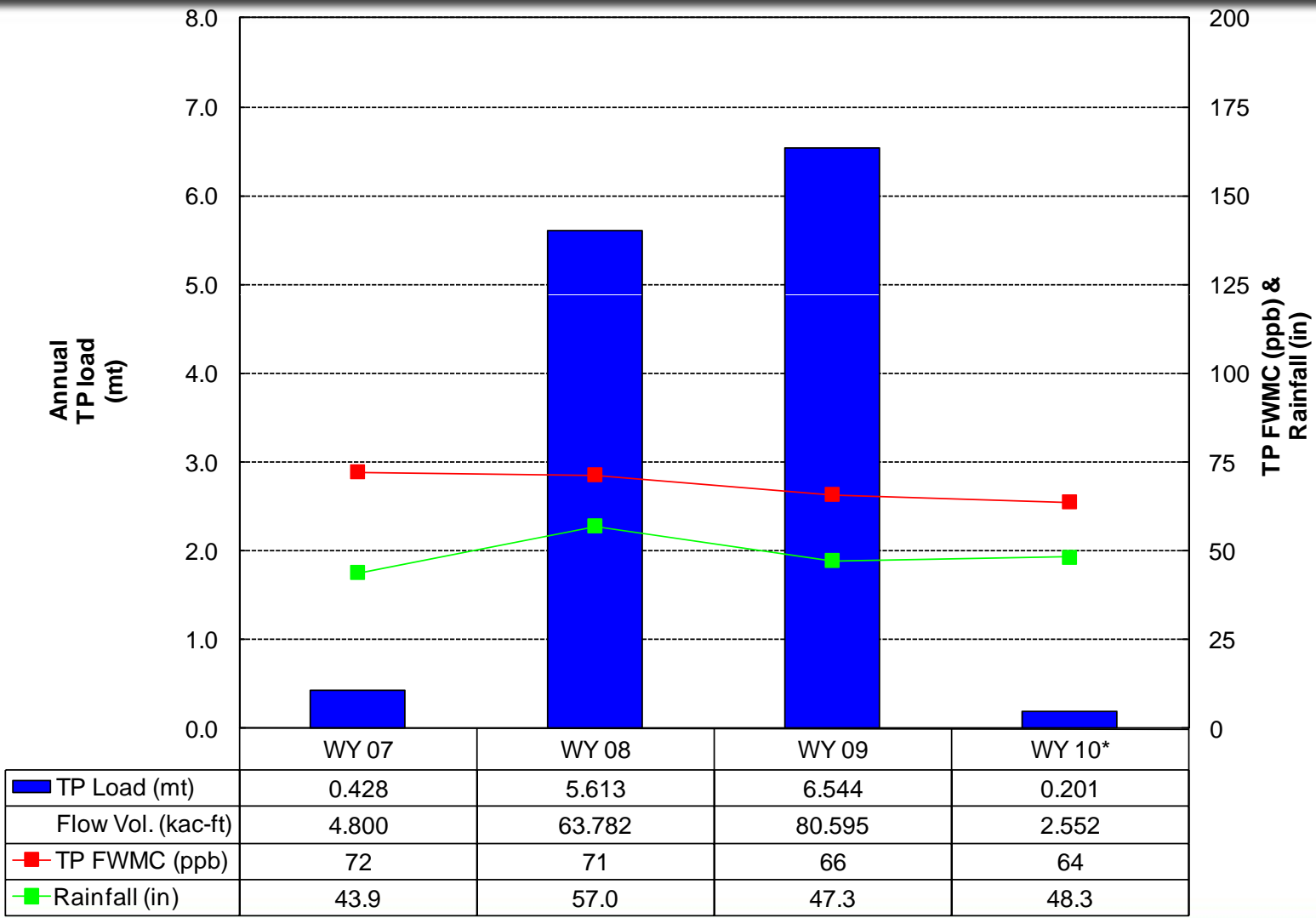


VOW Basin to WCA-1-Water Quality Results



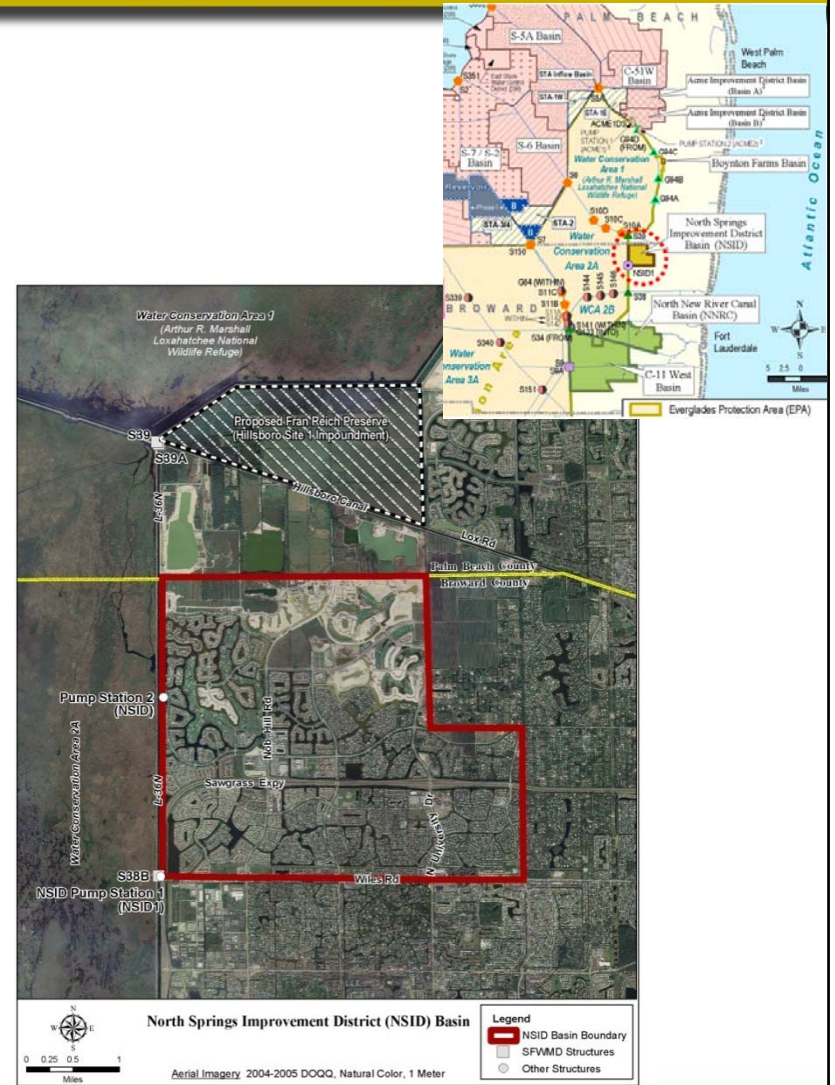
TP Load (mt)	5.469	7.278	6.947	1.612	5.006	2.254	2.184	4.969	3.235	4.185
TP FWMC (ppb)	94	161	144	94	122	100	89	171	97	129
Rainfall (in)	65.6	48.3	69.7	41.6	63.7	55.6	47.1	45.9	50.8	43.9
Flow Vol. (kac-ft)	47.292	36.734	39.010	13.948	33.194	18.282	19.889	23.563	26.928	26.322

VOW Basin to C-51W Canal-Water Quality Results



NSID Source Control Projects

1. ERP Program
2. Public Education and Outreach Agreement with Broward County



1. ERP Program

- Revised NSID ERP to provide for:
 - water quality and flow monitoring at NSID discharge to the EPA
 - water quality monitoring at upstream locations throughout the basin
 - Minimize discharges to the EPA through operational controls and Memorandum of Understanding
 - limits allowable TP loading to the EPA
 - BMP Plan for public education and capital improvement projects



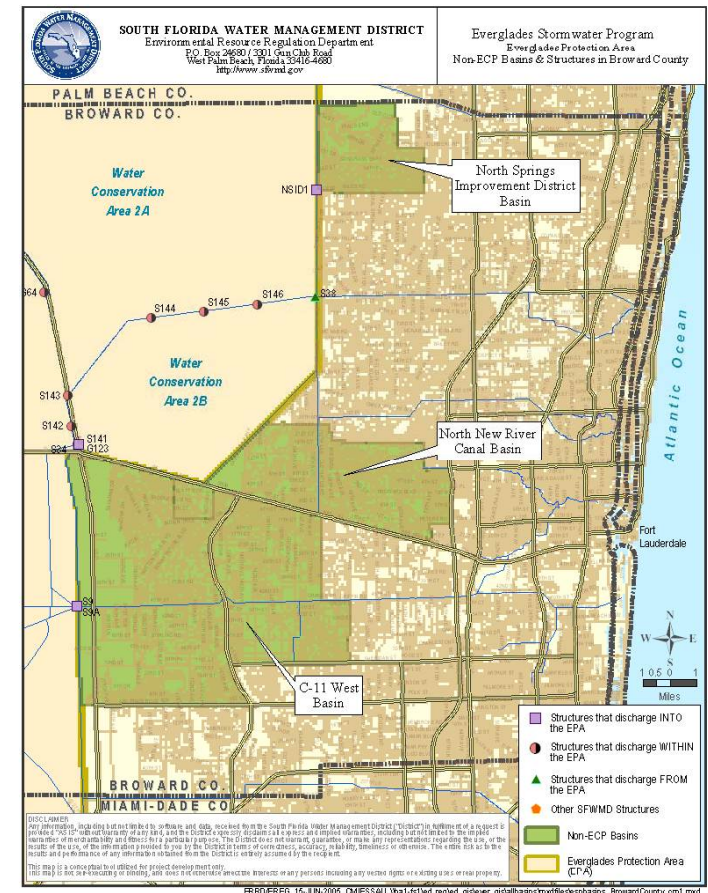
NORTH SPRINGS IMPROVEMENT DISTRICT

LOCATION MAP

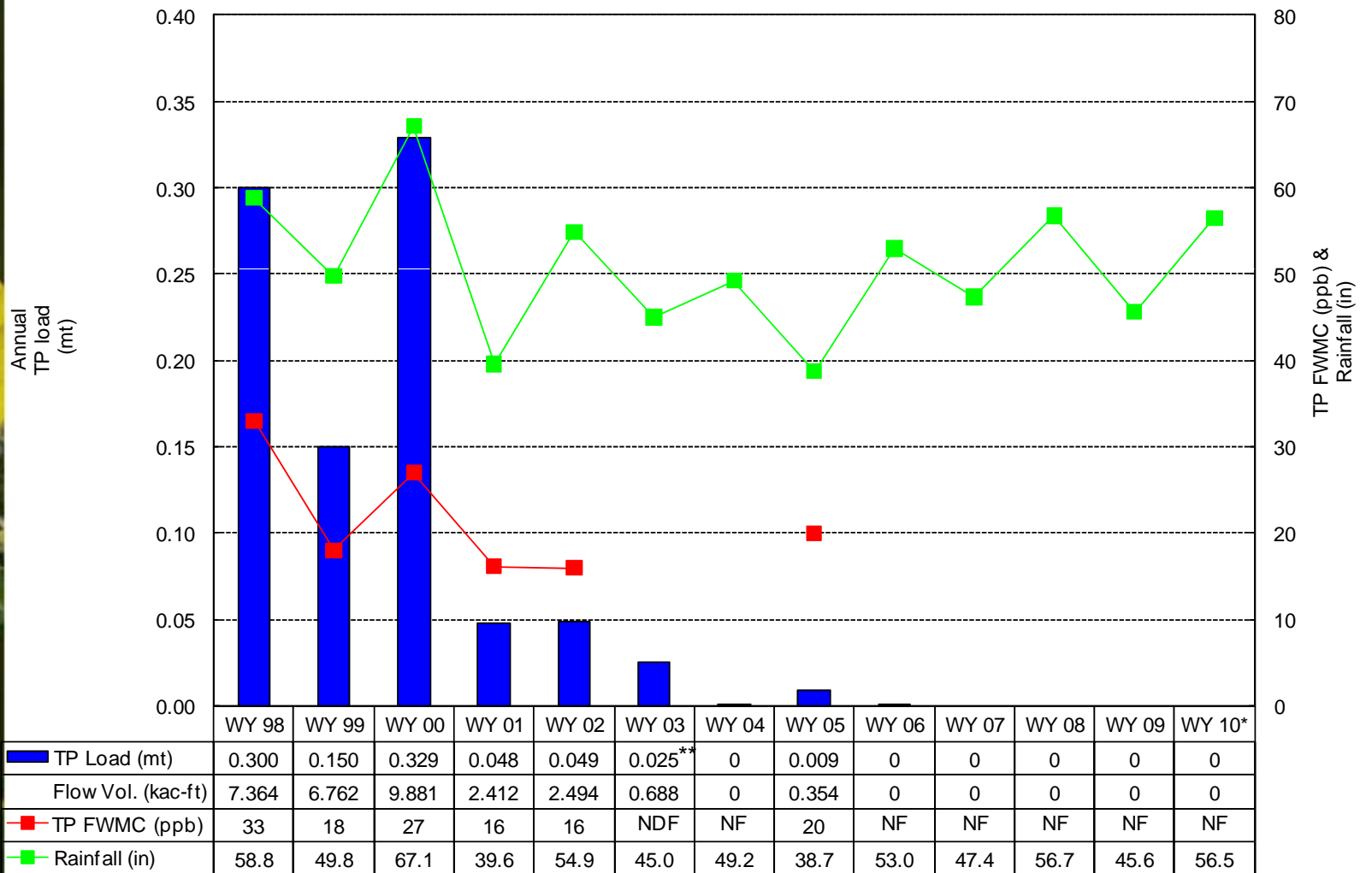


2. Agreement with Broward County

- Assists local communities by providing public education and outreach for BMP implementation; includes 'Know the Flow' courses provided to hundreds of homeowner association property managers
- Third year of three year contract with intent to renew

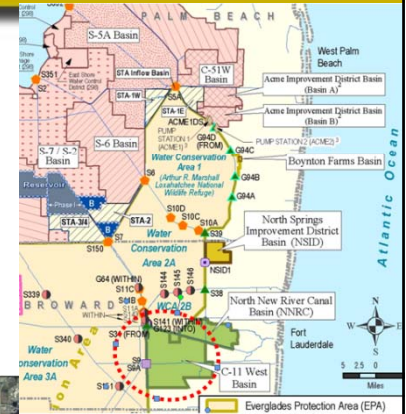


NSID Basin – Water Quality Results



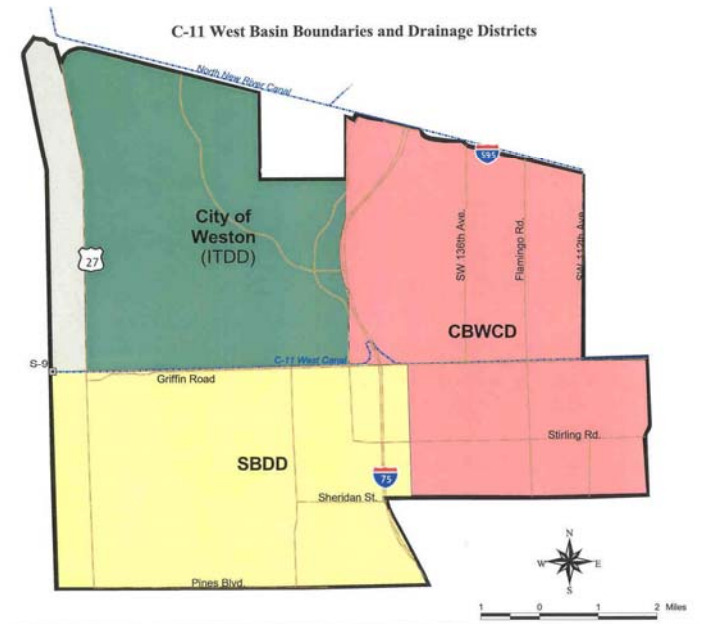
C-11 West Source Control Projects

1. ERP Program
2. Participation in Broward Everglades Working Group
3. Public Education and Outreach Agreement with Broward County



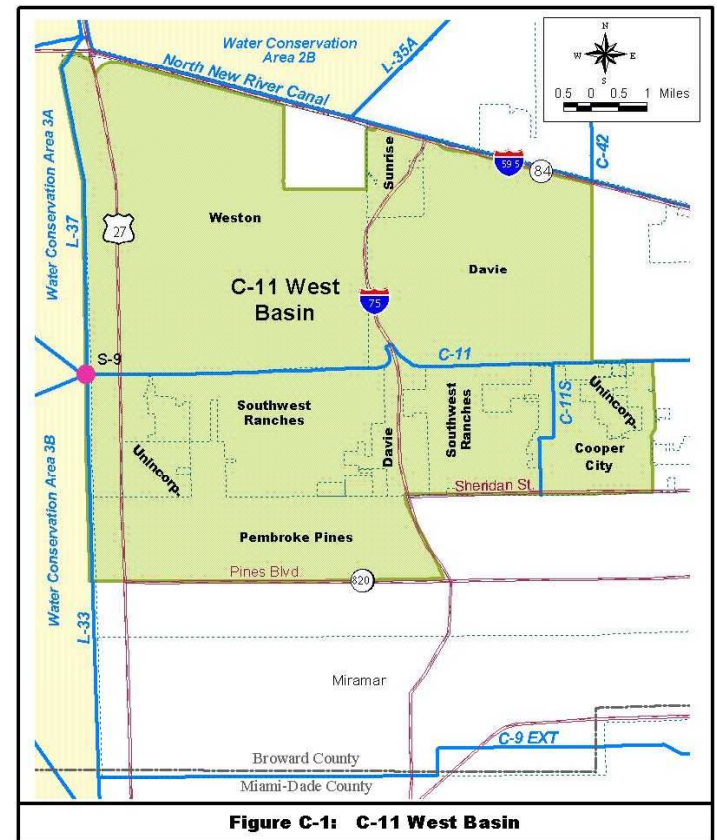
1. ERP Program

- ERPs for South Broward Drainage District (SBDD), Central Broward Water Control District (CBWCD) and Indian Trace Drainage District (ITDD) provide for:
 - operational controls to limit discharge to the C-11 West Canal
 - water quality monitoring at discharges to the C-11 West Canal
- Include BMP requirements in new developments, as necessary

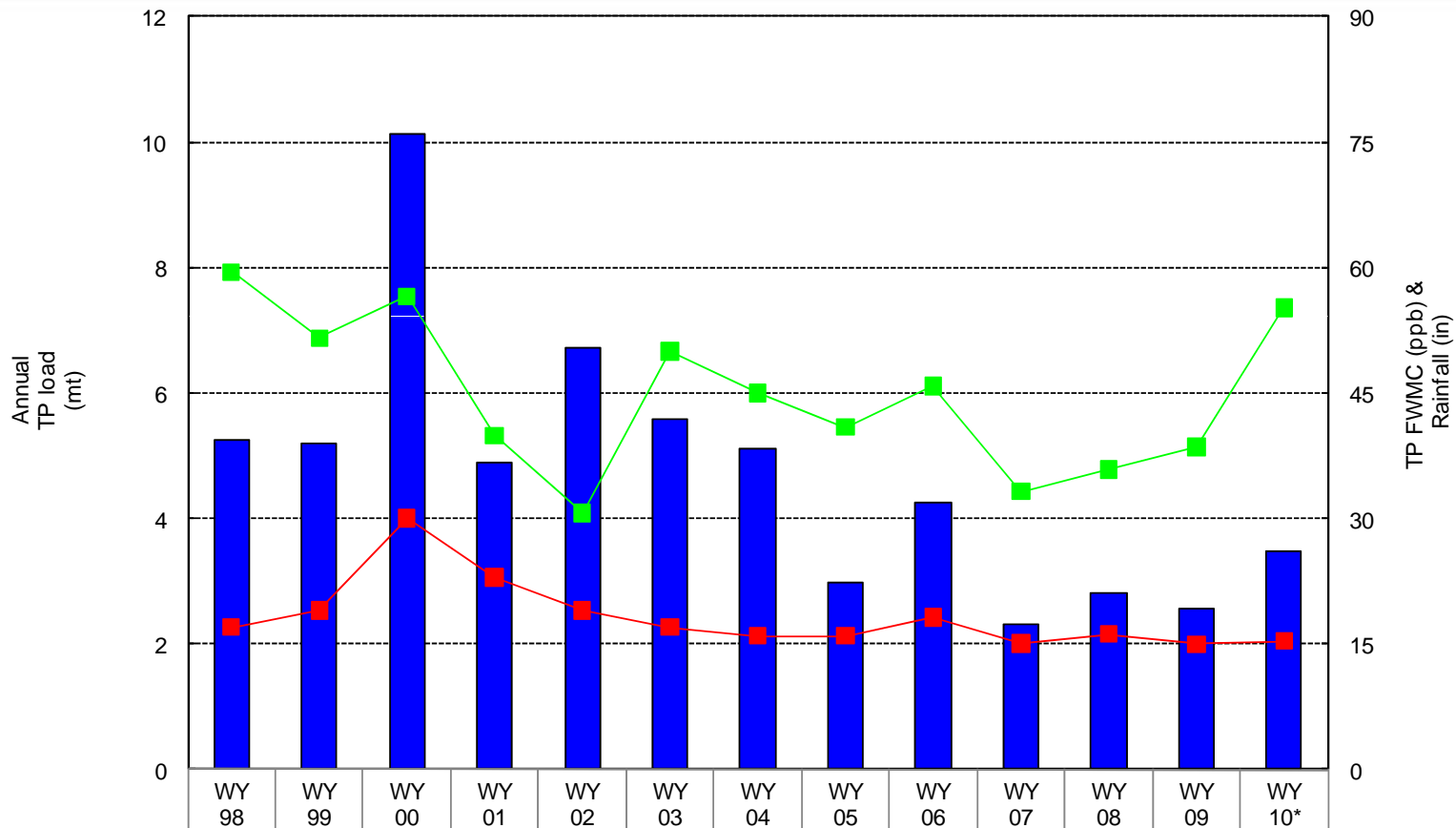


2. Broward Everglades Working Group

- Broward County driven group comprised of public and private sector individuals and organizations to develop, evaluate and implement source controls to improve water quality in discharges to the C-11 West Canal
- Provides annual review of water quality monitoring results within the C-11 West basin and tracks the progress of phosphorus reduction programs



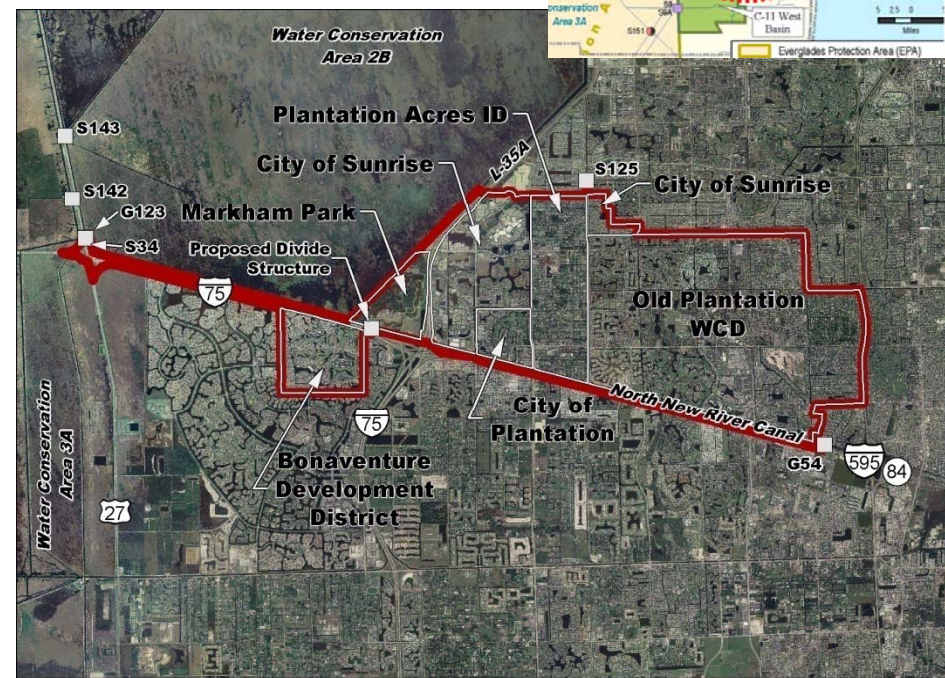
C-11 W Basin - Water Quality Results



■ TP Load (mt)	5.250	5.193	10.125	4.881	6.716	5.580	5.122	2.972	4.262	2.306	2.805	2.562	3.484
■ Flow Vol. (kac-ft)	250.35	221.58	273.61	172.04	283.61	264.30	257.31	149.98	189.81	123.81	140.43	143.17	184.07
■ TP FWMC (ppb)	17	19	30	23	19	17	16	16	18	15	16	15	15
■ Rainfall (in)	59.5	51.6	56.6	39.9	30.7	50.0	45.0	40.9	45.8	33.3	35.8	38.6	55.2

NNRC Source Control Projects

1. ERP Program
2. Public Education and Outreach Agreement with Broward County
3. No discharge to the EPA since WY 04



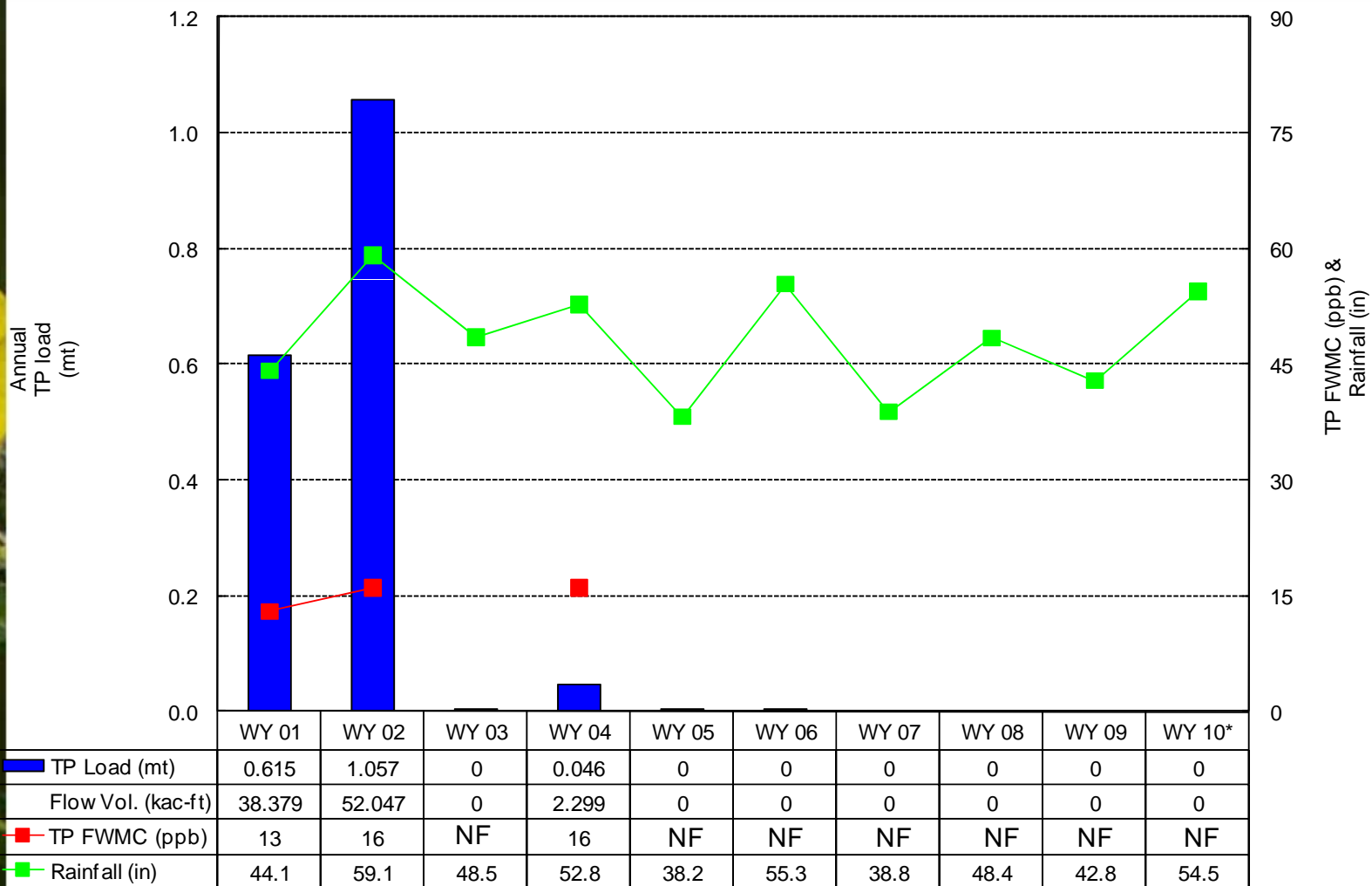
North New River Canal (NNRC) Basin

Legend	
	NNRC Basin Boundary
	SFWMD Structures

Aerial Imagery 2004-2005 DOQQ, Natural Color, 1 Meter

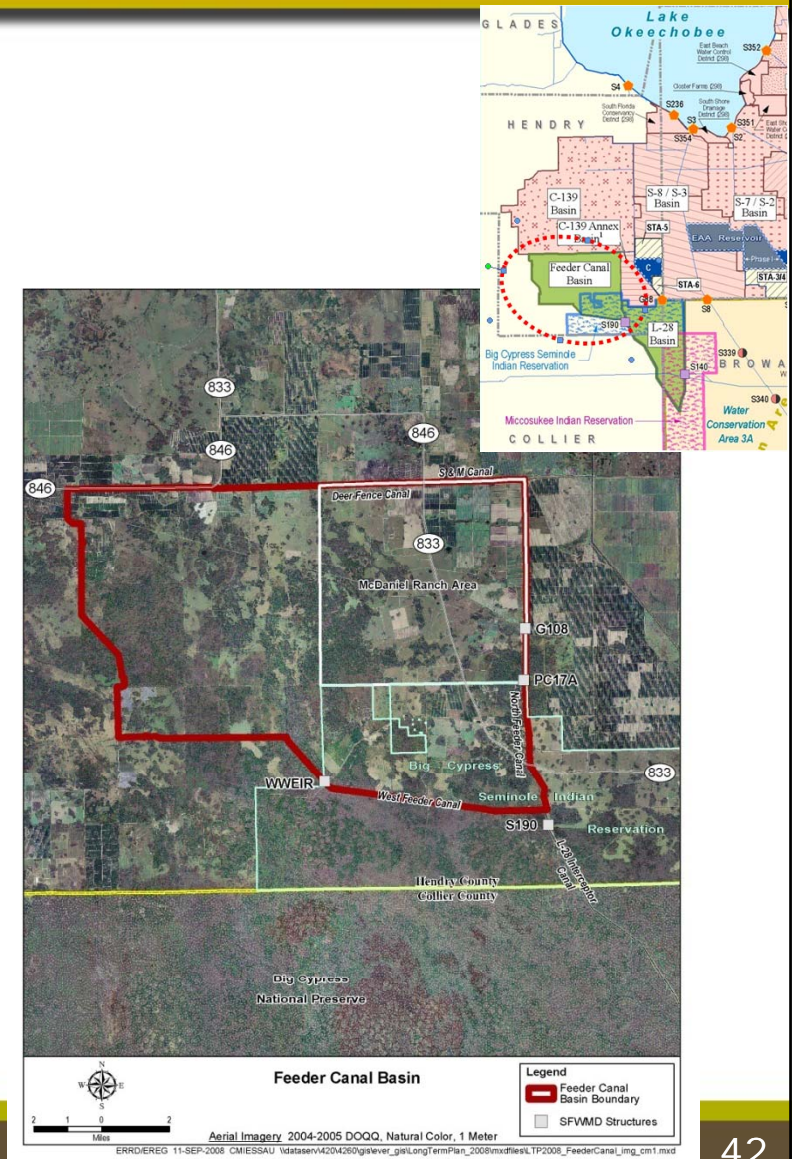
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NNRC Basin - Water Quality Results

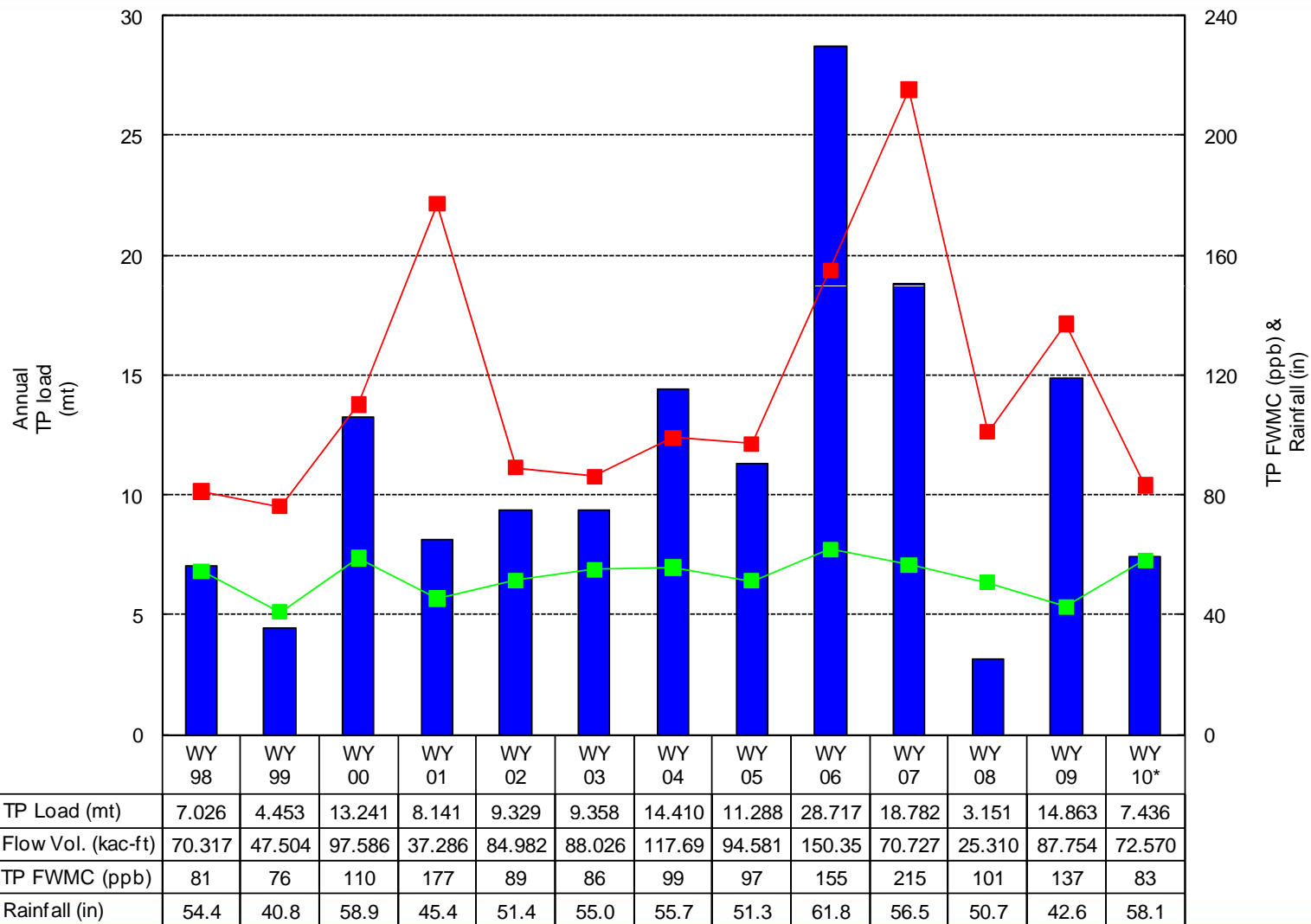


Feeder Canal Source Control Projects

1. BMP Implementation at McDaniel Ranch
2. Integrated Permit Compliance Initiative
3. Preliminary activities in support of future regulatory source control program
4. Supplementary Water Quality Collection and Analysis
5. Regional Feasibility Study

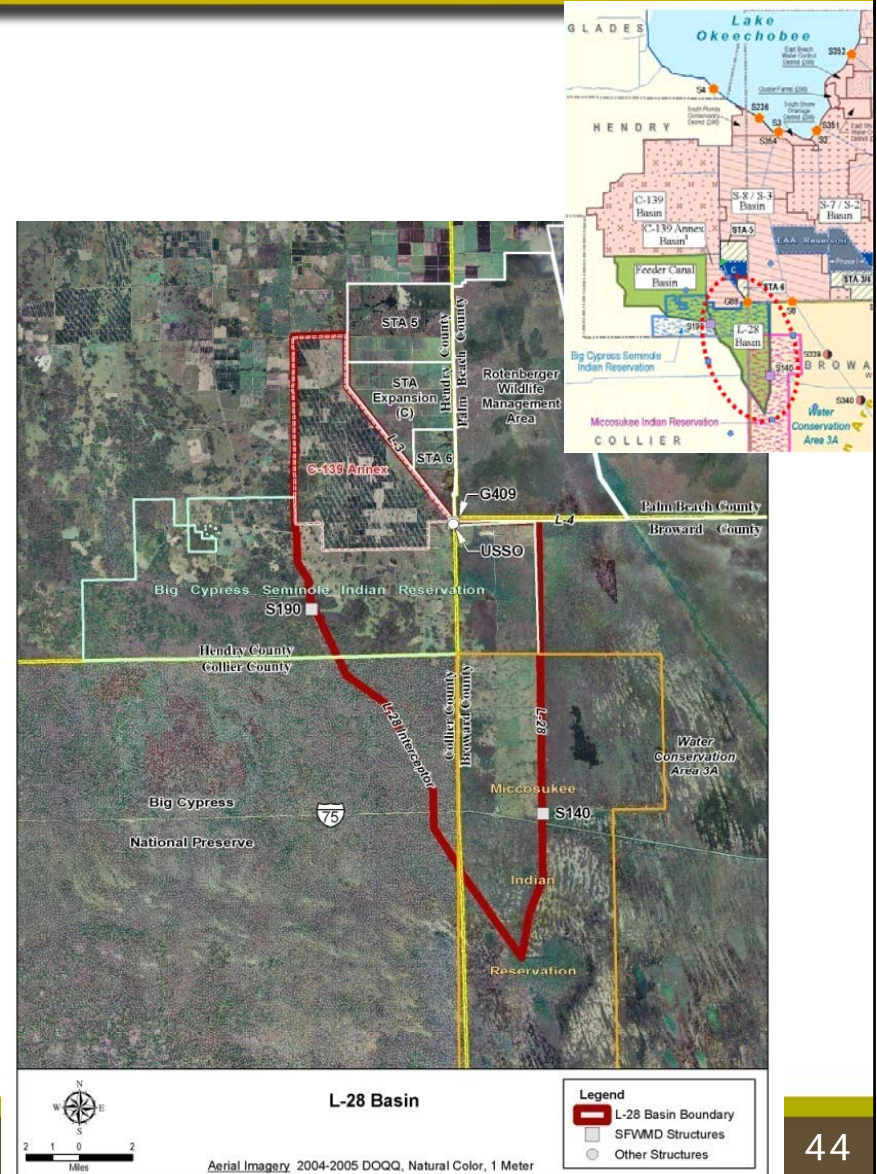


Feeder Canal Basin - Water Quality Results

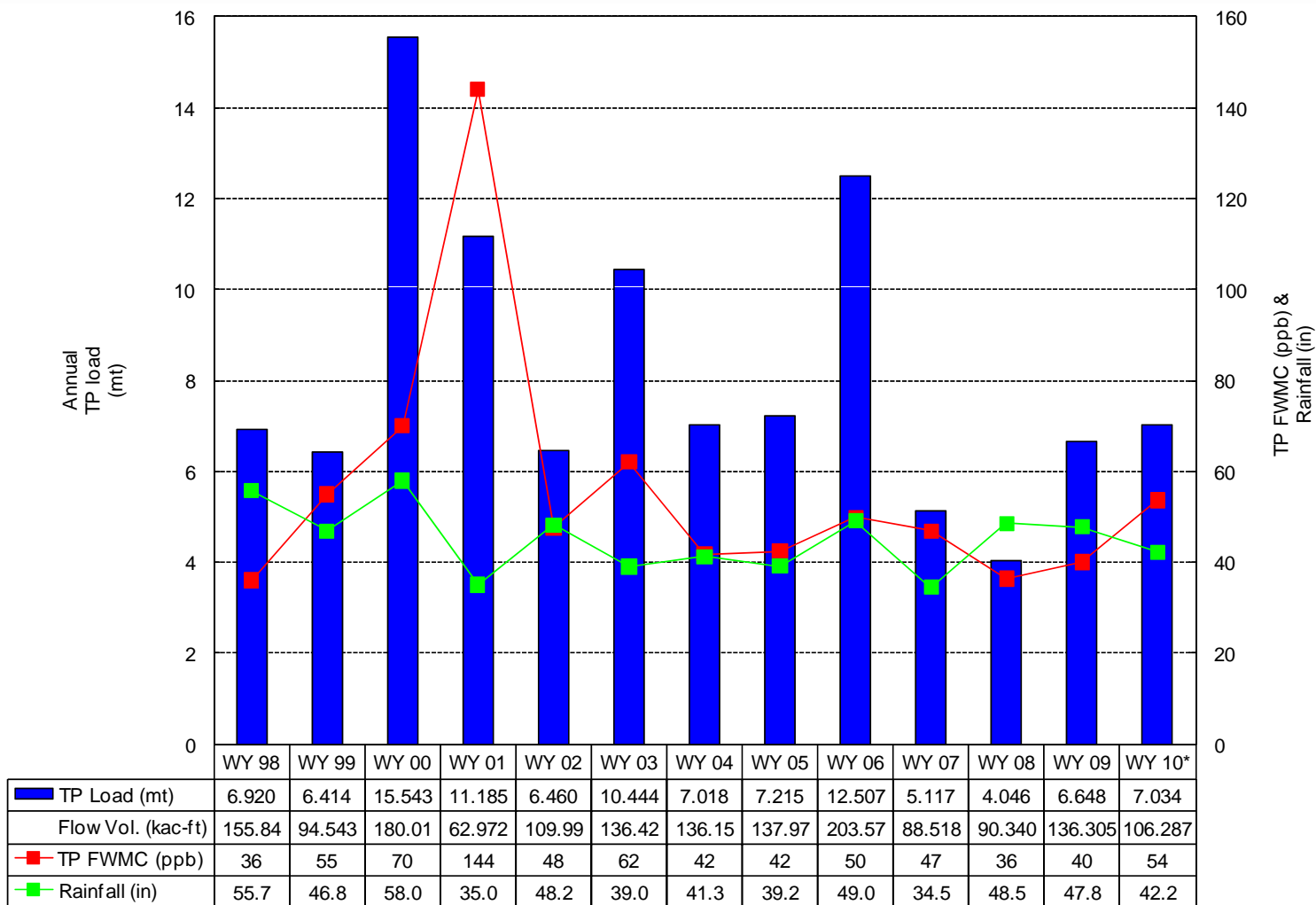


L-28 Source Control Projects

1. Diversion of C-139 Annex Flows to STA-6 (see C-139 Annex slide)
2. Regional Feasibility Study

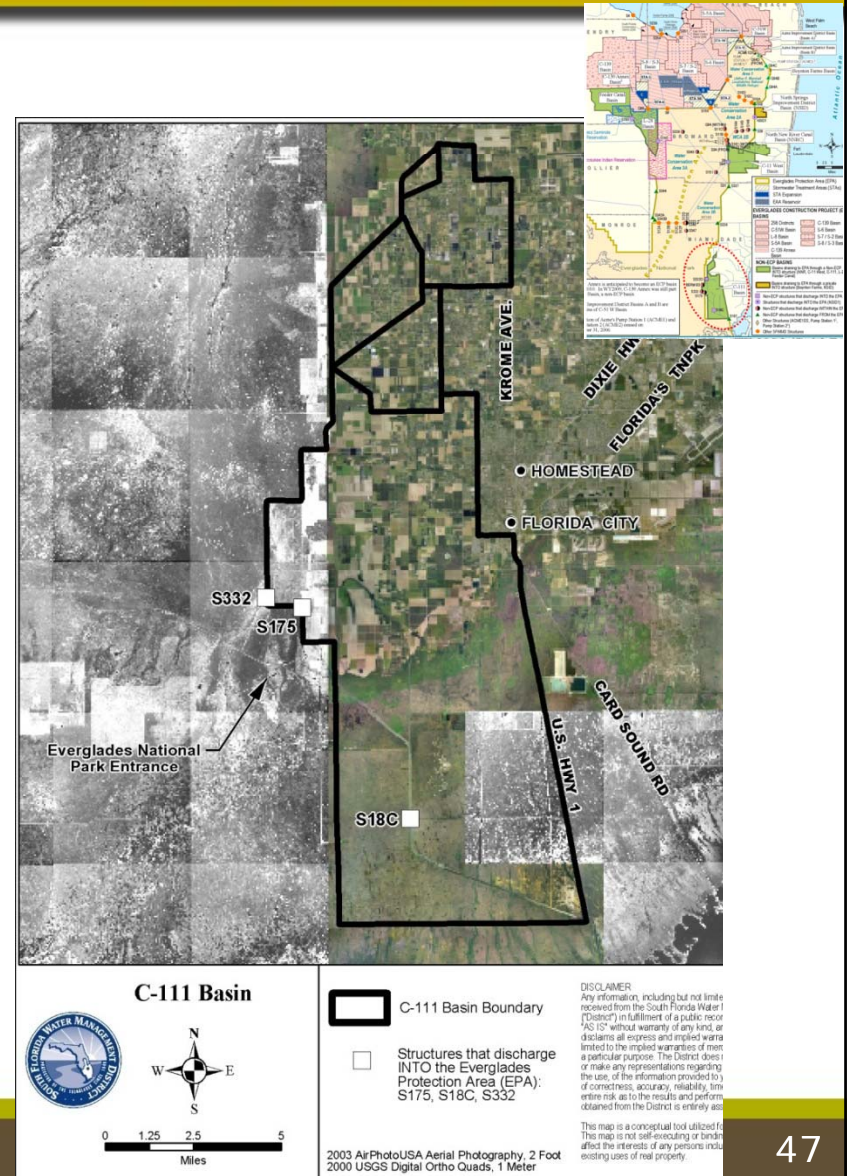


L-28 Basin - Water Quality Results



C-111 Basin

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



Long-Term Plan – CERP and Other Projects

Long-Term Plan relies upon **source controls** and full integration with CERP and/or other local, state and federal projects

Basin	Project
C-11W	CERP-Broward County Water Preserve Area (WPA)
NSID	CERP-Hillsboro Site 1 Impoundment
NNRC	CERP- Water Conservation Area (WCA) 2 and WCA-3 Diversion
Acme Basin B	CERP- Acme Basin B Diversion
Feeder Canal	CERP-Big Cypress/L-28 Interceptor Modifications
	Seminole Water Conservation Plan (WCP)
L-28	CERP-Miccosukee Water Management Plan (WMP)



Summary

1. On-going mandatory BMP Program implementation (EAA and C-139 Basin)
2. Adaptive management based on:
 - BMP demonstration and research
 - Supplementary monitoring initiatives
3. Rule-development as needed to incorporate findings
4. Environmental Resource Permit (ERP) program is being used, when necessary or applicable, to require BMP implementation (including capital improvement projects, operational changes, public outreach, etc.) and water quality monitoring



Summary (Cont'd)

5. Developing preliminary evaluation of performance measures in support of future regulatory source control program for Feeder Canal Basin
6. Working cooperatively with landowners, local governments, drainage districts, tribal representatives, stakeholders, and state and federal agencies is key for success of source control projects
7. Many EPA Tributary Basins rely also in full integration with CERP and/or other local, state and federal projects to achieve water quality goals
8. Continue water quality monitoring is necessary to track the success of the source control projects in the EPA Tributary Basins

District staff are available to discuss these projects in more detail.

Thank you for your attention



DRAFT 2010 SOUTH FLORIDA ENVIRONMENTAL REPORT



South Florida Environmental Report (SFER)

- » Previous Reports
- » 2010 Draft Report
- » Web Board
- » Project Database

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Home

Schedule

Peer Review

Editing References

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Volume I

Volume II

Appendices

2010 Draft Report

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» [Table of Contents for All Volume I Chapters](#)
 This is a single pdf file containing the table of contents to each Chapter of Volume I. Panelists can print the TOC for the chapters under review. Please note--this is not part of the report, but a tool for the reviewers.

Volume I: The South Florida Environment

Front Matter	Acronyms & Abbreviations, Units of Measure, Main Glossary
Chapter 1	Introduction to the 2010 South Florida Environmental Report - Volume I
Chapter 2	Hydrology of the South Florida Environment
Chapter 3A	Status of Water Quality in the Everglades Protection Area
Chapter 3B	Mercury and Sulfur Monitoring, Research and Environmental Assessment in South Florida
Chapter 4	Phosphorus Source Controls for the South Florida Environment
Chapter 5	Performance and Optimization of the Everglades Stormwater Treatment Areas <small>(Note: Table 5-1 revised and reposted on 9/1/09, Table 5-2 revised and reposted on 9/18/09)</small>
Chapter 6	Ecology of the Everglades Protection Area

Chapter 4: Phosphorus Source Controls for the South Florida Environment <http://www.sfwmd.gov/sfer/>