An aerial photograph of a rural landscape, likely agricultural, with a grid overlay. A large rectangular area in the bottom right corner is highlighted in a light yellow color. The text is overlaid on the map.

Model Lands Hydrology and L-31E Canal Control Elevations

**Craig Grossenbacher, Chief
Water Resources Coordination Division
MDC DERM
BBSEER Workshop November 17, 2020**

OVERVIEW

- Description of the Model Lands Basin
- Hydrology and Regional Restoration Vision
- Control Elevations of the L-31E Canal
- Saltwater Intrusion
- Land Ownership
- Recent CERP Progress: The S-20 Control Structure Operations Change

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0 0.5 1 2 Miles



US 1

SW 344 Street (Palm Drive)

No culvert at L-31E and Palm Drive

Model Lands Basin
~21,000 wetland acres

Card Sound Road

Levee 31 East (L-31E)

Biscayne National Park

FPL Turkey Point Cooling Canal System (CCS)

Florida Keys National Marine Sanctuary

Model Lands Hydrology

- Isolated by Roads/Levees
- No Connection to Regional Canal System
- Rain-driven

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0 0.5 1 2 Miles

US 1

SW 344 Street (Palm Drive)

Levee 31 East

Model Lands Basin
~21,000 wetland acres

Card Sound Road

Biscayne National Park

Model Lands Hydrology

- Palm Drive culverts (2021 restoration)
- S-20
- Everglades Mitigation Bank L-31E culvert weirs

FPL Turkey Point Cooling Canal System (CCS)

Florida Keys National Marine Sanctuary

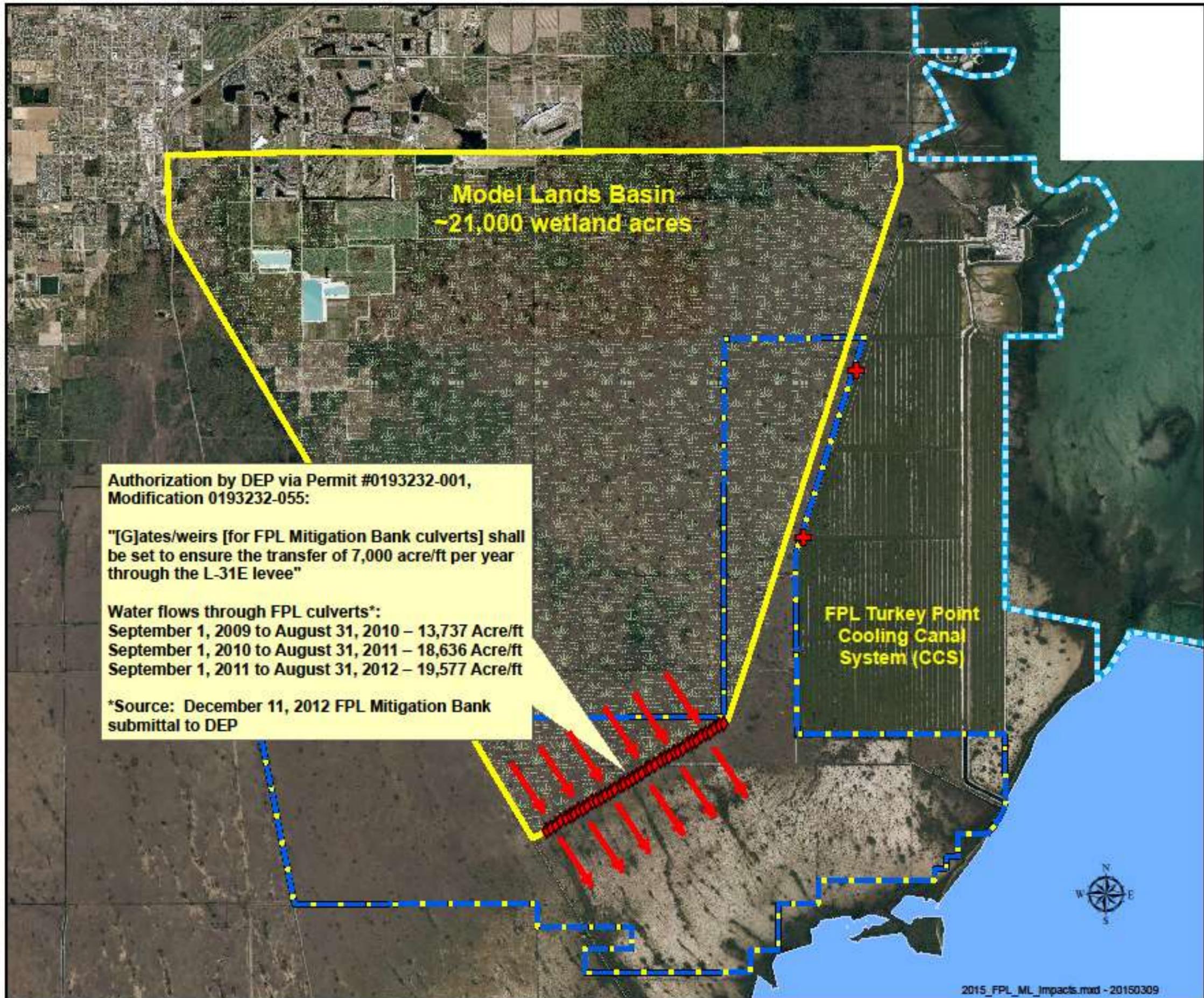
S-20

L-31E

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FPL Water Management Operations** and the Water Resources of the Model Lands Basin



**Model Lands Basin
~21,000 wetland acres**

**FPL Turkey Point
Cooling Canal
System (CCS)**

Authorization by DEP via Permit #0193232-001, Modification 0193232-055:

"[G]ates/weirs [for FPL Mitigation Bank culverts] shall be set to ensure the transfer of 7,000 acre/ft per year through the L-31E levee"

Water flows through FPL culverts*:
 September 1, 2009 to August 31, 2010 – 13,737 Acre/ft
 September 1, 2010 to August 31, 2011 – 18,636 Acre/ft
 September 1, 2011 to August 31, 2012 – 19,577 Acre/ft

*Source: December 11, 2012 FPL Mitigation Bank submittal to DEP

- ◆ 40 FPL Mitigation Bank Culverts at L-31E
- ✚ FPL CCS Interceptor Ditch Pumps
- ▭ Model Lands Basin Boundary
- ▭ Model Lands Wetlands
- ▭ Biscayne National Park Boundary
- ▭ FPL Mitigation Bank Boundary
- ▭ Florida Keys National Marine Sanctuary



Recent USGS Report

In Collaboration with Miami-Dade County



Map of the approximate inland extent of saltwater at the base of the Biscayne aquifer in the Model Land Area of Miami-Dade County, Florida, 2016

Scientific Investigations Map 3380

Prepared in cooperation with Miami-Dade County

By: Scott T. [Prinos](#)

Abstract

The inland extent of saltwater at the base of the Biscayne aquifer in the Model Land Area of Miami-Dade County, Florida, was mapped in 2011. Since that time, the saltwater interface has continued to move inland. The interface is near several active well fields; therefore, an updated approximation of the inland extent of saltwater and an improved understanding of the rate of movement of the saltwater interface are necessary. A geographic information system was used to create a map using the data collected by the organizations that monitor water salinity in this area. An average rate of saltwater interface movement of 140 meters per year was estimated by dividing the distance between two monitoring wells (TPGW-7L and Sec34-MW-02-FS) by the travel time. The travel time was determined by estimating the dates of arrival of the saltwater interface at the wells and computing the difference. This estimate assumes that the interface is traveling east to west between the two monitoring wells. Although monitoring is spatially limited in this area and some of the wells are not ideally designed for salinity monitoring, the monitoring network in this area is improving in spatial distribution and most of the new wells are well designed for salinity monitoring. The approximation of the inland extent of the saltwater interface and the estimated rate of movement of the interface are dependent on existing data. Improved estimates could be obtained by installing uniformly designed monitoring wells in systematic transects extending landward of the advancing saltwater interface.

Suggested Citation

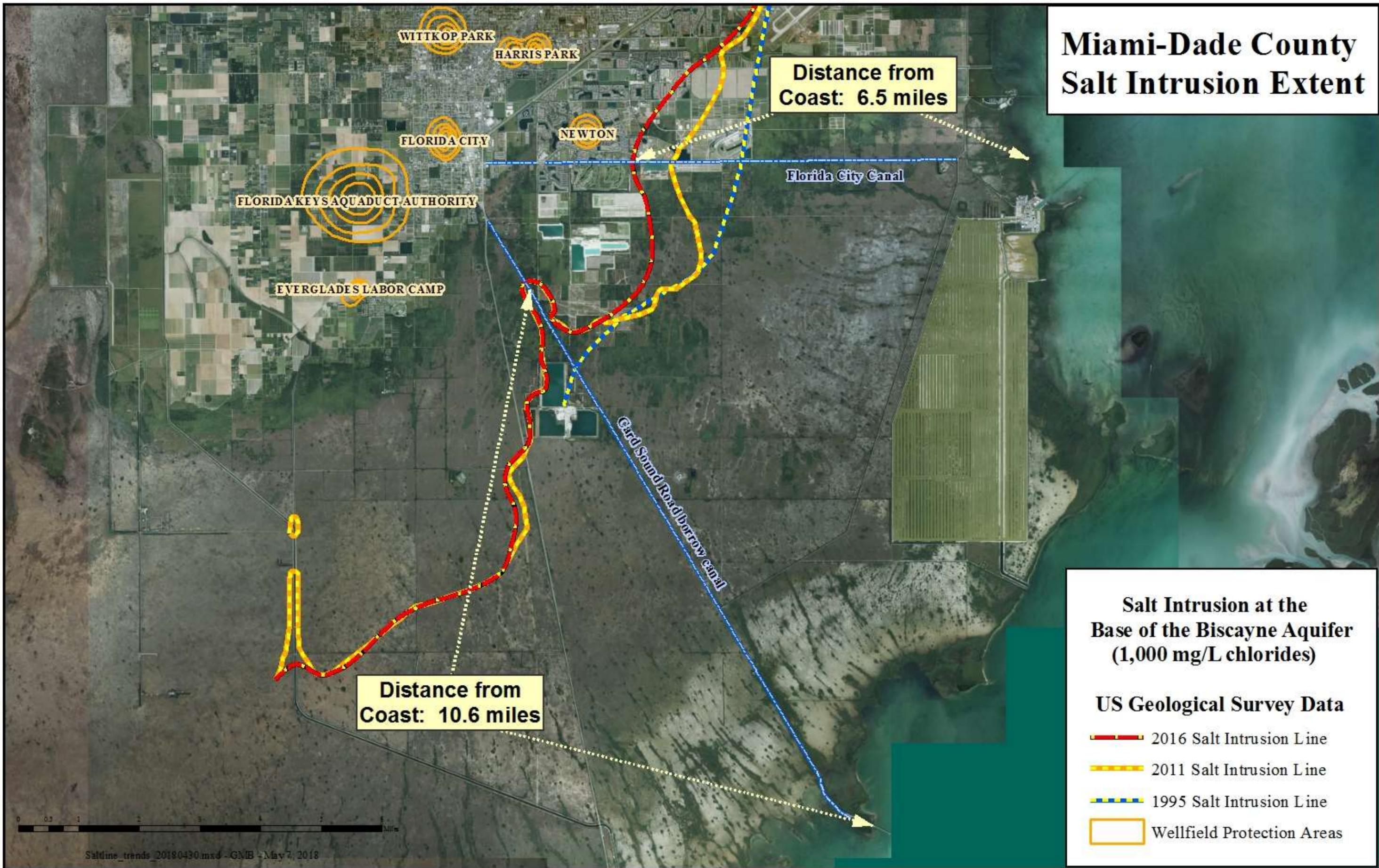
[Prinos](#), S.T., 2017, Map of the approximate inland extent of saltwater at the base of the Biscayne aquifer in the Model Land Area of Miami-Dade County, Florida, 2016: U.S. Geological Survey Scientific Investigations Map 3380, 8-p. pamphlet, 1 sheet, <https://doi.org/10.3133/sim3380>.

ISSN: 2329-132X (online)

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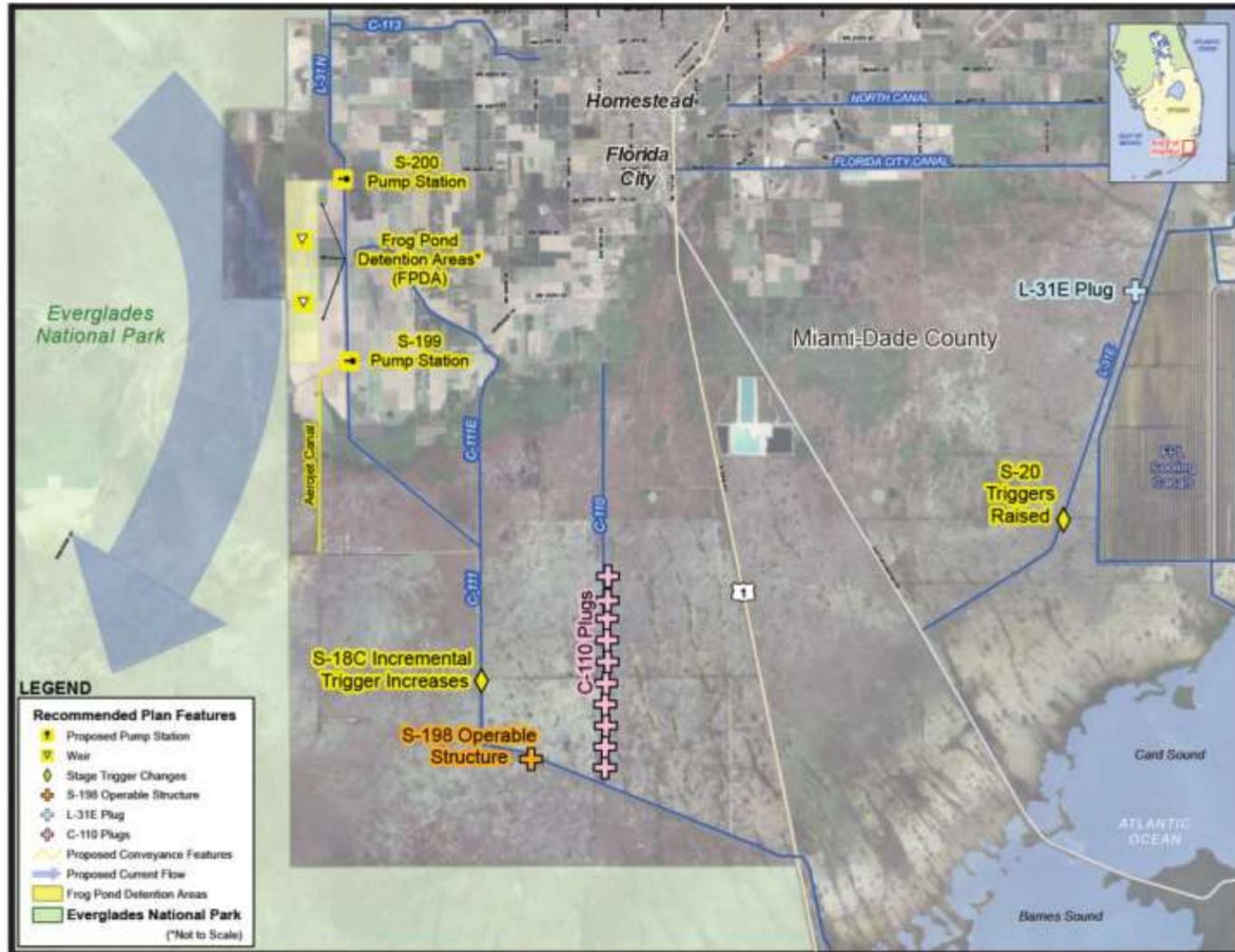
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BBSEER Workshop

Miami-Dade County Salt Intrusion Extent



PROJECT STATUS

On June 10, 2014, the project received congressional authorization in the Water Resources Reform and Development Act (WRRDA) of 2014. Congressional authorization now makes the project eligible for funding during the appropriations process. In February 2012, SFWMD completed construction of the C-111 Spreader Canal Western Project as part of its state-expedited program. The C-111 Spreader Canal Western Project includes the Frog Pond Detention Area, Aerojet Canal features, plugs in the C-110, a plug at S-20A, and **operational changes at S-18C and S-20**. A new structure in the lower C-111 Canal is scheduled for construction in the future.



C-111 Spreader Canal Western CERP Project

- February 2012 – Project Construction completed under SFWMD state-expedited program
- June 10, 2014 Congressional Authorization (WRDA 2014)
- Features:
 - ✓ Frog Pond Detention Area
 - ✓ Aerojet Canal Features
 - ✓ Plugs in C-110
 - ✓ Operational Changes at S-18C
 - ✓ Plug at S-20A
 - ✓ **Operational Changes at S-20**

FOR MORE INFORMATION



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C-111 Spreader Canal Western CERP Project

CENTRAL AND SOUTHERN FLORIDA PROJECT
COMPREHENSIVE EVERGLADES RESTORATION PLAN
C-111 SPREADER CANAL WESTERN

FINAL INTEGRATED
PROJECT IMPLEMENTATION REPORT
AND
ENVIRONMENTAL IMPACT STATEMENT

EXECUTIVE SUMMARY

Page xii:

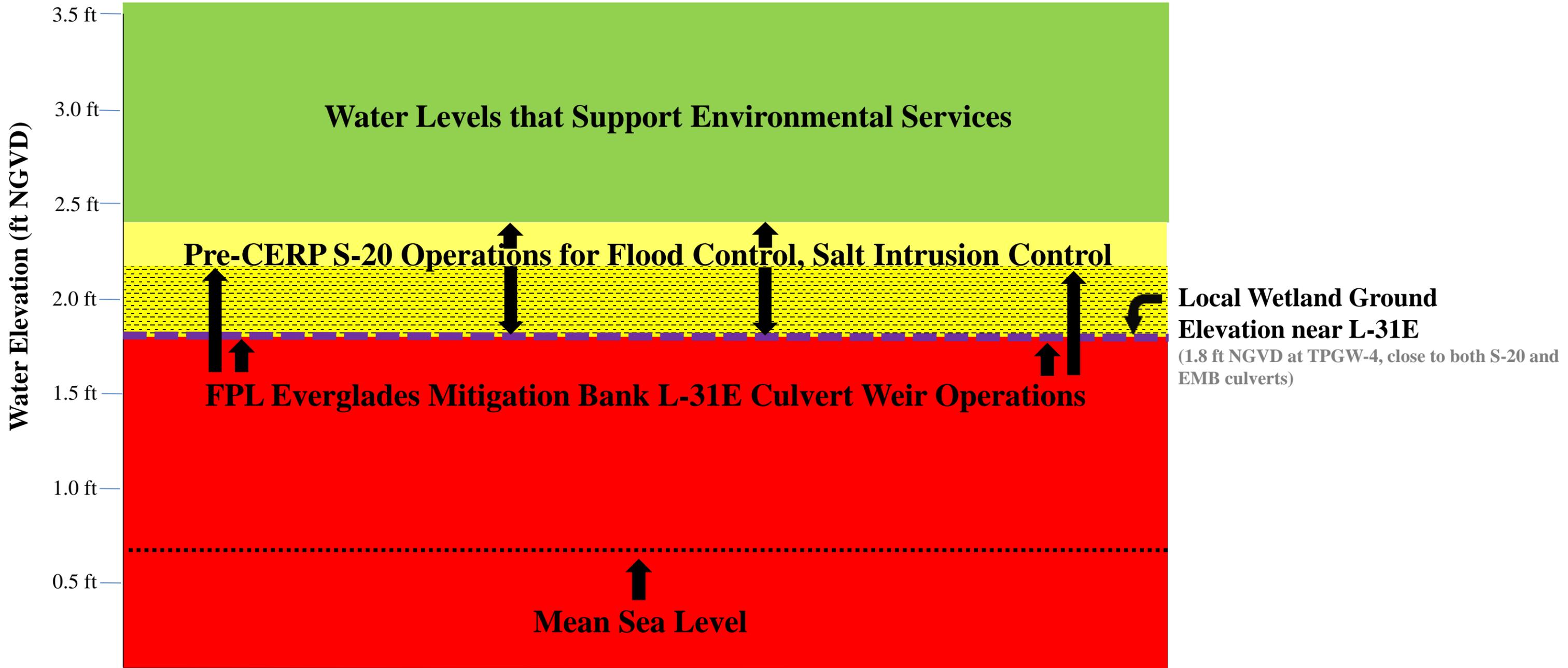
PLUG AT S-20A AND OPERATIONAL CHANGES AT S-20

The plan includes the construction of a permanent plug at existing structure S-20A in the L-31E Canal, and operational changes at existing structure S-20. The proposed plug near S-20A and proposed operational changes at S-20, specifically raising the “open and close” triggers to 0.5-feet, are intended to restore hydroperiods within the Model Land.

OUR CONCLUSION: HYDROPERIOD RESTORATION IS DEPENDENT ON A REDUCTION IN OVERDRAINAGE CAUSED BY CANAL INFRASTRUCTURE



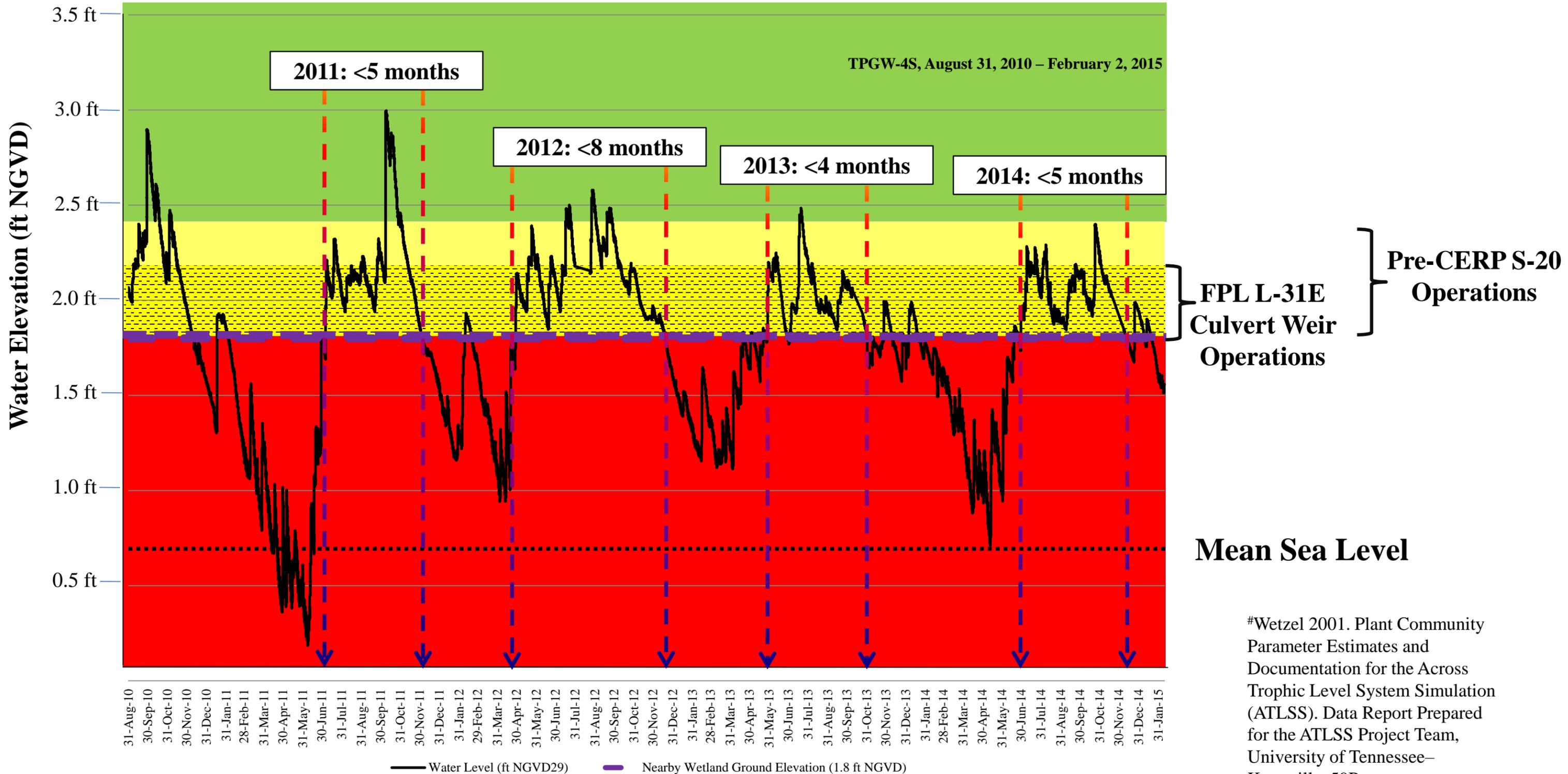
Model Lands Groundwater Control Elevations Pre-CERP Water Management





Model Lands Groundwater Stages Existing Conditions vs. Healthy Ecology

Healthy Sawgrass Prairie:
8-10 months Hydroperiod[#]



[#]Wetzel 2001. Plant Community Parameter Estimates and Documentation for the Across Trophic Level System Simulation (ATLSS). Data Report Prepared for the ATLSS Project Team, University of Tennessee–Knoxville, 59Pp.

C-111 Spreader Canal Western CERP Project

Florida Department of Environmental Protection

COMPREHENSIVE EVERGLADES RESTORATION PLAN REGULATION ACT (CERPRA) PERMIT CONSTRUCTION AND OPERATIONS AUTHORIZATION

PERMITTEE:

South Florida Water Management District
3301 Gun Club Road
West Palm Beach, FL 33406

ATTENTION:

Mr. Peter Antonacci
Executive Director

Permit Number: 0293559-011

Project: C-111 Spreader Canal

Phase: Phase 1 (Western Features)

County: Miami-Dade

Date of Original

Permit Issuance: October 08, 2009

Renewal Date: December 16, 2015

Major Modification Date: December 20, 2016

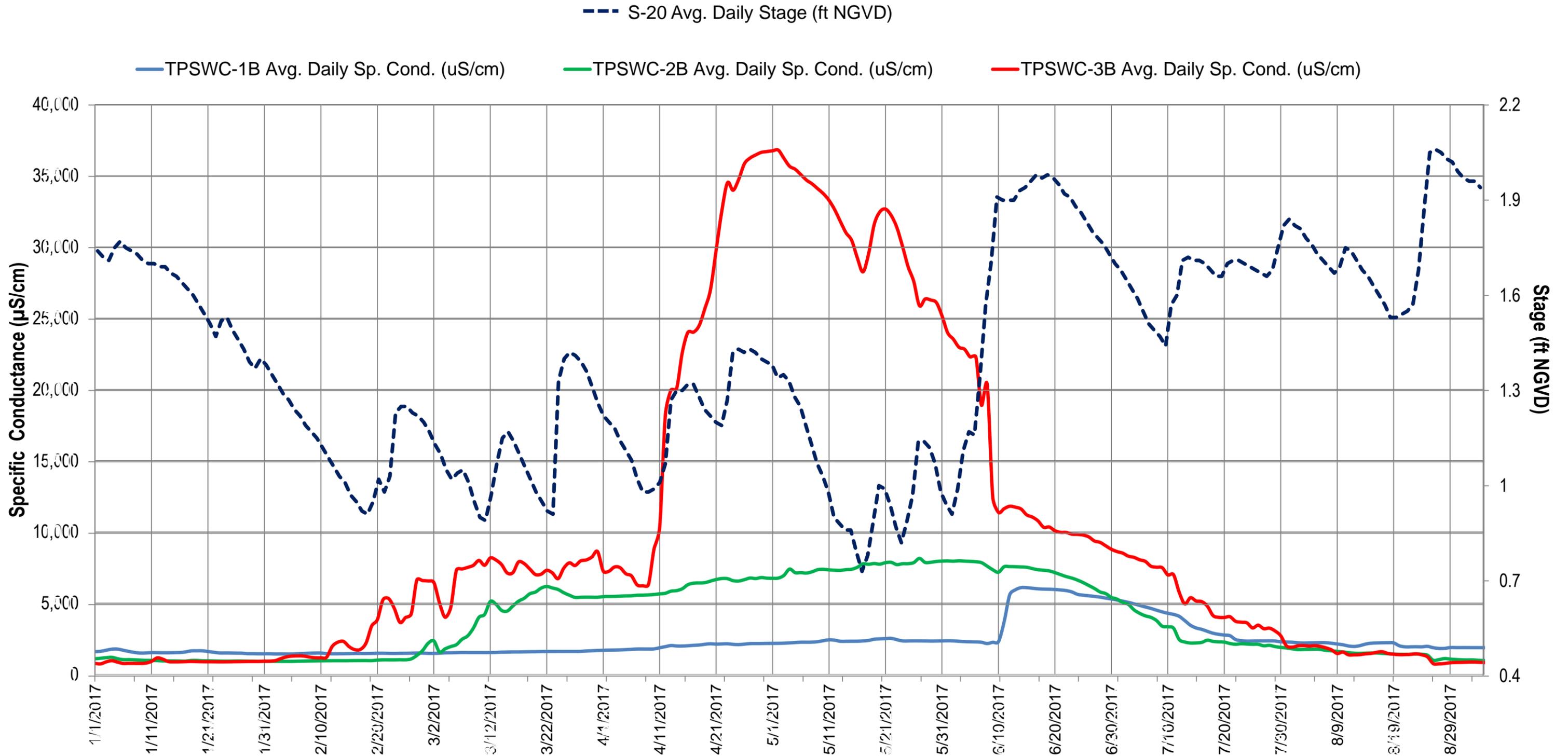
Expiration Date: December 16, 2020

6. Incremental Operational Testing adjustments to Structures S-20

Temporary incremental changes to the operations at the S-20 Structure will be included as part of this project in order to maximize restoration efforts within the project area. Hydrometeorological monitoring and reporting of the upstream and adjacent areas will be required prior to implementation of each incremental change. Permanent changes to the operation of the S-20 structure shall require separate review and approval by the Department to determine whether a permit modification will be required.

L-31E Canal Bottom Specific Conductance vs. Surface Water Stage

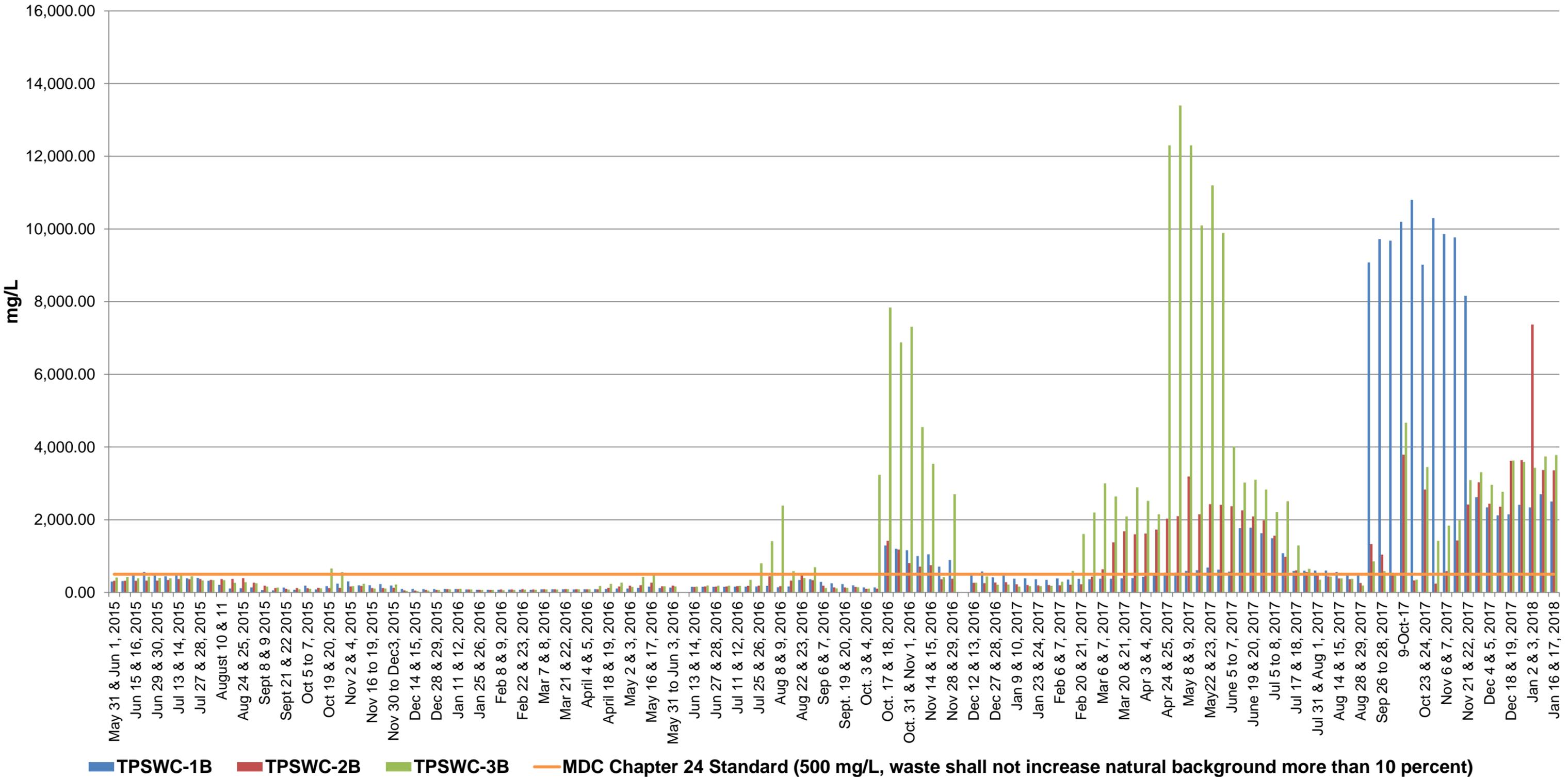
January 1 to September 4, 2017

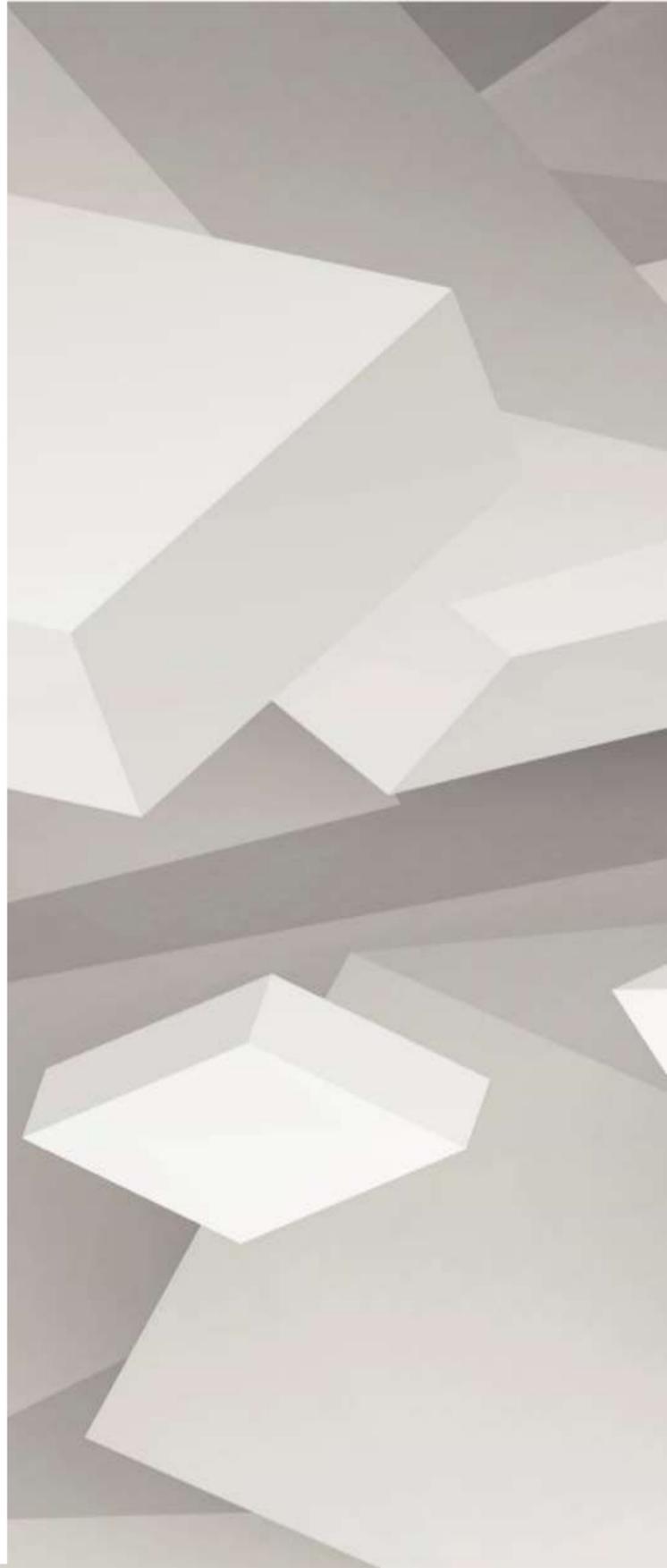
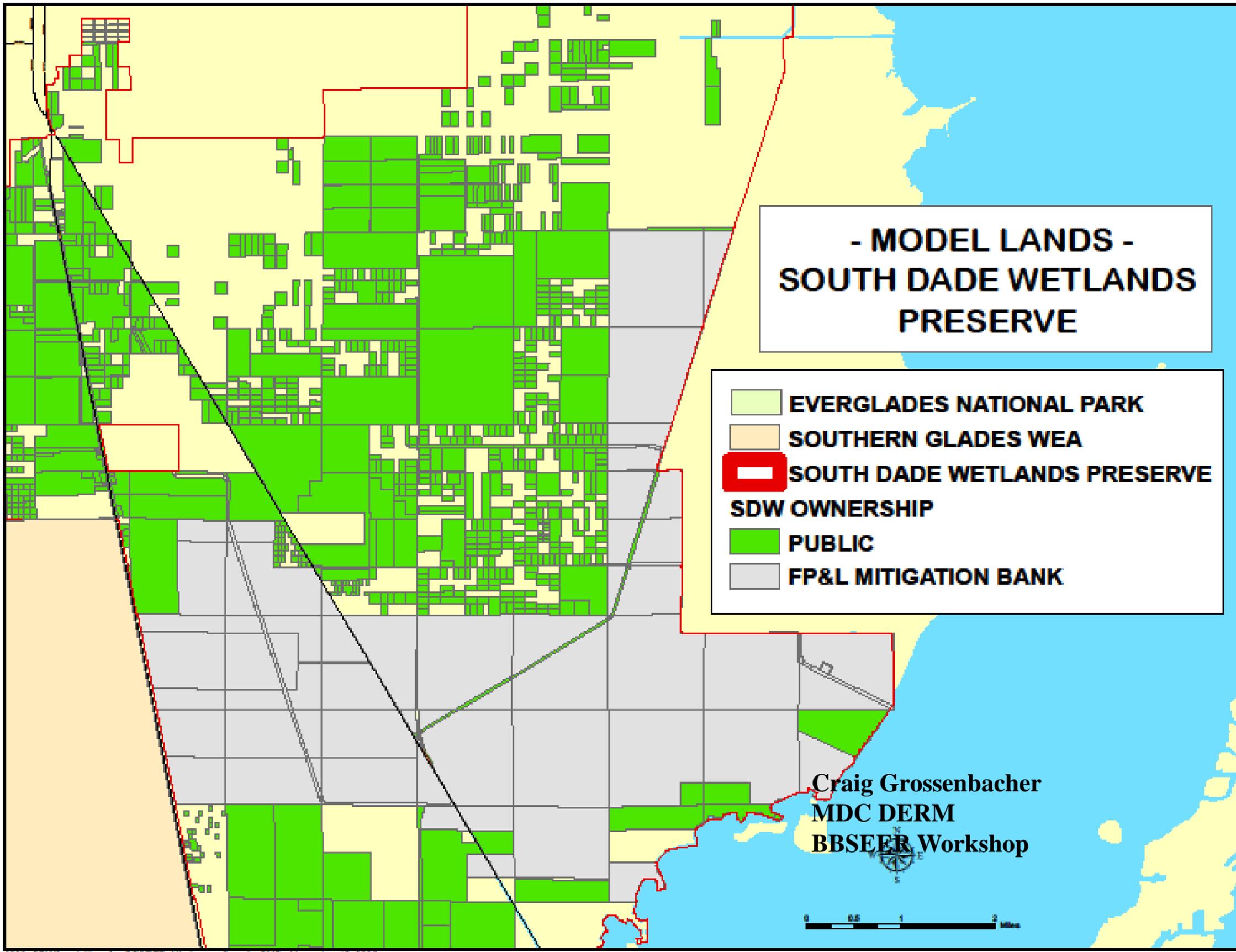


DERM Class I Permit Required Monitoring in L-31E Canal

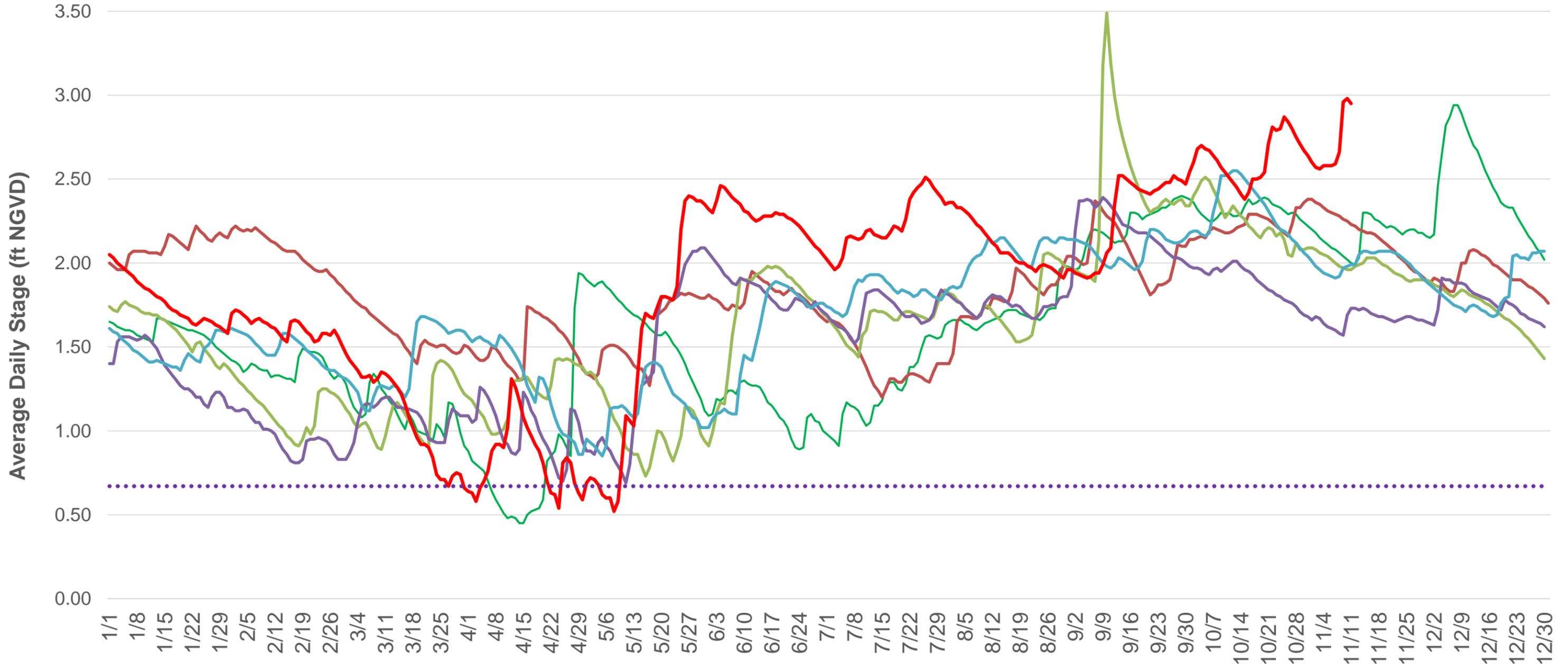
Summary of Chloride Results

June 2015 to January 17, 2018





S-20 Average Daily Upstream Stage (ft NGVD) 2015-2020



- S-20 Average Daily Upstream Stage (ft NGVD) for 2015
- S-20 Average Daily Upstream Stage (ft NGVD) for 2016
- S-20 Average Daily Upstream Stage (ft NGVD) for 2017
- S-20 Average Daily Upstream Stage (ft NGVD) for 2018
- S-20 Average Daily Upstream Stage (ft NGVD) for 2019
- S-20 Average Daily Upstream Stage (ft NGVD) for 2020
- Mean Sea Level (0.67 ft NGVD)

Key Points

- Per the CERP PDT, the Model Lands Basin has been overdrained by the L-31E canal and S-20 water control structure, with water levels occasionally dropping below sea level
- Overdrainage needs to be stopped to restore both wetland stage and hydroperiod per CERP
- CERP authorized a change in S-20 operations to increase trigger stages by 0.5 ft in order to reduce overdrainage in the Model Lands
- The S-20 operations change was approved as a 2-year deviation permit to study the effects of increasing the trigger stages, effective October 14, 2019.
- There is already evidence that this operations change has the potential to improve both wetland stage and hydroperiod in the Model Lands.
- The agencies agree that moving water out of the Model Lands through FPL's mitigation bank culverts to the tidal wetlands is preferable to drainage via the S-20 water control structure.
- The S-20 operations change is expected to make additional water available for release through the FPL culverts – a “win-win” for all parties.

Craig Grossenbacher
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BBSEER Workshop

2/2016

THANK YOU

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BBSEER Workshop