Response to the WCA-3A High Water Emergency February – May 2016

Greater Everglades Ecosystem Restoration Conference April 19, 2017

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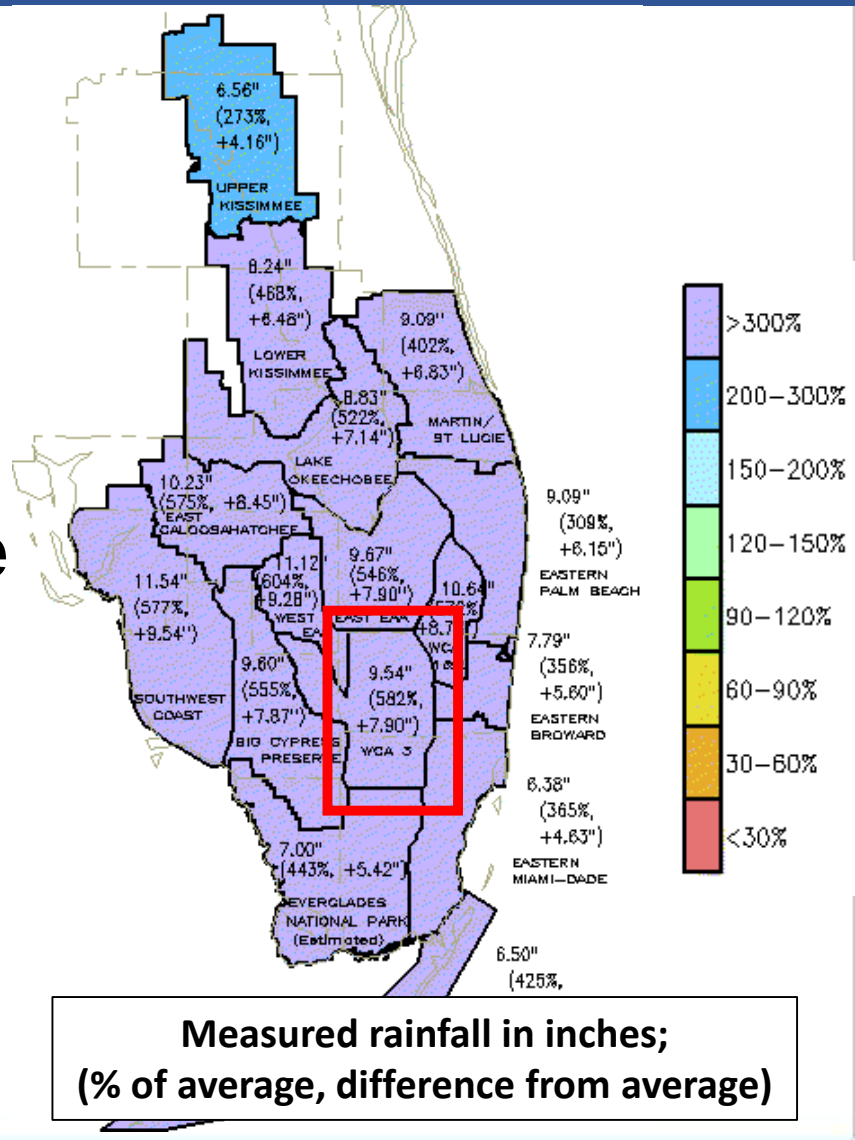
Deployment of temporary pumps next to S-355B on L-29 Canal

C-358 Berm Repair

S-357 Pump Station

2016 Extraordinary Natural Phenomena

- January 2016 WCA-3A rainfall (9.5 inches, 300% of average) was the highest January rainfall since recordkeeping began in 1957
- The 4.8-inch three-day WCA-3A rainfall January 27-29, 2016 was more than twice the average amount for January
- January 2016 SFWMD rainfall (9.2 inches, 476% of average) was also a record amount

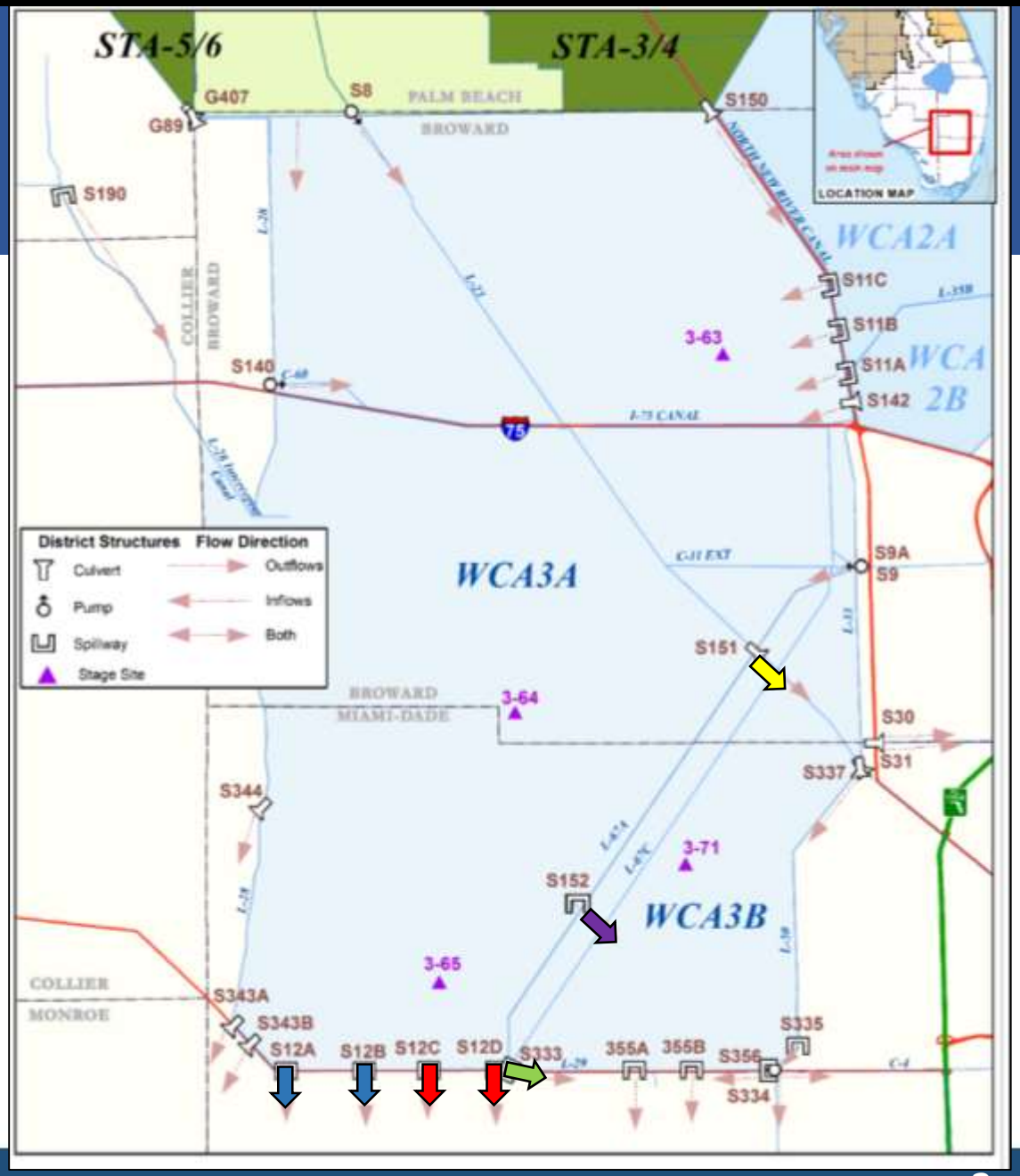


Measured rainfall in inches;
(% of average, difference from average)

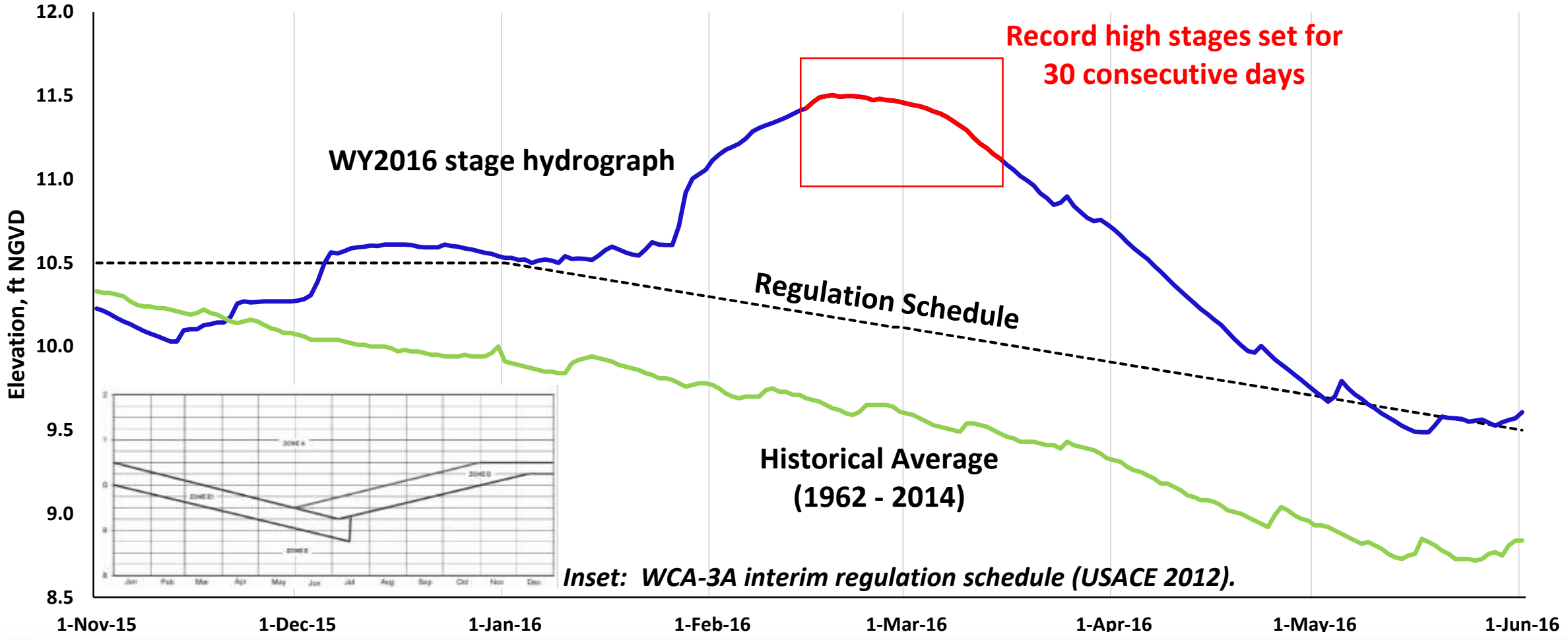
Water Conservation Area 3

- Largest of the three WCAs; 915 square miles
- Divided into WCA-3A and WCA-3B in 1962 to reduce seepage losses

- Major outflow structures:
  - S-12A, S-12B
  - S-12C, S-12D
  - S-333
  - S-151
  - S-152

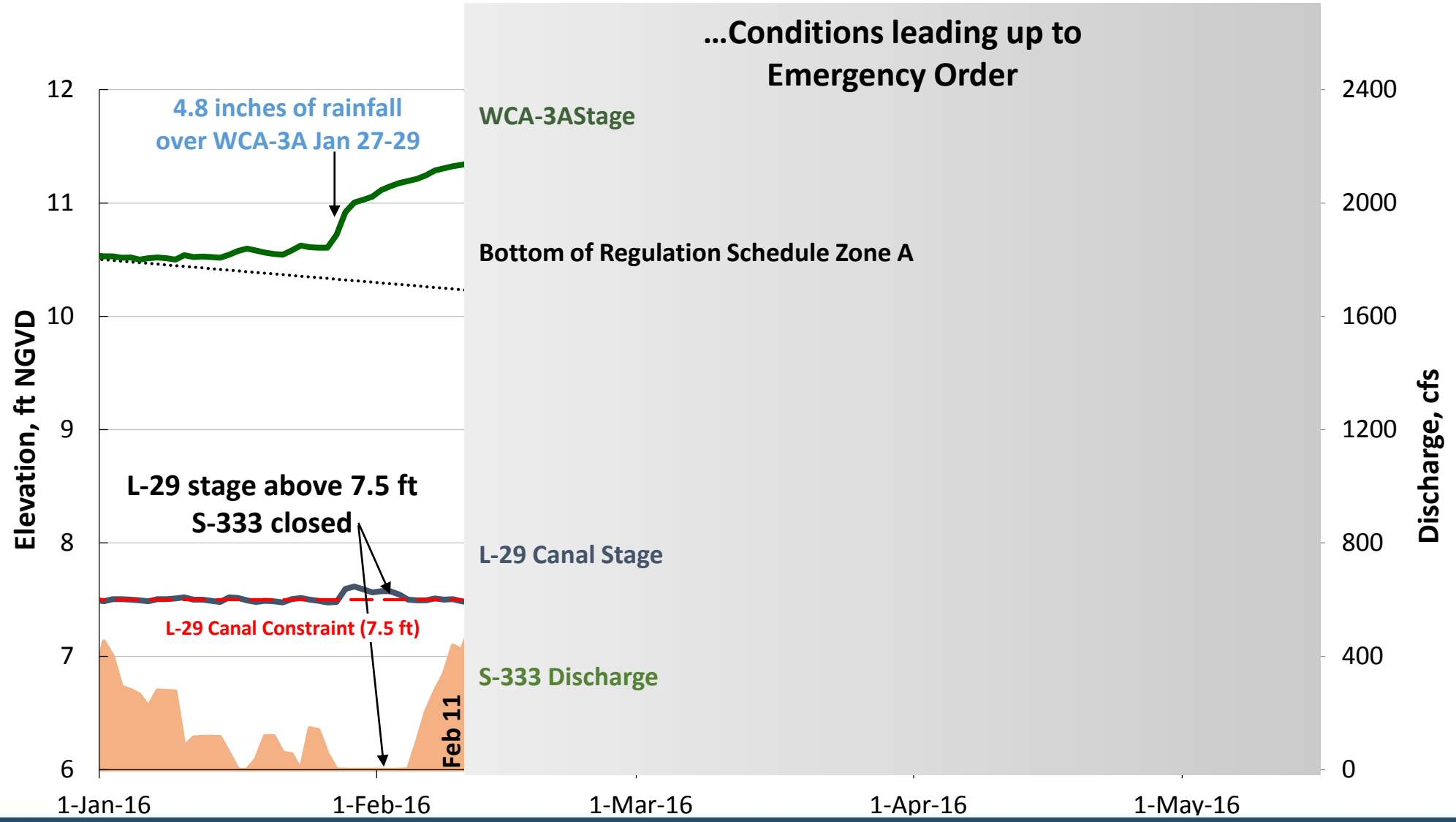


WCA-3A WY 2016 Dry Season, Historical Average and Regulation Stages



Inset: WCA-3A interim regulation schedule (USACE 2012).

Effect of Emergency Operations



Emergency Operations Field Work

Deployment of Temporary Pumps on the L-29 Levee

Emergency Operations Field Work

Protecting Businesses Along Tamiami Trail from Higher L-29 Canal Stages

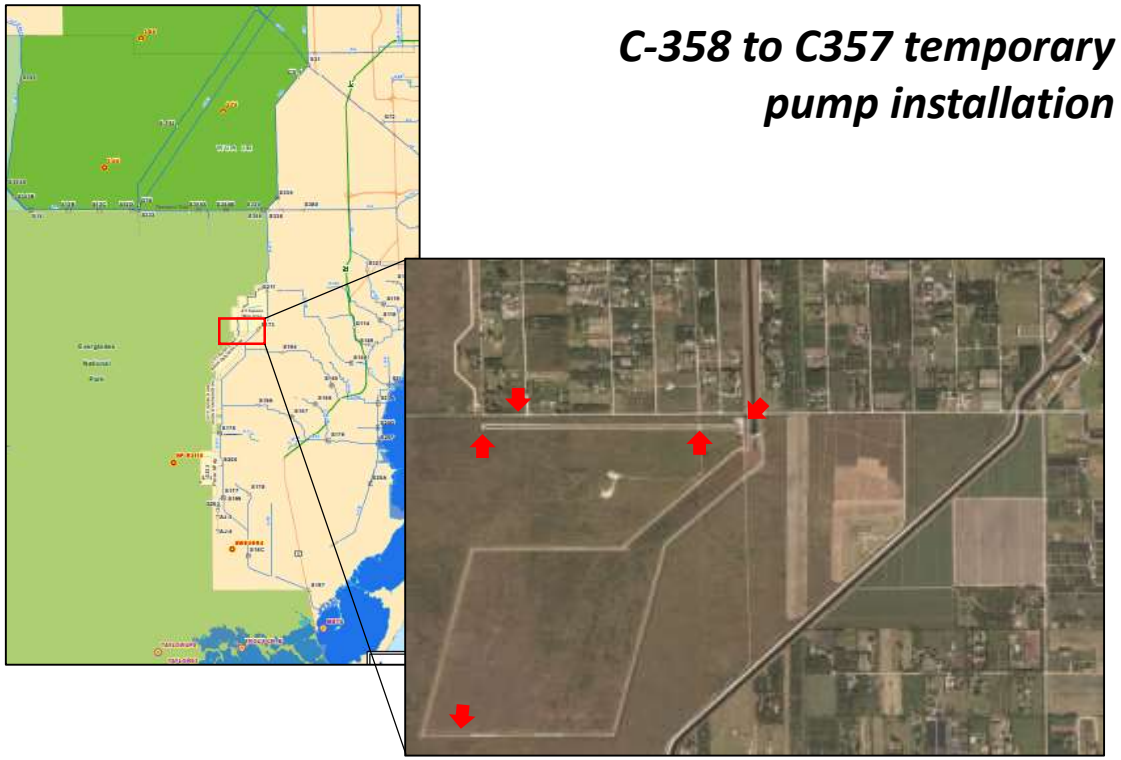
Placement of culvert covers at Gator Park

Before and after placement of sand to provide dry refugia for crocodiles at Everglades Safari Park

Installation of elevated walkway with handrails at Everglades Safari Park

Emergency Operations Field Work

Mitigation for Higher Water Levels in the Las Palmas Community



C-358 to C357 temporary pump installation

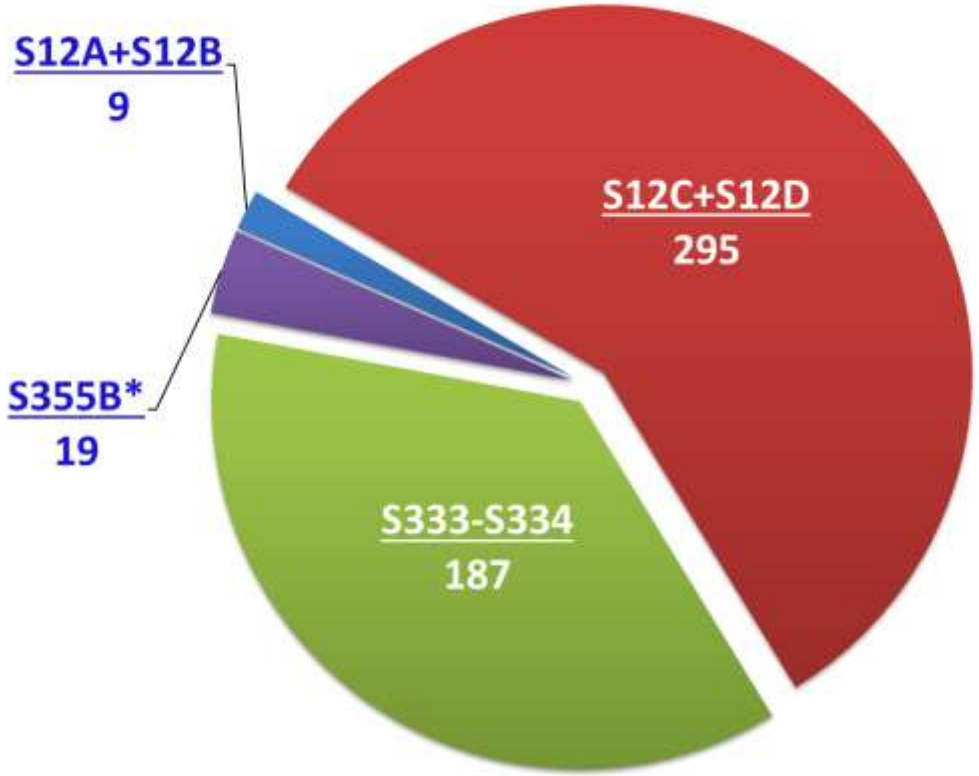
C-358 seepage collection canal west end berm erosion and repair

WCA-3A/3B Discharge South

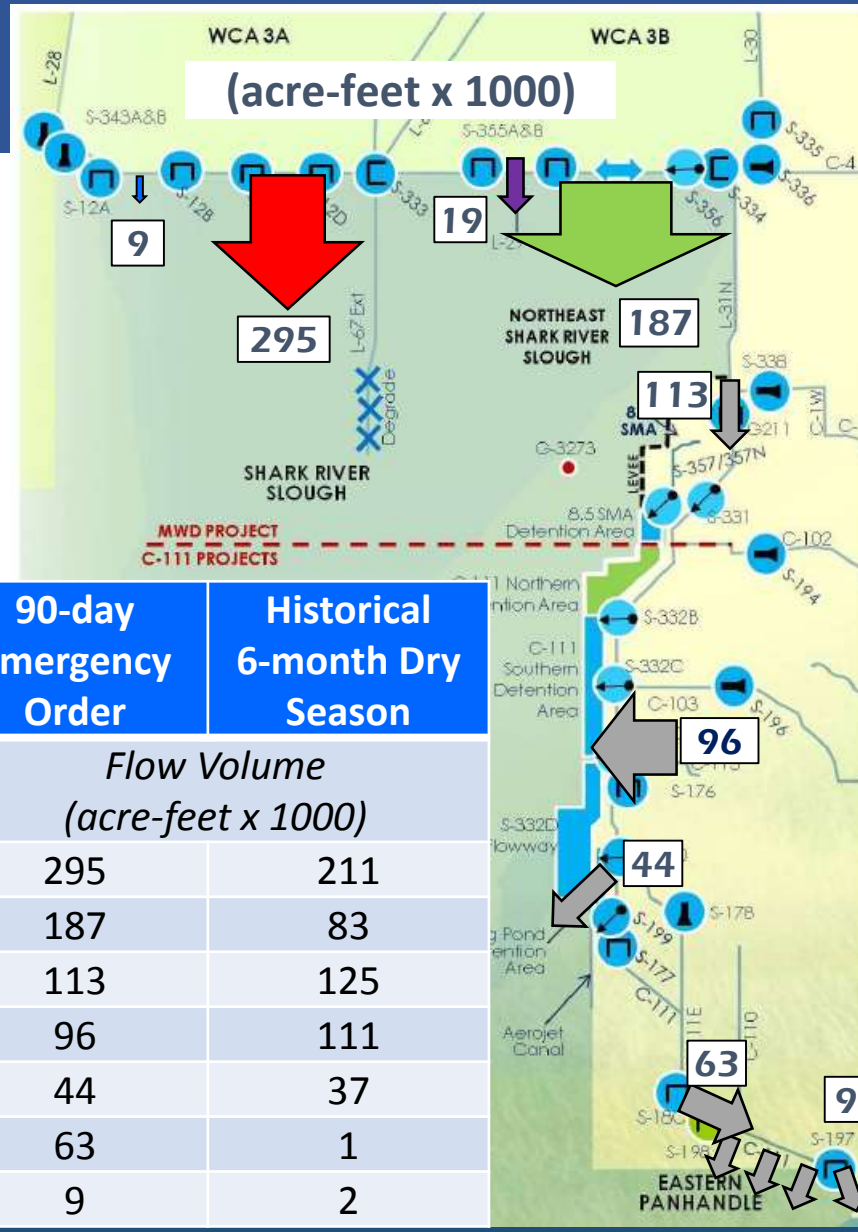
February 12 – May 11, 2016

Flows to Shark River Slough

Flow volumes in acre-feet x 1000



**** Temporary pump stations deployed next to S-355B***



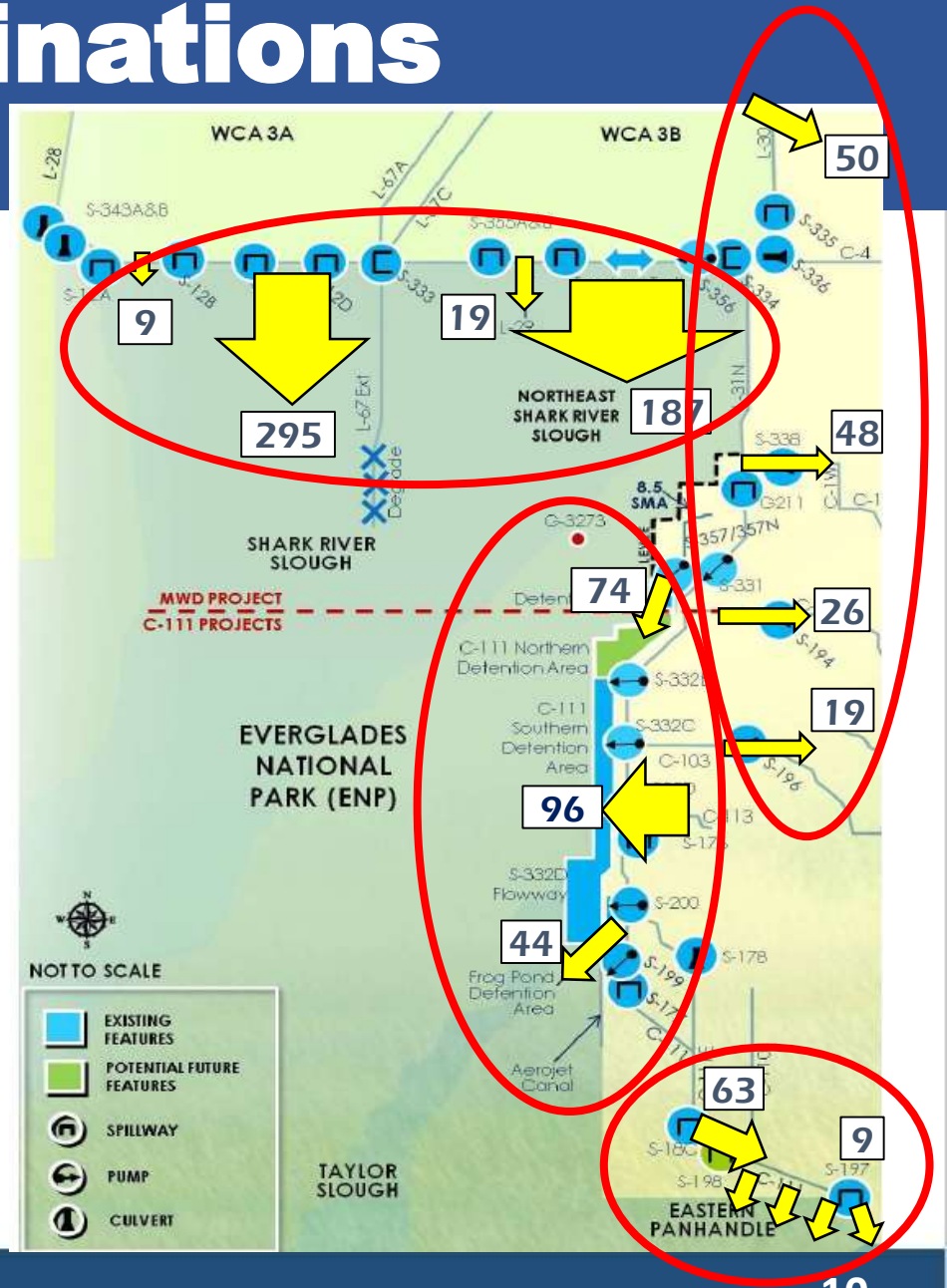
Structure	90-day Emergency Order	Historical 6-month Dry Season
	Flow Volume (acre-feet x 1000)	
S-12C + S-12D	295	211
S-333 – S-334	187	83
G-211	113	125
S-332B, C, D	96	111
S-199 + S-200	44	37
S-18C	63	1
S-197	9	2

WCA-3A/3B Discharge Destinations

February 12 – May 11, 2016

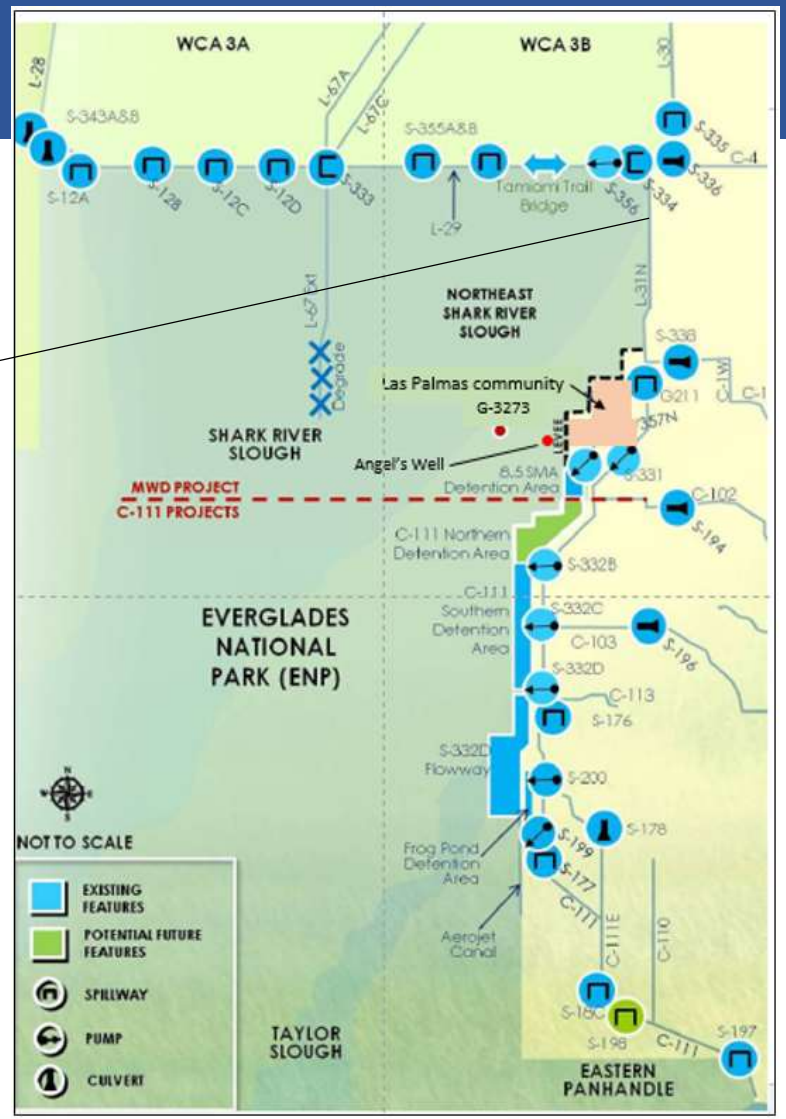
- East Coast Basins: 143
- Everglades National Park:
  - Shark River Slough: 510
  - Detention Areas / Hydraulic Ridge and Taylor Slough: 214
  - S-18C (toward Eastern Panhandle and Barnes Sound): 63
- S-197: 9

Flow volumes are in acre-feet x 1000

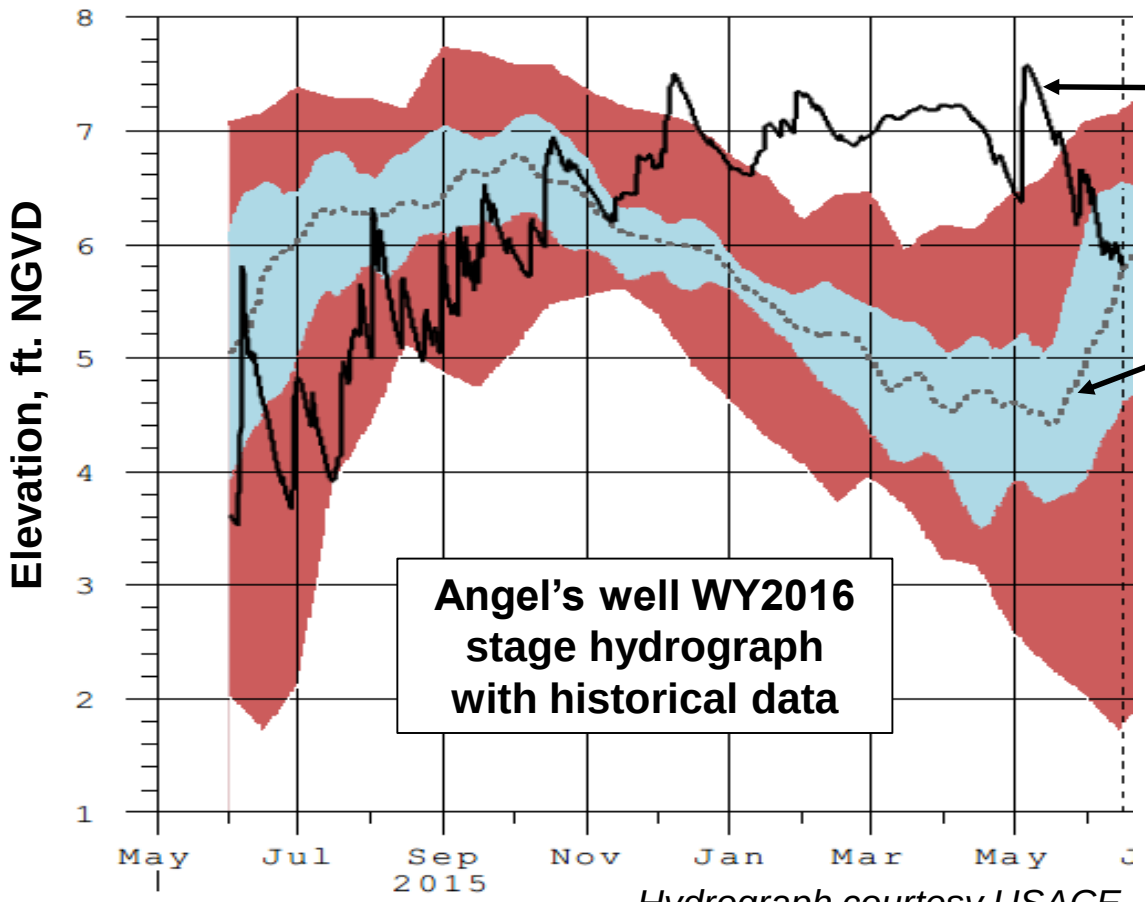


Water Level Response in Northeast Shark River Slough

Northeast Shark River Slough next to L-31 Canal, January 2016 (looking south)



Water Level Response in Northeast Shark River Slough



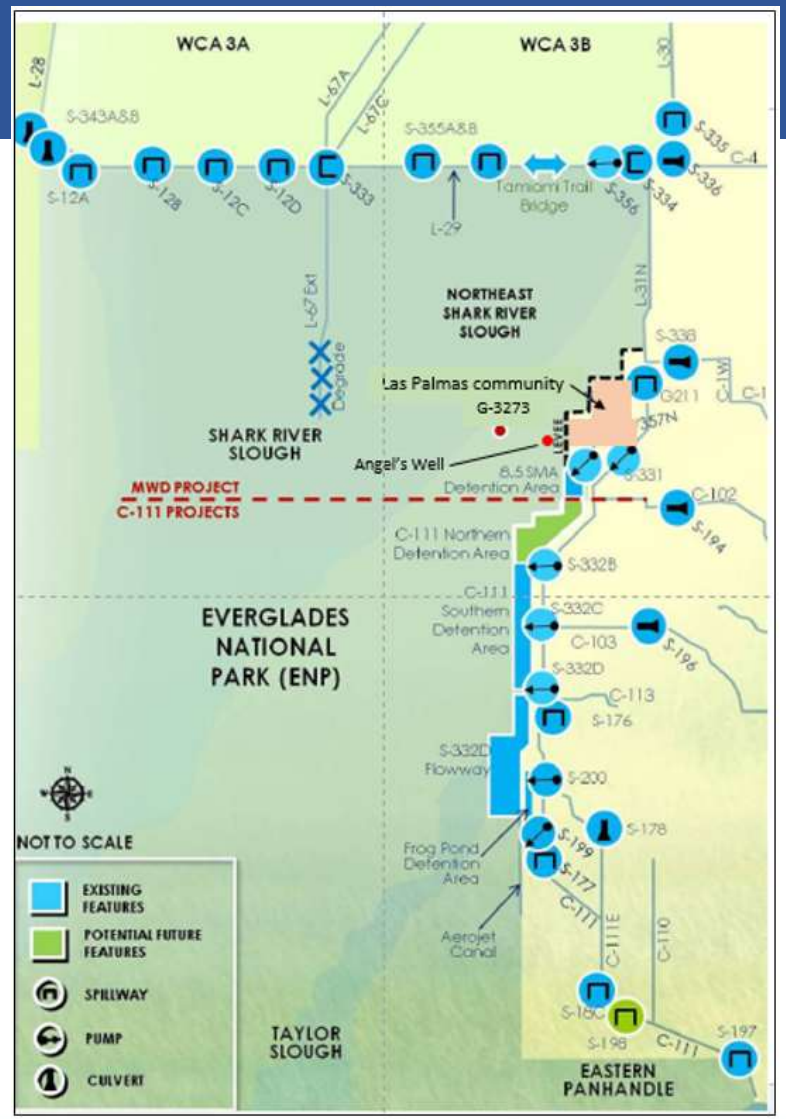
Hydrograph courtesy USACE

WY2016 stage

Median daily stage (2002 -2015)

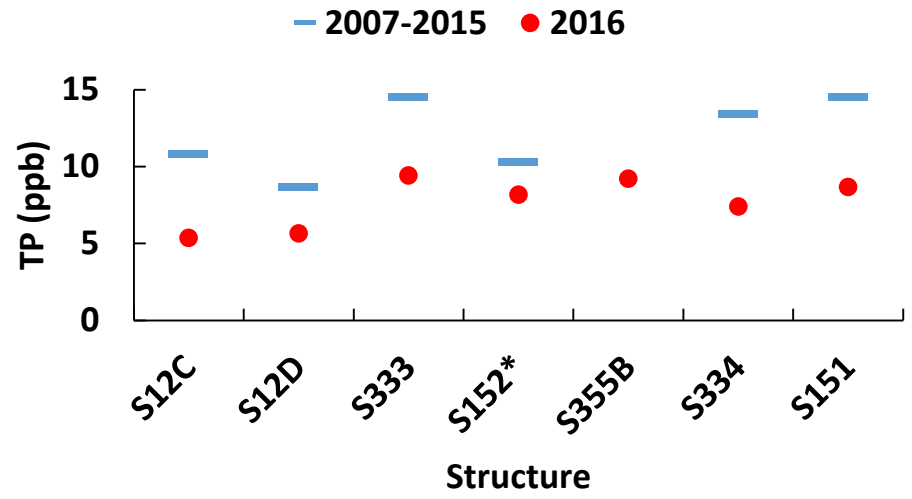
50% band

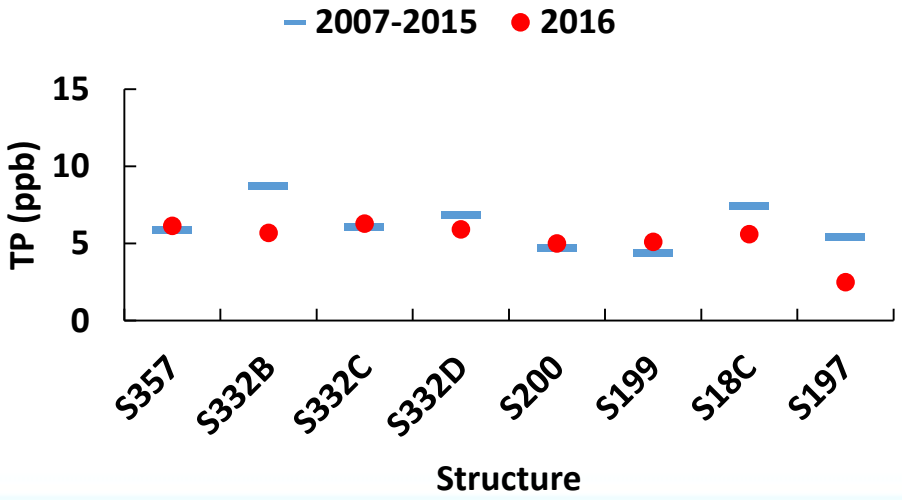
95% band



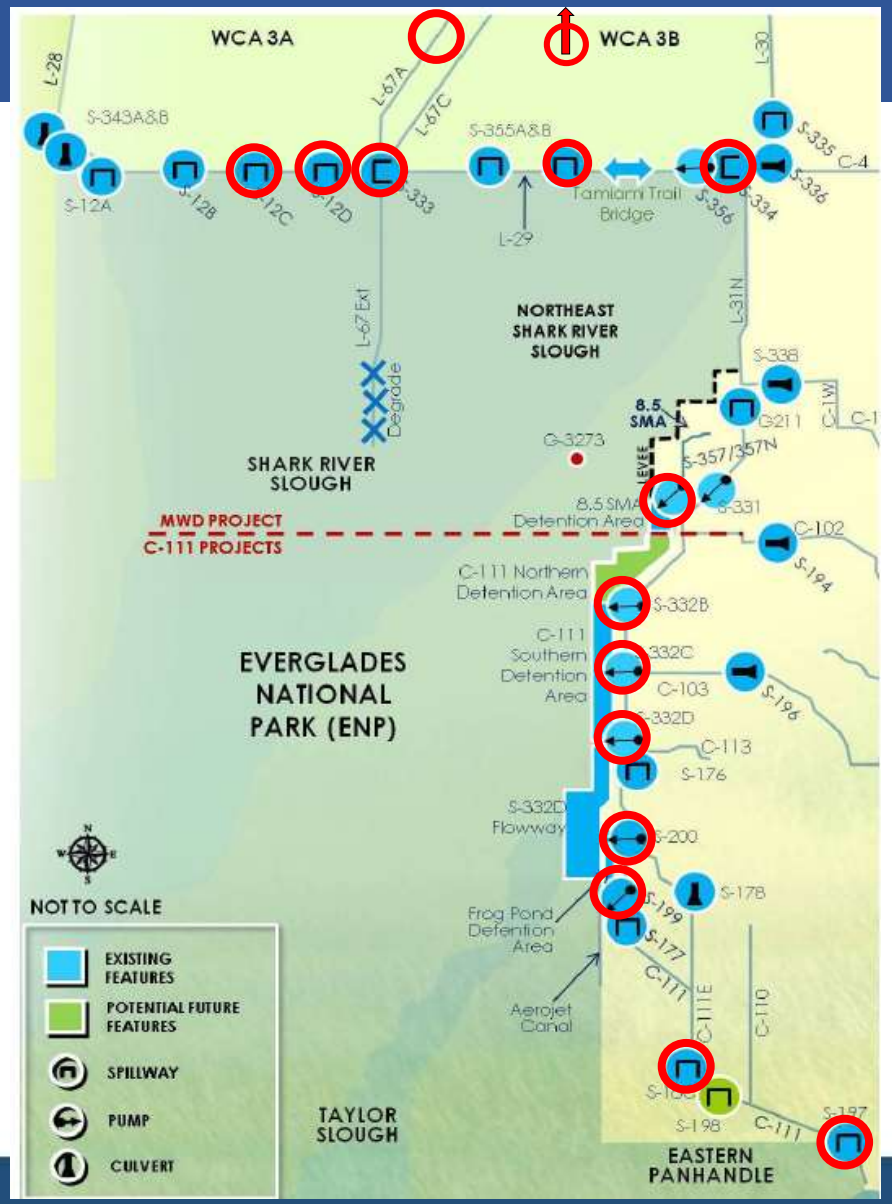
Total Phosphorus Concentration Comparison

February – May Periods

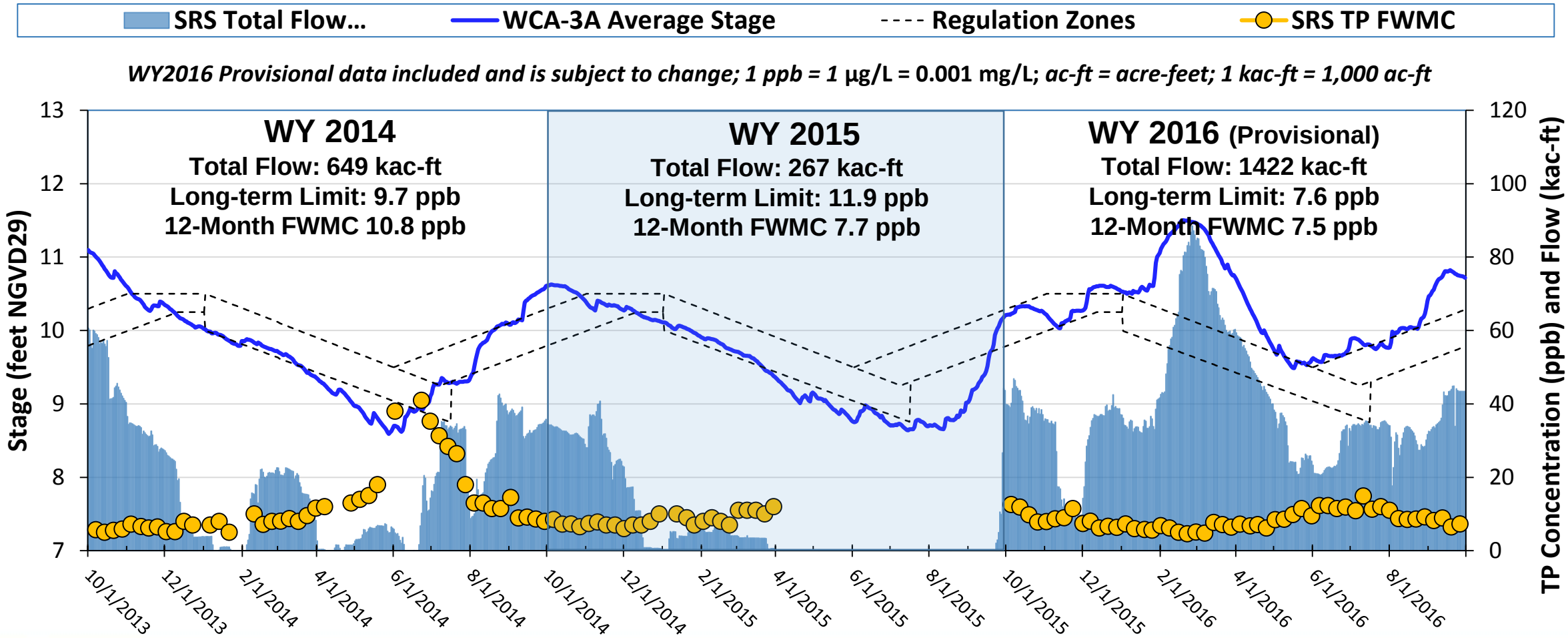




** Concentrations are presented as flow-weighted means except for S-152 which is a geometric mean*

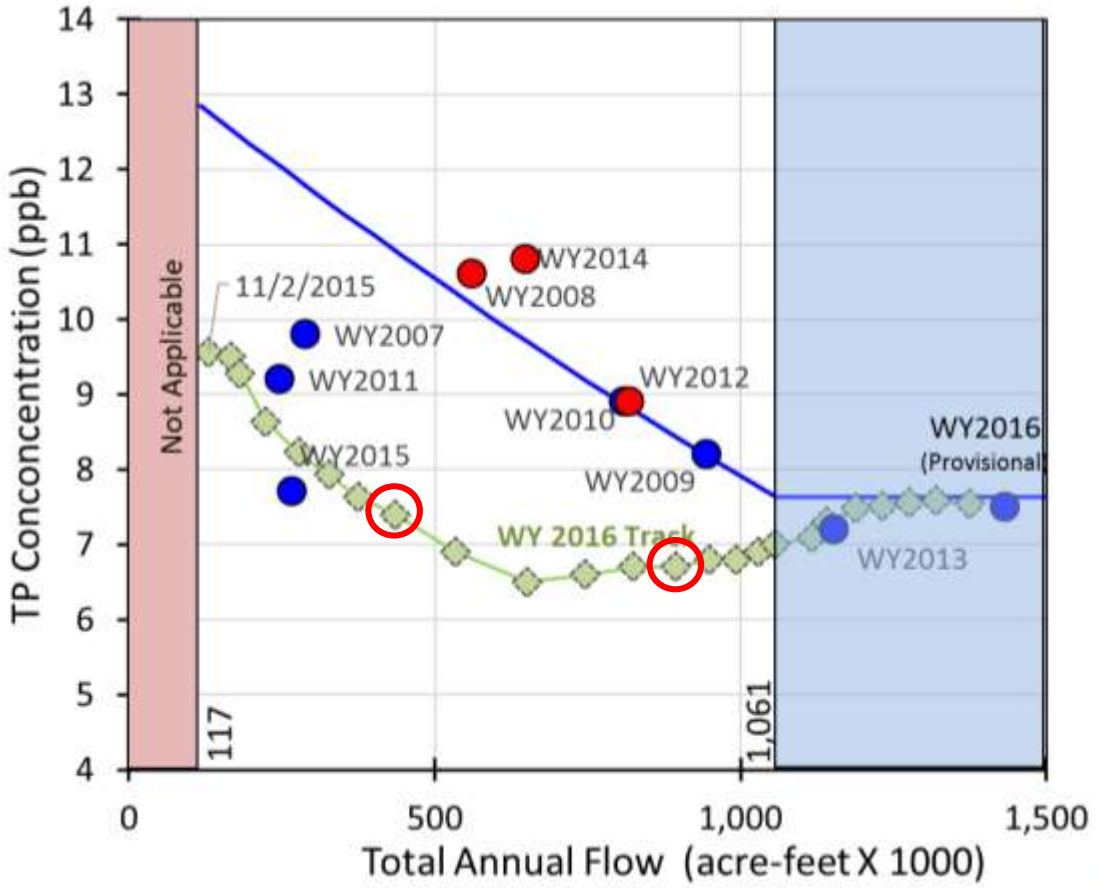


WCA-3A Stage and Flow with TP Flow-weighted Mean Concentrations to Shark River Slough



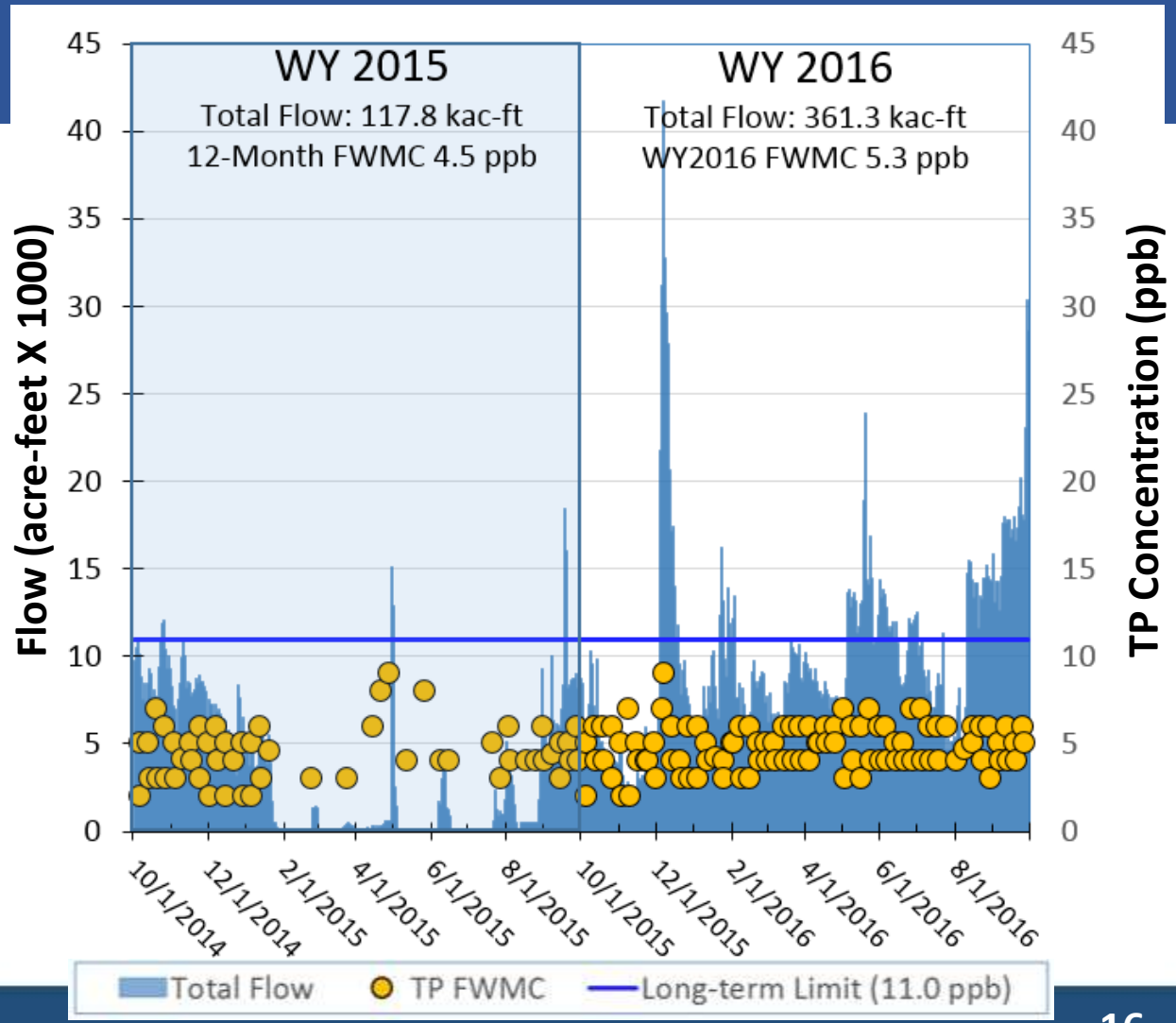
Relationship between the Shark River Slough Federal Water Year Total Flow and TP Flow-Weighted Mean Concentration

- Phosphorus compliance for Shark River Slough based on annual flow-weighted mean TP concentration
- Variable TP limit decreases as flow increases into SRS
- Lowest Limit is 7.6 ppb for total annual flows ≥ 1,061 acre-feet x 1000
- Federal water year to-date TP FWM concentration decreased during emergency operations

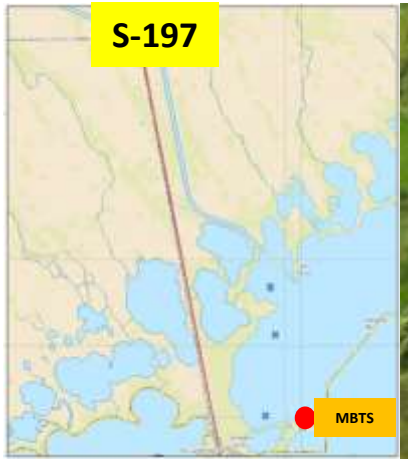


Flow and TP Flow-Weighted Mean Concentration to Taylor Slough and Coastal Basins

- Consent Decree compliance for Taylor Slough and Coastal Basins is based on an annual flow-weighted mean TP concentration
- The TP limit is fixed at 11 ppb
- The provisional WY2016 FWM TP concentration is 5.3 ppb



Manatee Bay and Barnes Sound



Thalassia testudinum Manatee Bay May 23, 2016; photo courtesy Miami-Dade Department of Environmental Resources Management

Summary

- WCA-3A stage was significantly lowered as a result of emergency operations
- More than one half million acre-feet of water was delivered to Shark River Slough
- Inflow TP concentrations to ENP were between 5 and 10 parts per billion and were below historical average concentrations for this time of year
- Discharges through S-197 helped maintain desirable salinity in Manatee Bay and Barnes Sound; healthy bottom cover and clear water conditions were sustained

For More Information

SFWMD publication

Emergency Operations After Action Report High Water Conditions in the South Florida Region February 12 – May 11, 2016

available online at
http://www.sfwmd.gov