



Source Controls in the C-139 Basin

Quarterly Communications Meeting on the Long-Term Plan for
Achieving Water Quality Goals for the Everglades Protection Area
Tributary Basins

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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.”

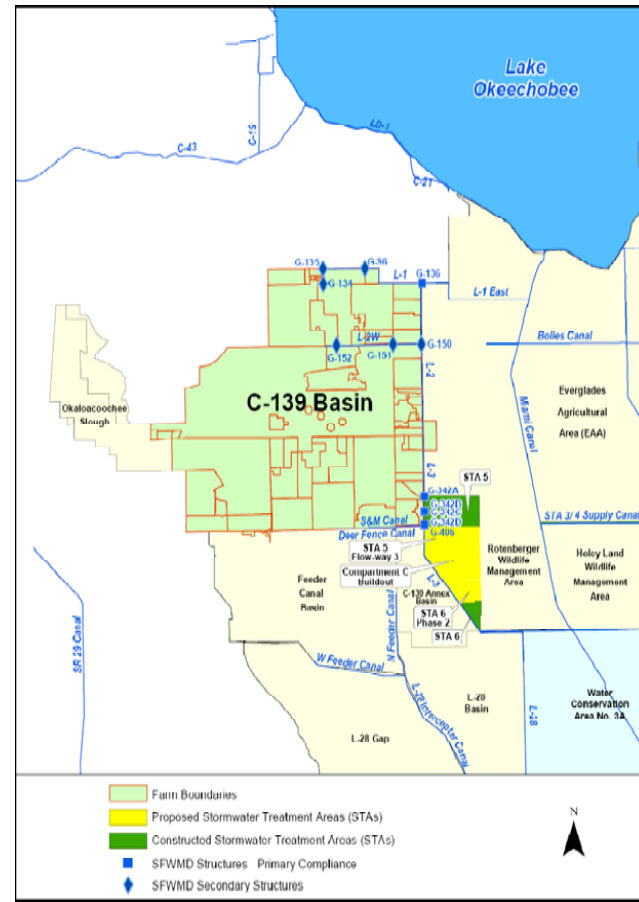
Specifically:

- 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



C-139 Source Control Projects

1. BMP Program Implementation
2. Rule Amendment
3. District-funded BMP Demonstration Projects
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 of 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 Amendment

- Rule development was initiated in May 2007
- The C-139 Basin had been out of compliance four times with the water quality requirements of Rule 40E-63, F.A.C.
- The amended rule became effective November 9, 2010
- A workshop was held on November 10 to assist applicants complete their applications
- Applications for new or renewed permits are due on December 24th, 2010



2. Basin Rule Amendment

- Water quality performance measures
 - More comprehensive rainfall to TP load relationship
- Comprehensive BMP Plans
 - Required 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



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

- Scope has been modified based on lessons learned:
 - Field experiments: Demonstration of pH adjustment replaced by use of slow release fertilizers (polymer coated and sulfur coated)
 - Greenhouse experiments (new): Reduce application by using via drip irrigation and foliar application
 - Greenhouses will reduce the risk of losing experiments during freezes (e.g., 2008 – 2010)
 - Effects of water quality will be accurately measured in small lysimeters
- Report for 2009-2010 growing season is available on request



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
- Additional funding is available for FY2010-11 (\$300,000)



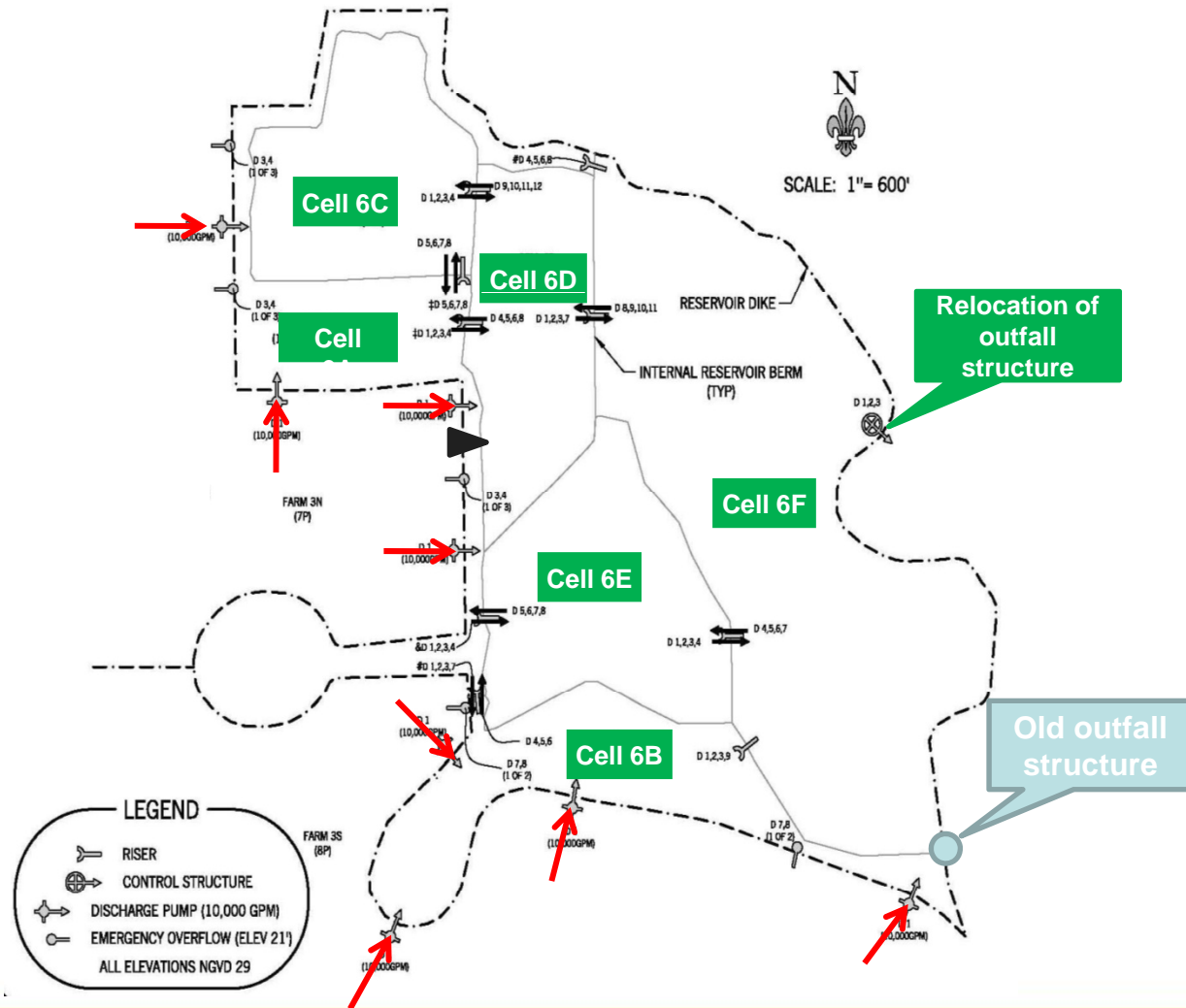
3.2 BMP Demonstration Grant (continued)

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)
- Final Report development is underway



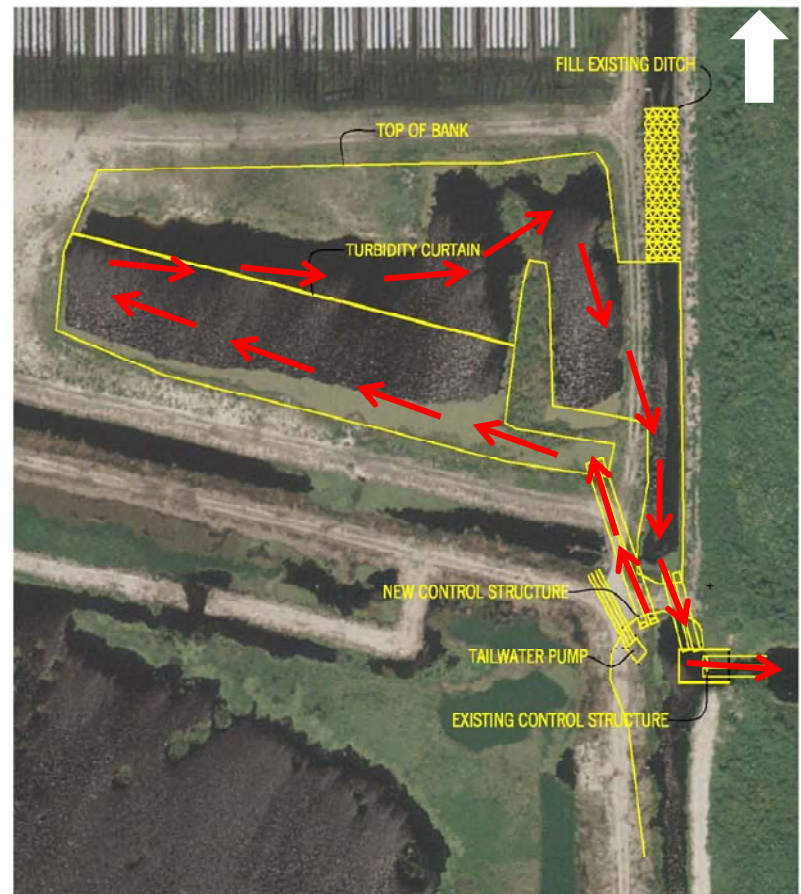
3.2 BMP Demonstration Grant (continued)



3.2 BMP Demonstration Grant (continued)

2. Chemical Precipitation

- Phase I – Laboratory
 - Aluminum Chloride
 - Alum
- Phase II – Field Implementation
 - Construction of treatment pond
 - Water quality and quantity data collection started in August 2010 (one year)



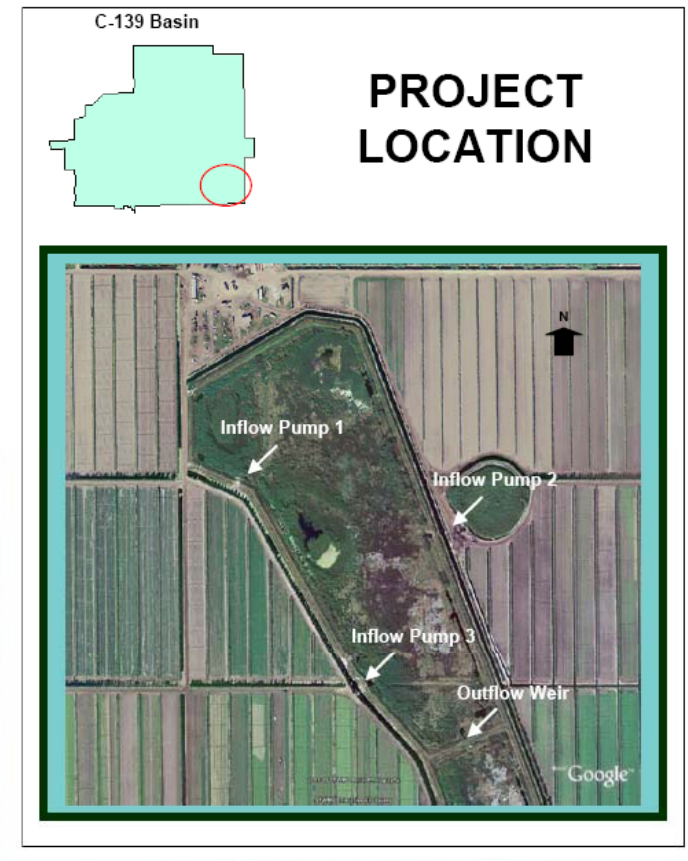
3.2 BMP Demonstration Grant (continued)



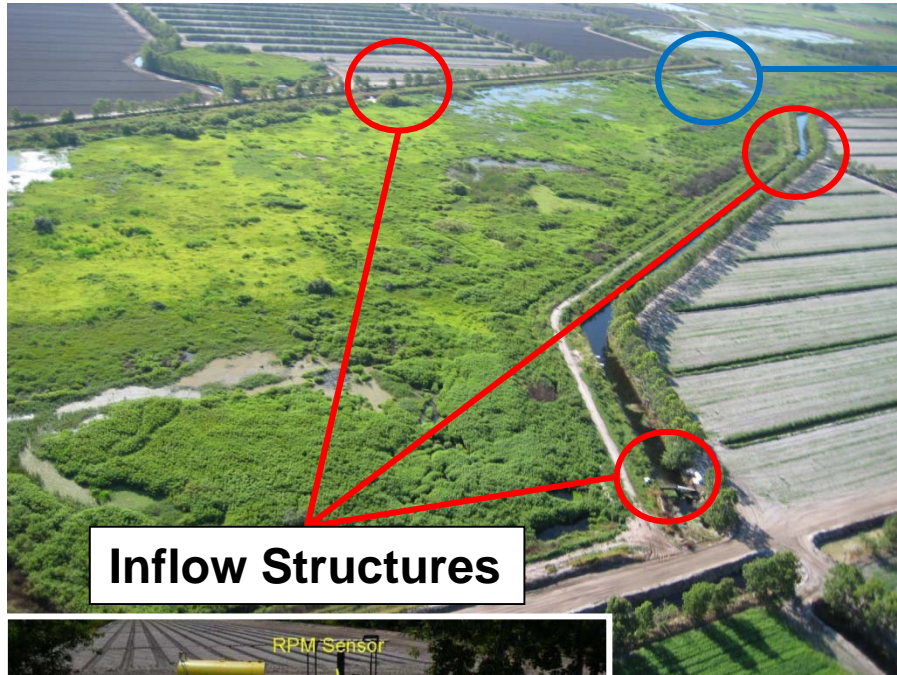
3.3 UF-IFAS Southwest Florida Research and Education Center, AGI Performance Evaluation

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
- Preliminary results presented on September 21, 2010
- Report completion is ongoing



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



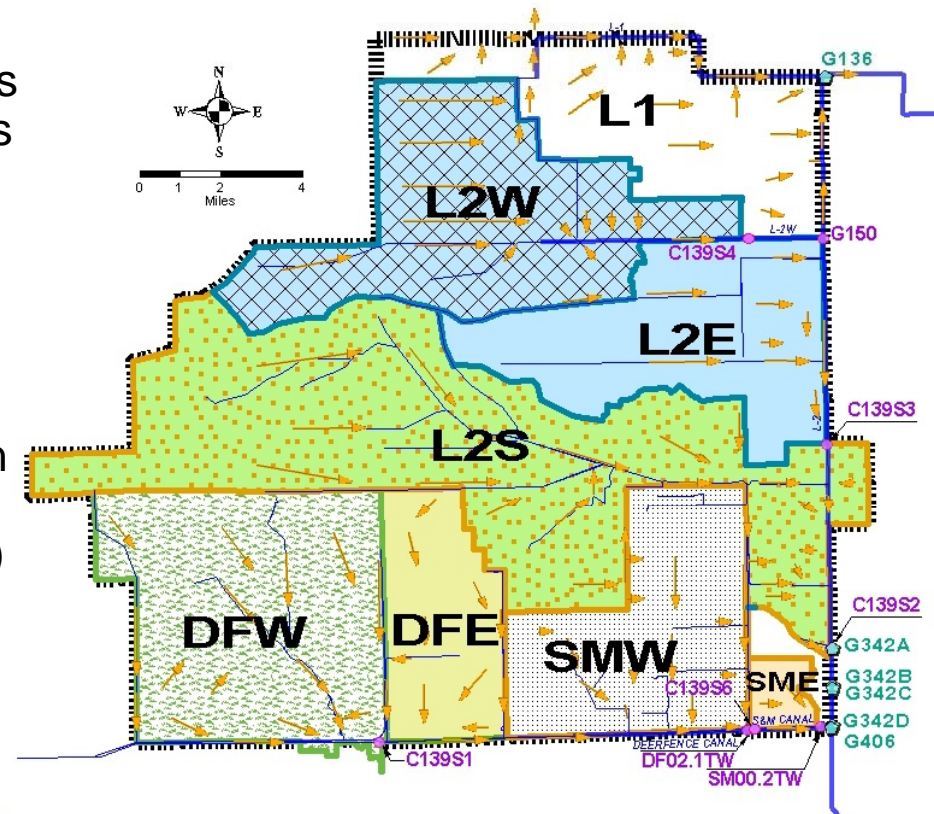
Inflow Structures

Outflow Structure



4a. Supplemental WQ Collection and Analyses

- The supplementary monitoring network started in 2006 (primarily grab)
- Evolved into a permanent stations (autosampler and flow)
 - 8 upstream and 6 basin-outlet monitoring locations representing 8 sub-basins
 - Continuous flow data summed to daily interval
 - TP automatic samplers
 - Weekly grab samples for TP, TDP, and SRP (when autosampler weekly composites are collected)



4b. Phosphorus Transport and Cycling

- Analyzed phosphorus and flow data from WY2006 to WY2009
- Verified that wet season discharge events are most significant
- Flow and load are higher in the southern than in the northern part of the basin
- Soluble reactive phosphorus is dominant in high flow events
- Slight downward concentration trend in southern areas
- Strong relationship between flow and concentration indicates the need to focus on detention and reducing runoff flow rates
- Lack of flow data at many upstream sites limits the calculation of flow-weighted concentrations
- As time passes, additional data collection and analysis will serve to understand the effectiveness of the program



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 improvement of Water Quality leaving the basins
- Additional data collection found necessary to improve calibration and verification of Mike-She/Mike 11 model
- Spreadsheet model developed and used to assess ten alternative scenarios (September 2010)
- Next steps are to refine alternatives, coordinate with land acquisition project planning, and include potential S4 Basin diversion south



Summary

SEWMD

1. The amended C-139 Basin rule, which includes additional BMP requirements, was adopted and permits including these requirements are being issued.
2. The District-funded BMP Demonstration Projects to increase the body of knowledge on BMP effectiveness continue.
3. Water quality collection and analyses efforts are ongoing and provide the foundation for improving the source control program.

