

Western Everglades Restoration Project


Virtual Project Delivery Team Meeting and Listening Session

Sanibel-Captiva Conservation Foundation

Conservancy of Southwest Florida

December 09, 2022

Paul Julian PhD

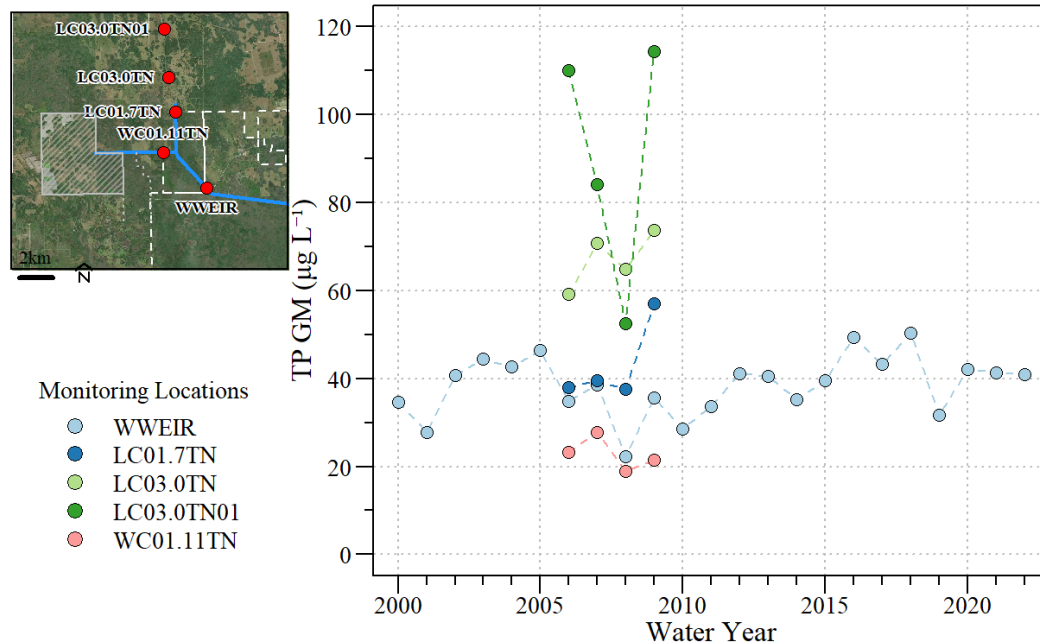
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West Feeder WQ Information



Annual (FLWY) Geometric Mean TP concentrations.

- Since 2008 WWEIR AGM Concentrations have been significantly increasing ($\tau=0.41$; $\rho\text{-value}<0.05$).
- Based on limited data Wingate Canal Concentrations < Lard can Canal.
- Lard Can AGM TP concentrations increase from south to north (based on limited data).

Downstream WQ Limits

- As detailed in *"Numeric Interpretation of Narrative Standards for the L-28 Interceptor Canal and Big Cypress National Preserve."*¹ a numeric interpretation of the narrative water quality standard was developed for WERP to be protective of the downstream OFW (Big Cypress National Preserve).

	Total Phosphorus ($\mu\text{g L}^{-1}$)	Total Nitrogen (mg L^{-1})
Long-term (5-Year) ¹	13	1.00
Annual	21	1.24

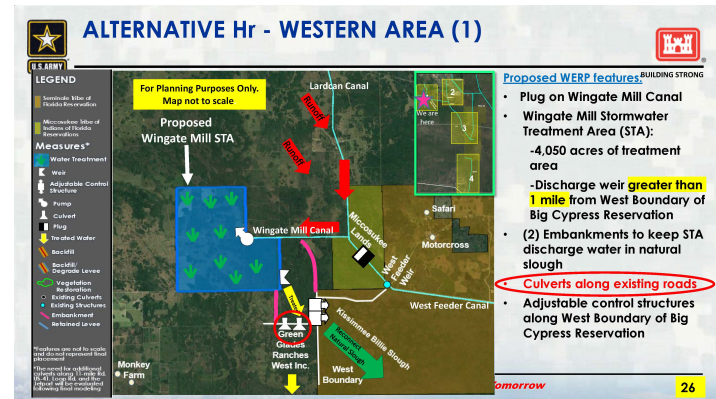
¹ Long Term = Five (5) Florida Water Years (May - April).; Average geomtric mean concentraion.

Therefore, some level of treatment is needed to improve water quality in the Wingate-Lard Can-West Feeder Canal system.

¹ FDEP, 2017, Numeric Interpretation of Narrative Standards for the L-28 Interceptor Canal and Big Cypress National Preserve. Tallahassee, FL. [LINK to Document](#)

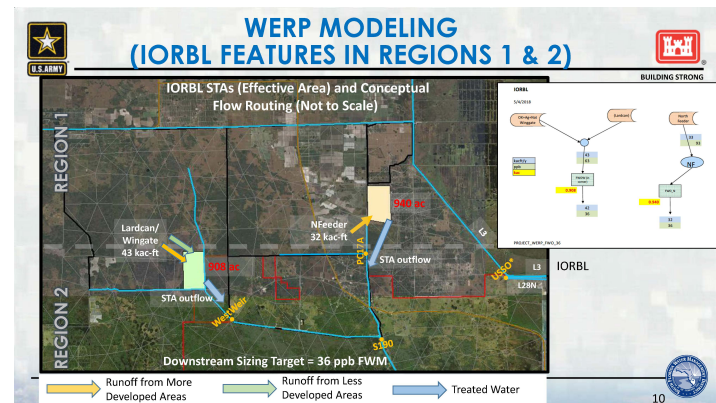
Current WQ treatment Projects

- Land and sizing issues with current proposed Wingate Mill STA.
 - Current stakeholder concerns
 - Concerns regarding ability to effectively operate (maintain target stages).



From 28 Feb 2022 PDT

- FWO Wingate/Lardcan STA?
 - 908 Acres
 - Sized to achieve L-28 Interceptor Canal baseline concentrations



From 21 Sept 2020 PDT

Conceptual WQ treatment projects

Improved/Advanced BMPs

- **Low hanging fruit**, implement watershed/basin BMPs
 - Include Canal cleaning and improvement
- Identify areas of concern (i.e. old culverts) and implement site specific nutrient and sediment reduction BMPs.
 - Proof of concept - EAA BMP program

Pros

- Cost effective
- Leverage state funding programs for BMP development and implementation

Cons

- Willing participation
- Not going to provide complete level of treatment needed (additional projects needed)

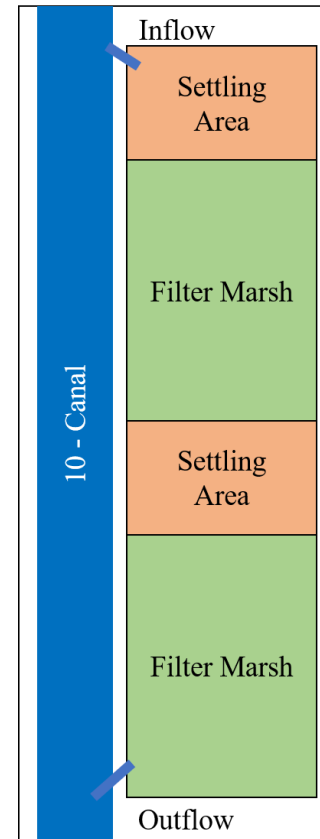
Conceptual WQ treatment projects

Concept #1 - Filter marsh

- Lard Can and Wingate Mill canal filter marsh(es)
 - Utilize land next to canals to build a filter marsh (long linear STA) along the canal.
 - Provide WQ treatment with minimal land
 - Utilized in urban environments - Example Lee County Florida, 10-Mile Canal.
- Lard Can canal filter marsh
 - ~ 2.4 km (~1.5 mi) between junction to Roberts/Sherrods property boundry gate
- Wingate Mill canal filter marsh
 - ~ 2.6 km (~1.6 mi) between junction to WC034TN (Inactive WQ site).

Conceptual WQ treatment projects

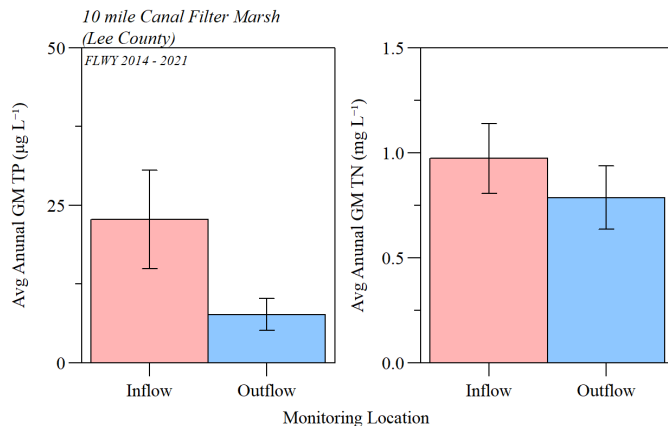
- 10-Mile Canal Filter Marsh
 - ~2 km (~1.21 mi) long project
 - ~30 meters (~ 100 ft) wide
 - Over the last 9 years 66% and ~20% reduction in TP and TN, respectively (based on annual GM Conc.)



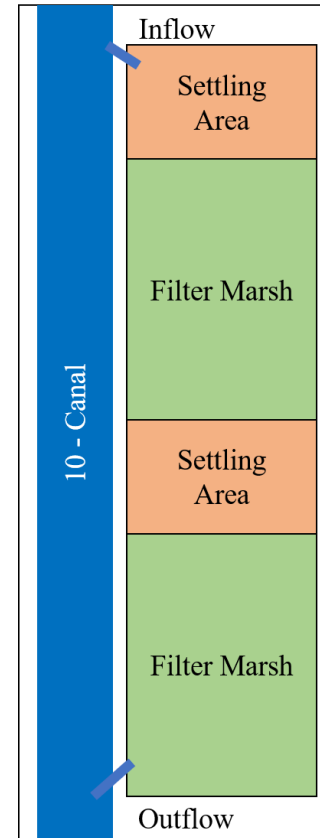
Generalized diagram of 10-mile Canal filter marsh

Conceptual WQ treatment projects

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Avg GM concs WYs 2014 - 2022



Generalized diagram of 10-mile Canal filter marsh

Conceptual WQ treatment projects

Concept #1 - Filter marsh

Pros

- Smaller footprint
- If 60 meters wide (~164 ft) total area ~74 acres
- less intrusive than Wingate Mill STA
- Provides some level of treatment

Cons

- Not going to provide complete level of treatment needed
- Some management is needed (maintenance and monitoring)
- Additional infrastructure (gates on canal for diversions if needed)
- Still requires land

Conceptual WQ treatment projects

Concept #2 - Hybrid Wetland Treatment

- Combine chemical and wetland treatment to reduce nutrients
 - Utilized flocculents such as Alum, Polyaluminium chloride (PAC), Ferrous Chloride to reduce nutrient concentrations
 - Wetland treatment to provide additional treatment prior to discharge
 - Proof of Concept - Grassy Island HWT and Lemkin Creek/Wolff Ditch HWT
- Based on evaluation of past and ongoing pilot projects, recommend larger wetland features to improve treatment

Pros

- Smaller footprint when compared to traditional STAs
- Potential for high level of treatment efficiency

Cons

- Costly to run (i.e. pumps, flocculent, etc) and maintain (i.e. drying and disposal of flocculent material)
- Must understand water chemistry to optimize treatment without exporting flocculent material (i.e. sulfate, aluminum, etc.)
- Regional concern regarding mercury methylation (and other ecological and biogeochemical effects) due to increases sulfate load
- If treatment is not optimized, particulate aluminum (if Alum is used) can be discharged and cause downstream pH specific toxicity concerns
- Arsenic accumulation in biotia
- Still requires land