C-139 Basin

A Regional Water Management Perspective

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

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The C-139 "Region"

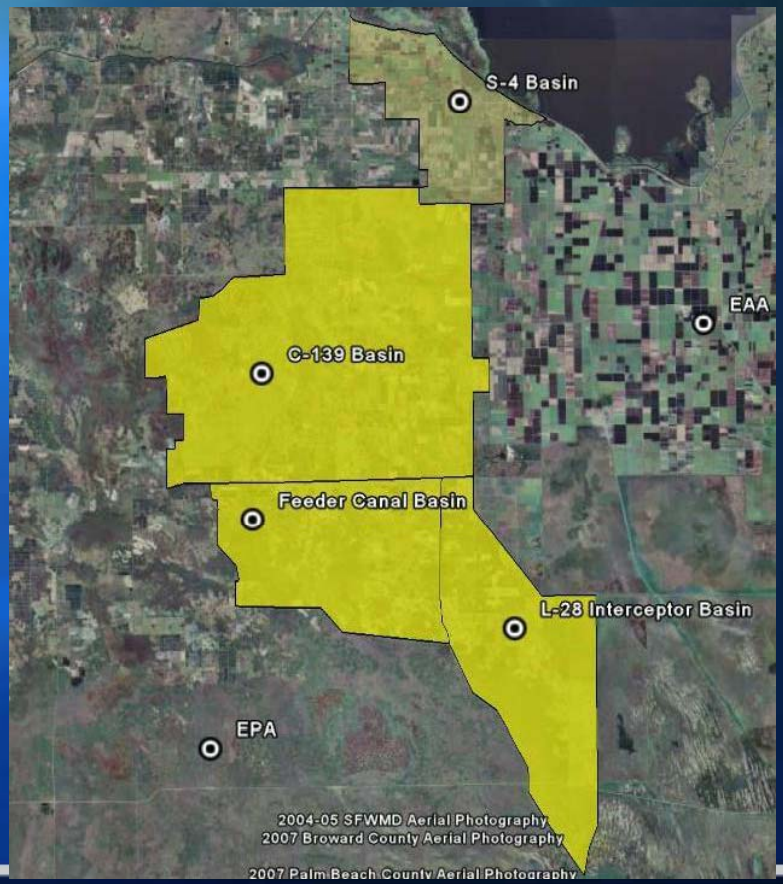
- ***C-139 - one of several Everglades western tributaries***
- ***Collectively known as the "Western Basins"***

Current Tributary Basins

- **C-139 basin**
- **Feeder Canal basin**
- **L-28 Basin**

Potential Tributary Basin

- **S-4 basin (Industrial Canal)**



Features & Challenges: C-139 Basin

Current Features

- 2nd largest discharging tributary to Everglades behind EAA
- Mandatory BMP source control program for landowners
- STA-5 & STA-6 treatment
- Dependency on groundwater for water supply

Challenges

- Further reduce total phosphorus (TP) loads in basin discharges
- STA performance has been impacted by high inflow TP loads
- Increase basin storage
- Land Use Intensification due to economic conditions
- Management of water supply to promote conservation and improve water quality
- Ensure flood protection is maintained

Features & Challenges: Feeder Canal Basin

Current Features

- **3rd largest discharging tributary to Everglades behind EAA**
- **No Mandatory BMP source control program for all landowners**
- **No STA treatment**
- **Dependency on groundwater for water supply**

Challenges

- **Further reduce TP loads in basin discharges**
- **Increase basin storage**
- **Management of water supply to promote conservation and improve water quality**
- **Discharge limits to be determined**

Features & Challenges: L-28 Basin

Current Features

- 4th largest discharging tributary to Everglades behind EAA
- C-139 Annex diversion of flows to STA-6 w/ Mandatory BMPs
- Remaining landowners - No Mandatory BMPs & No STA treatment
- Dependency on groundwater for water supply

Challenges

- Further reduce TP loads in basin discharges
- Increase basin storage
- Management of water supply to promote conservation and improve water quality
- Discharge limits to be determined

Features & Challenges: S-4 Basin

Current Features

- Consists of S-4 and Industrial Canal
- Historically discharged to Lake Okeechobee and Caloosahatchee River
- Diversion Proposal - ~ 50% of basin discharge south to C-139 Region
- Mandatory BMPs, but No STA treatment currently in basin

Challenges

- Reduce TP loads to Lake Okeechobee by increasing load south
- Storage and treatment of diverted flows (water quality impacts)
- Integrated water management with C-139 Region (flood control)
- Avoid overloading existing STAs including upcoming expansion
- C-139 Region water supply - potential use

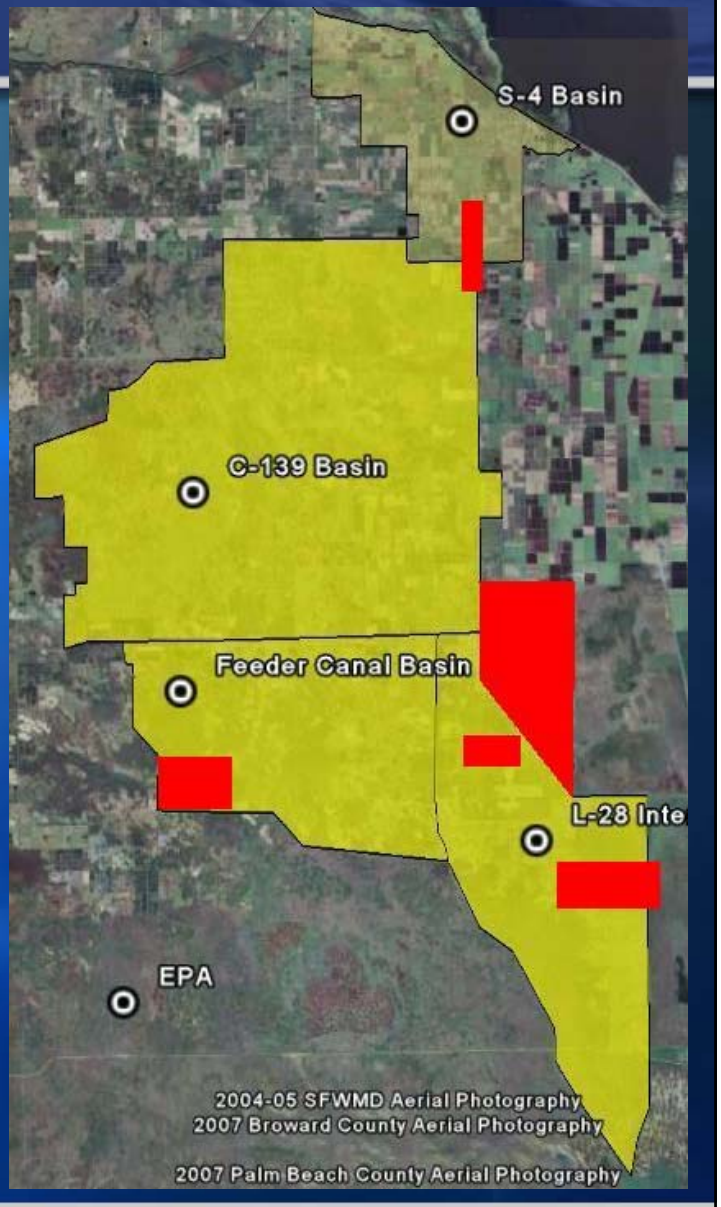
Basin Specific Projects: Existing & Currently Planned

Existing

- STA-5: Cells 1, 2 and 3
- STA-6: Sections 1 and 2
- C-139 Annex Pump Station

Planned

- Feeder Canal Basin: “Critical Project” (Tribe and ACOE)
- “Compartment C” in construction
- Potential S-4/Industrial Canal Diversion to the south
- Feeder Canal/L-28 CERP Projects



C-139 Regional "Challenges"

Develop an integrated regional approach beyond basin specific efforts to deal with these challenges ….

- **Water Quality & Quantity**
  - **EFA mandates – basins not meeting goals**
- **Flood Control**
  - **Most rain falls in short period decreasing percent retained within basins**
- **Water Availability**
  - **Reliance on groundwater is affected by rainfall patterns and soils**
- **Coordination/Integration of Projects**
  - **ECP/LTP, CERP, Land Practices**

C-139 Regional Perspective: Potential Solutions

Evaluate the feasibility of ....

- **Regional Storage**
  - **Benefit Water Quality, Water Availability**
- **Canal / Infra-structure modifications**
  - **Allow for more flexibility in movement of water for flood protection & regional storage/treatment**
  - **Develop interconnections between individual basins for water availability for irrigation**
- **Operational Optimization**
  - **Take advantage of infra-structure to better manage regional water resources**

C-139 Regional Feasibility Study

The Regional Feasibility Study (RFS) will ....

- **Identify solutions for C-139, Feeder Canal and L-28 Basins together as a "Region" and include potential S-4 basin diversions**
- **<u>Phase 1 FY 2008-2010</u>:**
  - **Gather existing information**
  - **Identify additional data needs (and benefits to study)**
  - **Collect additional data (Topography, Canal Cross-sections, Monitoring Wells)**
  - **Develop Integrated Groundwater/Surface Water model for region**
- **<u>Phase 2 FY2010:</u>**
  - **Conduct RFS to develop alternatives and planning level costs**

Potential “alternatives”

- Storage in above-ground impoundments
- Storage and treatment in above-ground impoundments
- Evaluation of potential S-4 Basin diversions
- Water management changes through infrastructure changes
- Water management changes through operational changes
- Potential shift of withdrawals from the Lower Tamiami Aquifer to other water resources
  - Canal surface water
  - Recycling of stormwater for irrigation

Potential alternatives continued

- **Alternative water storage – excess water capture**
- **Alternative treatment technologies**
- **Regional/sub-regional scaling**

- **As the RFS moves forward, there is always potential for shorter-term/interim solutions to be identified and developed**

Overall Project Execution

- **Phase I – Develop a baseline model for the C-139 Region**
- **Phase II – Identify potential solutions for region and quantify appropriate "Performance Measures"**
- **Future Efforts**
  - **Select Alternative**
  - **Develop Basis of Design**
  - **Development of solution (design, Operation Plan, etc.)**
  - **Implementation of solution (construction, etc.)**
  - **Operations and maintenance**

Project Breakdown (Cont'd)

Phase I – Current Efforts

- Existing data collection, data gaps identification & model selection
- Field data collection
- Baseline model development
- Identification of challenges within the region
- Identification of a range of possible alternatives

Project Breakdown (Cont'd)

Phase II (FY 2010)

- Development of Performance Measures and several Alternatives
- Alternatives scenario modeling
- Review and analysis of proposed projects/water optimization strategies
- Conceptual design development
- Cost estimation

Phase 1 “Work Plan” and Schedule

- **Task 1 - Various meetings throughout duration of contract**
- **Task 2 - Gather and assess relevant reports and data – produce summary reports**

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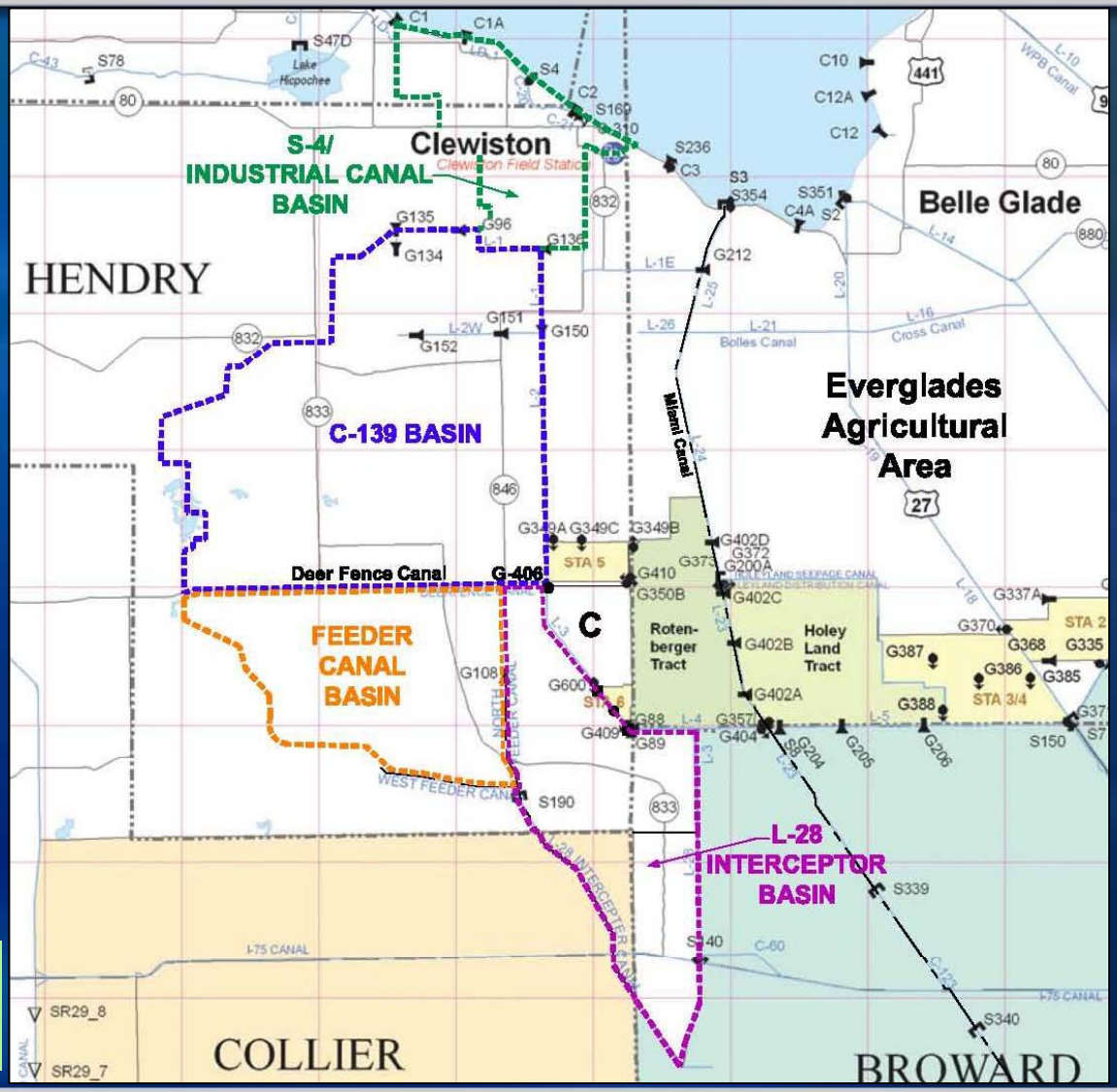
- **Task 3 - Field Data Collection: Jul - Dec 2009**
- **Task 4 - Model Development, Calibration and Verification: Oct 2009 - Jan 2010**
- **Task 5 - Final Report and Work Plan for Phase 2: Feb 2010**
- **Commence with Phase 2: Mar 2010**

Overall Project Layout



Current and Next Steps

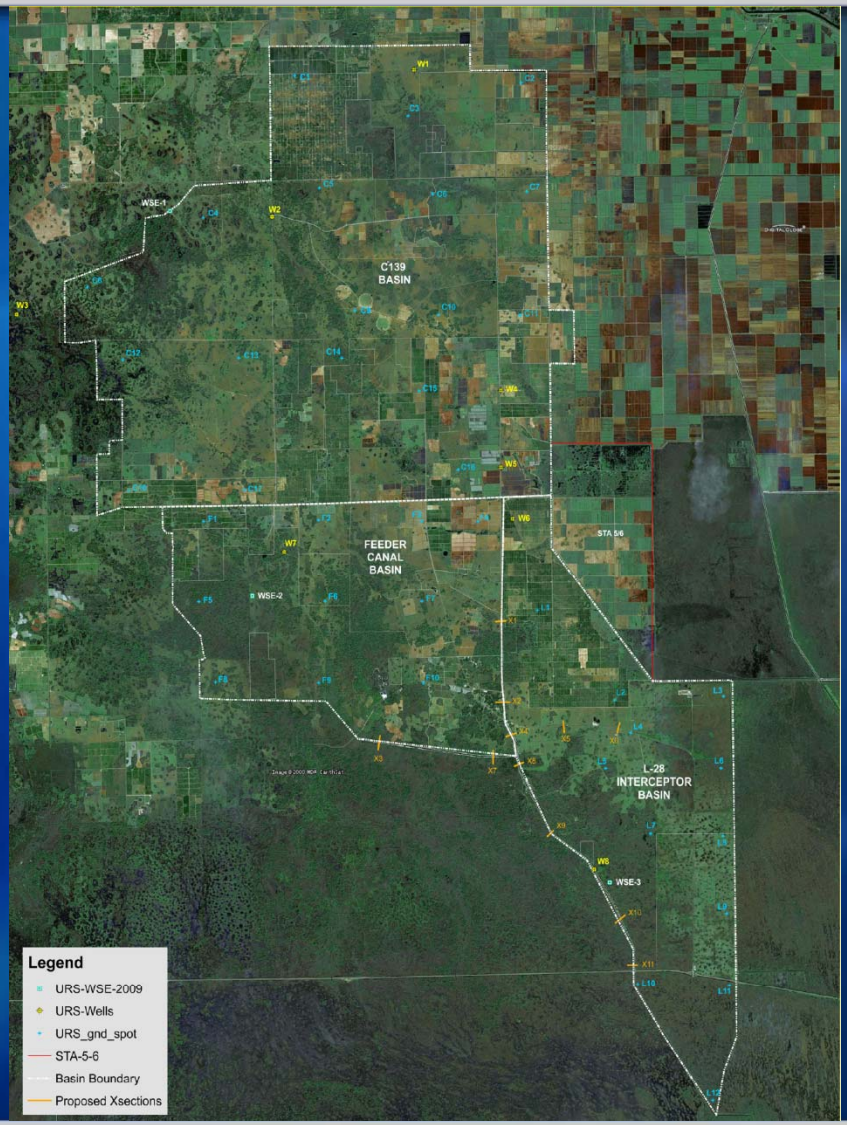
- **Begin Task 3 (“Fill in the Data Gaps”): Jul - Sep 2009**
  - **Ground-truth topography**
  - **Additional monitoring well installation and monitoring**
  - **Additional canal cross-sections**
  - **Meet with Landowners when/where appropriate**
- **Begin Task 4 Model Development: Aug – Nov 2009**

Field Data Collection

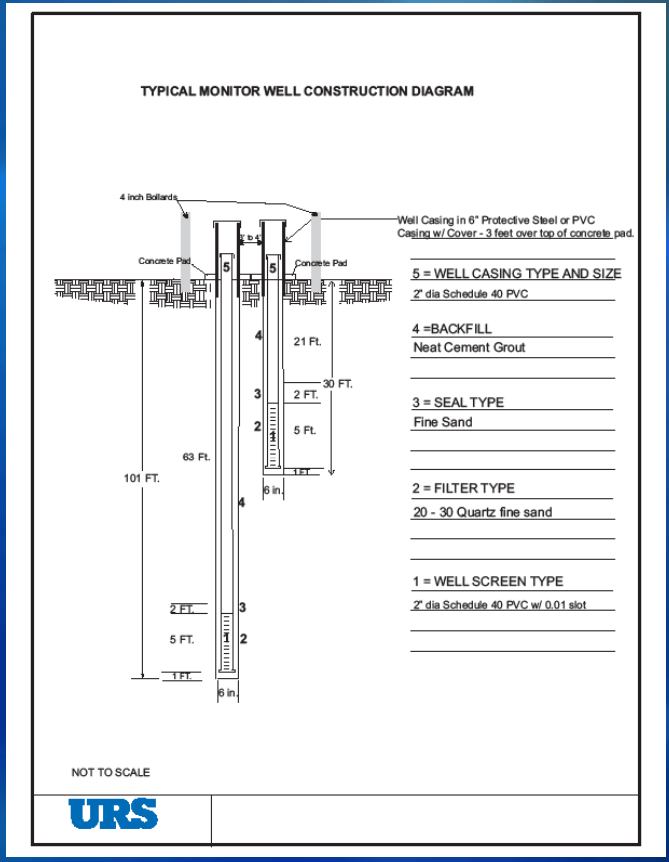
Phase I – current data needs

	Overall	Seminoles Reservation
Nested Groundwater wells	9	1
Water Surface Level	3	0
Canal Cross Sections	11	8
Spot Elevations	40	5

Field Data Collection (Overall)



“Nested Pair” Monitoring Wells



Regional Model Development

- **Need an integrated surface water/groundwater model**
- **Cost to modify existing models was considered cost prohibitive**
- **Lack of “internal” water quality data represents a challenge**
- **Selected the MIKE-SHE/MIKE-11 model with a “Spreadsheet” Water Quality analysis**

Coordinated Effort - Public Input and District Resources

Critical coordination

- **Stakeholder Input**
- **Construction and Engineering issues**
- **Regional Modeling (integrated surface & groundwater)**
- **Land Management issues**
- **Operation of District facilities**
- **Regulatory issues**
- **Water Supply planning**
- **River of Grass restoration coordination**

- **Questions/Comments?**