Refuge's Enhanced Water Quality Monitoring Modeling Program Update

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Update to TOC, August 31, 2010

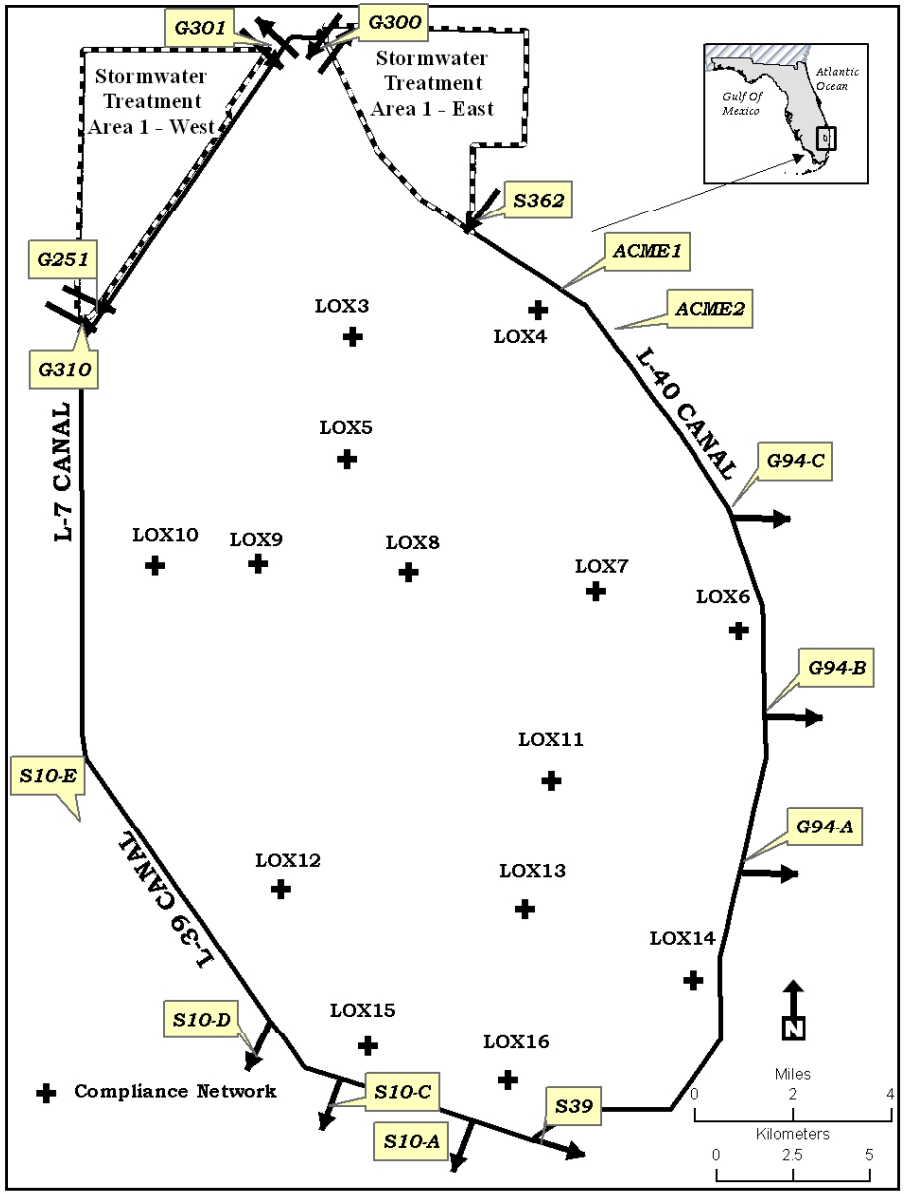
Project Focus – Monitoring

1) Additional monthly water quality sampling sites focus outside of the compliance monitoring network (14 stations)
   - Characterizes large areas of the Refuge marsh not monitored by the CD compliance network
   - Nearly 40 sites located on transects and additional locations in the marsh
   - 24 enhanced network sites also used for STA discharge permits and 4-part test compliance
   - Data provided quarterly at TOC meetings

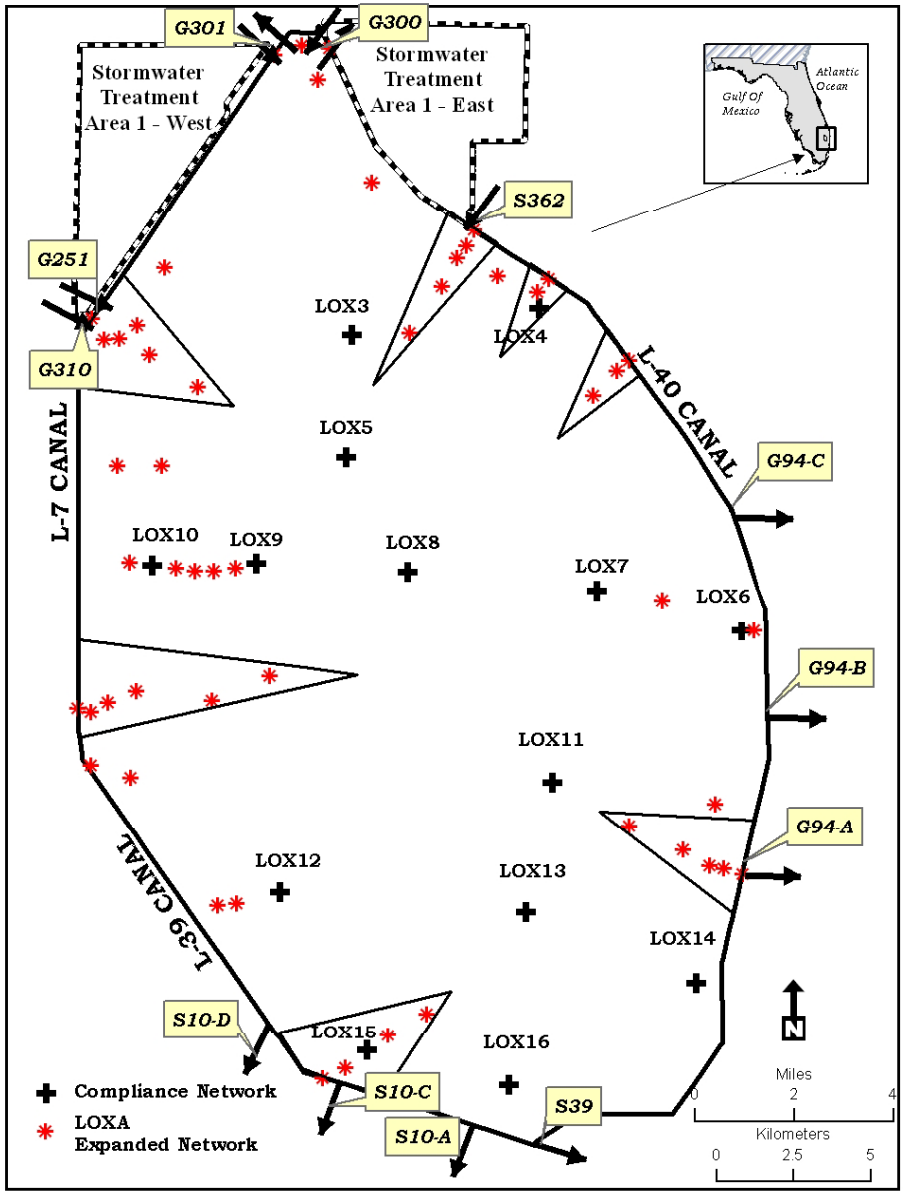
Project Focus – Monitoring

2) Monitoring of canal water intrusion using eight surface water conductivity transects
   - continue to identify patterns of canal water intrusion into the interior marsh with 47 sondes
   - transects run from canal towards marsh interior
   - data presented in Annual Reports and have been made available upon request for TOC and interested parties

Historical



Enhanced



Project Focus - Modeling

3) Development of hydrodynamic and water quality modeling

- improve understanding of water budgets, hydrology (including Refuge's water needs) and water quality
- understand impacts of water management activities to help with Refuge management decisions
- support planning of future water quality and ecological studies
- Simple models developed for screening purposes
- Complex models developed for more detailed spatial analyses
- Utilized both stakeholder input during development and input from independent Technical Review Panel

Project Focus – Simple Modeling

The simple models are done and are being used for specific applications:

-- Refuge water needs effort

-- Review of EAA Regional Feasibility Study

-- Development of performance measures

-- Use in River Of Grass and remedy discussions

Project Focus – Complex Modeling

The hydrology component is done.

The conservative tracer (Cl) is done

Report being prepared on hydrology/conservative tracer

The TP component presented at the last Modeling Workshop and was reviewed by an Independent Technical Review Panel

The next steps will focus on addressing TP comments from workshop and review panel, and finalize documentation for constituent modeling.

2009-2010 Program Product Examples

Documents

- **Quarterly Reports**: Jul. 2010; Apr. 2010; Jan. 2010; Oct. 2009; Jul. 2009; Apr. 2009; Jan. 2009
- **Annual Reports**: USFWS. (2009). A.R.M. Loxahatchee National Wildlife Refuge - Enhanced Water Quality Monitoring and Modeling Program – 4th Annual Report – July 2009.
- Wang, H, et al. (2009) Surface Water Sulfate Dynamics and Sulfate Reduction in the Northern Florida Everglades, USA. Journal of Environmental Quality. 38: 734-741.
- Meselhe, E. A., et al. (2010) Water budget model for a remnant northern Everglades wetland. Journal of Hydraulic Research. 48(1): 100-105.

Presentations

- Gibble, R., et al. (2010) Growth and survival of *Pomacea paludosa* Say (Florida apple snail) associated with water chemistry gradients in the A.R.M. Loxahatchee National Wildlife Refuge. 2010 GEER Conference. July, 2010.
- Roth, W. A. (2010) Compartmental Screening Model for Stage and Water Quality in a Large Everglades Wetland. 2010 GEER Conference. July, 2010.
- Waldon, M. G. (2010) Designing and Testing Modeled Hydrological Performance Measures. 2010 GEER Conference. July, 2010.
- Chen, C. (2010) Setup, Formulation and Validation of a Spatially Explicit Hydrodynamic and Surface Water Chloride Concentration Model. 2010 GEER Conference. July, 2010.
- Harwell, M. C., et al. 2009. Integrating Best Available Science to Manage Floodplain Wetlands in the Everglades. North American Benthological Society 57th Annual Meeting. May, 2009.

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