

WRTF Presentation

October 27, 2022

Background and Need for Corbett

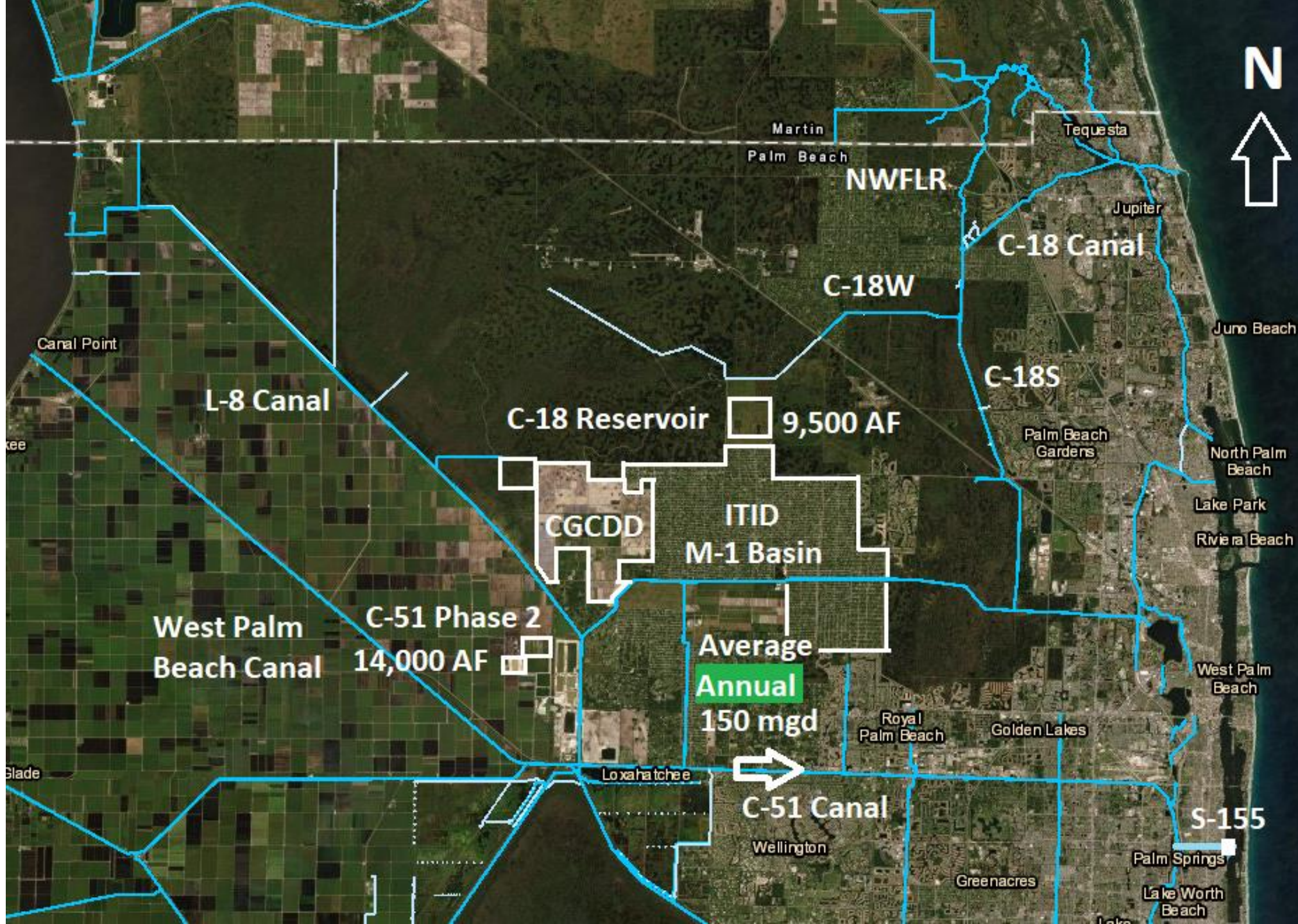
Levee Upgrade

L-8 Canal Flows and Stages During

Hurricane Ian

# Description of the L-8 Basin

(Numbers provided are not exact!)



# Areas Draining into the L-8 Basin

The L-8 Basin receives excess water from CGCDD, ITID, J.W. Corbett WMA, Dupuis Wildlife Preserves, EAA (4,640 acres of the Bourne Two Area), and the White Fences and Deer Run Developments. With resolution of the pump station issues for White Fences, CGCDD and ITID are the most impacted by high water in the L-8 Canal.

# L-8 Basin Details

Total Area on the order of 171.2 square miles (109,568 acres).

J. W. Corbett WMA and Dupuis Wildlife Preserve make up about 62,600 acres. Using a drainage rate of 0.25 inches per day the WMA generate about 660 cfs.

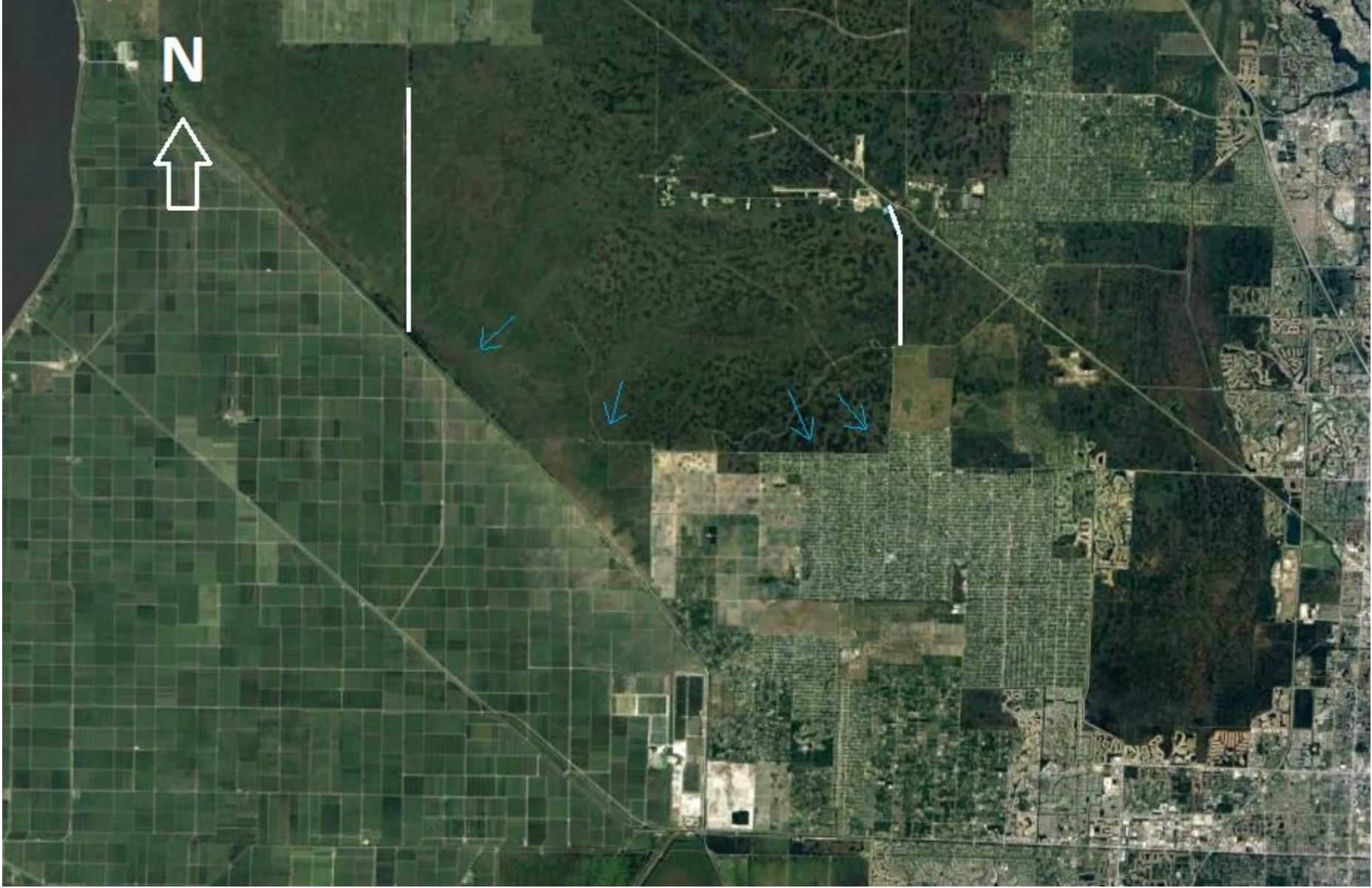
Using an average of 0.75 inches per day for the remaining 46,968 acres the discharge is 1,479 cfs. The 46,968 acres includes ITID and CGCDD.

These flows total about 2,139 cfs. This number is an order of magnitude estimate.

# Corbett WMA Levee

The levee along the north side of ITID separates the J.W. Corbett Wildlife Management Area (WMA) from ITID. As can be seen from the following figures the land in the WMA slopes to the south and southeast.

The levee is essential as it prevents J.W. Corbett WMA runoff from flooding ITID and holds this water for hydroperiod maintenance in the WMA.



## Map of Study Area:

The 2016 bare earth Digital Elevation Model (DEM) is colorized as shown in the legend below.

The highest elevation for this area is less than 26 feet. The cell size is 2.5 x 2.5 feet. The LiDAR is Quality Level -2 (QL-2). The Aggregated Nominal Pulse Density (ANPD) is 1.7 per meter square

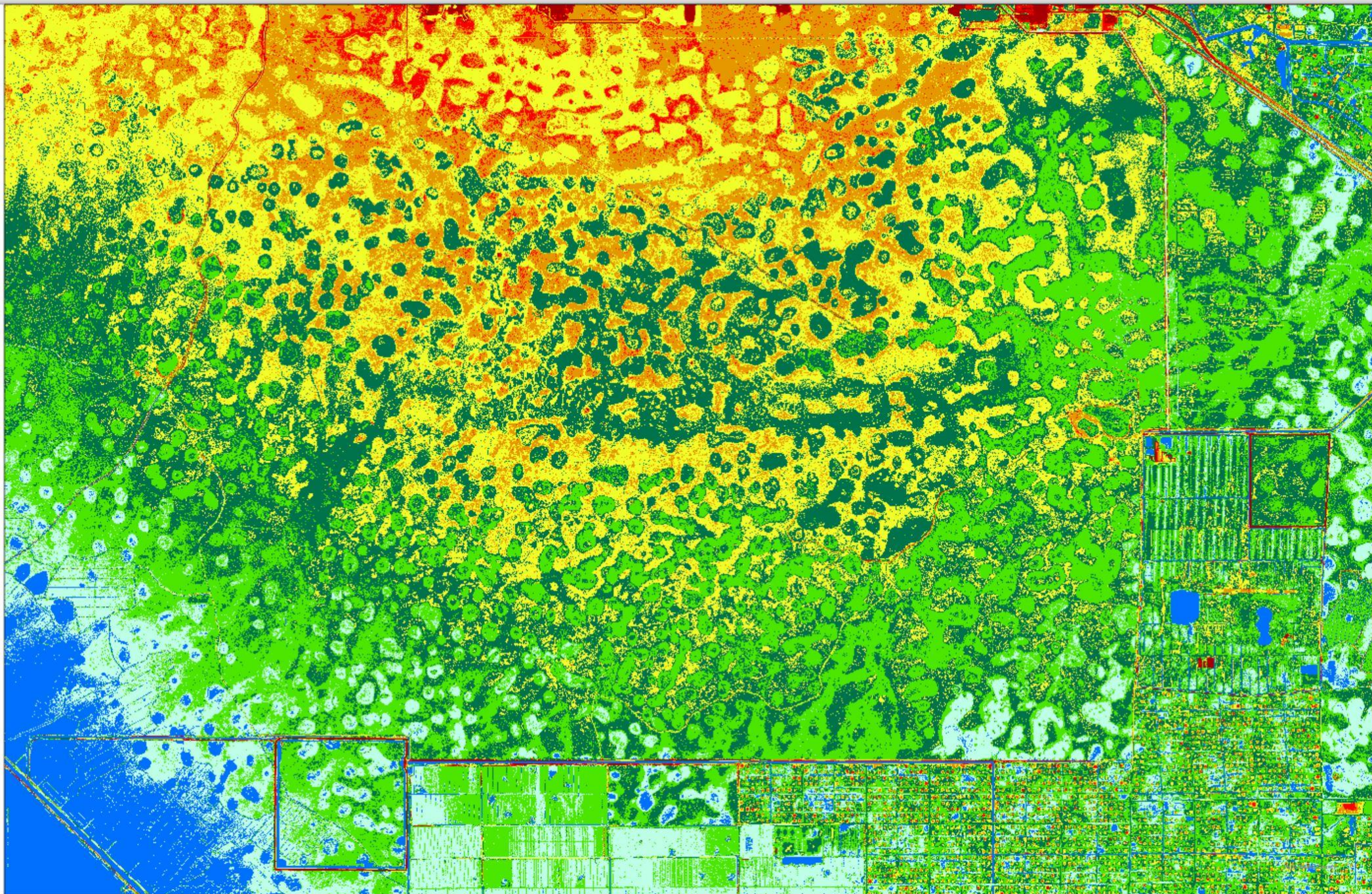
DEM\_2016

NAVD - 1988 (U.S. Survey Feet)

- -14.331 - 18.5
- 18.501 - 19.5
- 19.501 - 20.5
- 20.501 - 21.5
- 21.501 - 22.5
- 22.501 - 23.5
- 23.501 - 24.5
- 24.501 - 25.5



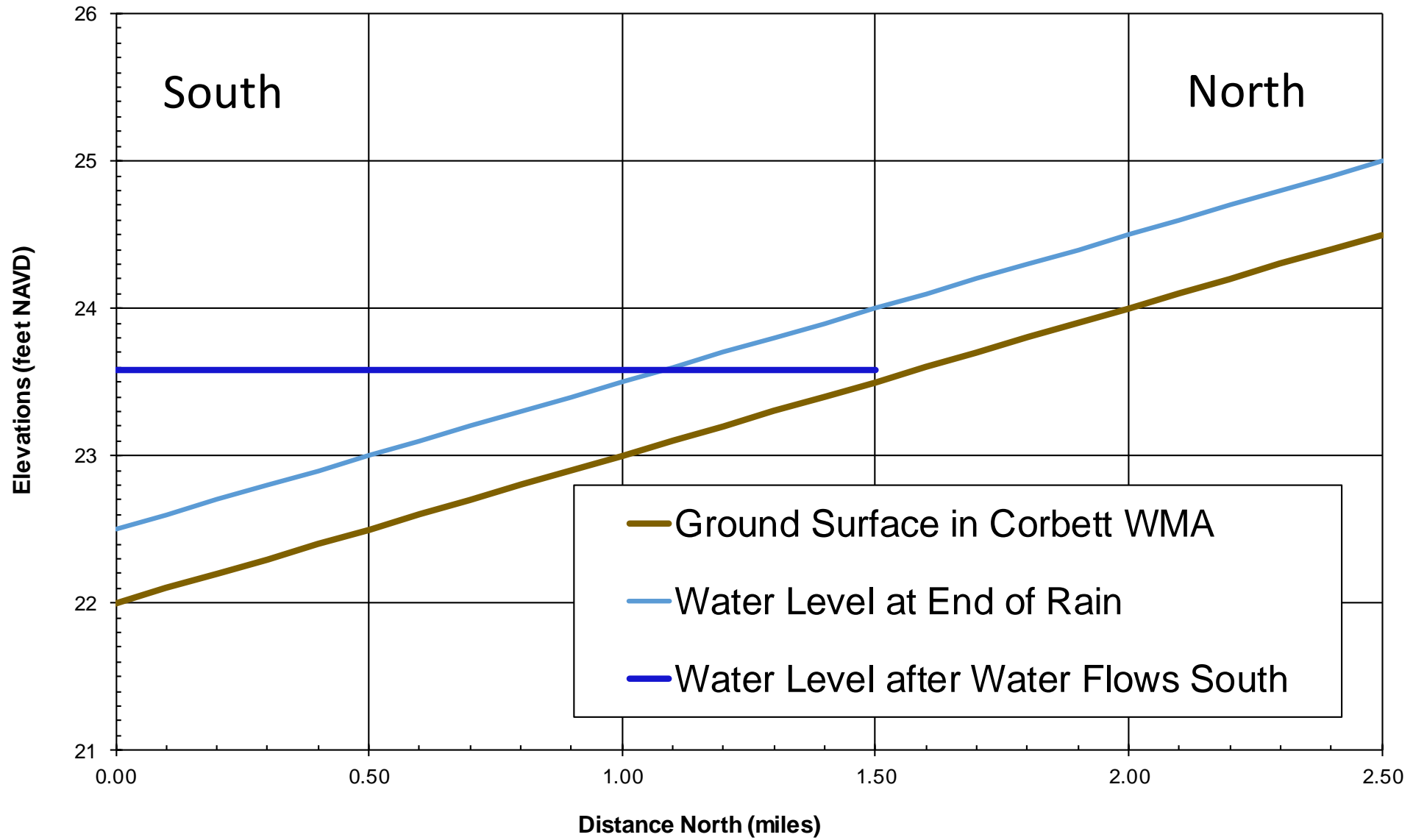
0 500 1,000 2,000  
Meters





# Corbett WMA Levee

The levee was not constructed to the current standards in terms of 1) protection against erosion by wave action, 2) internal seepage (prevention of piping failure), and free board requirements based on the land slope and J.W. Corbett WMA runoff from Tropical Storm Events.



**Example of How Six Inches of Rain with Wet Antecedent Conditions Could Result in Depth Increase of 1.5 feet at the Levee**



This segment of the Corbett Levee will be addressed by the CERP LRWNP

~0.6 mile segment along West side of Seminole Pratt Whitney Road

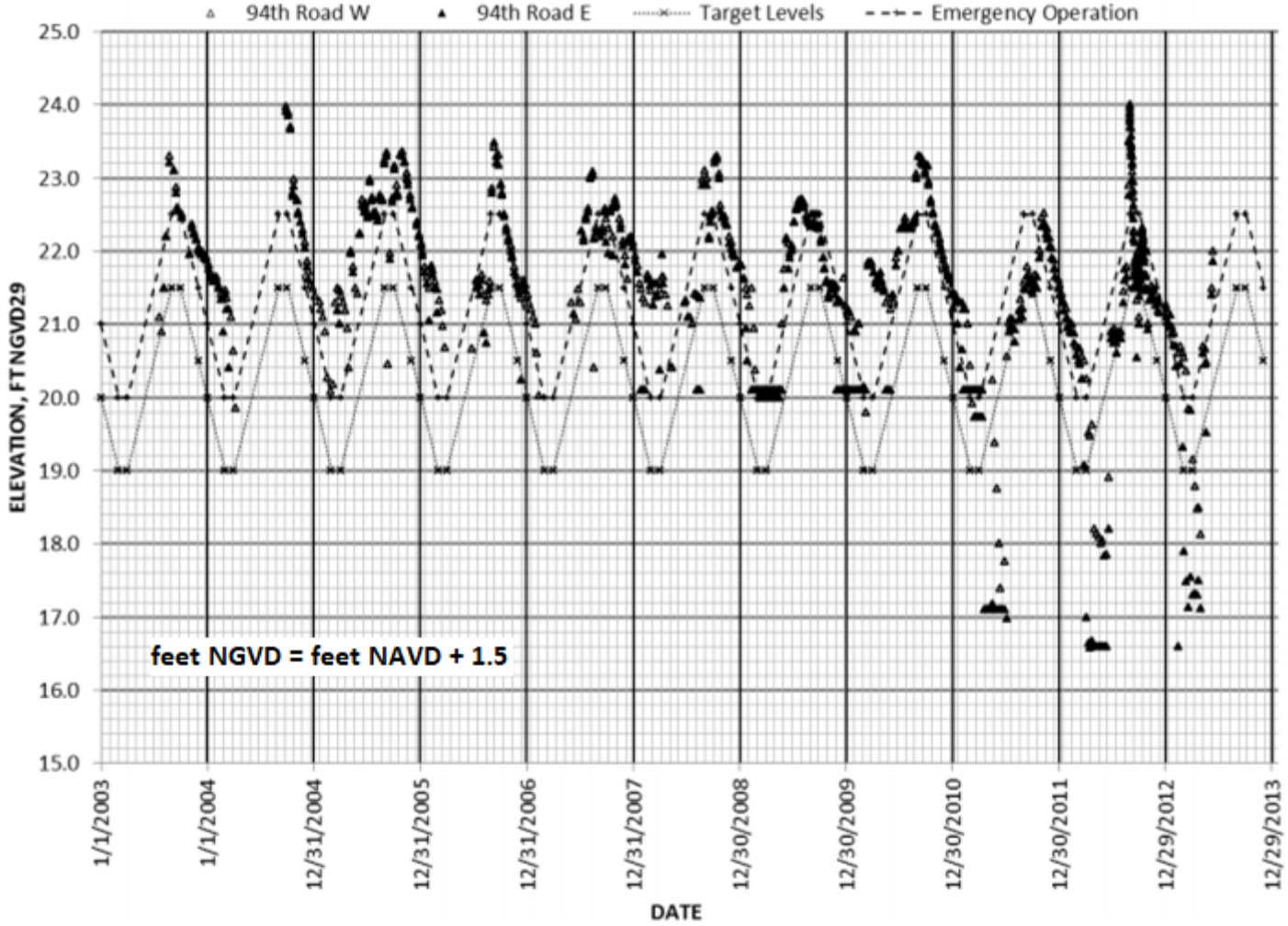
~3.0 miles of Levee along North Side of ITID's M-O Canal

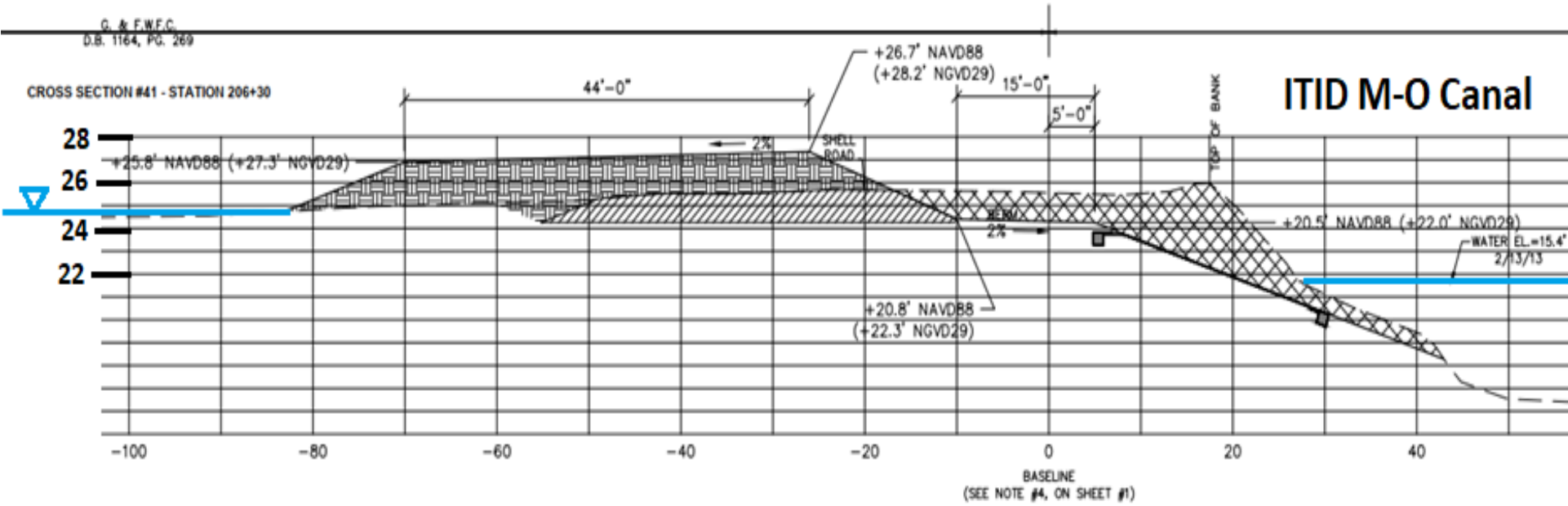
~2.6 miles complete in 2015

ITID's M-O Canal

ITID



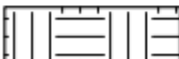
# CORBETT SOUTHEAST CORNER HISTORICAL WATER LEVEL





### ITID M-O Canal

feet NGVD = feet NAVD + 1.5

-  EXISTING MATERIAL TO REMAIN IN PLACE
-  CUT
-  COMPACTED BACKFILL

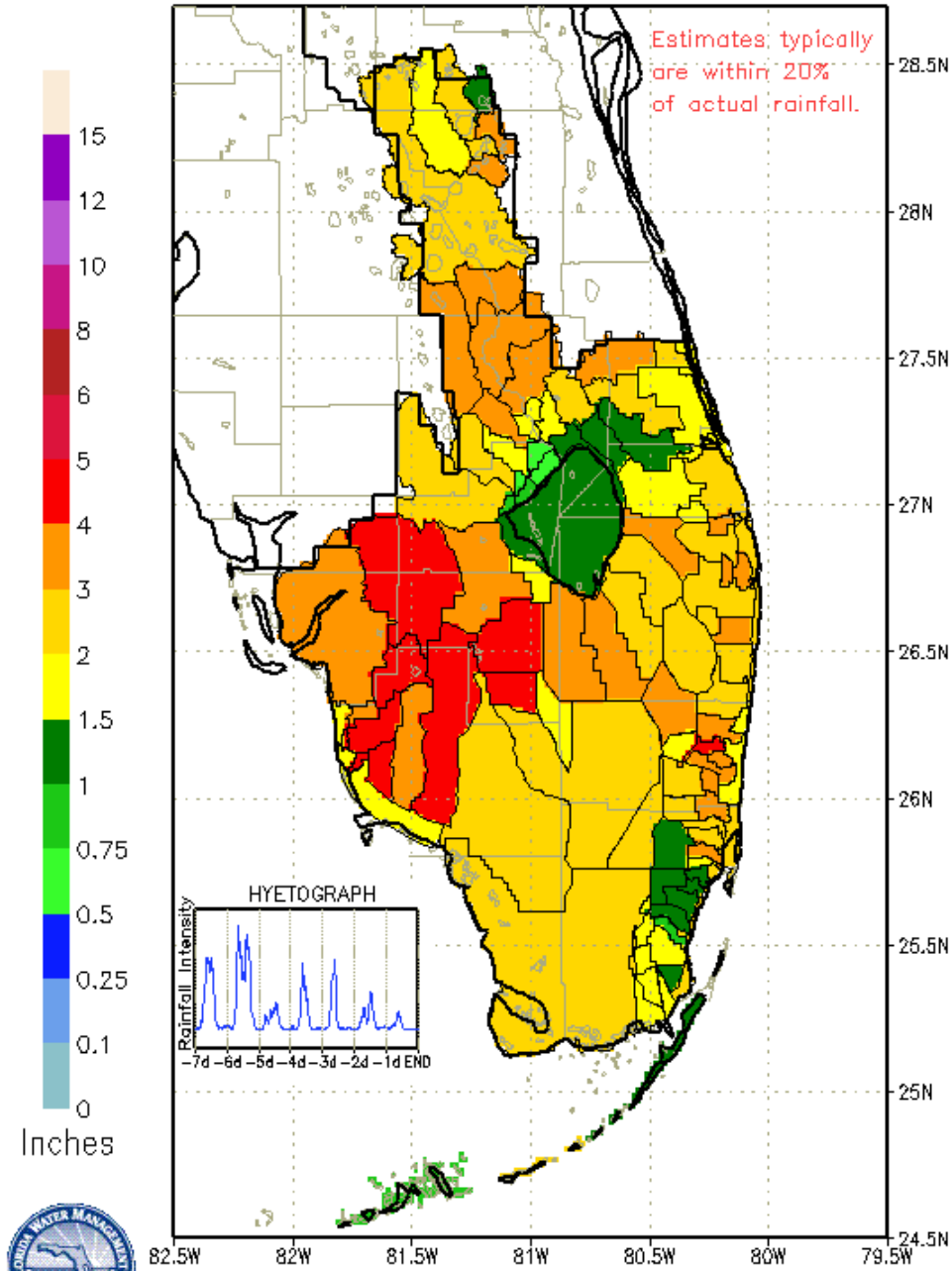
# Hurricane Ian Rainfall

Hurricane Ian generated considerable runoff because

- 1) the antecedent conditions were wetter than typical for the wet season
- 2) The rainfall was substantial

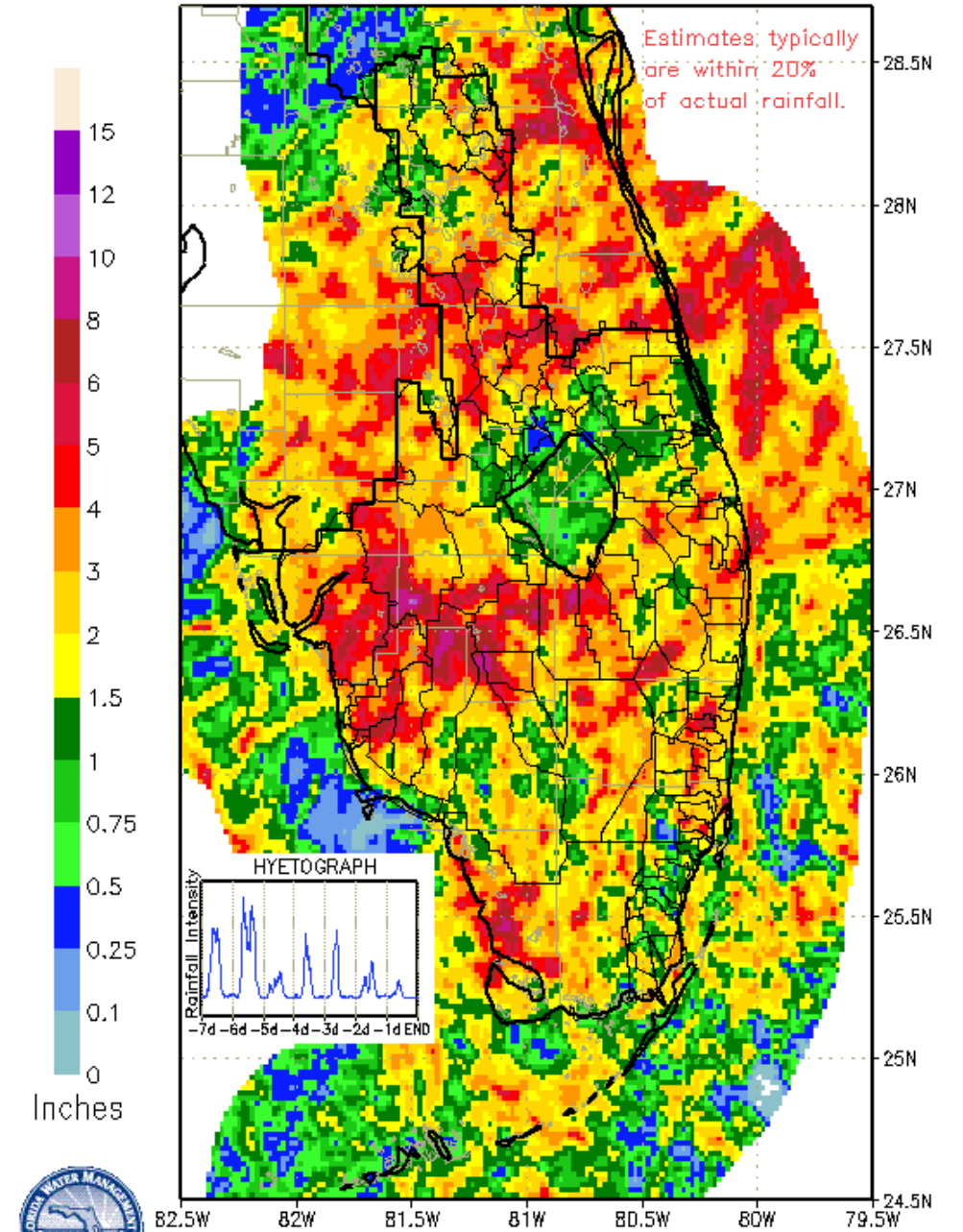
# Rain Before Event

SFWMD RAINDAR BASIN RAINFALL ESTIMATES  
FROM: 0700 EST, 09/16/2022 THROUGH: 0700 EST, 09/23/2022



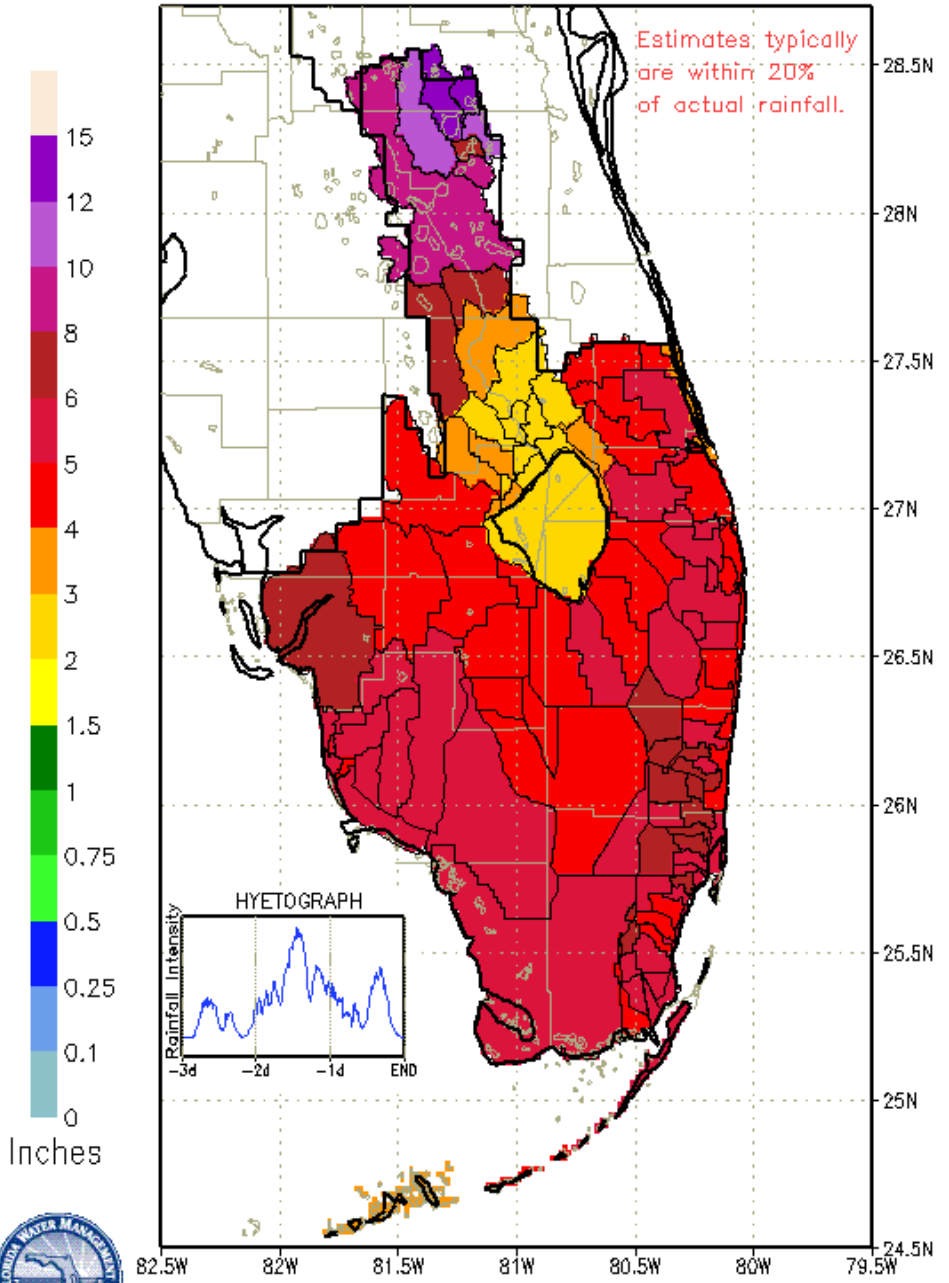
DISTRICT-WIDE RAINFALL ESTIMATE: 2.817"

SFWMD RAINDAR RAINFALL ESTIMATES  
FROM: 0700 EST, 09/16/2022 THROUGH: 0700 EST, 09/23/2022

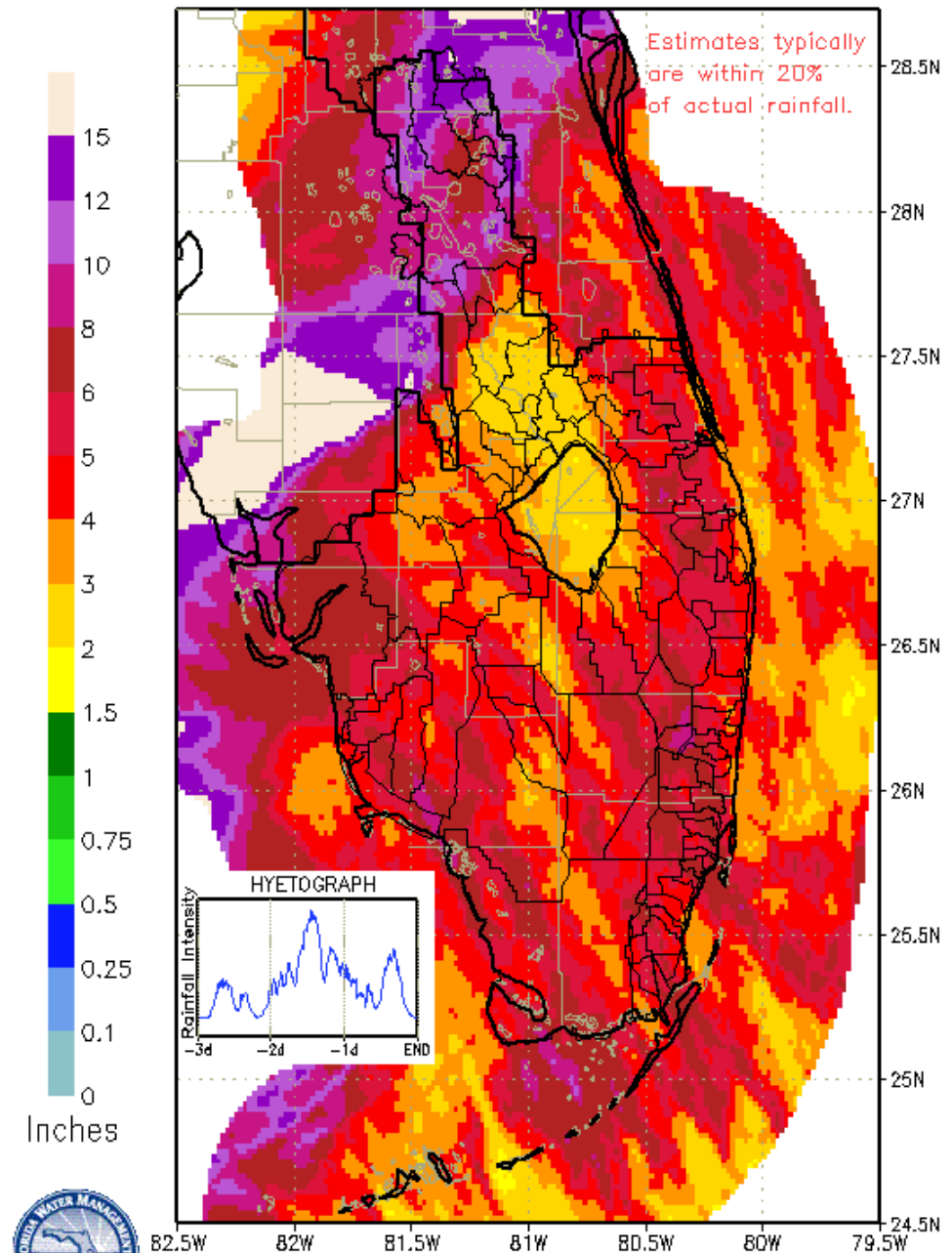


DISTRICT-WIDE RAINFALL ESTIMATE: 2.817"

Event  
Rainfall



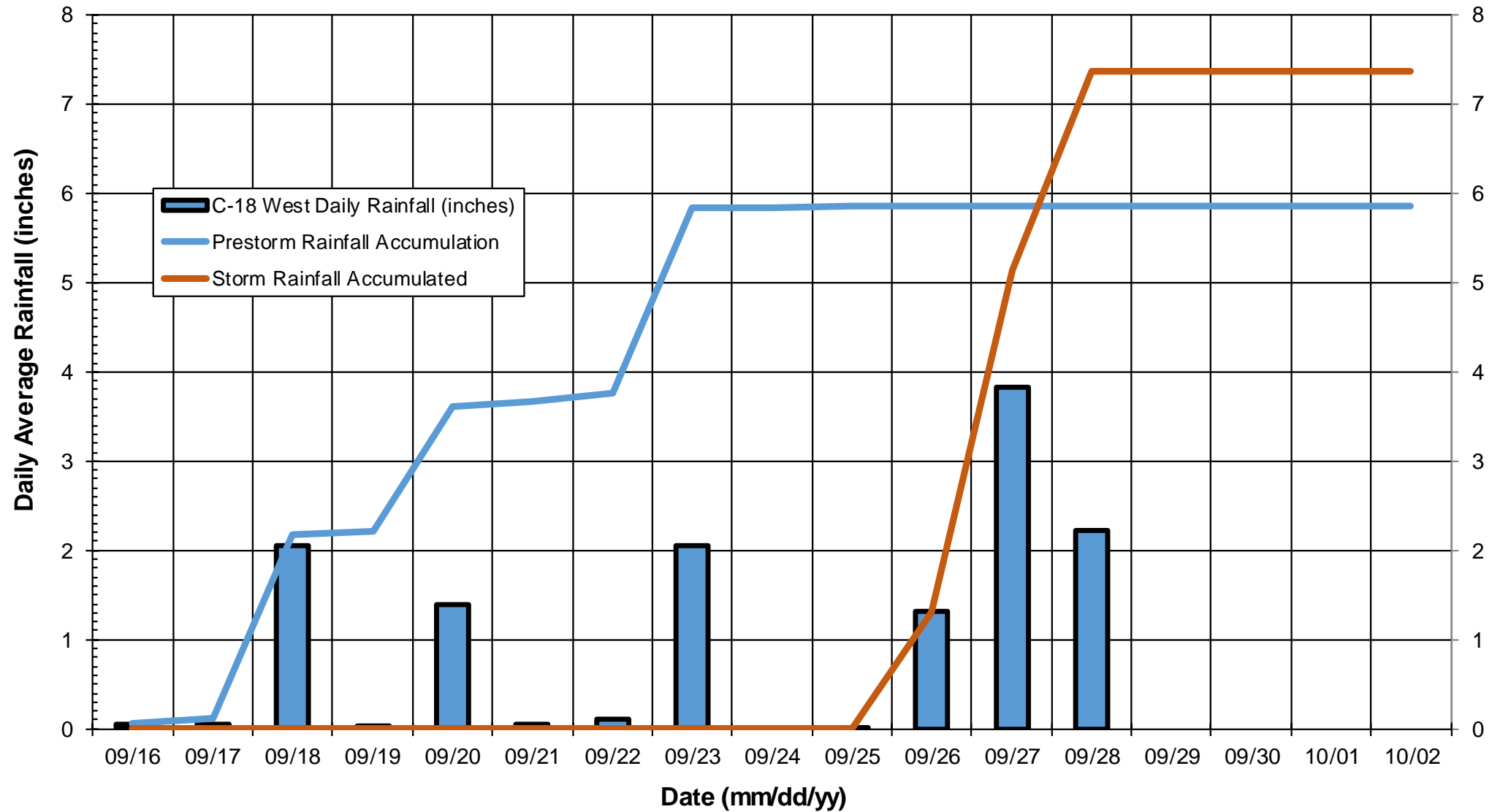
DISTRICT-WIDE RAINFALL ESTIMATE: 5.369"



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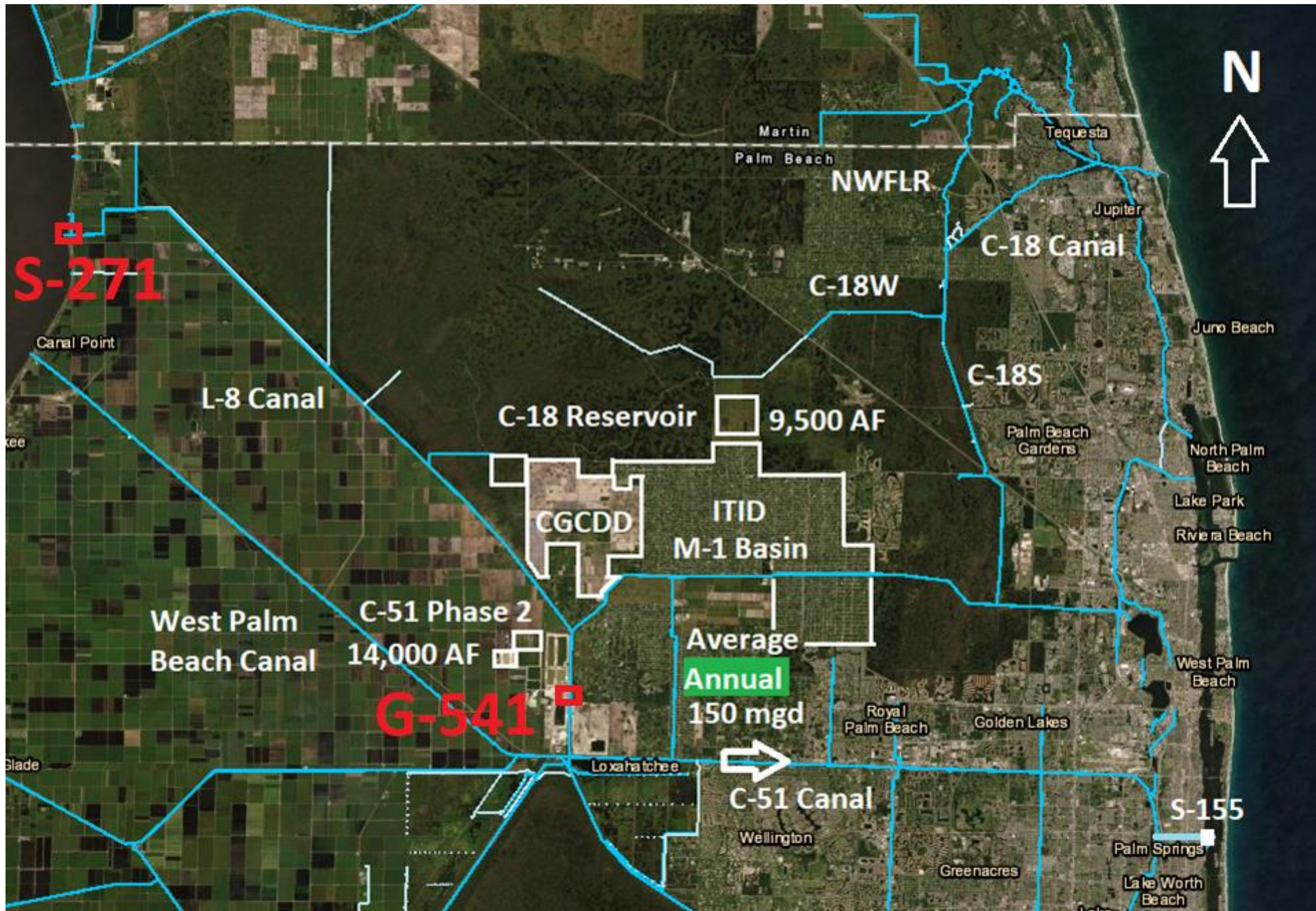


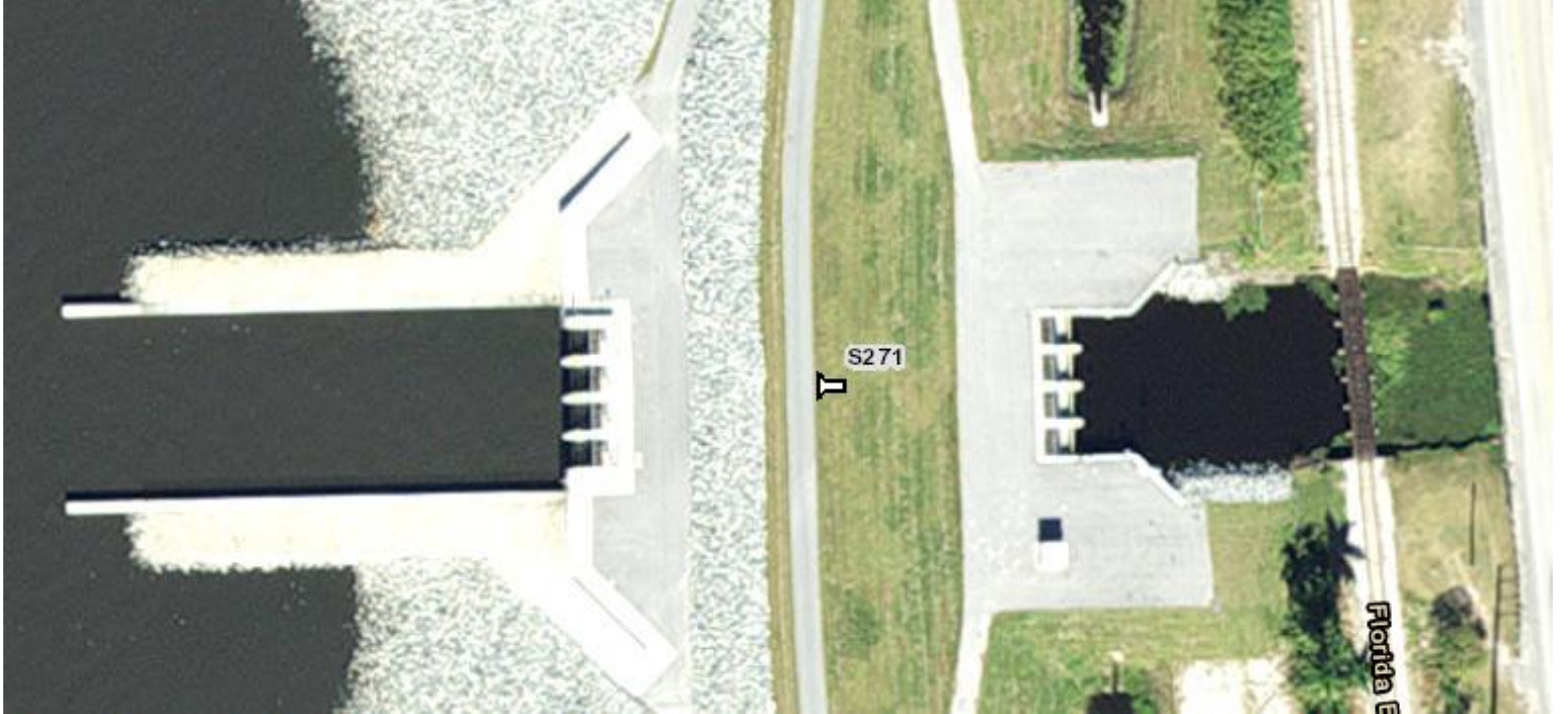
**FIGURE 1**  
**Daily Rainfall and Accumulated Rainfall for C-18 West**

# L-8 Canal Structures

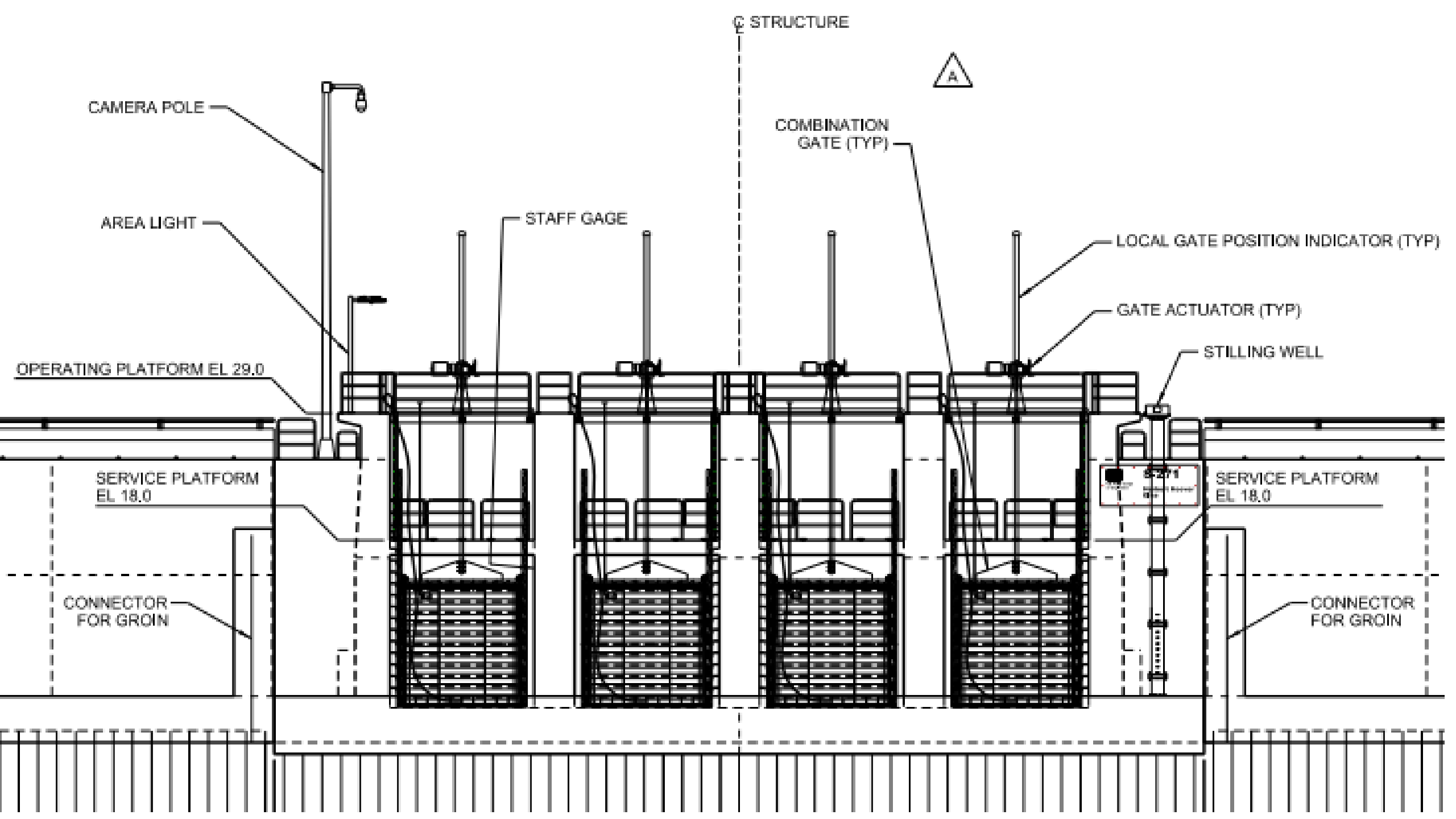
With the construction of the G-541 Structure the L-8 Basin stage is controlled by S-271 and G-541

- S-271 is located at the northwest end of the L-8 Canal and the stage at this end is directly affected by Lake Okeechobee
- G-541 is located at the southeast end of the L-8 Canal and the stage this end is affected by the flows to the L-FEB and the Capacity in the C-51 Canal

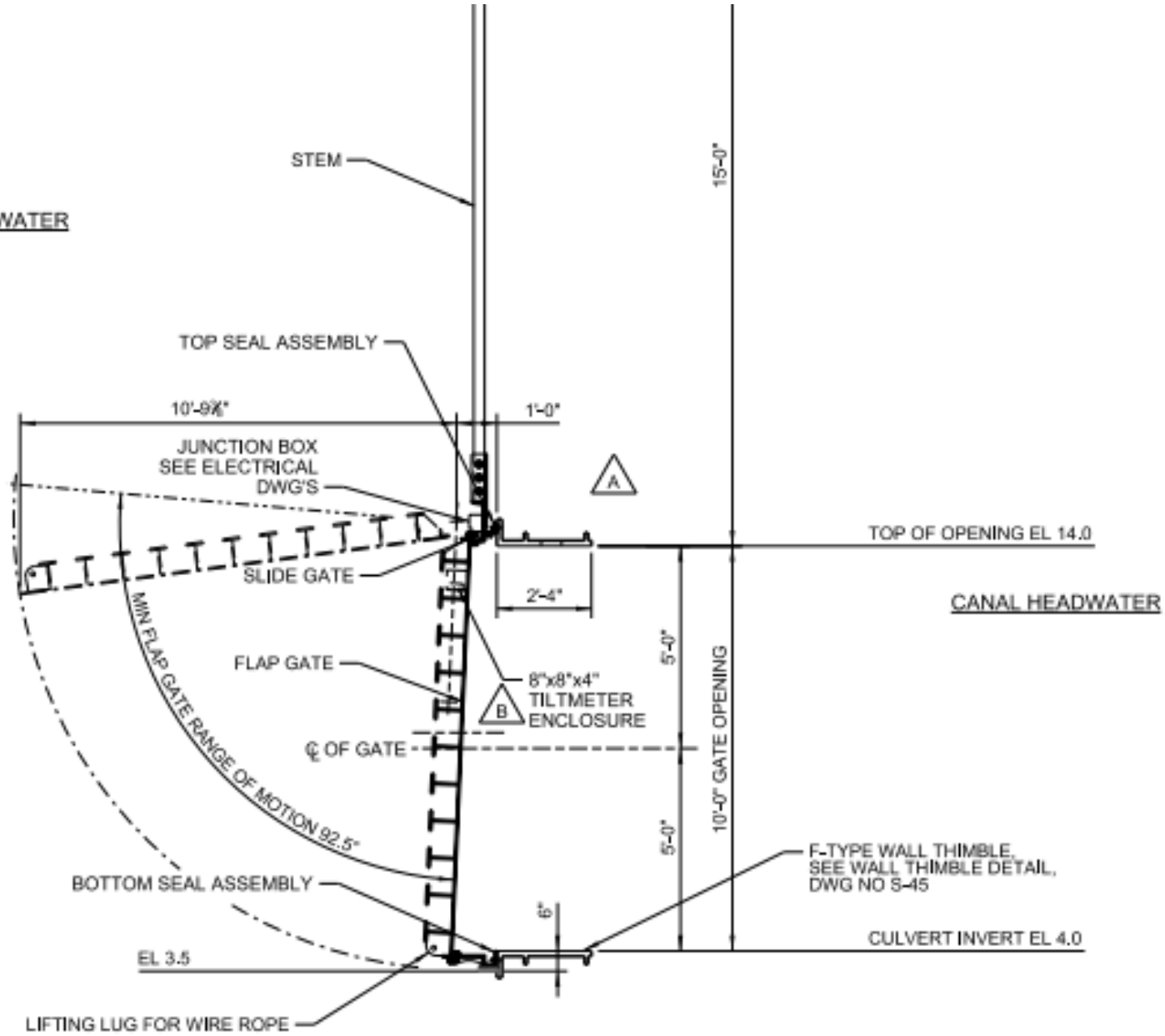




USACE S-271 Culvert at Northwest End of L-8 Canal (September 2019)  
Previous Structure was CV10A (May 2017)

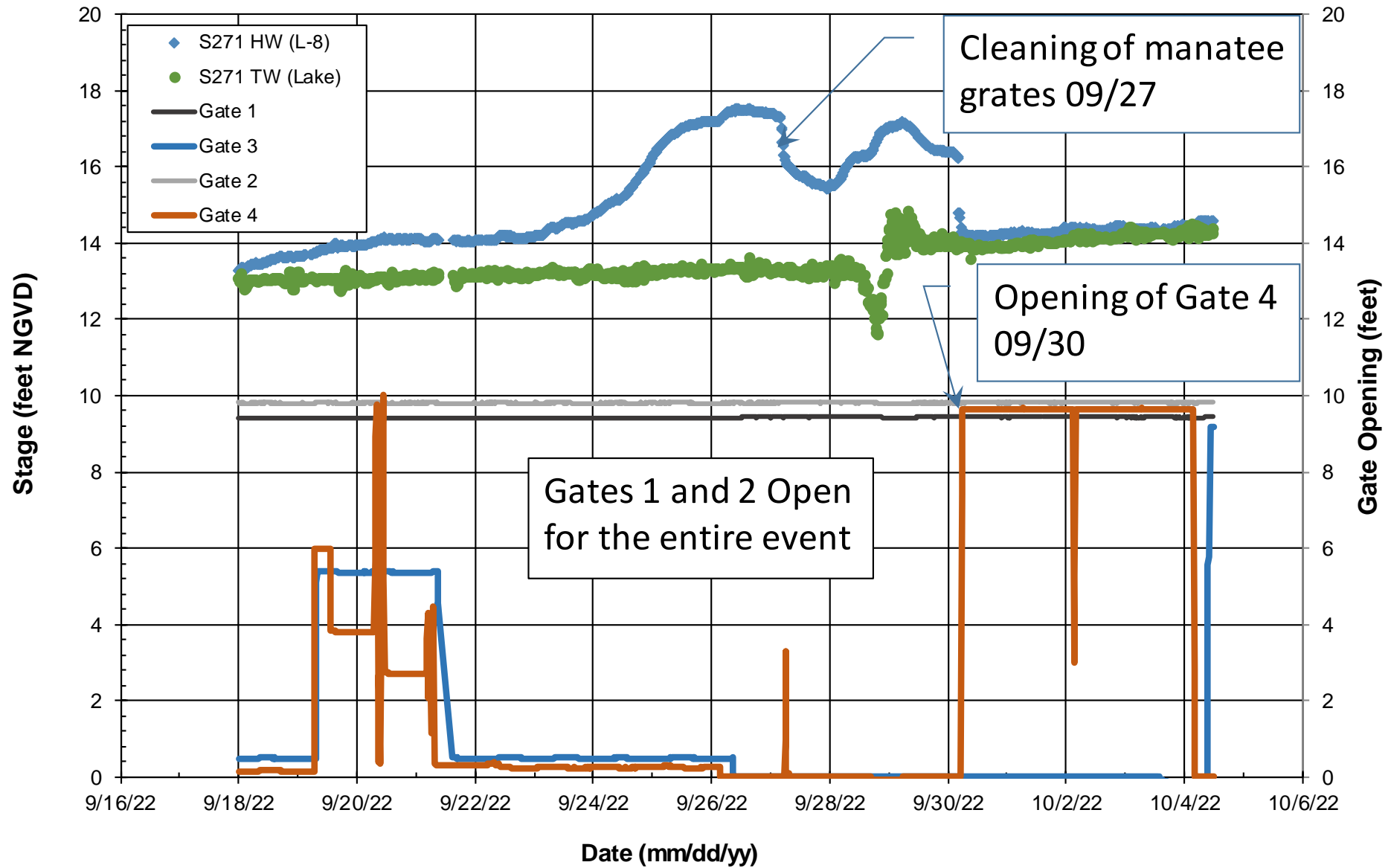


LAKE HEADWATER

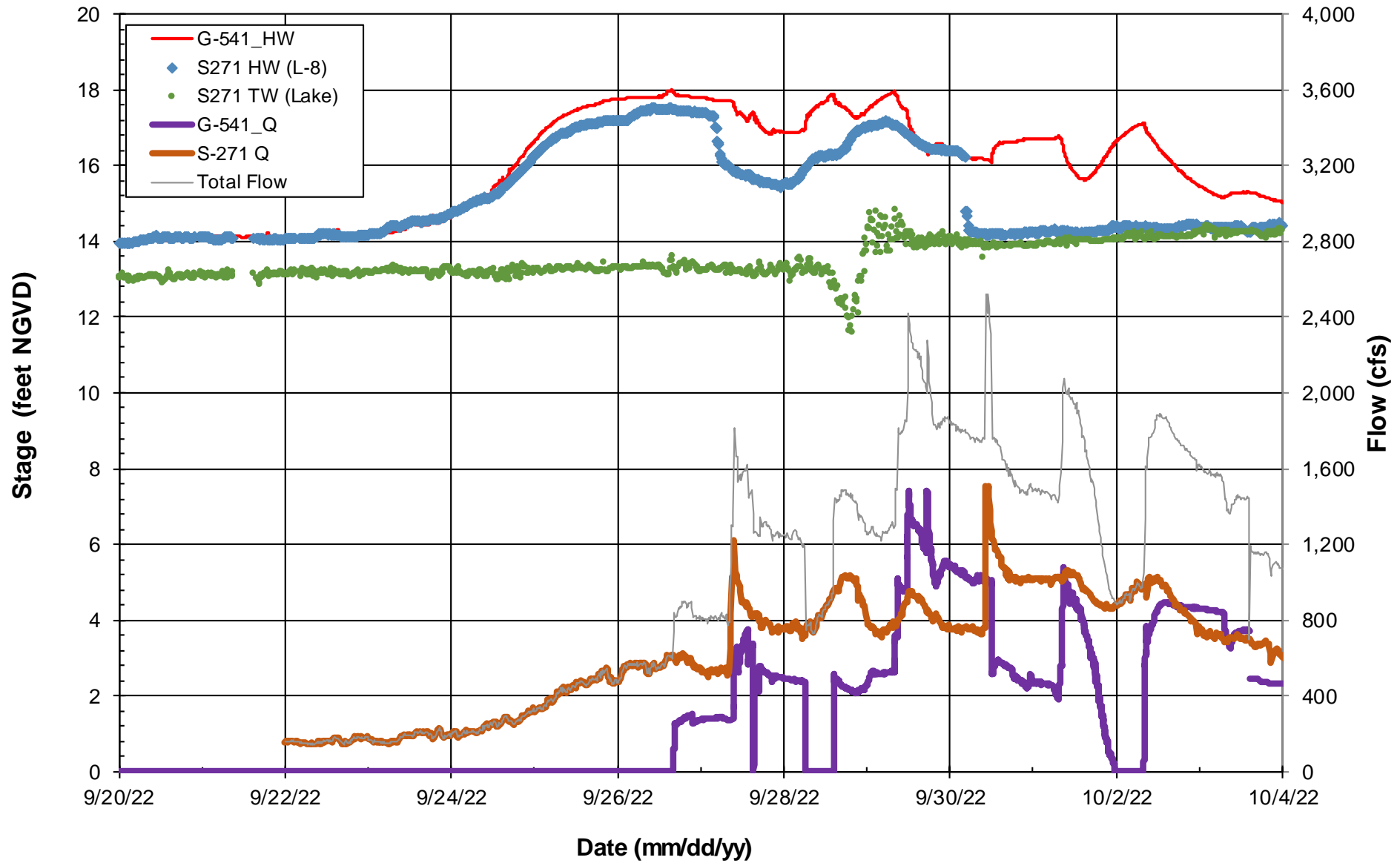


**A**  
**S-44**

**SECTION**  
SCALE: A



**Flows and Stages in the L-8 Canal from Hurricane Ian Rainfall**



**Flows and Stages in the L-8 Canal from Hurricane Ian Rainfall**



# What we Learned

The capacity of the S-271 structure (which replaced CV10A) reduced meaningfully during Hurricane Ian due to clogging of the Manatee Grates. The reduced capacity worsened the high stages in the L-8 Canal. The SFWMD responded by sending water to tide through G-541, S-5AE, S-155A, and S-155. Conditions were favorable for moving water to tide through the C-51 Canal

While there is usually meaningful capacity to tide through the C-51 Canal, heavy rainfall in the eastern portion of the C-51 can reduce the capacity available to the L-8 Basin

# Was the L-8 FEB Used

The SFWMD used the L-8 Flow Equalization Basin (L-8 FEB) to reduce flow to STA-1. Only a minor amount of L-8 Water was put into the L-8 FEB.

The L-8 FEB primary function is to provide flow equalization for STA-1; which is necessary in order to achieved the required water quality treatment. The L-8 FEB is incongruently named the L-8 FEB as it is not located in the L-8 Basin and its primary function is not flow equalization for the L-8 Basin.

The L-8 Basin's size and land use results in maximum inflow rates ranging from 1,500 to 2,500 cfs. Clearly, during all tropical events and any other large rainfall event (> 3 inches) the full capacity of S-271 is required.

## SHORT TERM RECOMMENDATIONS

The USACE should either pull or clean the Manatee Grates S-271 when a tropical storm watch or warning is issued for Palm Beach County. This will facilitate pre-storm drainage.

The USACE should include in their hurricane preparation cleaning of the Manatee Grates on the last full day before the hurricane.

## LONG TERM RECOMMENDATIONS

Based on the response from the L-8 Basin to Tropical Storm Isaac (August 25, 2012), Hurricane Irma (September 10, 2017), Hurricane Ian (September 25, 2022) the L-8 basin requires a consistent 2,000 cfs of discharge capacity for three to five days then 1,500 to 1,000 cfs for three to five days after large rainfall events.

Clogging of the Manatee Grates has reduced the capacity of S-271 during the last two large rainfall events (Hurricane Irma and Hurricane Ian). The capacity loss is on the order of 500 to 1,000 cfs.

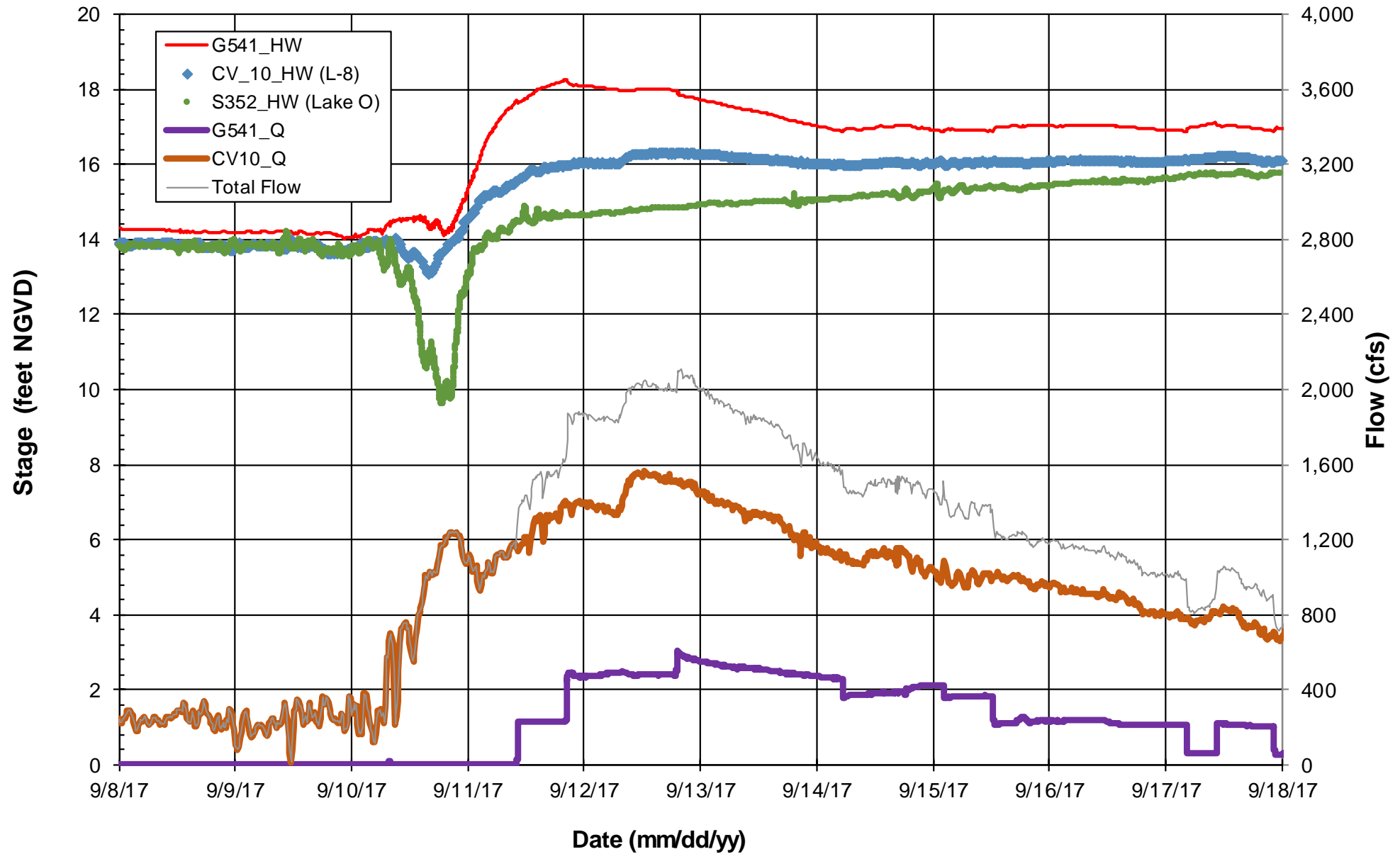
If the clogging of the Manatee Grates at S-271 can be addressed the basin is missing about 700 cfs of capacity. The 700 cfs would allow G-541 releases to be minimized. If the clogging of the Manatee Grates at S-271 cannot be addressed the basin is missing about 1,200 cfs of capacity.

# Lake Okeechobee High Water Events

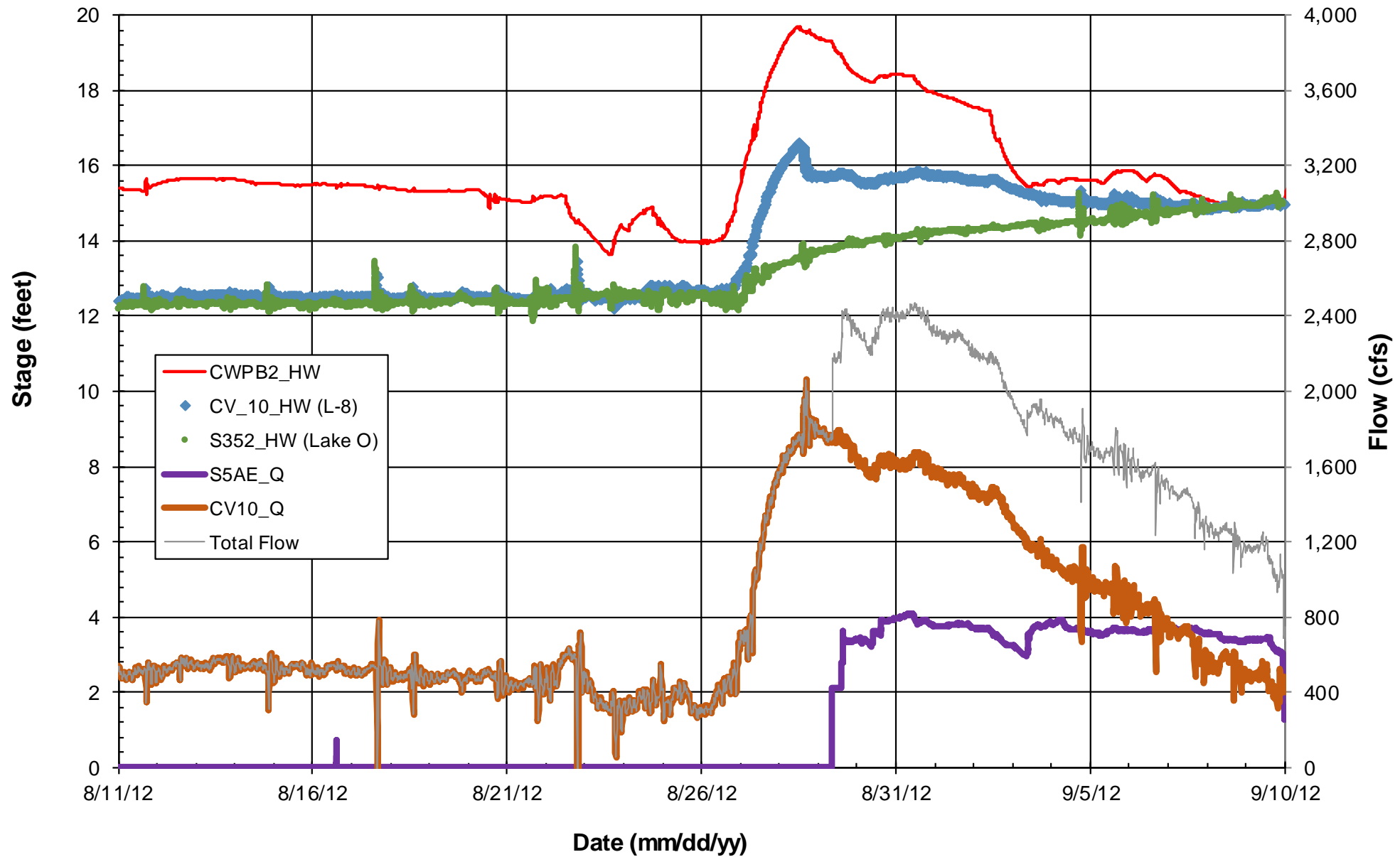
## Modeling Period of Record (POR) 1965-2016

	No Action	LOSOM	No Action	LOSOM
	Events	Events	Average	Average
	Above	Above	Duration	Duration
Stage	Stage	Stage	Above	Above
Threshold	Threshold	Threshold	Threshold	Threshold
(feet NGVD)	(-)	(-)	(days)	(days)
16.00	16	33	52	103
16.50	9	24	42	63
17.00	4	10	10	25
17.50	1	6	6	7
18.00	0	0	0	0

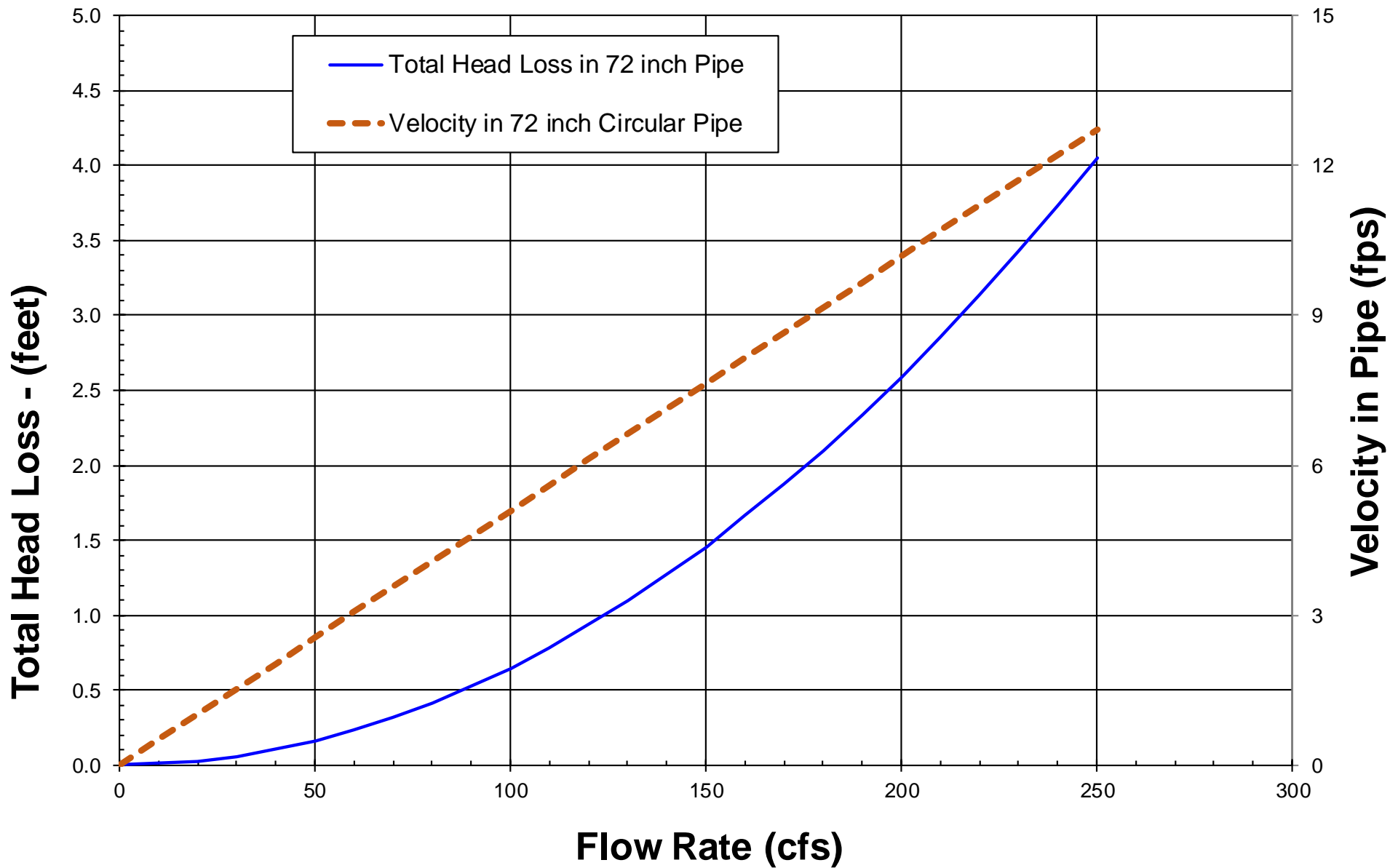
For the 52 year POR 26 events equates to an average of one event every other year.



**Flows and Stages in the L-8 Canal from Hurricane Irma Rainfall (2017)**

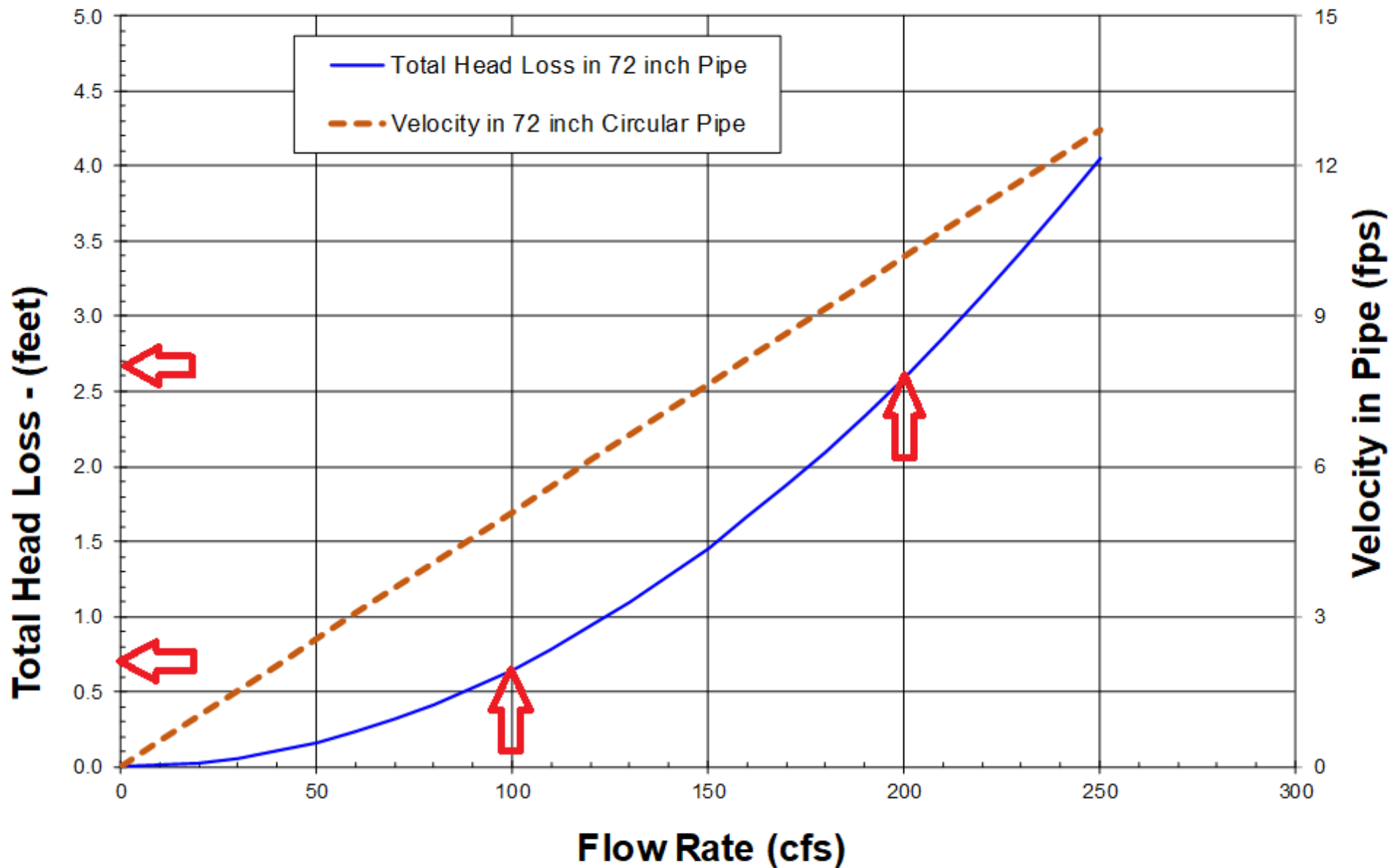


**Flows and Stages in the L-8 Canal from Tropical Storm Isaac Rainfall (2012)**



**Delta H (Y-Axis) as a Function of Flow (X-Axis) for 50 feet Long 72 inch Diameter RCP**





**Delta H (Y-Axis) as a Function of Flow (X-Axis) for 50 feet Long 72 inch Diameter RCP**