

Disclaimer: Information contained in the report addresses environmental conditions only and is not the official South Florida Water Management District operations recommendation or decision.

## **M E M O R A N D U M**

**TO:** John Mitnik, Chief, Operations, Engineering and Construction Bureau  
Paul Linton, Chief, Operations Section

**FROM:** SFWMD Staff Environmental Advisory Team

**DATE:** June 13, 2017

**SUBJECT:** Weekly Environmental Conditions for Systems Operations

### **Summary**

#### **Weather Conditions and Forecast**

Below average rains expected again today before thunderstorms begin to increase Wednesday through the end of the week. Mid-level high pressure centered just east of the north central Florida coast will help limit activity today. Associated southeasterly flow will focus showers/storms around and north of the Lake today. Flow becomes southerly tomorrow and Thursday as high pressure shifts further eastward and a mid to upper level trough/low develops off the west coast of Florida. Showers/storms will increase through this transition with a higher coverage of showers/storms into the weekend.

#### **Kissimmee**

On Sunday, stage was 0.8 feet below regulation schedule in East Lake Toho and Lake Toho, and 2.3 feet below schedule in Kissimmee-Cypress-Hatchineha. Over the past week, discharge at S65, S65A, and S65E averaged 037, 175, and 350 cfs, respectively. Tuesday morning discharges were ~032 cfs, 122 cfs, and 351 cfs, respectively at S65, S65A, and S65E. Dissolved oxygen data in the Kissimmee River averaged 5.2 mg/L for the week (manual sondes at PC33). Kissimmee River mean floodplain depth on Sunday was 0.18 feet. No new recommendations.

#### **Lake Okeechobee**

Lake stage is 11.77 feet NGVD having increased by 0.71 over the past week due to heavy rains and basin runoff. With the recent rise in Lake levels there were almost 12,000 less wading birds utilizing the Lake during the June 8, 2017 wading bird foraging survey. The District and the Florida Fish and Wildlife Conservation Commission (FWC) have collaborated to conduct aerial herbicide treatments to control nuisance emergent vegetation. The FWC has treated 1,500 acres of torpedograss in the Indian Prairie marsh and has proposed to treat an additional 1,600 acres of cattail in Moonshine Bay. The District has proposed treating an additional 1,600 acres of torpedograss in the Moore Haven marsh. The current weekly ascension rate of 0.71 feet equates to a projected ascension rate of 2.84 feet per month which is over five times the optimal 0.5 feet per month. The short-term impacts of the recent rapid rise in Lake stage are anticipated to be primarily negative, including loss of submerged aquatic vegetation and the drowning of both native and exotic apple snail egg clusters.

#### **Estuaries**

Total discharge to the St. Lucie estuary averaged 2,174 cfs over the past week with 0 cfs (0%) coming from Lake Okeechobee. Salinities were substantially lower compared to last week. The seven-day average salinity at the US1 Bridge is now in the good range for adult oysters. Total inflow to the Caloosahatchee estuary averaged 7,485 cfs over the past week with 0 cfs (0%) coming from the Lake. The 30-day average surface salinity at the Ft. Myers monitoring station is 13.2 and has been above 10 for 77 consecutive days. The 30-day average surface salinity at Val I-75 is 6.0. Salinity

conditions between Val I-75 and Ft. Myers are improving for tape grass. Salinity conditions are in the good range for adult oysters at the Cape Coral Bridge and Shellpoint, and in the fair range at the Sanibel Causeway. The 30-day moving average salinity at the I-75 Bridge is forecast to be 2.4 in the next two weeks if no flow comes through the S-79 structure, and the daily salinity is forecast to be 0.3.

### **Stormwater Treatment Areas**

Over the past week, the STAs/FEBs received approximately 300 acre-feet of Lake releases. The total amount of Lake releases sent to the STAs/FEBs in WY2018 (since May 1, 2017) is approximately 15,400 acre-feet. Most STA cells are above target depths. Operational restrictions are in place for vegetation rehabilitation in STA-1E. Operational restrictions are in place for the STA-1W Expansion project construction in STA-1W. The nest of an Endangered Species Act protected species has been observed in STA-1E. Due to recent basin runoff, it is recommended that no Lake releases be sent to the STAs/FEBs this week.

### **Everglades**

Despite heavy rainfall and associated dramatic increase in stage across the Everglades, the last of the nesting wading birds continue to support nestlings, perhaps finding food from a soggy urban or agricultural landscape. In Florida Bay mangrove zone, daily average decreased to 33 psu after peaking at 37 the previous week. The 30-day moving average increased +1.8 to end the week at 34.0 psu. An exceedance of the Florida Bay MFL is denoted as >30 psu.

## Supporting Information

### KISSIMMEE BASIN

#### Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 2.99 inches of rainfall in the past week and the Lower Basin received 3.62 inches (SFWMD Daily Rainfall Report 6/12/2017).

#### Upper Kissimmee Basin

Stages and departures in the Kissimmee Chain of Lakes (KCOL) are shown in Table 1.

**Table 1.** Departures from KCOL flood regulation (F) or temporary schedules (T, A, or S) (feet NGVD). Discharge and stage data are provisional real-time data from SFWMD OASyS DualTrend; reported values are averages through midnight of the Sunday prior to the report date unless otherwise specified.

Report Date: 6/13/2017

Water Body	Structure/Site	Discharge (cfs), week's average**	Stage Monitoring Site***	Lake Stage (feet)	Schedule*	Regulation (R) or Target (S or T) Stage (feet)	Daily Departure (feet)						
							6/11/17	6/4/17	5/28/17	5/21/17	5/14/17	5/7/17	4/30/17
Lakes Hart and Mary Jane	S62	7	LKMJ	60.1	R	60.0	0.1	-0.4	-0.1	-0.2	-0.3	-0.3	-0.3
Lakes Myrtle, Preston, and Joel	S57	0	S57	60.5	R	61.0	-0.5	-1.1	-0.4	-0.4	-0.3	-0.3	-0.3
Alligator Chain	S60	2	ALLI	62.3	R	63.2	-0.9	-1.1	-0.3	-0.4	-0.4	-0.5	-0.5
Lake Gentry	S63	2	LKGT	59.8	R	61.0	-1.2	-1.3	0.0	0.0	-0.1	-0.1	0.0
East Lake Toho	S59	67	TOHOE	55.7	R	56.5	-0.8	-1.2	-0.1	-0.2	-0.3	-0.5	-0.7
Lake Toho	S61	451	TOHOW, S61	52.7	R	53.5	-0.8	-1.1	-0.1	-0.2	-0.3	-0.5	-0.6
Lakes Kissimmee, Cypress, and Hatchineha	S65	37	LKISSP, KUB011, LKIS5B	48.7	R	51.0	-2.3	-2.6	-0.9	-1.2	-1.2	-1.2	-1.3

\* T = temporary schedule, R = USACE flood control schedule, S = temporary snail kite schedule, A = projected ascension line, N/A = not applicable or data not available.

\*\* Seven-day average of weighted daily means through Sunday midnight.

\*\*\* Names of in-lake monitoring sites and structures used to determine lake stage; if more than one site is listed, an average is reported.

DATA ARE PROVISIONAL

#### Lower Kissimmee Basin

Discharges and stages at Lower Basin structures are shown in Table 2. SFWDAT depth maps for the Phase I restoration area are shown in Figure 12. Kissimmee River floodplain stages at selected stations are shown in Figure 13.

**Table 2.** Mean weekly discharge at S-65x structures, and mean weekly Phase I area river channel dissolved oxygen and floodplain mean water depth. Discharge and stage data are provisional real-time data from SFWMD OASyS DualTrend; reported values are averages through midnight of the Sunday prior to the report date unless otherwise specified.

Report Date: 6/13/2017

Metric	Location	Sunday's 1-day average	Weekly Average**									
			6/11/17	6/4/17	5/28/17	5/21/17	5/14/17	5/7/17	4/30/17	4/23/17	4/16/17	4/9/17
Discharge (cfs)	S-65	0	37	145	190	237	234	258	283	330	344	292
Discharge (cfs)	S-65A	158	175	126	121	160	167	184	205	248	262	270
Discharge (cfs)	S-65D****	449	307	174	157	182	198	252	253	286	297	288
Discharge (cfs)	S-65E****	511	350	161	159	182	173	260	225	267	282	297
DO concentration (mg/L)***	Phase I river channel	3.7	5.2	7.2	7.9	7.7	8.0	7.4	7.9	7.8	8.1	7.7
Mean depth (feet)*	Phase I floodplain	0.18	0.13	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.06

\* 1-day spatial average from South Florida Water Depth Assessment Tool (SFWDAT).

\*\* Seven-day average of weighted daily means through Sunday midnight.

\*\*\* DO is the average for manual sondes at PC62 and PC33; telemetry sondes have been taken offline.

\*\*\*\* S-65D discharge combines discharge at S-65D, S-65DX1, and S-65DX2; S65E discharge combines S65E and S65EX1.

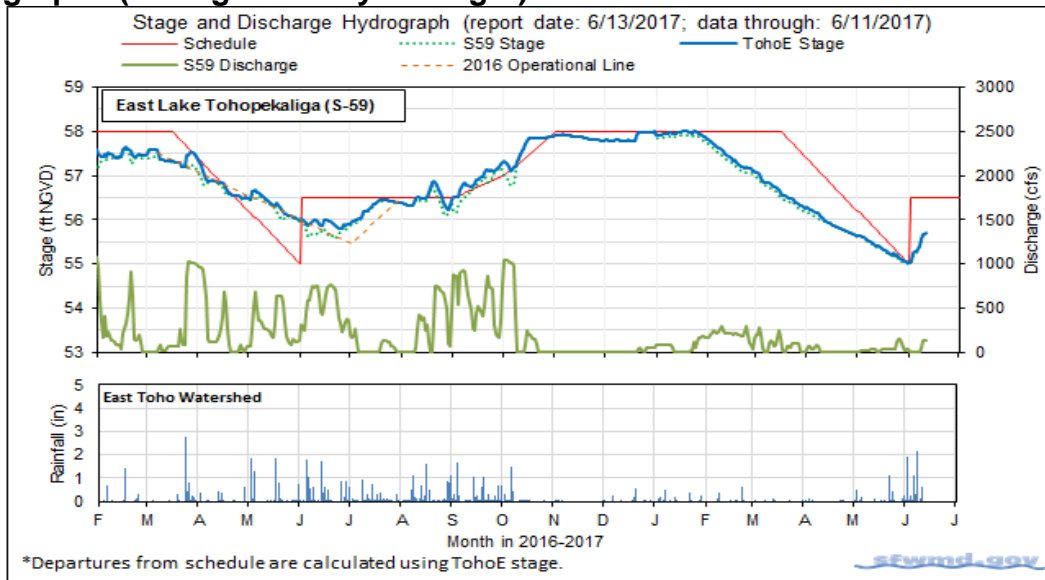
DATA ARE PROVISIONAL; N/A indicates that data were not available.

## Water Management Recommendations

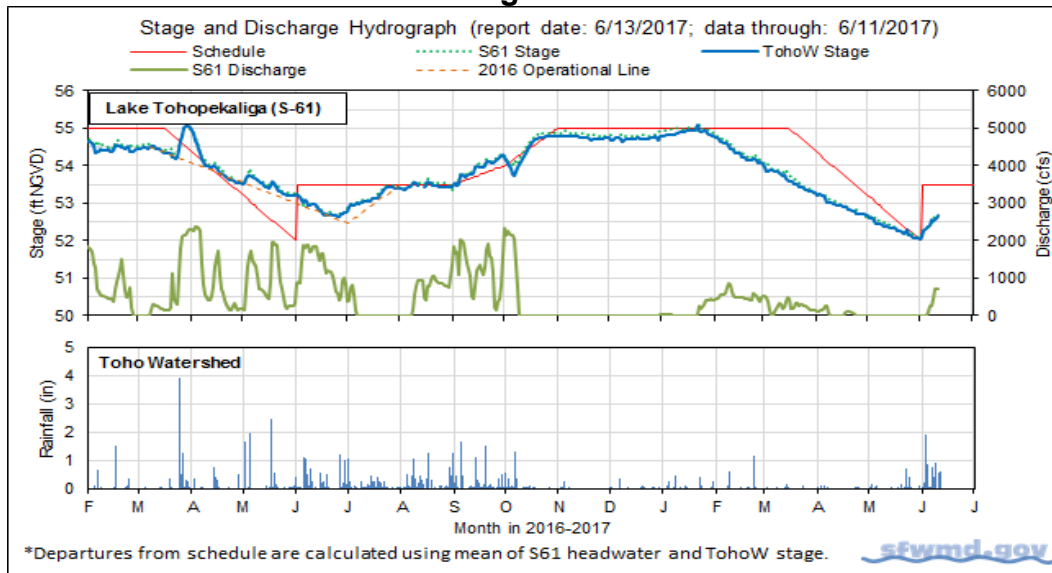
### Kissimmee Basin Adaptive Recommendations and Operational Actions

Date	Recommendation	Purpose	Outcome	Source
6/13/2017	No new recommendations.			
6/6/2017	No new recommendations.			
5/30/2017	No new recommendations.			
5/22/2017	No new recommendations.			
5/15/2017	Reduce discharge at S65/S65A by 40-50 cfs	Reduce rate of stage decline in KCH while maintaining discharge to the Kissimmee River.	Implemented	KB Ops
5/9/2017	No new recommendations.			
5/3/2017	Reduce discharge at S65/S65A by 50 cfs	Reduce rate of stage decline in KCH		SFWMD Water Management/KB Ops
4/25/2017	Reduce discharge at S65/S65A by 50 cfs	Reduce rate of stage decline in KCH	Implemented	SFWMD Water Management/KB Ops
4/17/2017	No new recommendations.			
4/11/2017	No new recommendations.			
3/30/2017	Reduce discharge at S-59 and S-61 so that stage in these lakes declines to respective low pools on May 31; reduce discharge at S-65 to 300 cfs.	Reduce rate of stage decline in East Toho, Toho, and KCH.	Implemented	SFWMD Water Management/KB Ops
3/23/2017	Reduce S-65 discharge by 75 cfs per day through 3/25 for a target discharge of ~500 cfs.	Reduce rate of stage decline in KCH.	Implemented	SFWMD Water Management/KB Ops
3/16/2017	Reduce S-65 and S-65A discharge by 150 cfs.	Reduce rate of stage decline in KCH.	Implemented	SFWMD Water Management/KB Ops
3/14/2017	No new recommendations.		N/A	
3/7/2017	No new recommendations.		N/A	
2/22/2017	Increase discharge at S65 to establish and maintain a stage recession on KCH to reach low pool (49 ft) by May 1, as possible subject to rainfall and construction needs. Maintain 49 ft or lower for the month of May as possible.	Wet season storage, aquatic plant management.		KB Operations
2/21/2017	No new recommendations.		N/A	
2/14/2017	Increase S65 and S65A discharge by 200 cfs.	Allow stage to decline in KCH.	Implemented	SFWMD Water Management/KB Ops
2/7/2017	No new recommendations.		N/A	
1/25/2017	Make releases from East Lake Tohopekaliga and Lake Tohopekaliga to achieve a recession rate of 0.2 feet per week. Releases will not be made to compensate for direct rain on the lakes, but adjustments may be made for changes in inflow to maintain the 0.2 feet per week recession rate to the extent available capacity in Lake Kissimmee allows.	To prepare for the 2017 wet season, facilitate the ongoing Kissimmee River Restoration Construction (backfilling of the C-38), and provide more desirable recession rates for East Lake Tohopekaliga and Lake Tohopekaliga, the SFWMD will follow the below guiding criteria to the extent it does not conflict with other water related needs (e.g. Kissimmee River Flows, Kissimmee River Restoration Construction, and flood control).	Implemented	SFWMD Water Management Section/KB Ops
1/24/2017	No new recommendations.		N/A	
1/17/2017	No new recommendations.		N/A	
1/10/2017	No new recommendations.		N/A	

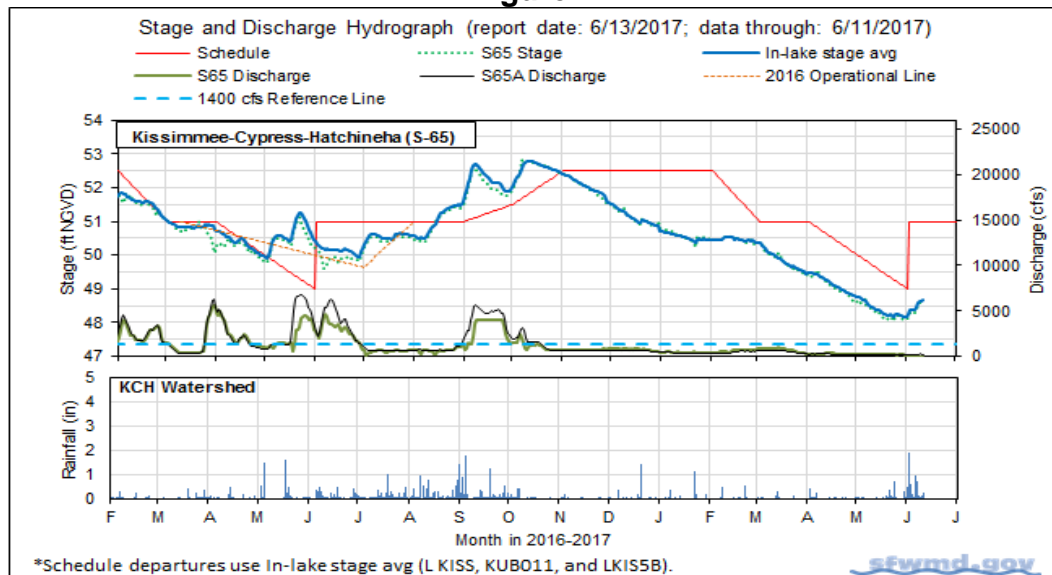
# KCOL Hydrographs (through Sunday midnight)



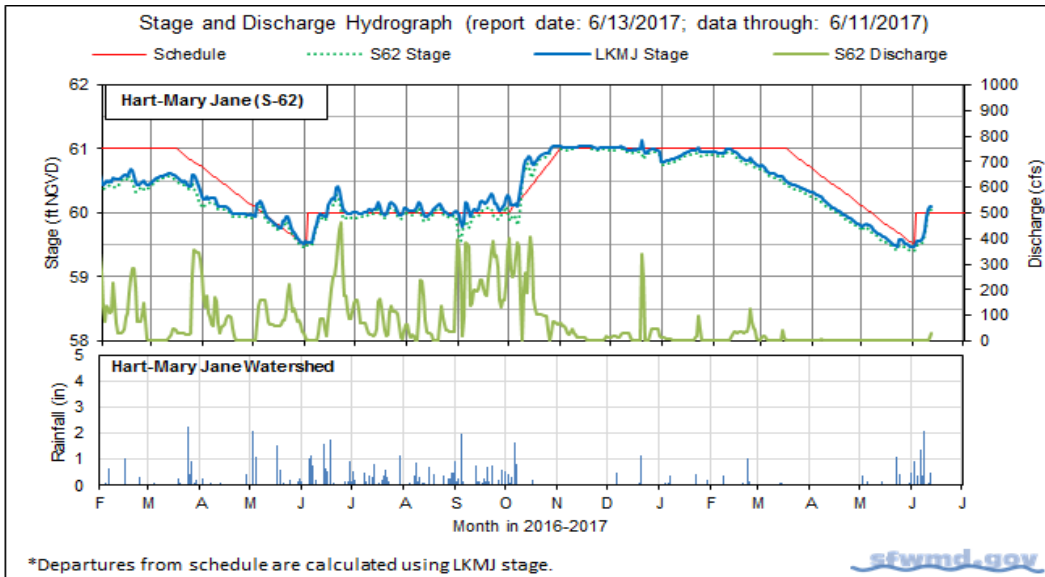
**Figure 1.**



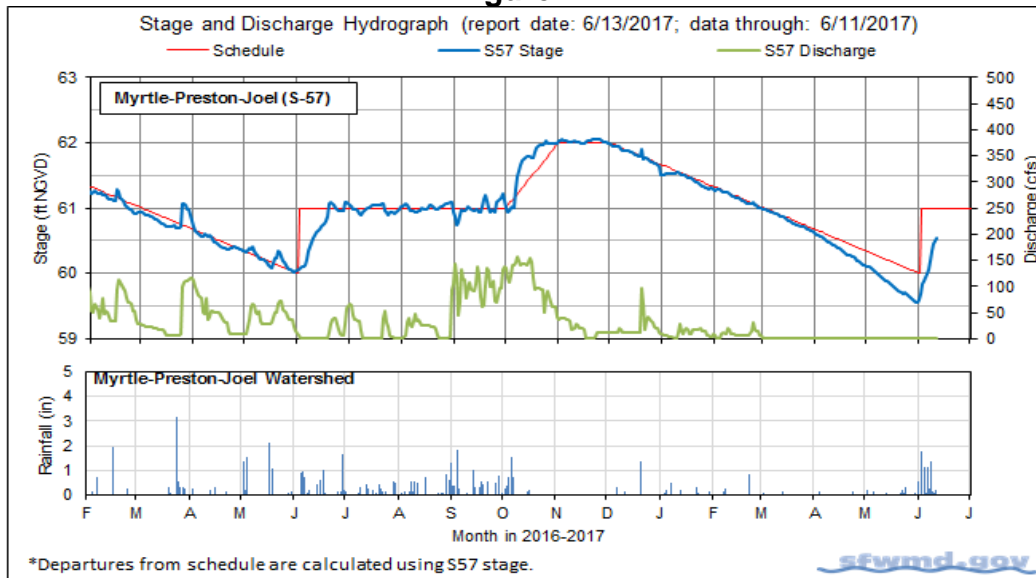
**Figure 2.**



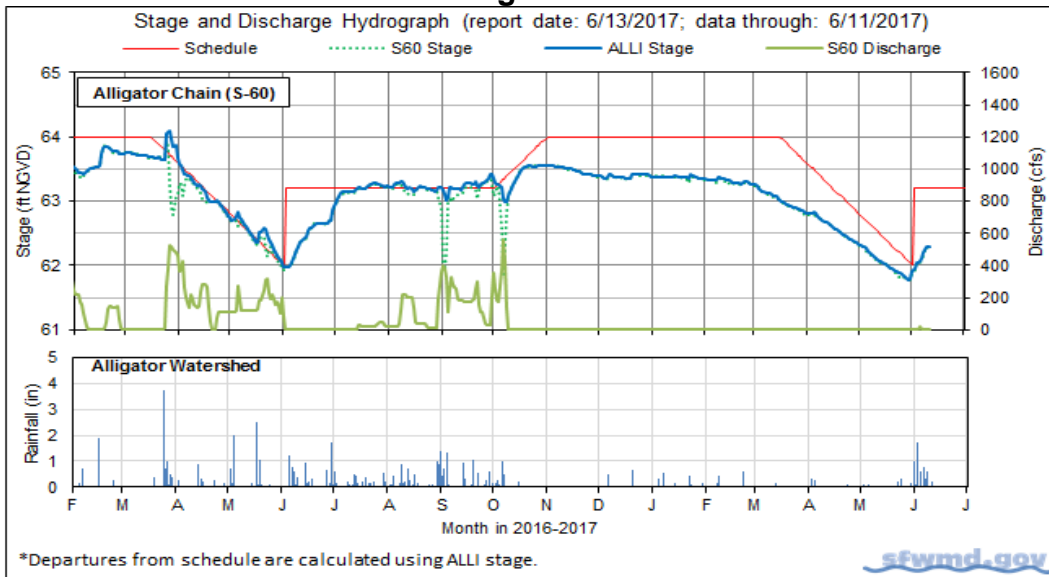
**Figure 3.**



**Figure 4.**



**Figure 5.**



**Figure 6.**

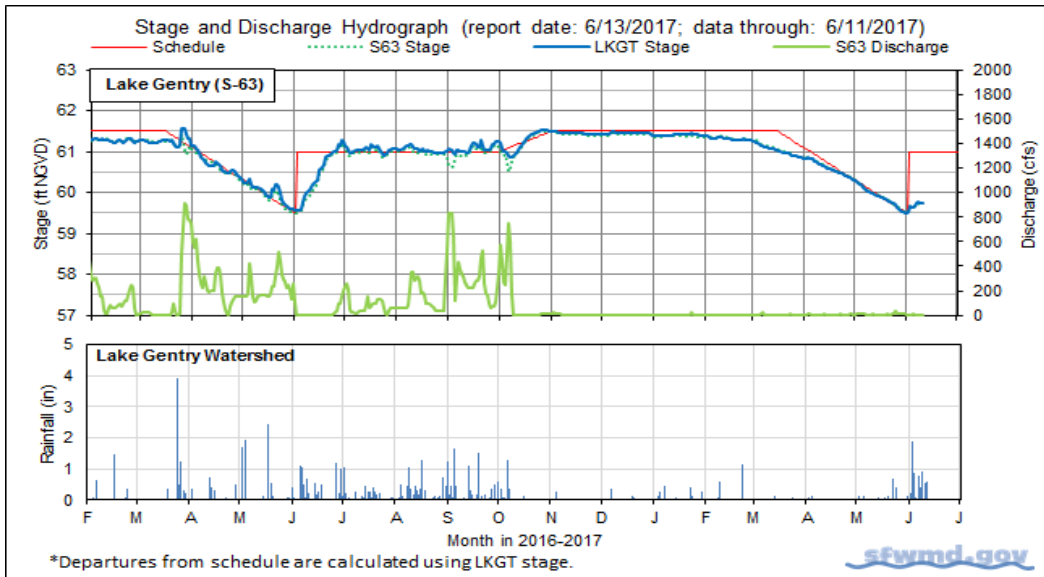


Figure 7.

**SOUTH FLORIDA WATER MANAGEMENT DISTRICT**

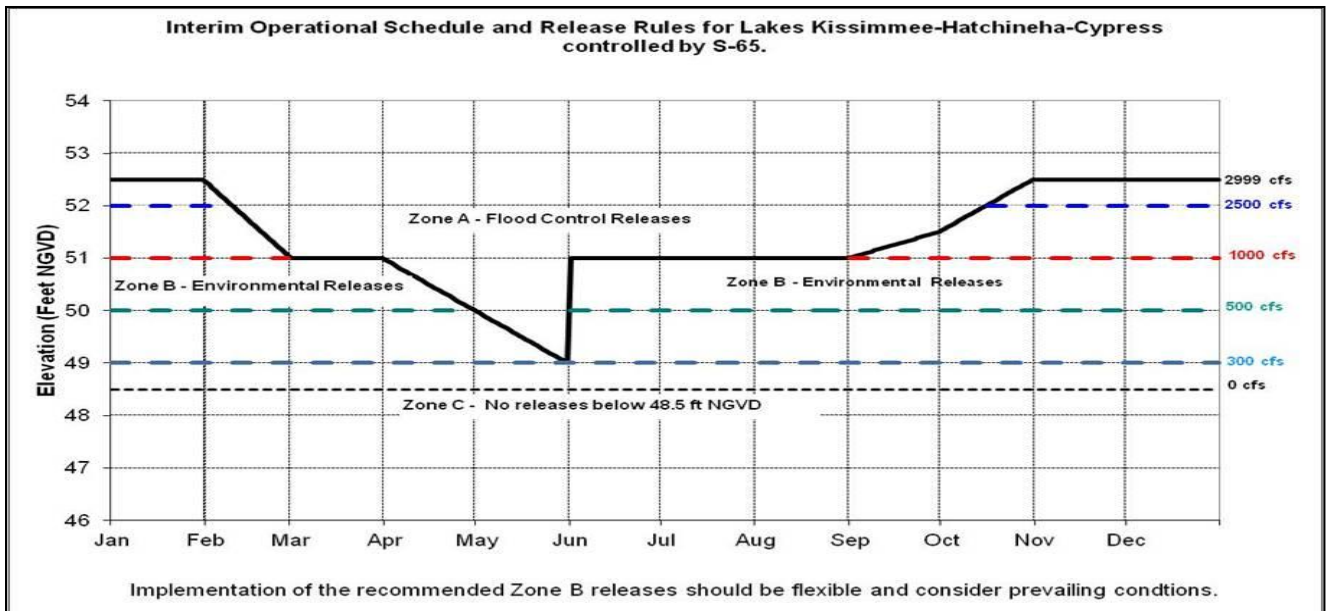
**Limits on Rate of Discharge Change at S65/S65A During Dry Season 2016-2017**

<b>Discharge Rate of Change Limits for S65/S65A (revised 11/16/16).</b>	
Q (cfs)	Maximum rate of increase or decrease (cfs/day)
300-650	75
650-1700	150
1700-3000	300
>3000	1000

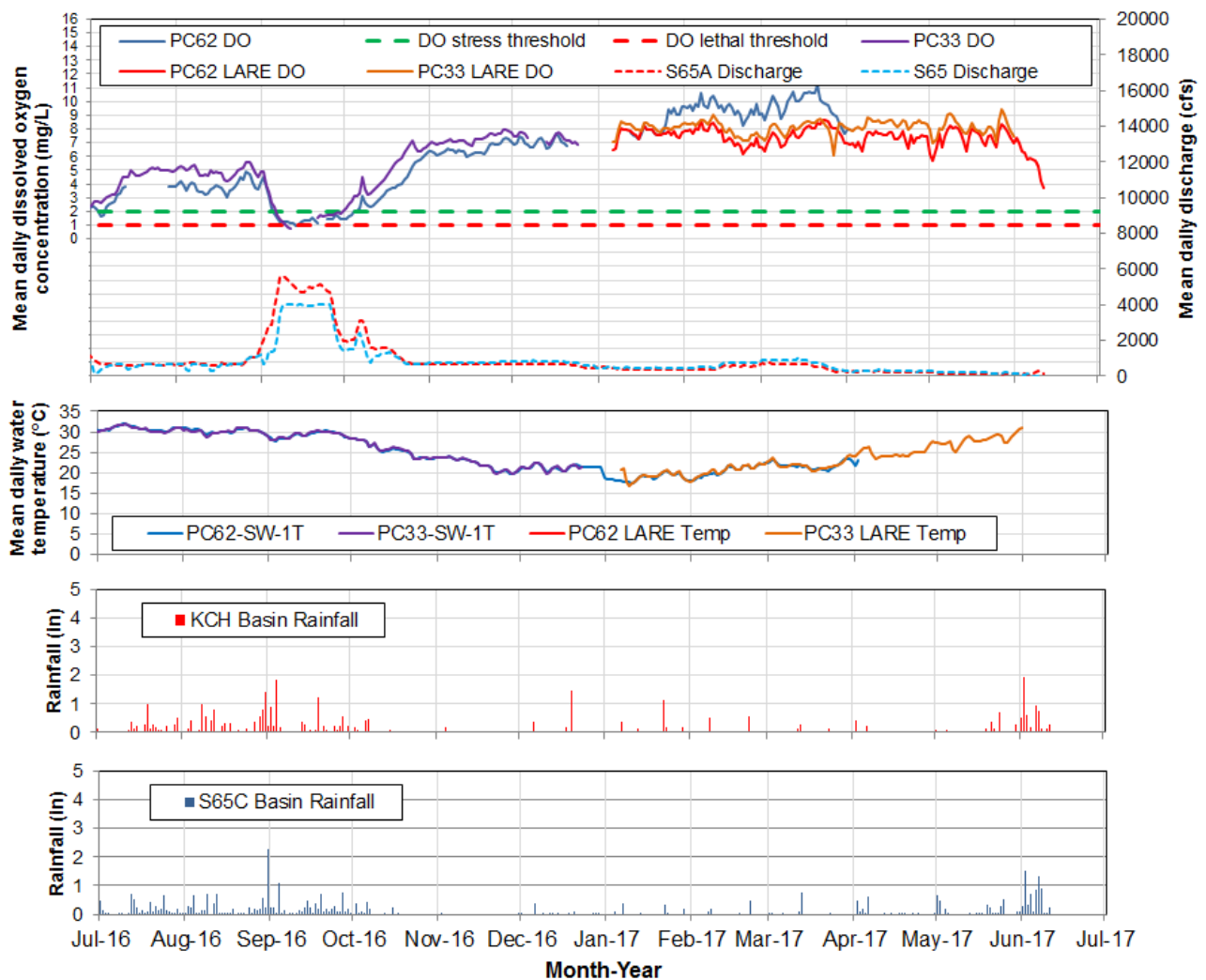
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Figure 8. Limits on rate of discharge change at S65/S65A for the 2016-2017 Dry Season.



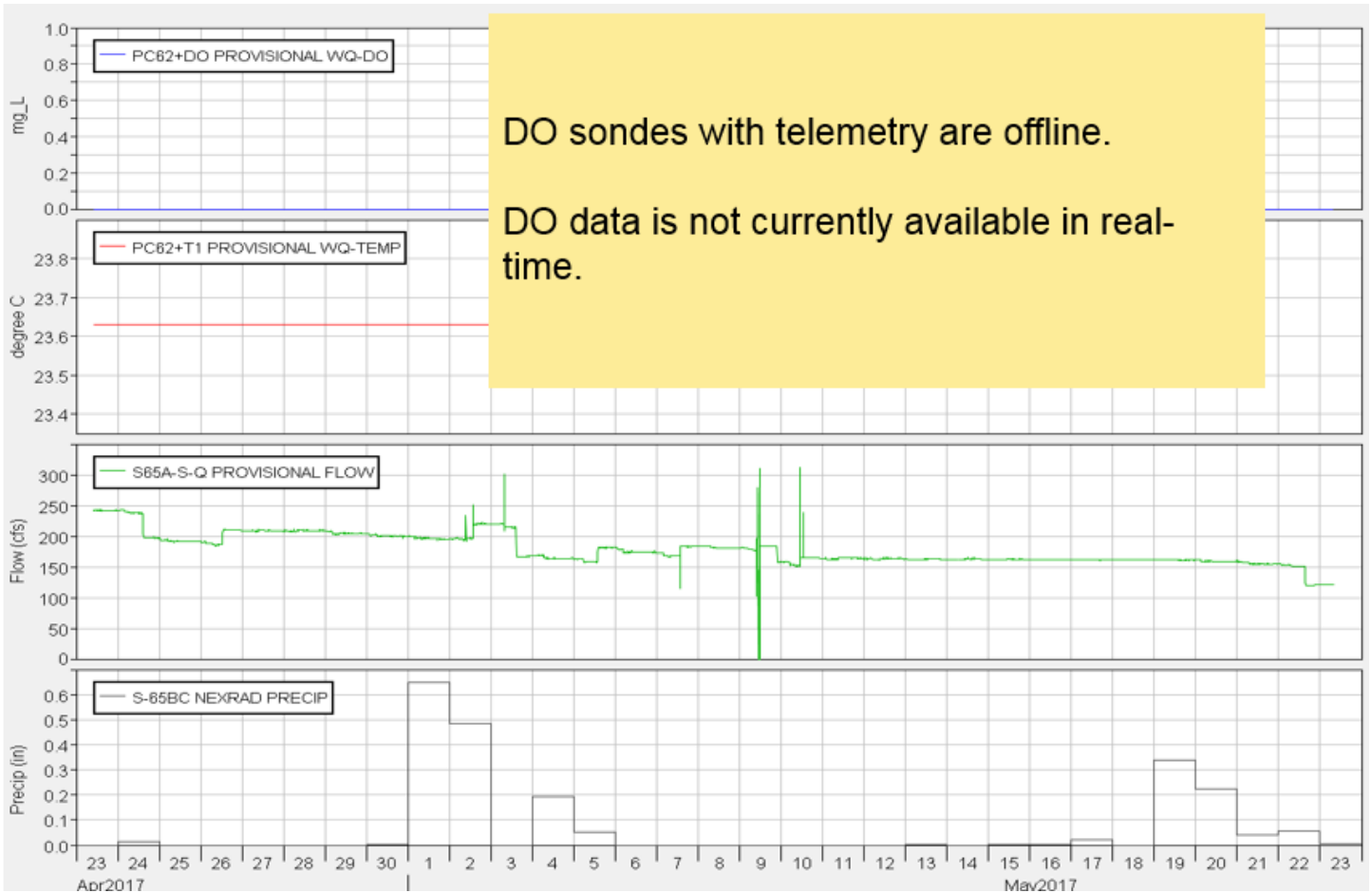


**Figure 9.** Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years or in Wet Season 2015.

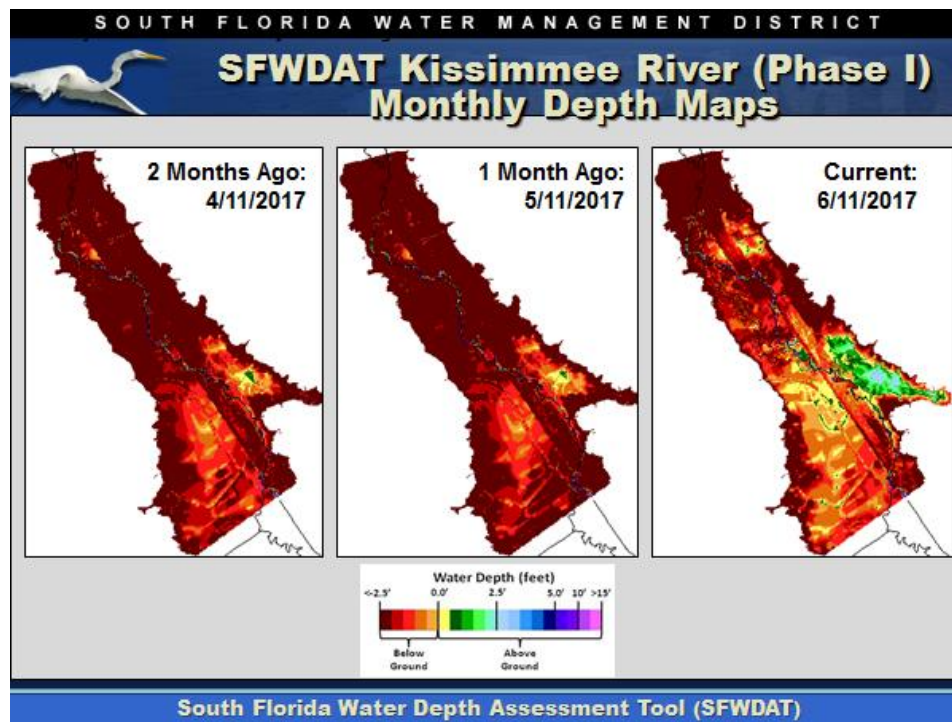


Report Date: 6/13/2017; data are through: 6/11/2017.

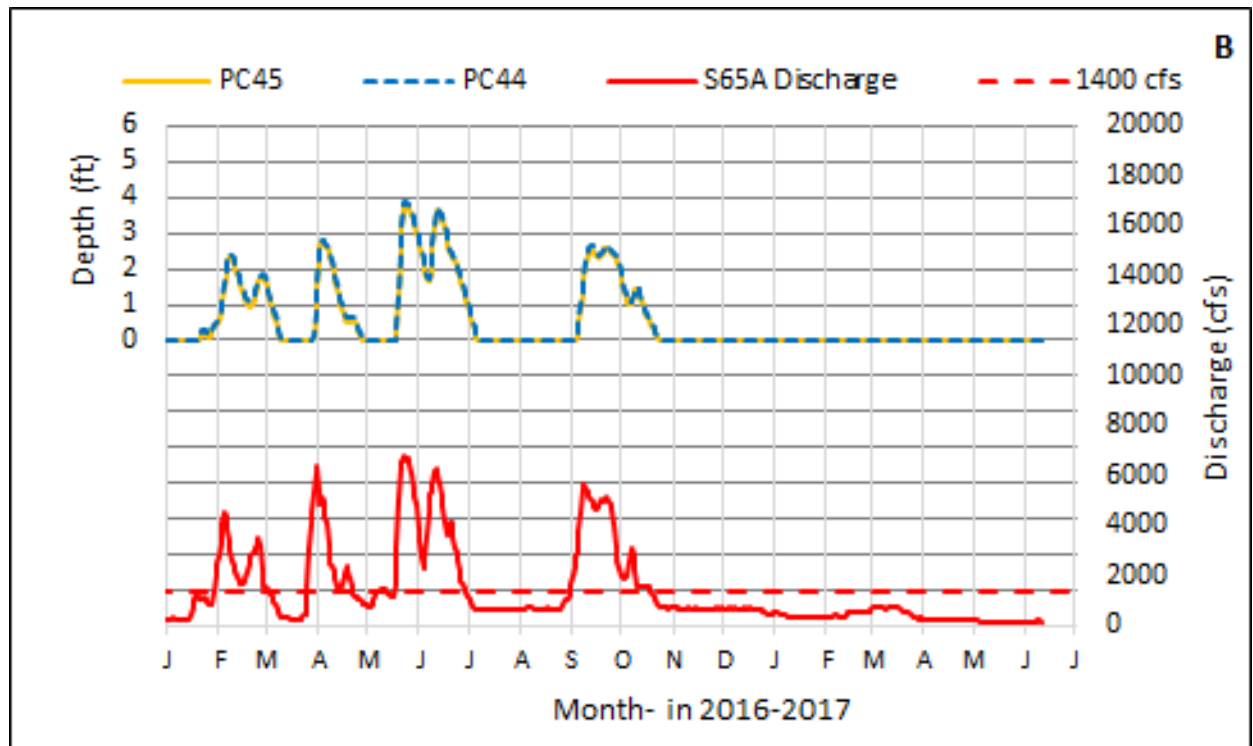
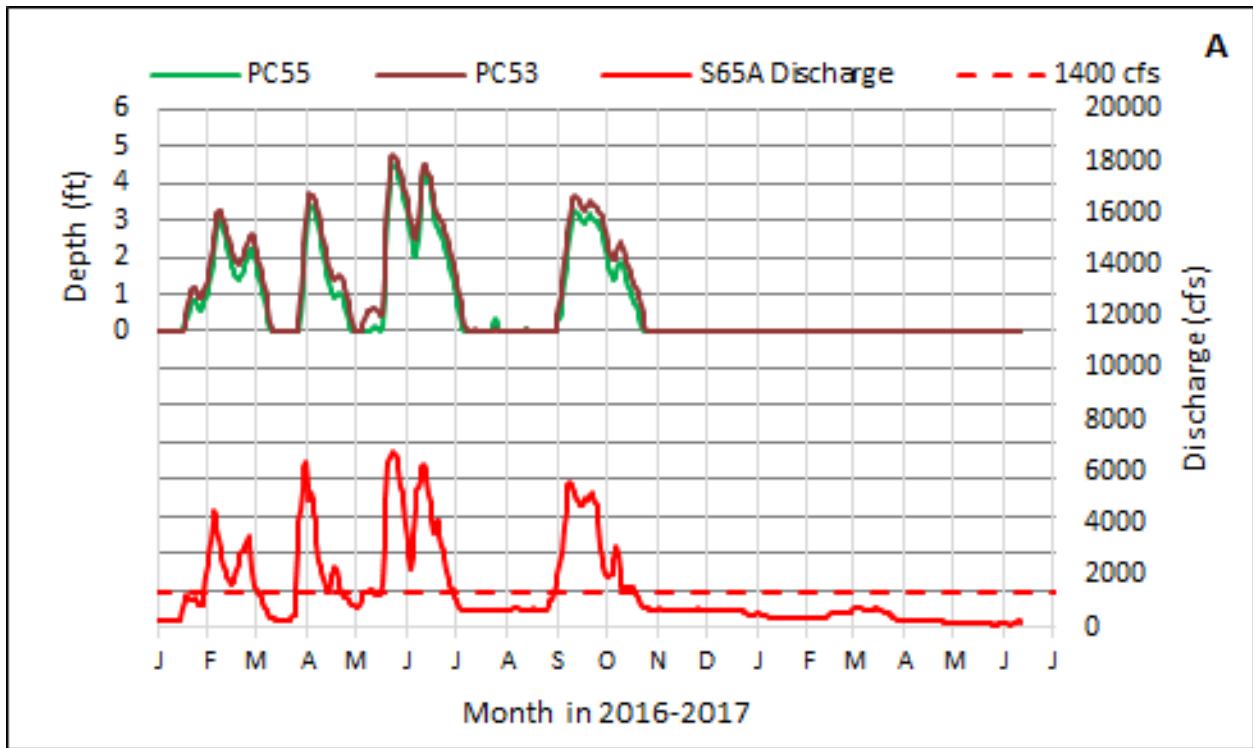
**Figure 10.** Mean daily Dissolved Oxygen, discharge, temperature and rainfall in the Phase I river channel.



**Figure 11.** Phase I river channel dissolved oxygen and water temperature (measured at 15 minute intervals) and Pool BC daily rainfall.

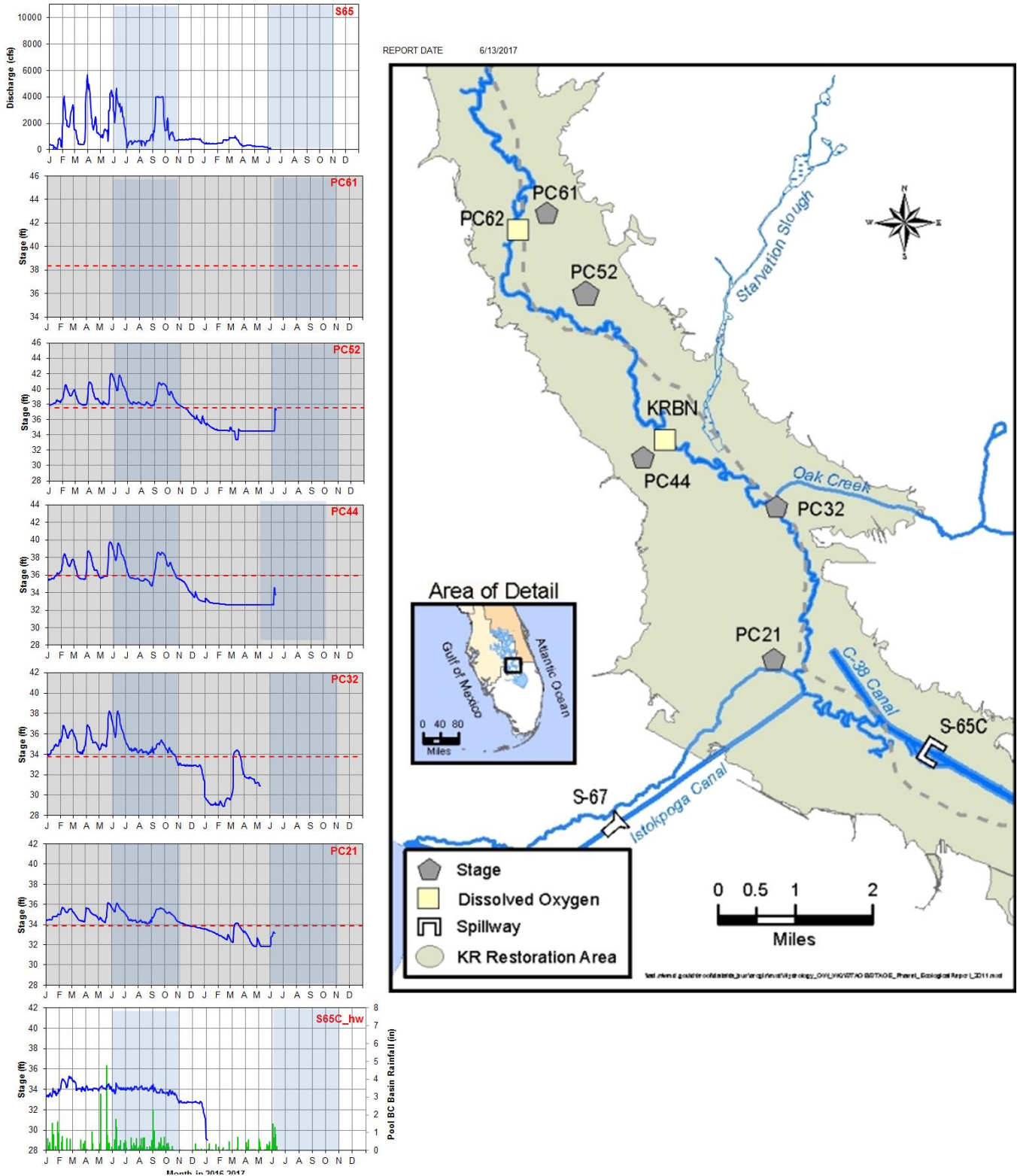


**Figure 12.** Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to Jan. 16, 2012.



**Insert.** Water depth at selected northern Kissimmee River floodplain sites on (A) the PC5's transect and (B) the PC4's transect, with S65A discharge.

# Kissimmee River Hydrographs



**Figure 13.** Discharge at S65, stages at five monitoring stations in the Phase I area of the Kissimmee River floodplain, and headwater stage at S65-C since January 1, 2015. The most recent data (~2 weeks) are provisional real-time data from SFWMD DualTrend; previous data are from SFWMD DB-HYDRO (validated). Dashed lines are ground elevations.



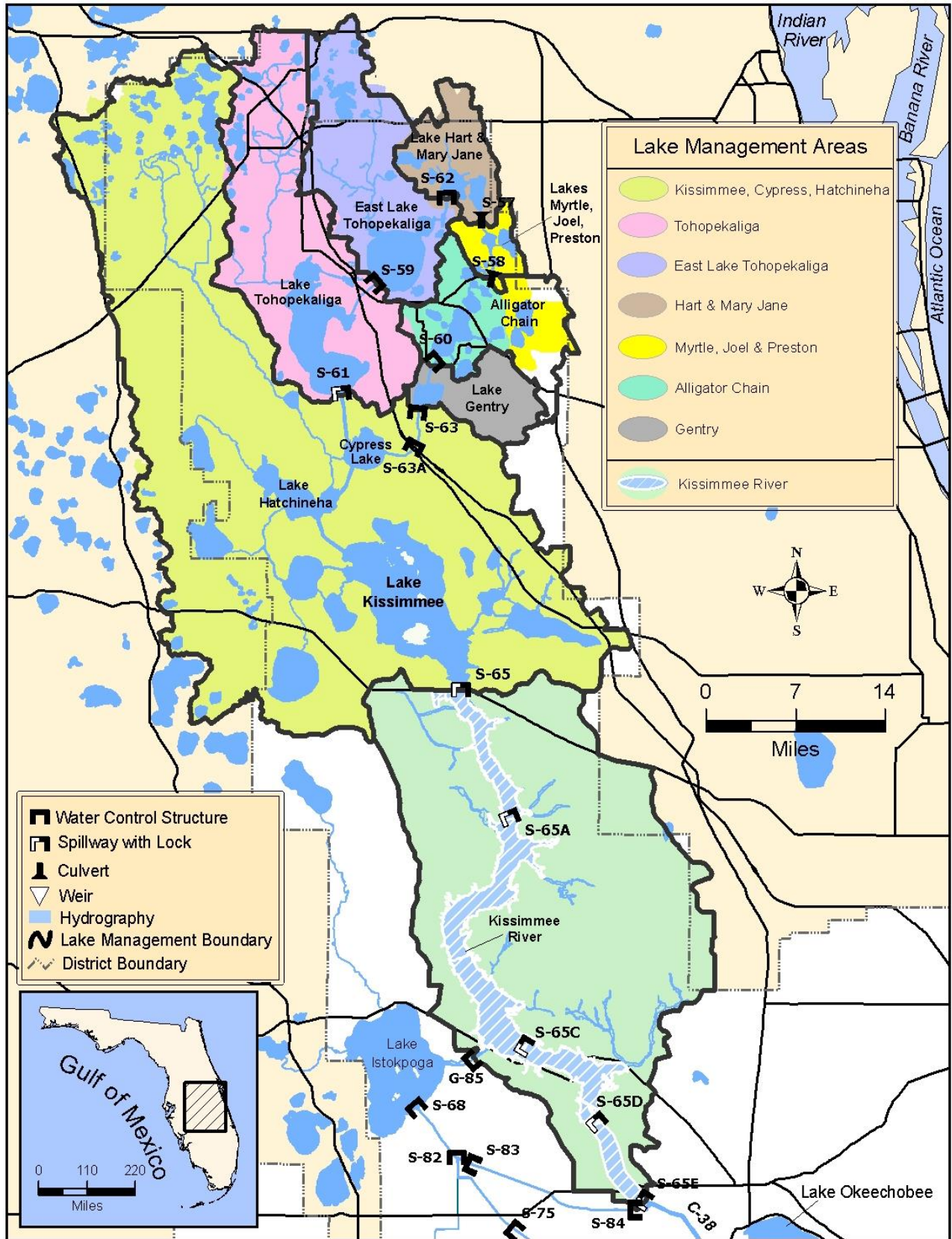


Figure 14. The Kissimmee Basin

## **LAKE OKEECHOBEE**

According to the USACE web site, Lake Okeechobee stage is at 11.77 feet NGVD for the period ending at midnight on June 11, 2017. This value is based on the use of four interior Lake stations (L001, L005, L006, and LZ40) and four perimeter stations (S308, S352, S4 and S133). Lake stage increased by 0.71 feet over the past week due to heavy rains and basin runoff and is 0.26 feet higher than it was a month ago and 2.87 feet lower than it was a year ago (Figure 1). The Lake is currently in the Beneficial Use sub-band (Figure 2). According to RAINDAR, 4.97 inches of rain fell directly over the Lake during the past seven days (Figure 3). Similar or greater amounts of rain fell in the surrounding watershed except for the Kissimmee Valley which received less amounts of rainfall.

Based on USACE reported values, current Lake inflow is approximately 3,002 cfs as detailed below.

<b>Structure</b>	<b>Flow cfs</b>
S65E	0
S65EX1	514
S154	0
S84 & 84X	141
S71	0
S72	78
C5 (Nicodemus slough dispersed storage)	0
S191	0
S133 PUMPS	0
S127 PUMPS	0
S129 PUMPS	57
S131 PUMPS	0
S135 PUMPS	0
Fisheating Creek	588
S2 Pumps	1623
S3 Pumps	0
S4 Pumps	0

Current Lake outflow is approximately -1,849 cfs with approximately 652 cfs entering the Lake from the L8 canal through Culvert 10A, 408 cfs entering through S351, S352 and S354 and 853 cfs entering through S308. Approximately 56 cfs is exiting through S131 Culverts and 8 cfs is exiting through S127 Culverts. Minimal flow (2 cfs) is exiting at S77. Corrected evapotranspiration value based on the L006 weather platform solar radiation data for this past week decreased from 3,453 cfs last week to 2,122 cfs.

Change in elevation equivalents and average weekly flows (midnight June 5, 2017 to midnight June 11, 2017) for major structures are presented in Figure 4.

Based on the Lake Okeechobee wading bird habitat suitability index, there are currently approximately 23,215 acres of suitable foraging habitat for long-legged birds and 9,860 acres for long and short-legged birds on the Lake (Figure 5). With the recent rise in Lake levels there were almost 12,000 less wading birds utilizing the Lake during the most recent wading bird foraging survey (Figure 6). However, the 2017 wading bird season is winding down so minimal impacts to wading birds are expected.

No new nests were recorded during the June (Survey 5) snail kite survey (Figure 7). Of the 39 total nests thus far this season, 21 were deemed successful, 11 have failed and seven are still considered active.

Taking advantage of the dry marsh conditions in Lake Okeechobee, the District and the Florida Fish and Wildlife Conservation Commission (FWC) have collaborated to conduct aerial herbicide treatments to control nuisance emergent vegetation. The FWC has treated 1,500 acres of torpedograss in the Indian Prairie marsh and has proposed to treat an additional 1,600 acres of cattail in Moonshine Bay (Figure 8). The District has proposed treating an additional 1,600 acres of torpedograss in the Moore Haven marsh (Figure 9).

No unobscured imagery from the OLCI sensor is available.

### **Water Management Recommendations**

The Lake is 11.77 feet NGVD having increased by 0.71 feet over the past week. This ascension rate equates to a projected ascension rate of 2.84 feet per month which is over five times the optimal 0.5 feet per month.

With the onset of the wet season, ecological concerns shift from the effects of desiccation of the marsh to the potential damage to submerged and emergent vegetation, wading bird foraging and nesting, and native apple snail egg production which can result from a too rapid (greater than 0.5 feet per month) rise in Lake stage.

Any activities that result in the slowing of the rate of rise of Lake Okeechobee would be ecologically beneficial now and would be protective of the Lake's emergent wetland and submerged aquatic flora and its associated fauna.

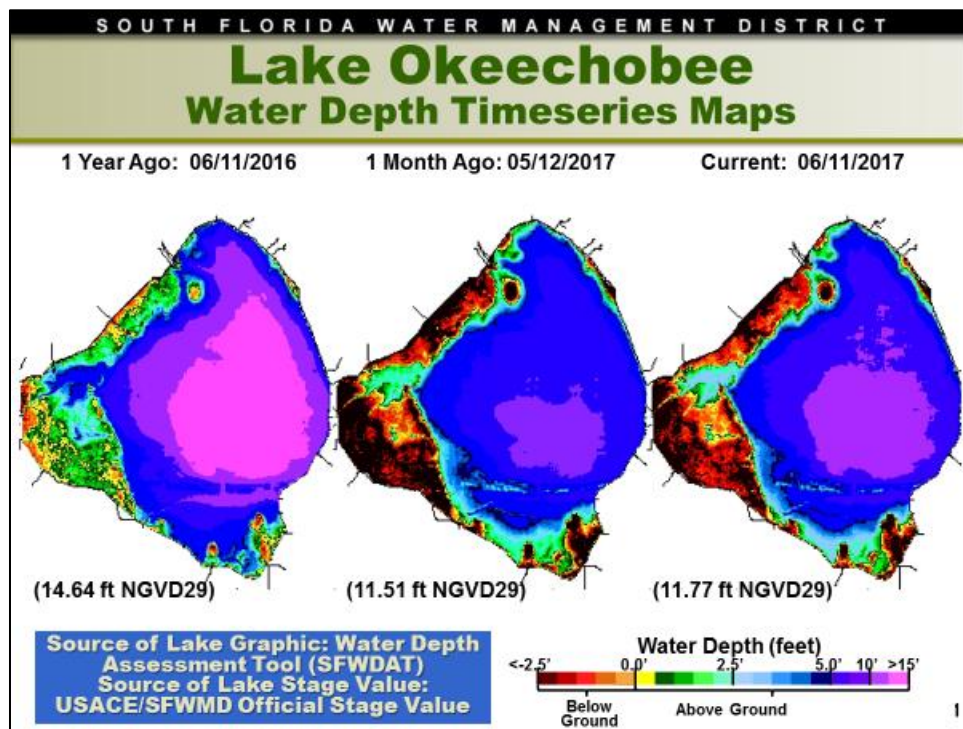


Figure 1

# Weekly Stage Hydrograph

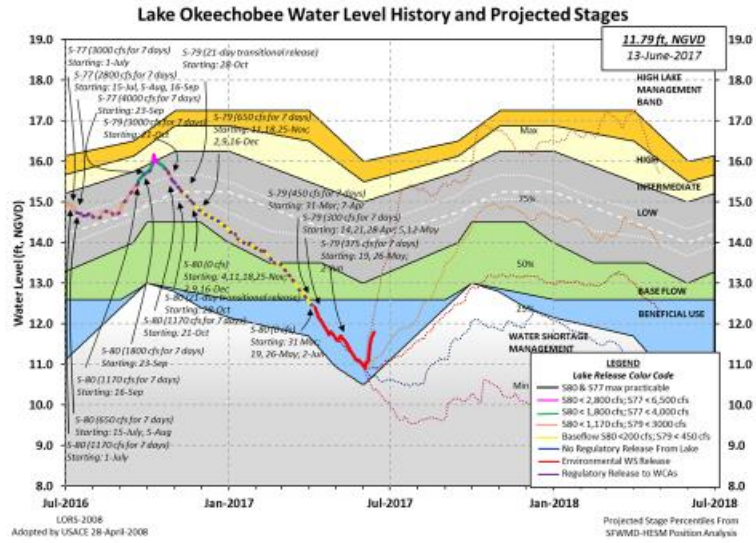
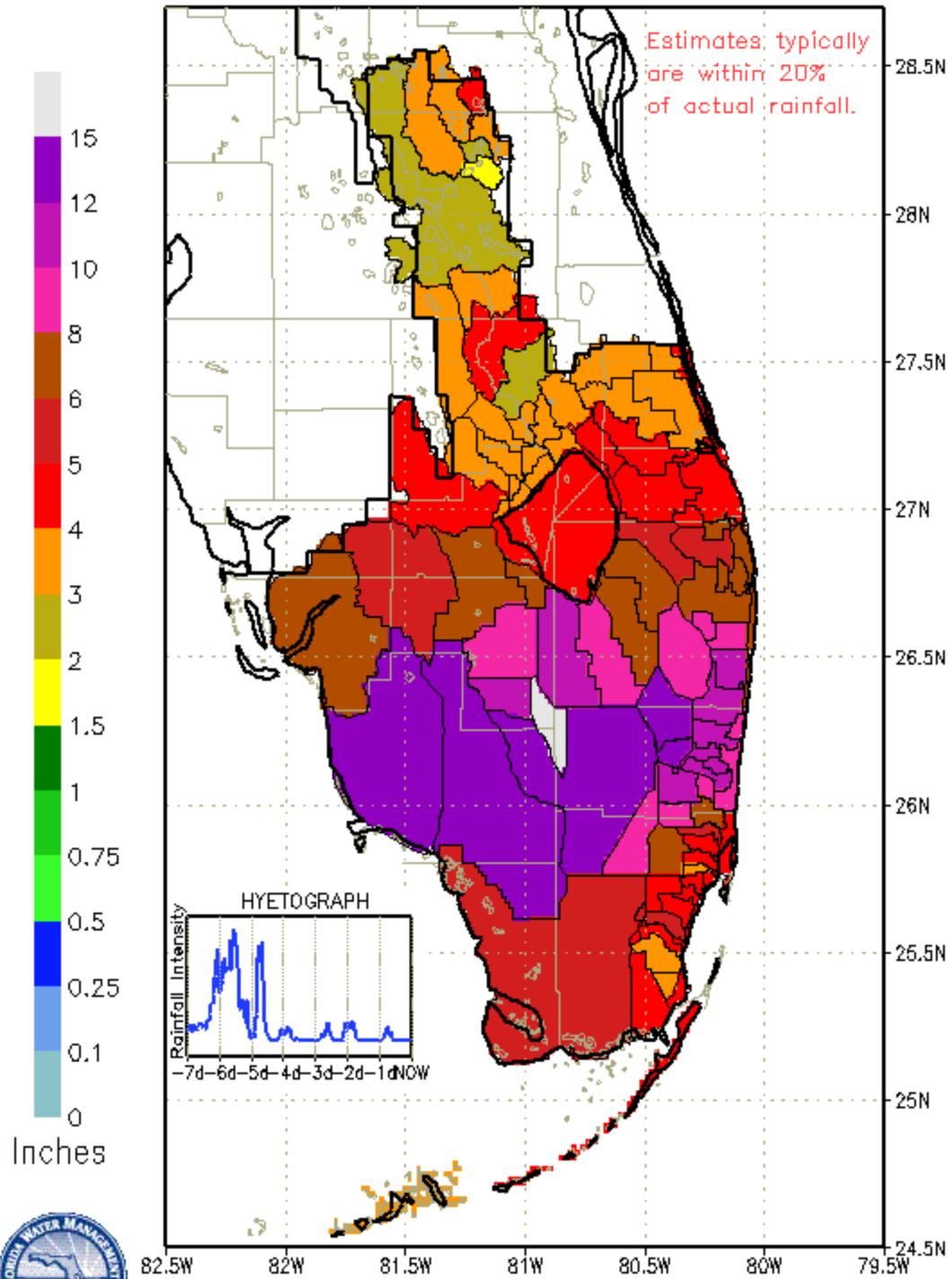


Figure 2



# SFWMD PROVISIONAL RAINFAR 7-DAY BASIN RAINFALL ESTIMATES

FROM: 0830 EST, 06/05/2017 THROUGH: 0830 EST, 06/12/2017



DISTRICT-WIDE RAINFALL ESTIMATE: 7.515"

Figure 3

INFLOWS	Average Daily Flow Past Week cfs	Feet of Change Past Week
S65E & S65EX1	321	0.013
S71 & 72	642	0.025
S84 & 84X	200	0.008
Fisheating Creek	27	0.001
Rainfall	N.A.	0.414
OUTFLOWS	Average Daily Flow Past Week cfs	Feet of Change Past Week
S77	52	0.002
S308	-1393	-0.055
S351	-210	-0.008
S352	-221	-0.009
S354	-636	-0.025
L8	-747	-0.029
ET	2122	0.083

Figure 4

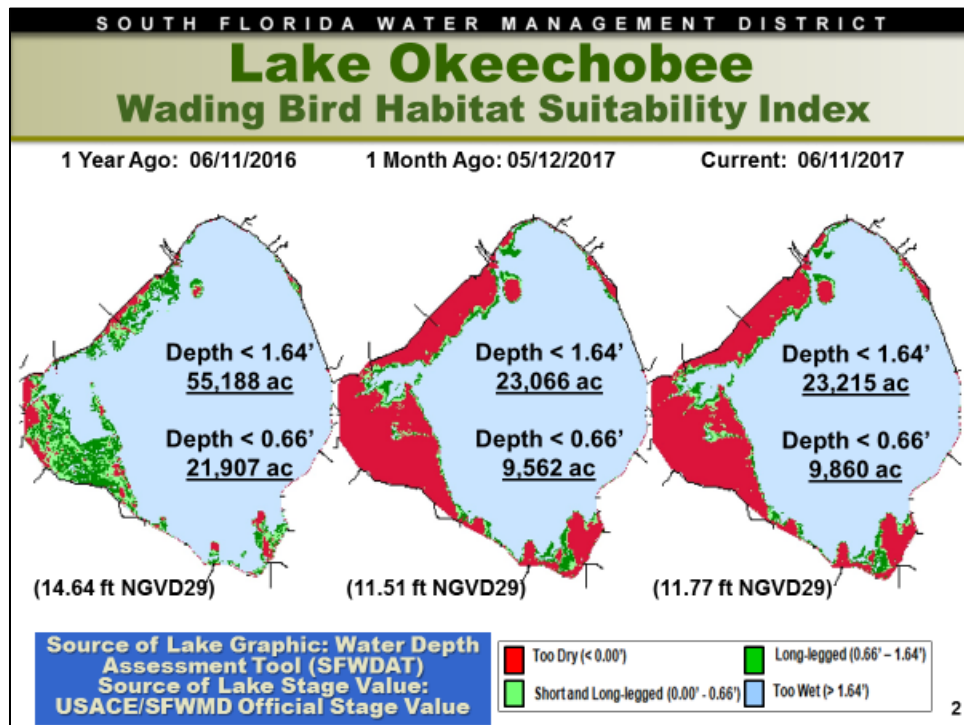


Figure 5

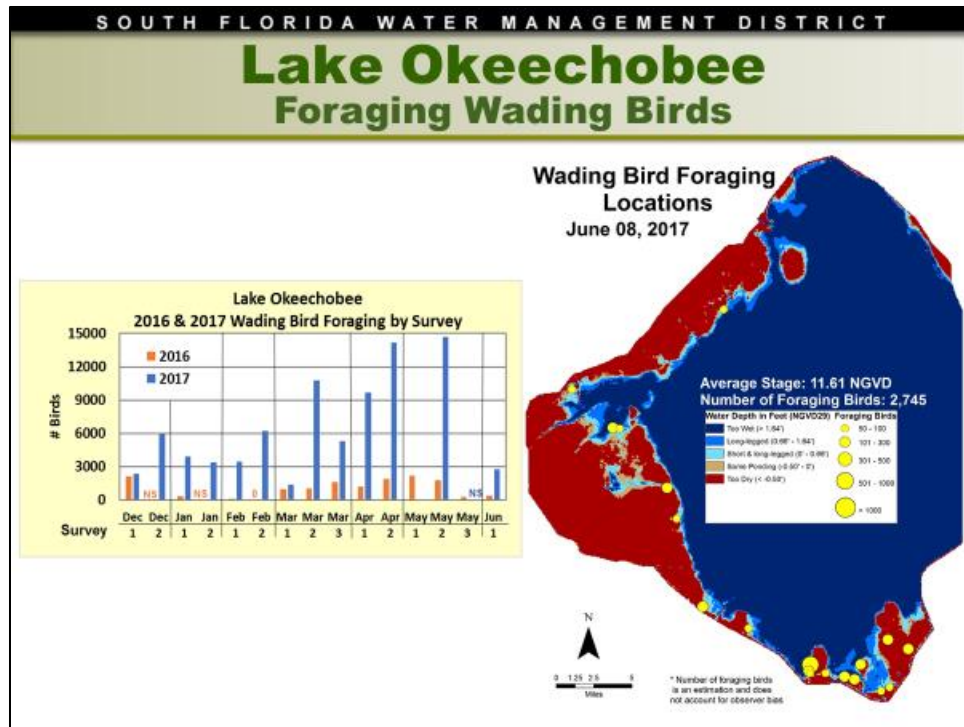


Figure 6

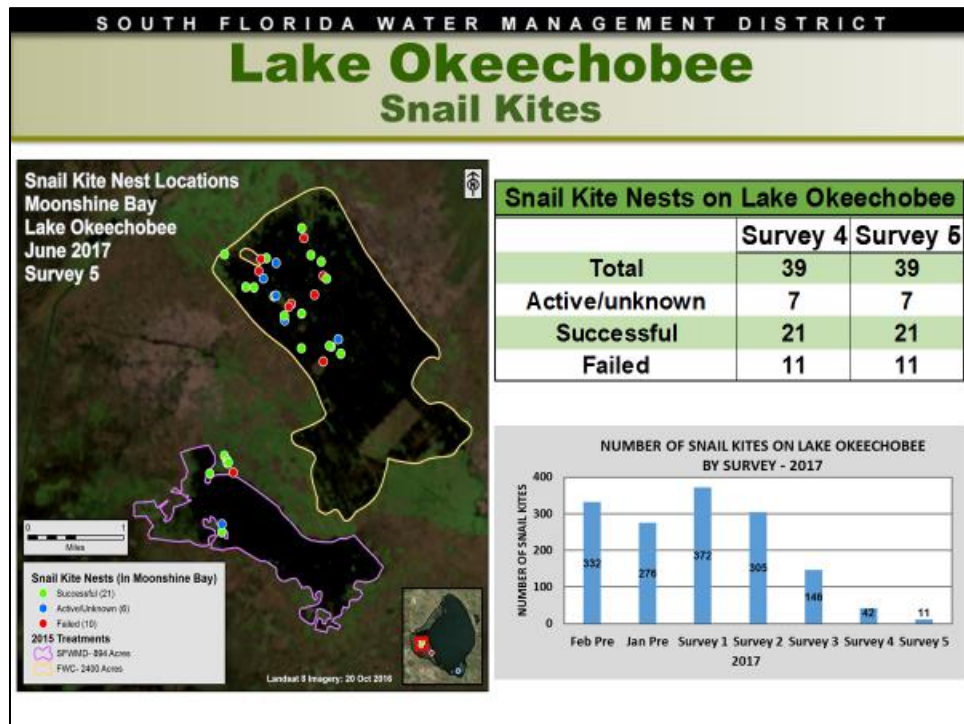


Figure 7

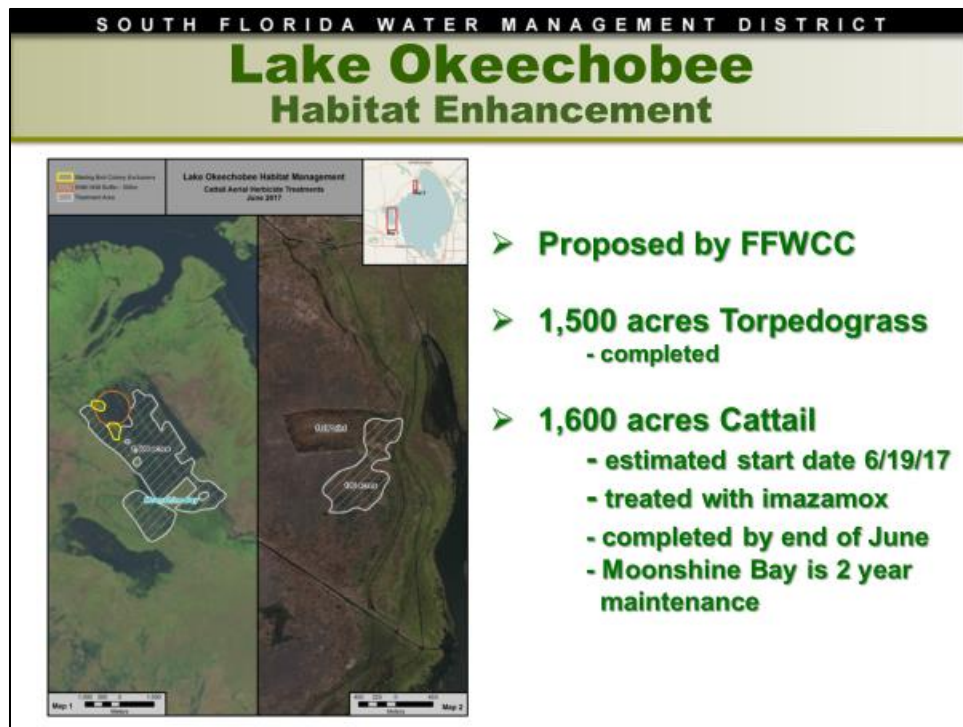


Figure 8

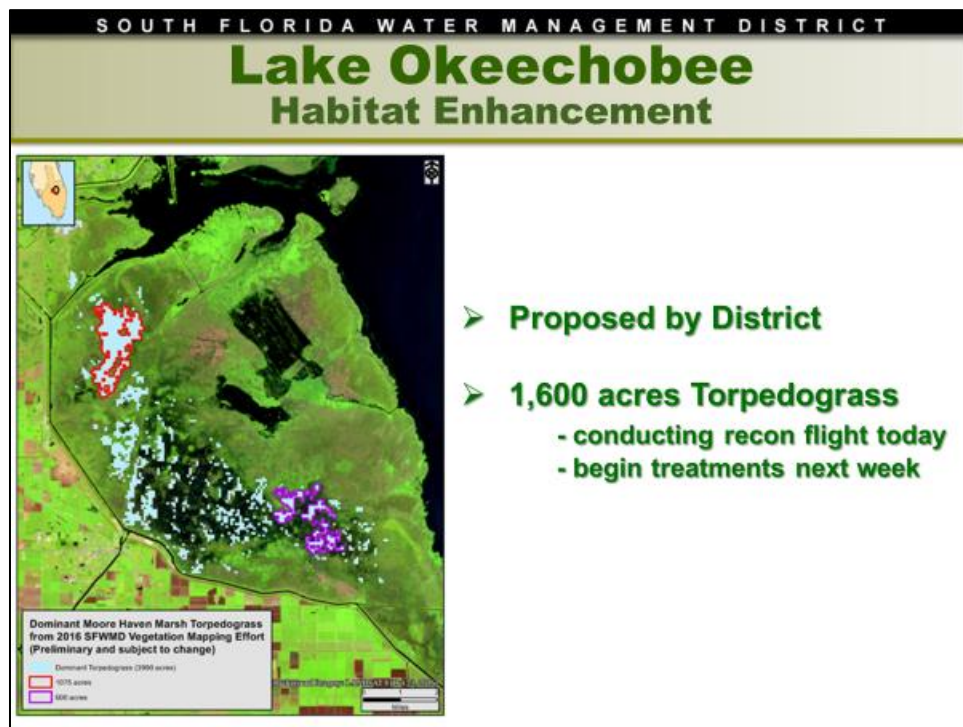


Figure 9

### Lake Istokpoga

Lake Istokpoga stage is 38.21 feet NGVD as of midnight June 11, 2017 and is currently 0.04 feet below its low pool regulation schedule of 38.25 feet NGVD (Figure 10). Average flows into the Lake from Arbuckle and Josephine creeks over the past week increased to 252 cfs and 32 cfs, respectively. Average discharge from S68 and S68X this past week was 5 cfs, a decrease from the previous week's

flow of 13 cfs. According to RAINDAR, 3.85 inches of rain fell in the Lake Istokpoga watershed during the past seven days.

No new snail kite nests were found during the June survey. There is currently one active snail kite nest on the Lake (Figure 11). Of the 14 nests recorded thus far this season six were deemed successful and seven have failed.

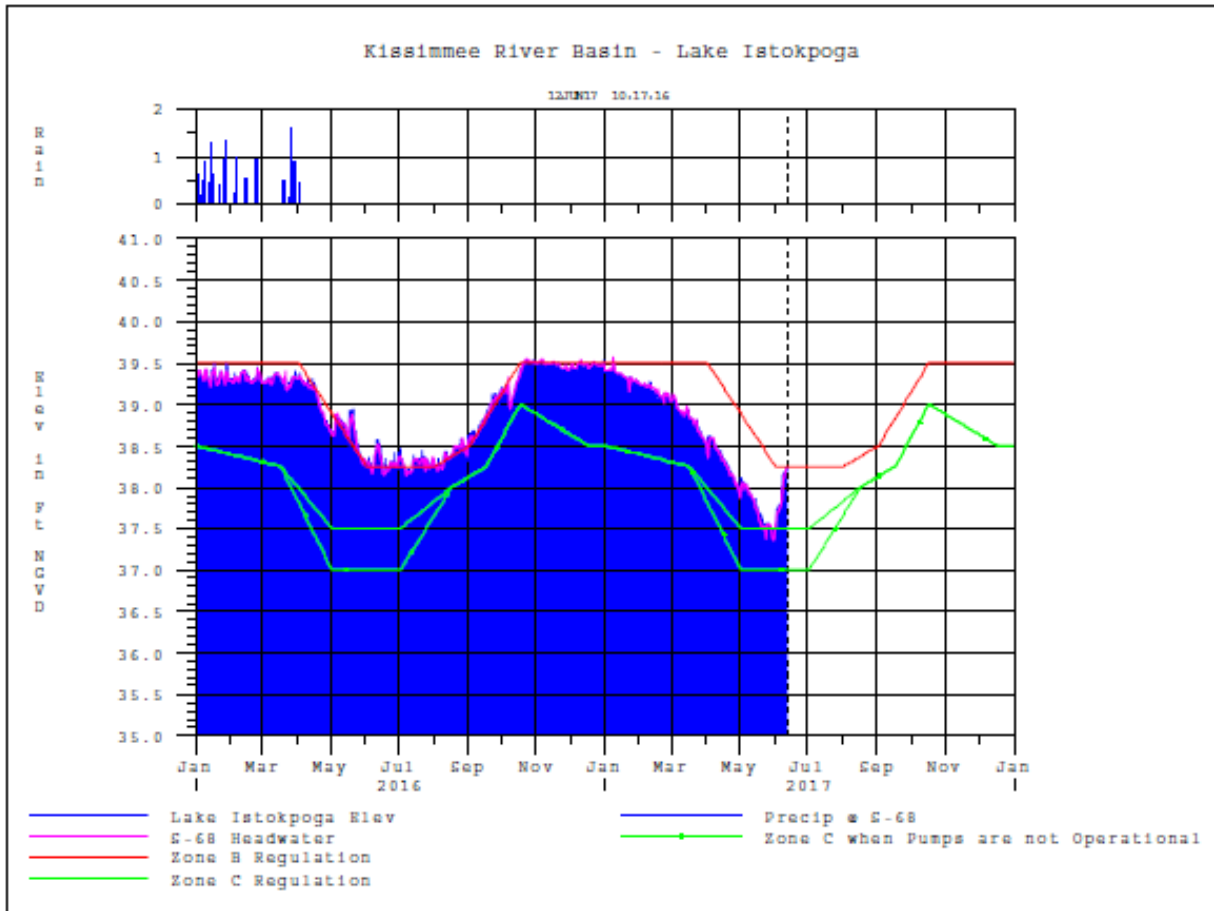


Figure 10



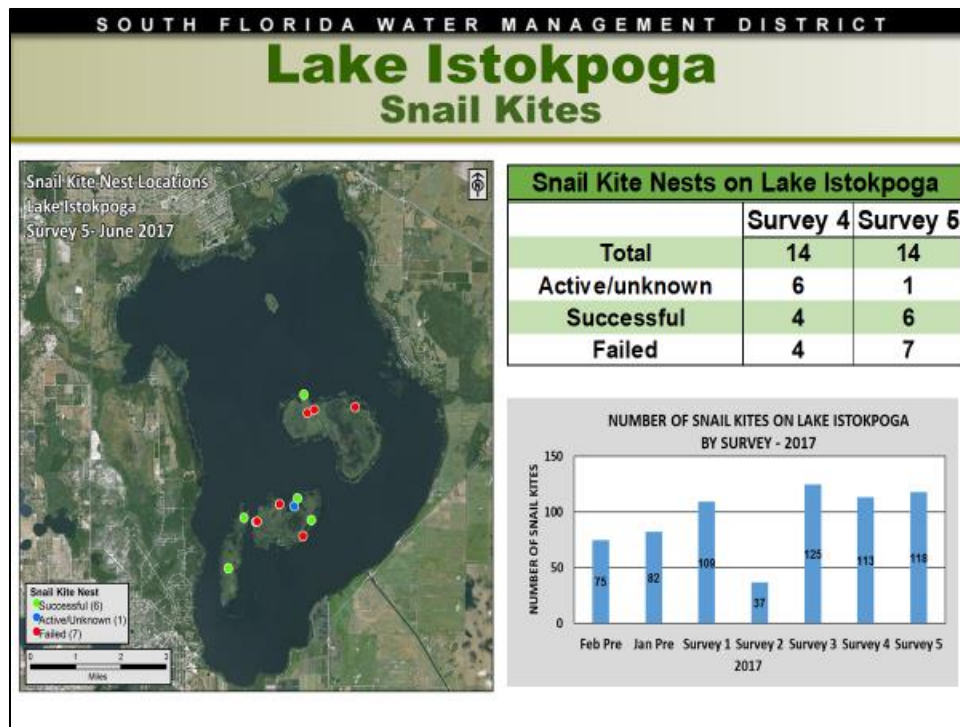


Figure 11

## ESTUARIES

### St. Lucie Estuary

Over the past week, provisional flows averaged about 0 cfs at S-80, 3,131 cfs downstream of S-308 flowing into Lake Okeechobee, 402 cfs at S-49 on C-24, 542 cfs at S-97 on C-23, and 348 cfs from Ten Mile Creek at the Gordy Road Structure. Average inflow from tidal basin tributaries is estimated to be 882 cfs (Figures 1 and 2). Total inflow averaged about 2,174 cfs last week and 776 cfs over last month.

Over the past week, salinity decreased throughout the estuary (Table 1, Figures 3 and 4). The seven-day moving average salinity of the water column at the US1 Bridge is about 16.4. Salinity conditions in the middle estuary are in the good range for the adult eastern oyster.

Table 1. Seven-day average salinity at three monitoring stations in the St. Lucie Estuary. Current average is in bold face type, previous average in parentheses. The envelope reflects the preferred salinity range for adult eastern oysters (*Crassostrea virginica*) in the middle estuary.

Sampling Site	Surface	Bottom	Envelope
HR1 (N. Fork)	<b>11.5</b> (25.0)	<b>19.6</b> (27.1)	NA <sup>1</sup>
US1 Bridge	<b>15.5</b> (27.2)	<b>17.4</b> (27.9)	10.0-26.0
A1A Bridge	<b>23.0</b> (31.9)	<b>26.2</b> (32.9)	NA

<sup>1</sup>Envelope not applicable

### Caloosahatchee Estuary

During the past week, provisional flows averaged approximately 0 cfs at S-77, 2,947 cfs at S-78, and 5,609 cfs at S-79. Average inflow from tidal basin tributaries is estimated to be 1,876 cfs (Figures 5 & 6). Total inflow averaged 7,485 cfs last week and 2,218 cfs over last month.

Over the past week in the estuary, salinity decreased throughout the estuary (Table 2, Figures 7 and 8). The seven-day average salinity values are within the good range for adult oysters at Cape Coral and at Shell Point, and within the fair range at Sanibel (Figure 9). The 30-day moving average surface salinity is 6.0 at Val I-75 and 13.2 at Ft. Myers. The 30-day moving average salinity at Ft. Myers has

been above 10 for 77 consecutive days. Salinity conditions between Val I-75 and Ft. Myers are likely to result in tape grass deterioration. Without discharges at S-79, the 30-day moving average salinity at Val I-75 is forecast to be 2.4 within two weeks (Figure 10).

Table 2. Seven-day average salinity at six monitoring stations in the Caloosahatchee Estuary. Current average is in bold face type, previous average in parentheses. The envelope reflects the preferred salinity range for tape grass (*Vallisneria americana*) at Val I-75 and for adult eastern oysters (*Crassostrea virginica*) elsewhere.

Sampling Site	Surface	Bottom	Envelope
S-79 (Franklin Lock)	<b>1.1</b> (5.3)	<b>1.1</b> (5.4)	NA <sup>1</sup>
*Val I75	<b>2.8</b> (6.8)	<b>4.9</b> (9.3)	0.0-5.0 <sup>2</sup>
Ft. Myers Yacht Basin	<b>7.0</b> (14.5)	<b>10.5</b> (15.3)	NA
Cape Coral	<b>14.6</b> (23.4)	<b>16.4</b> (24.5)	10.0-30.0
Shell Point	<b>24.4</b> (32.9)	<b>25.1</b> (32.7)	10.0-30.0
Sanibel	<b>30.9</b> (35.6)	<b>33.0</b> (36.7)	10.0-30.0

<sup>1</sup>Envelope not applicable and <sup>2</sup>Envelope is based on a 30-day average.

\*Val I75 is temporarily offline due to site construction,  
Salinity values are estimated using models developed for this site.

Monitoring data collected by the River, Estuary and Coastal Observing Network of Sanibel-Captiva Conservation Foundation using continuous sensors are summarized in Table 3 as concentration ranges of Chlorophyll *a* and dissolved oxygen at Beautiful Island, Ft. Myers, and Shell Point in the Caloosahatchee Estuary.

Table 3. Weekly ranges of Chlorophyll *a* (a measure of algal biomass) and dissolved oxygen concentrations at three monitoring stations maintained by the Sanibel-Captiva Conservation Foundation.

	RECON Monitoring Stations		
	Beautiful Island	Ft. Myers	Shell Point
Chlorophyll <i>a</i> (µg/l)	3.82 – 20.67	3.10 – 38.32	1.31 – 39.32
Dissolved Oxygen (mg/l)	2.48 – 6.37	0.99 – 6.10	No Data

The Florida Fish and Wildlife Research Institute reported on June 9, 2017, that *Karenia brevis*, the Florida red tide organism, was not present in samples collected from Lee County.

### Water Management Recommendations

The 30-day average salinity at the I-75 Bridge is 6.0 and is forecast to be below 5 in two weeks with no inflow at S-79. Lake stage is in the Beneficial Use sub-band of 2008 LORS. The 2008 LORS/Adaptive Protocols recommend no S-77 releases unless the Governing Board recommends otherwise. Given the current estuarine conditions, there are no ecological benefits associated with additional releases from Lake Okeechobee.

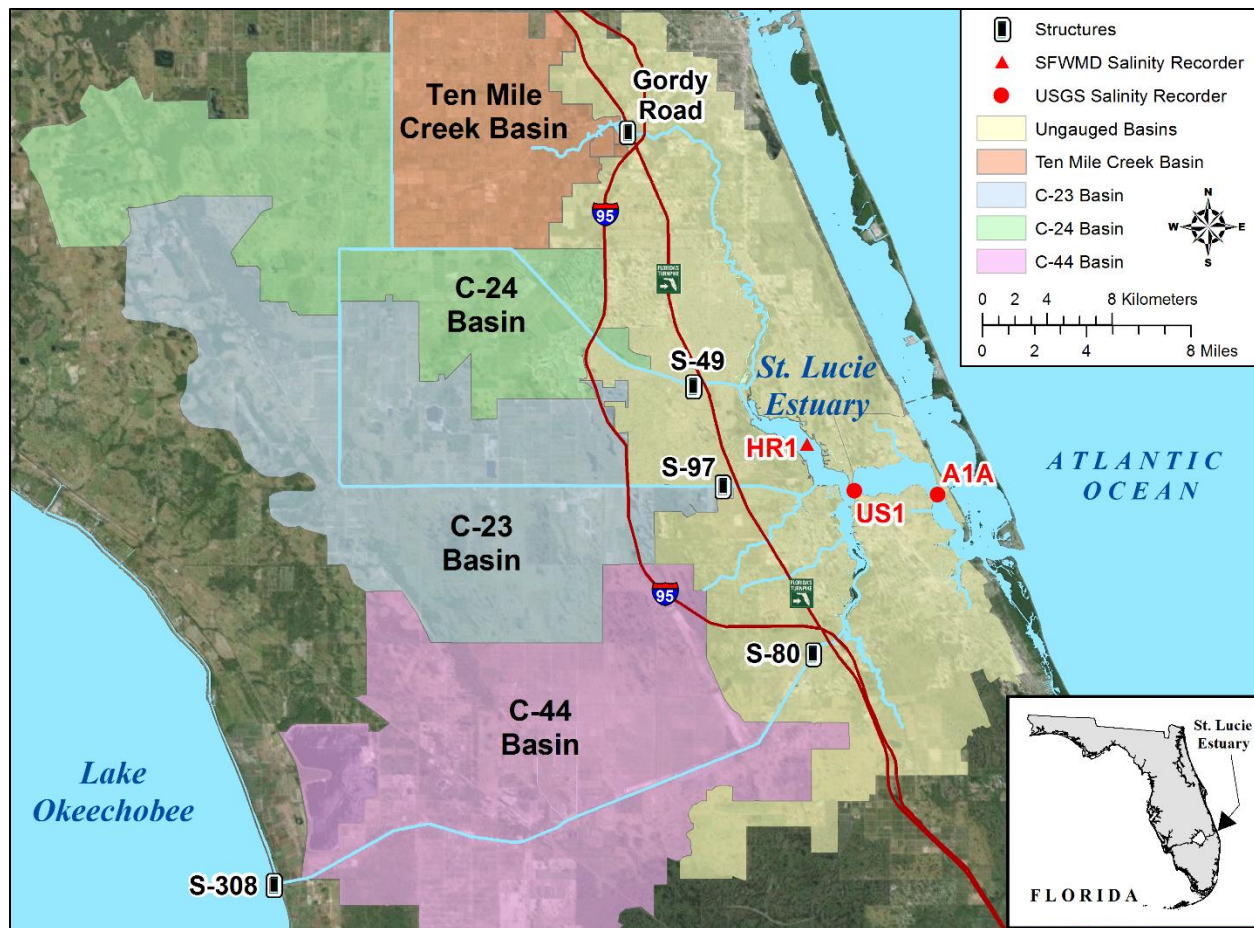


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

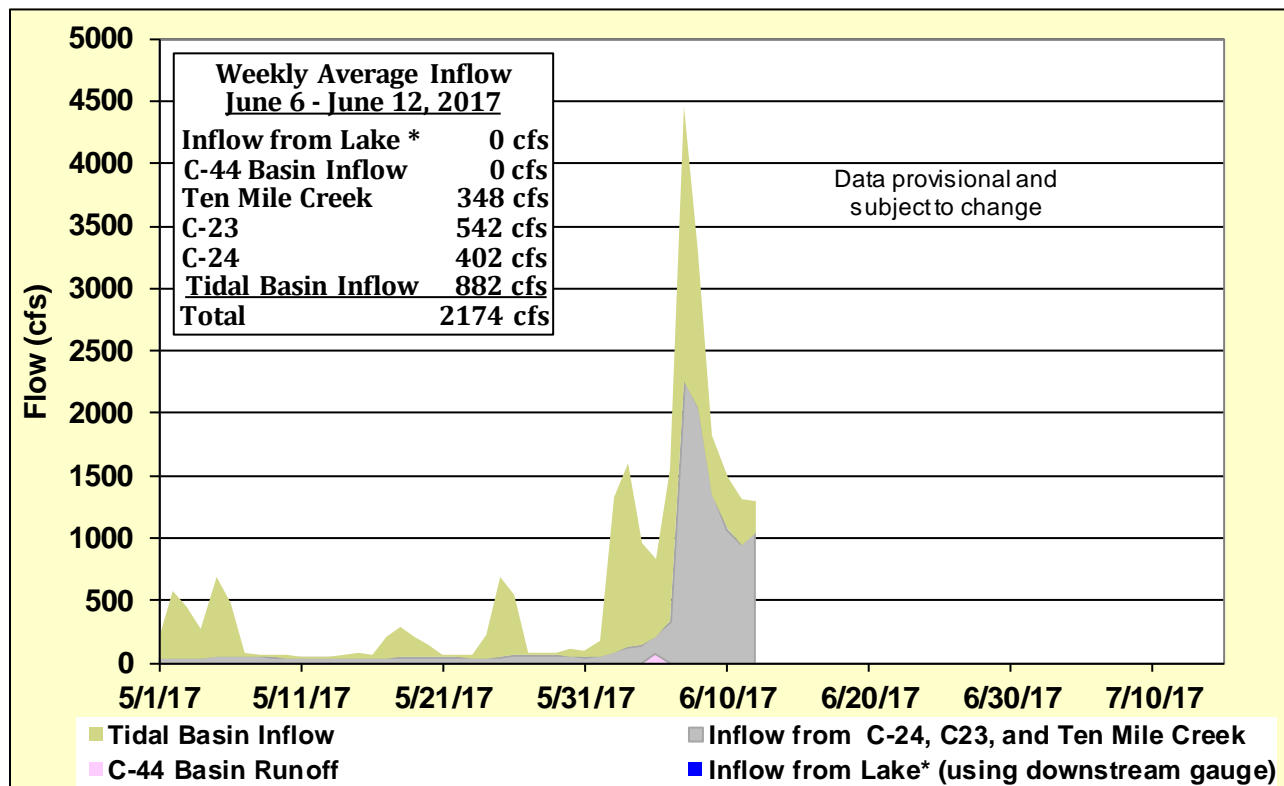


Figure 2. Estimated surface freshwater inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basins into the St. Lucie Estuary.



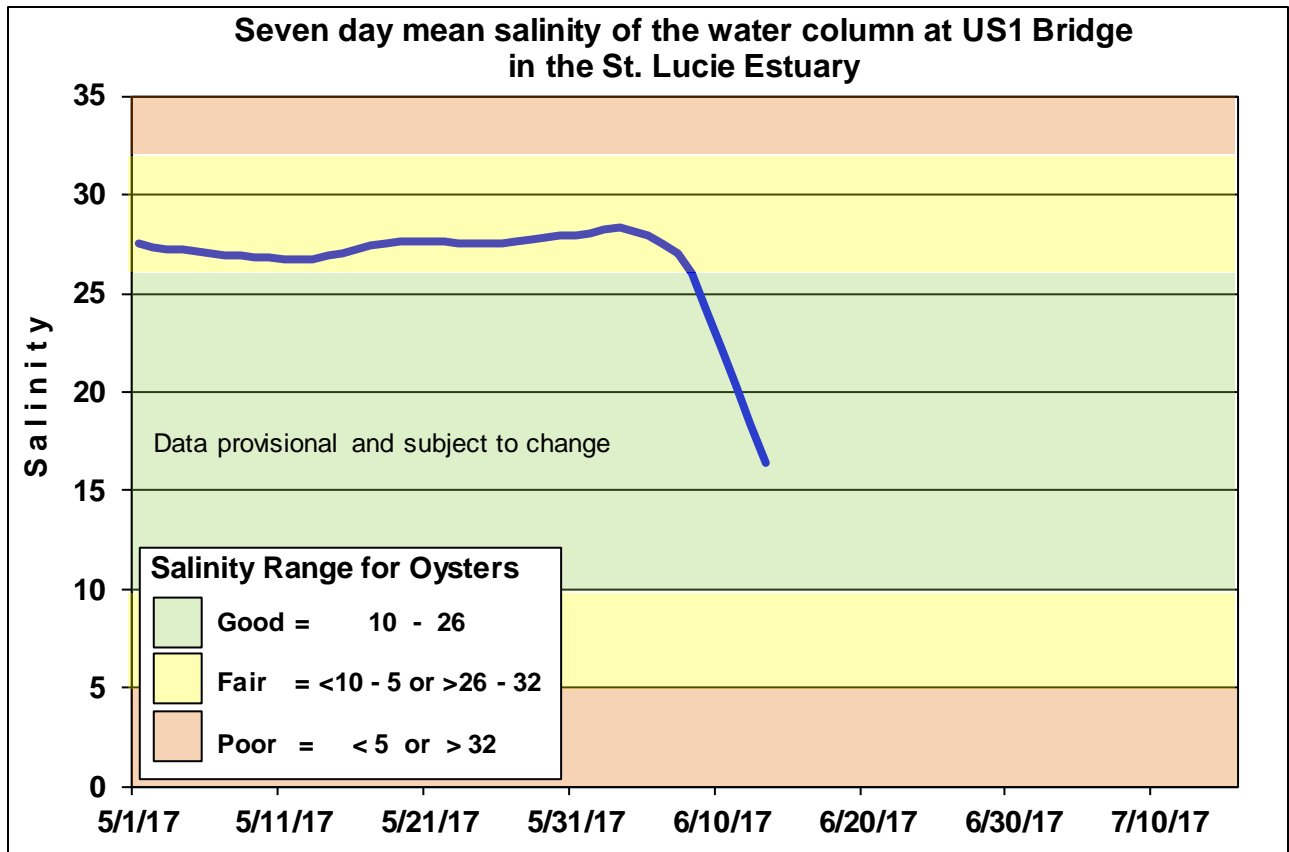


Figure 3. Seven-day mean salinity of the water column at the U.S. Highway 1 Bridge.

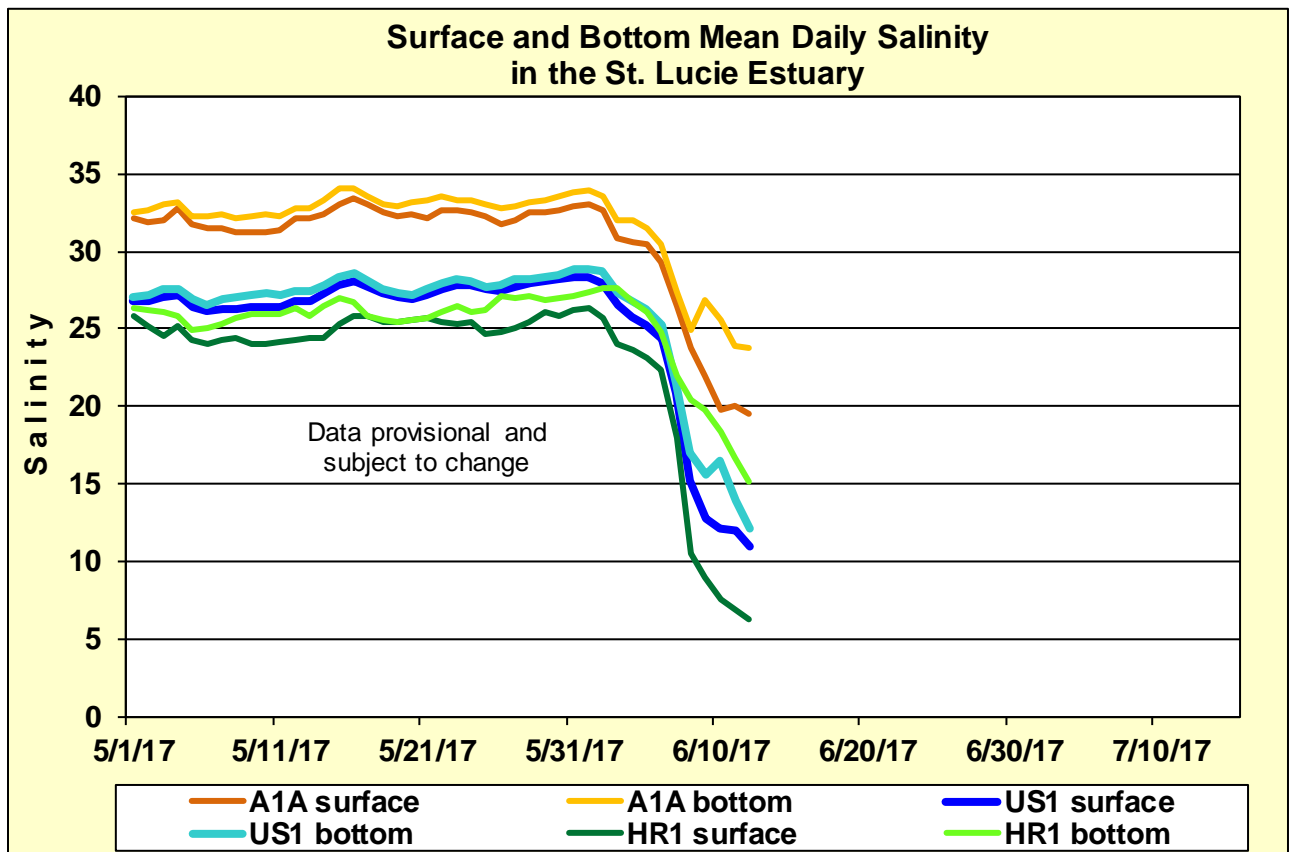


Figure 4. Daily mean salinity at the A1A, US1 and estimated HR1 stations.

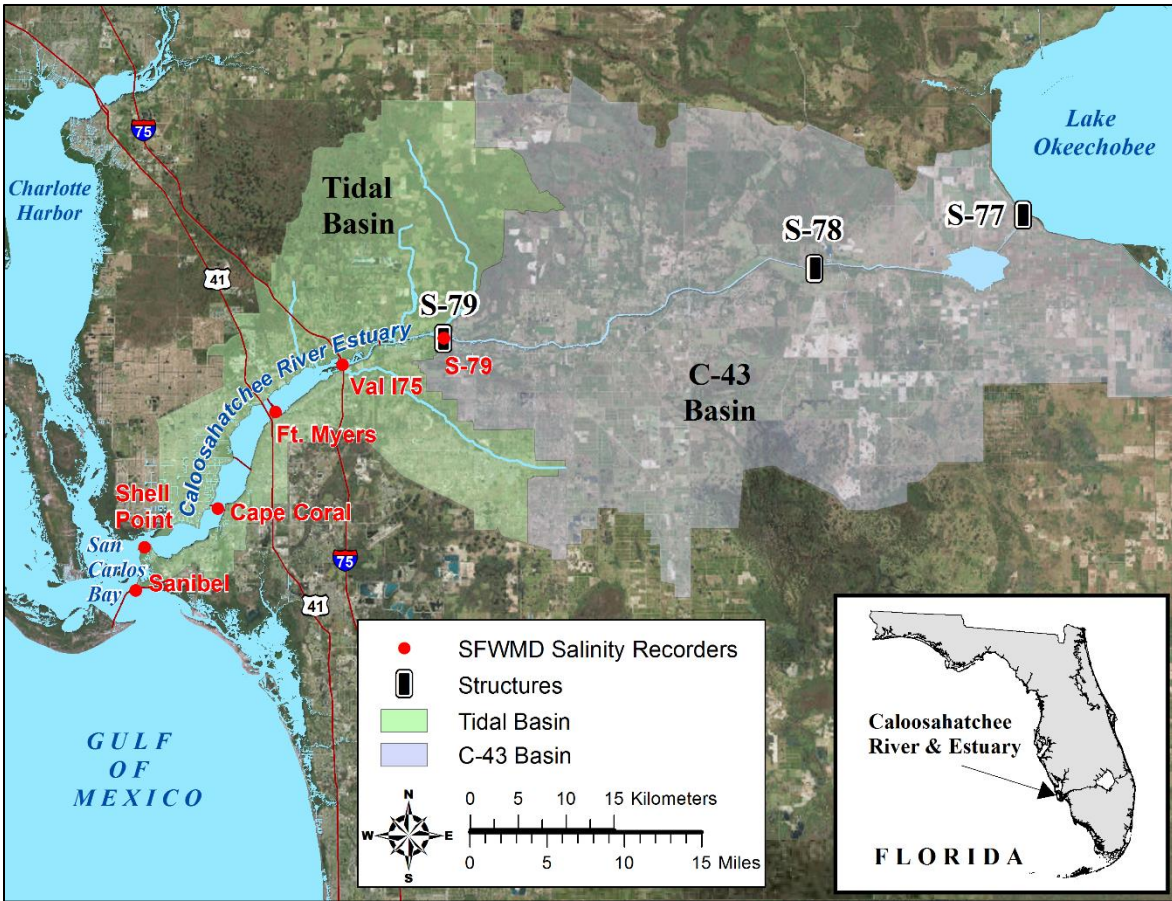


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

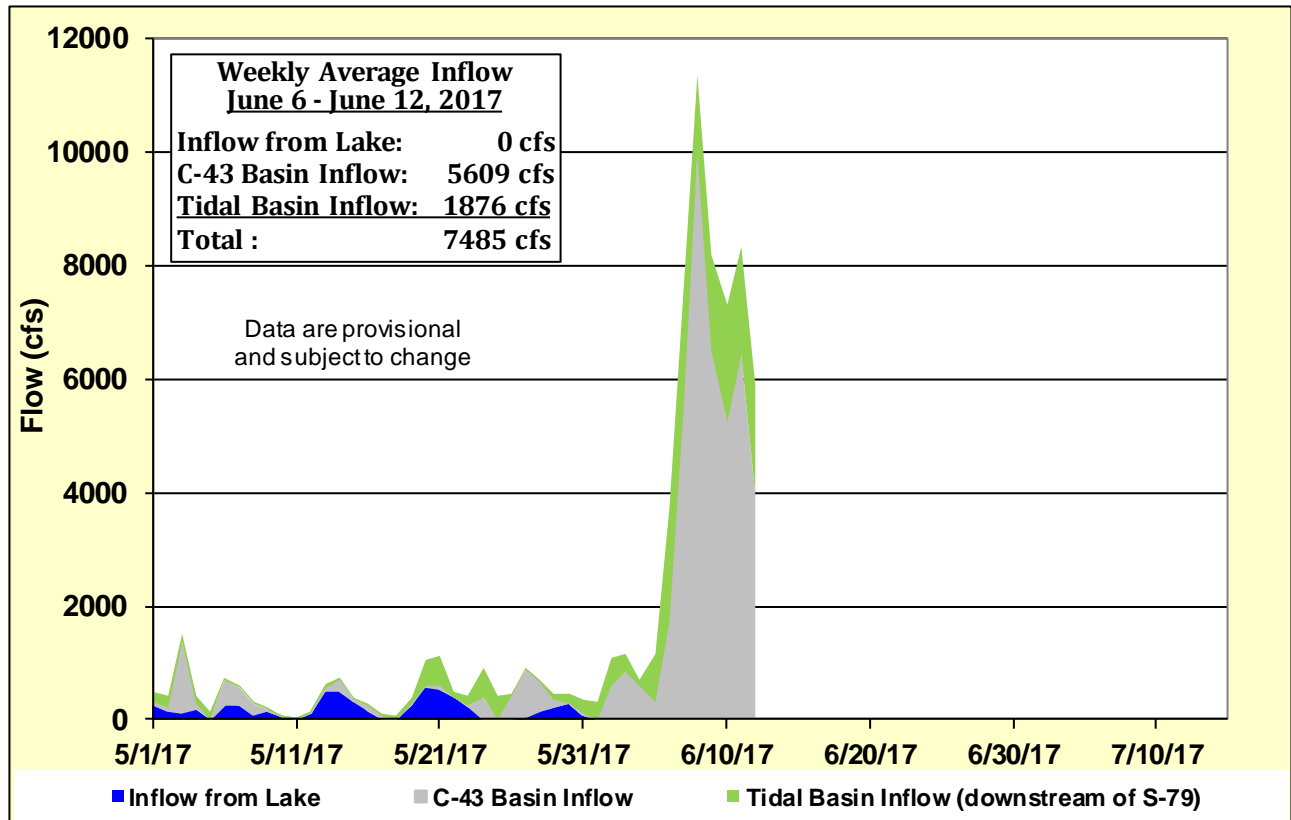


Figure 6. Freshwater inflows from Lake Okeechobee, runoff from the C-43 basin, and tributaries in the tidal basin into the Caloosahatchee River Estuary.

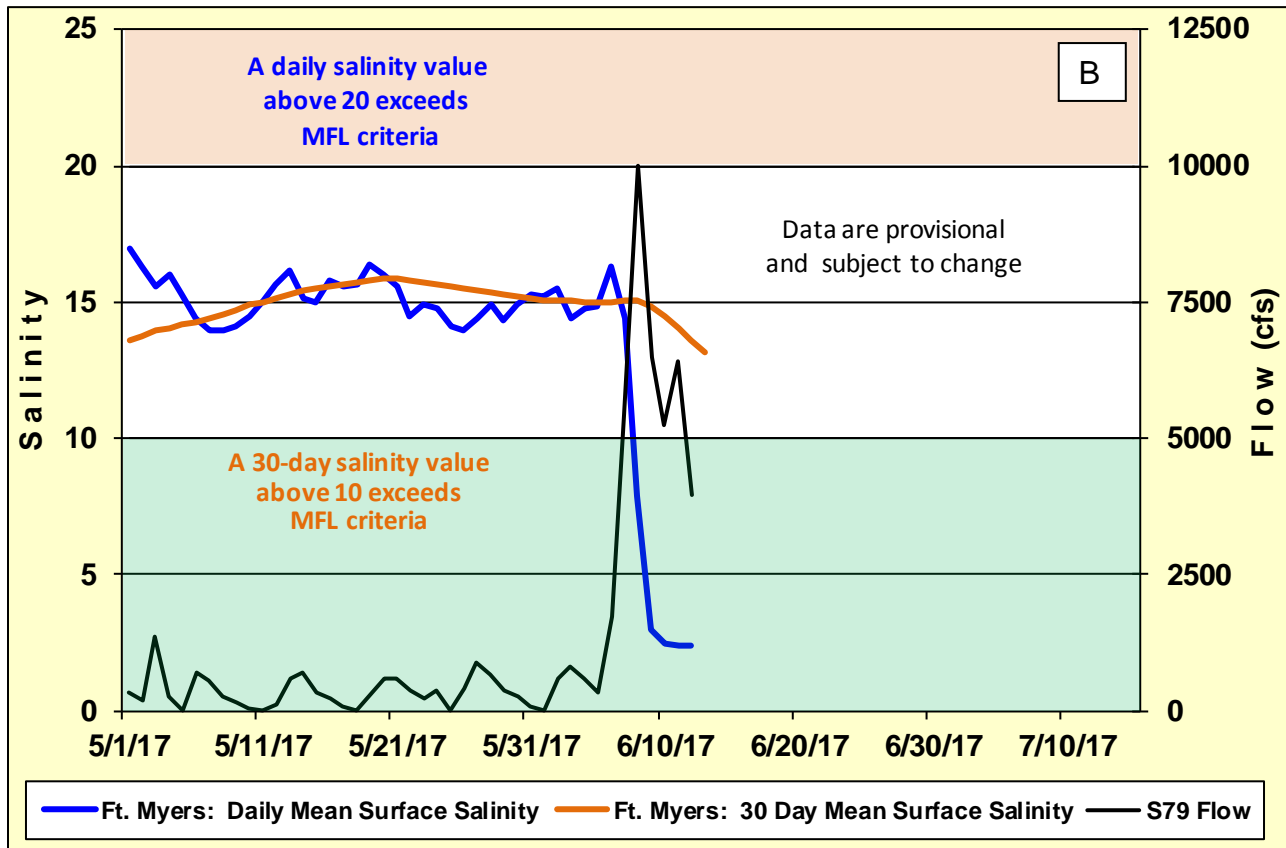
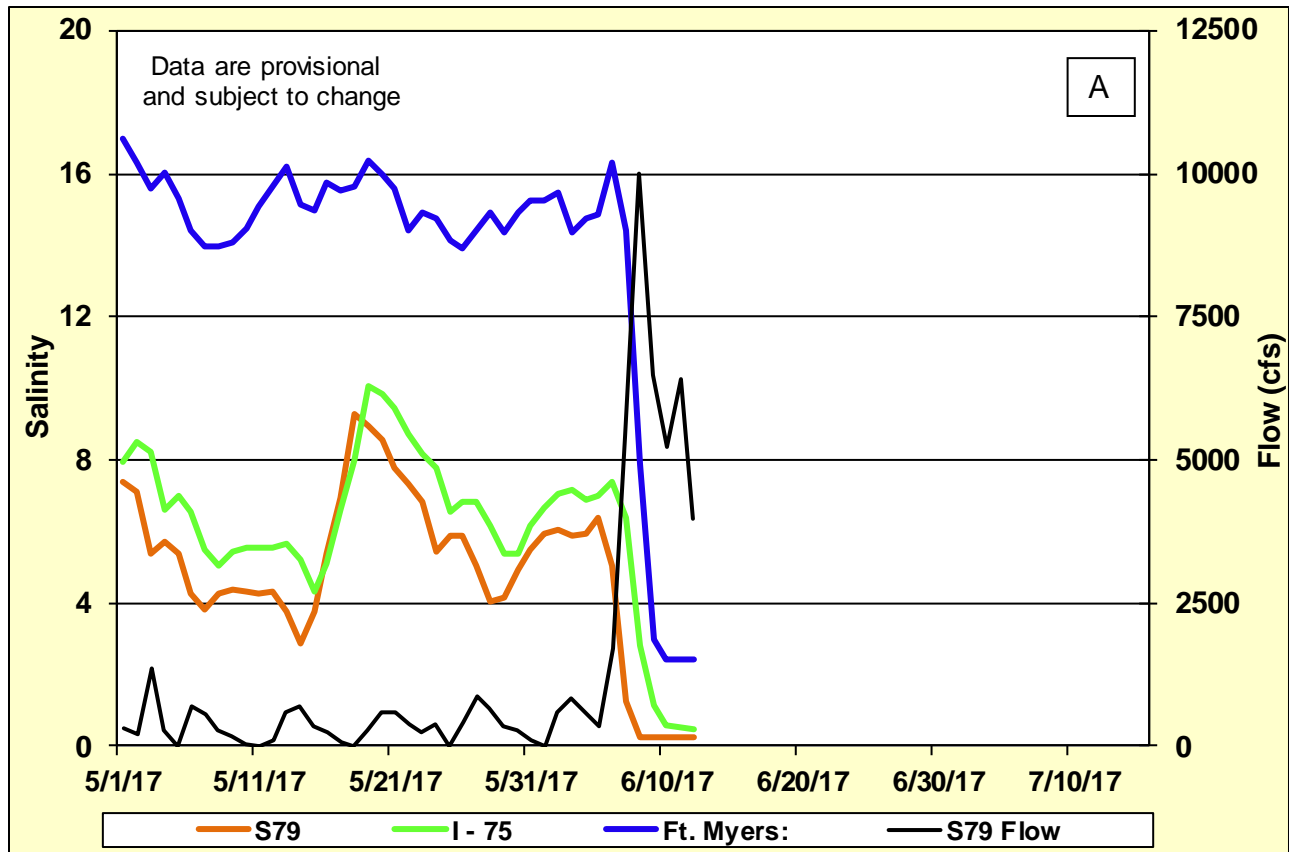


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations (A) and 30-day moving average salinity at Ft. Myers (B).

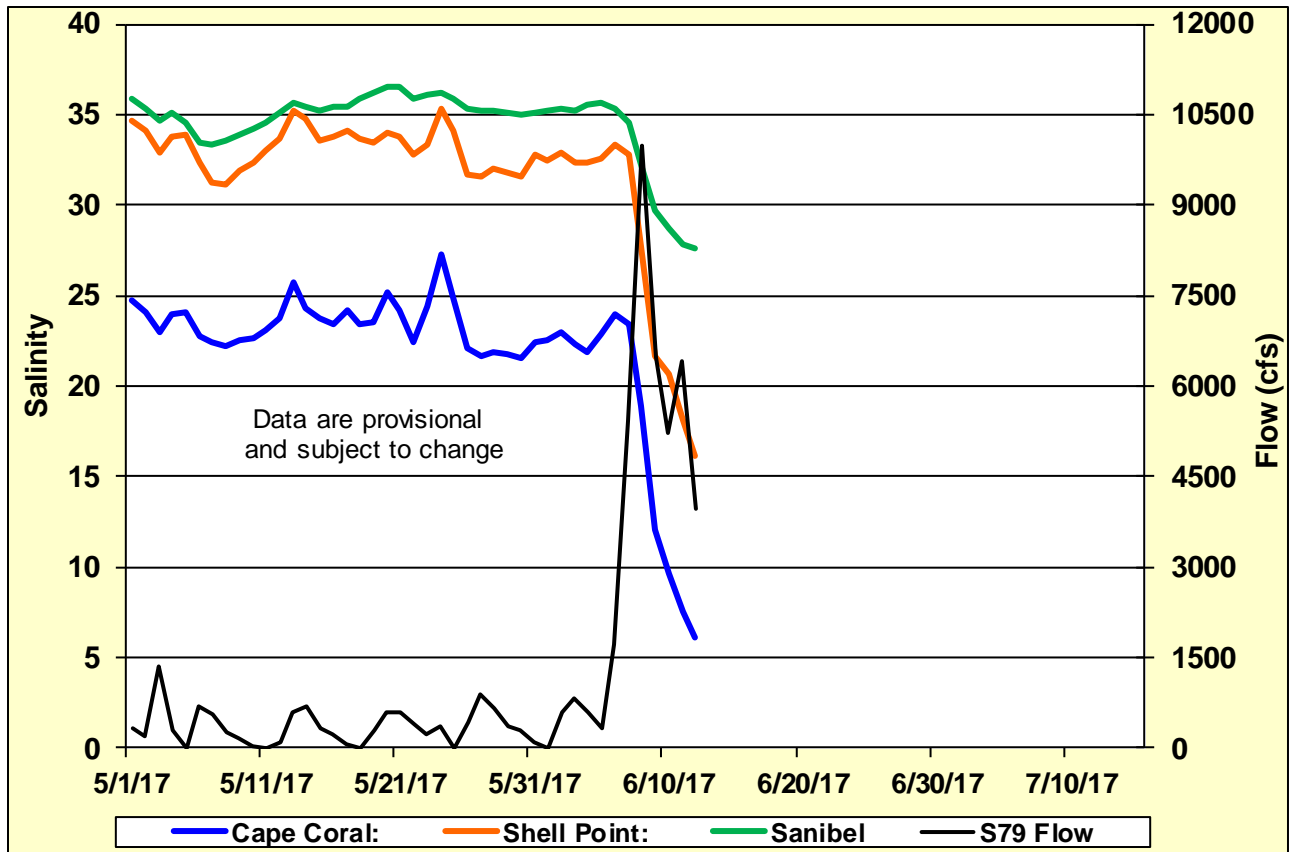


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

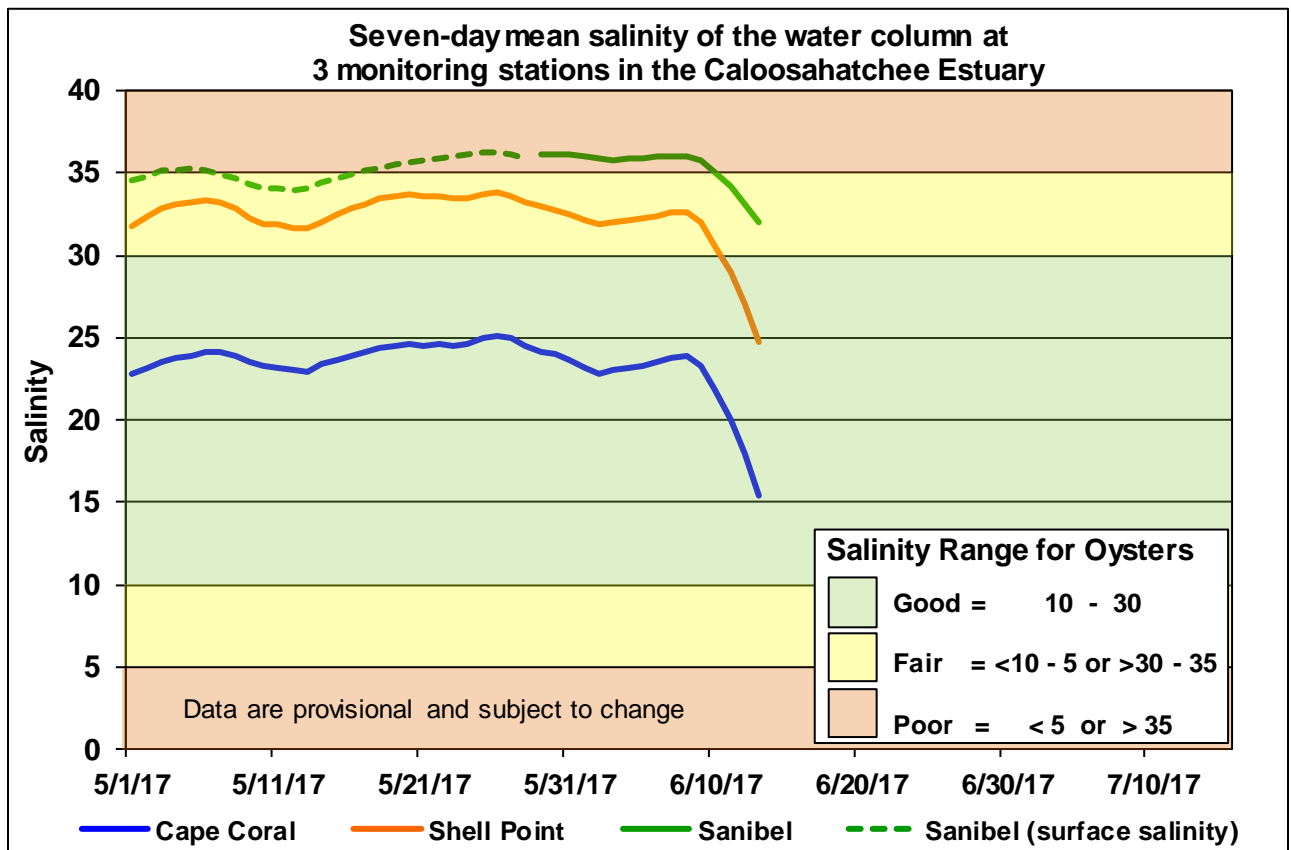


Figure 9. Seven-day mean salinity at Cape Coral Bridge, Shell Point and Sanibel Bridge monitoring stations.

## Caloosahatchee Estuary Flows and Salinity Observed and Forecast Salinity at Val I-75

**Forecast 1: S-79 = 0 cfs & TBR = 1665 cfs**

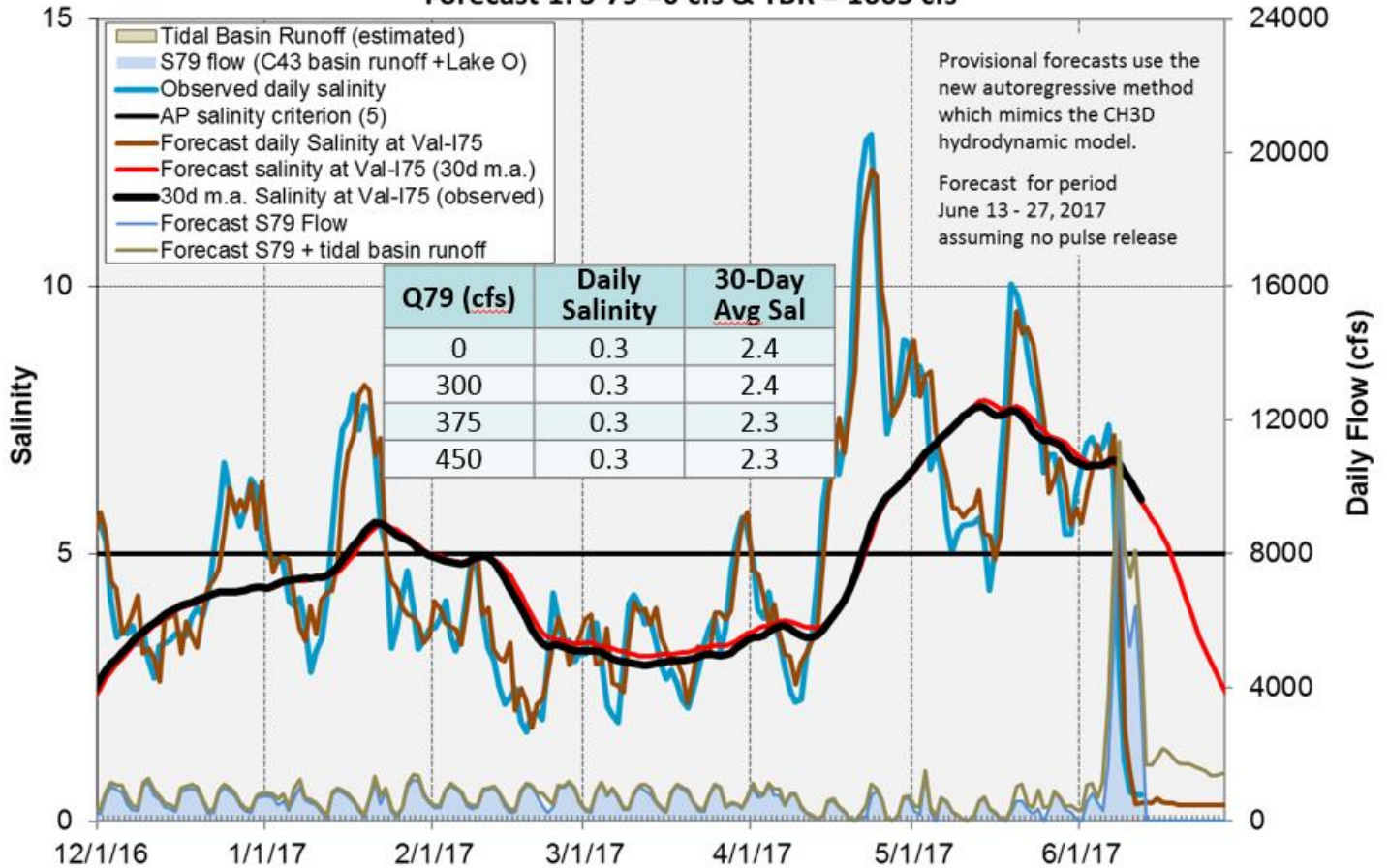


Figure 10. 14-day salinity forecast at Val I-75 assuming no releases at S-79.

### EVERGLADES

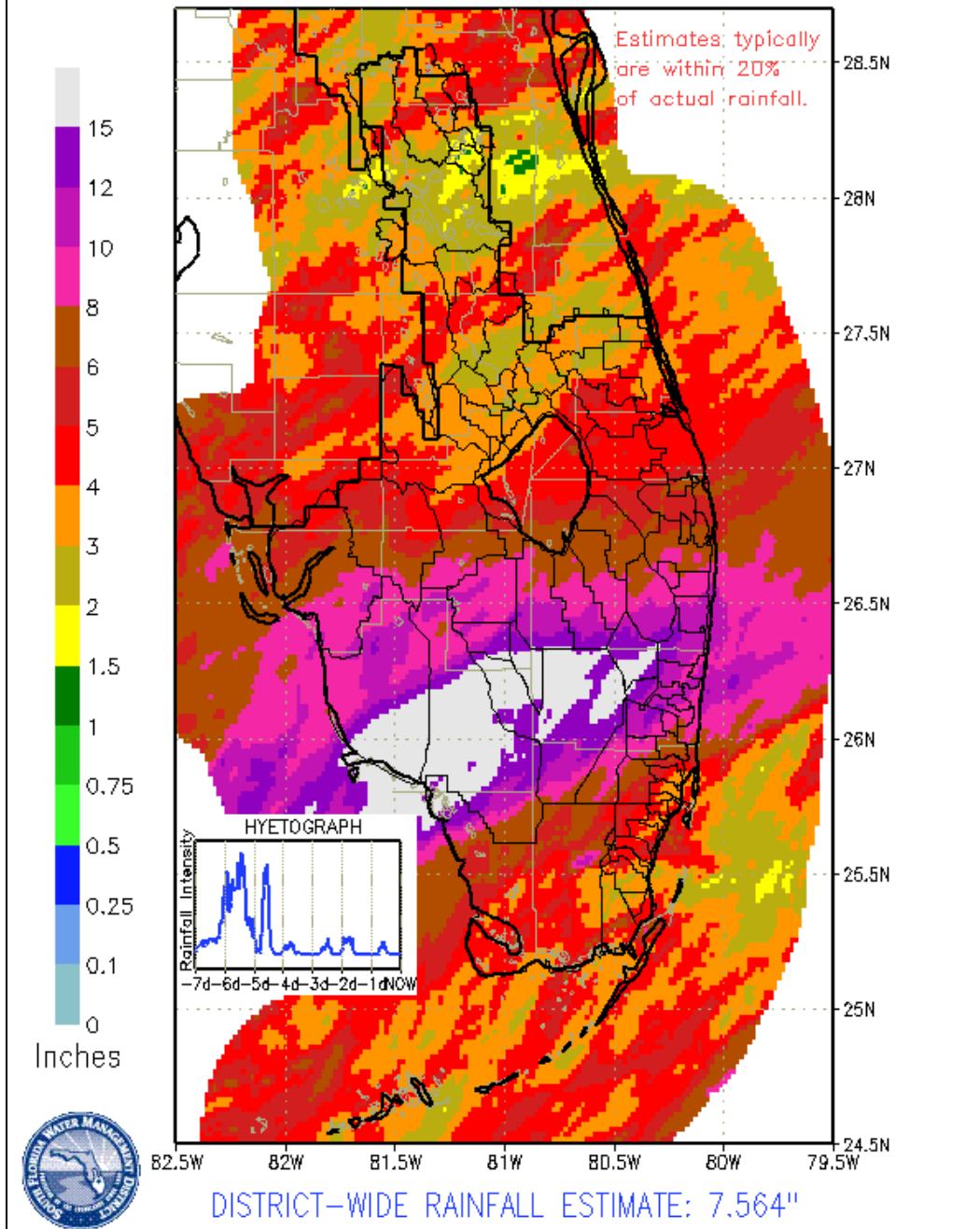
Widespread and heavy rain resulted in dramatic increases in stage across the Everglades.  
\*data from EDEN13 gauge.

Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	9.69	0.74
WCA-2A	14.15	1.81
WCA-2B	13.41	1.12*
WCA-3A	14.47	1.68
WCA-3B	8.66	0.14
ENP	5.96	0.25

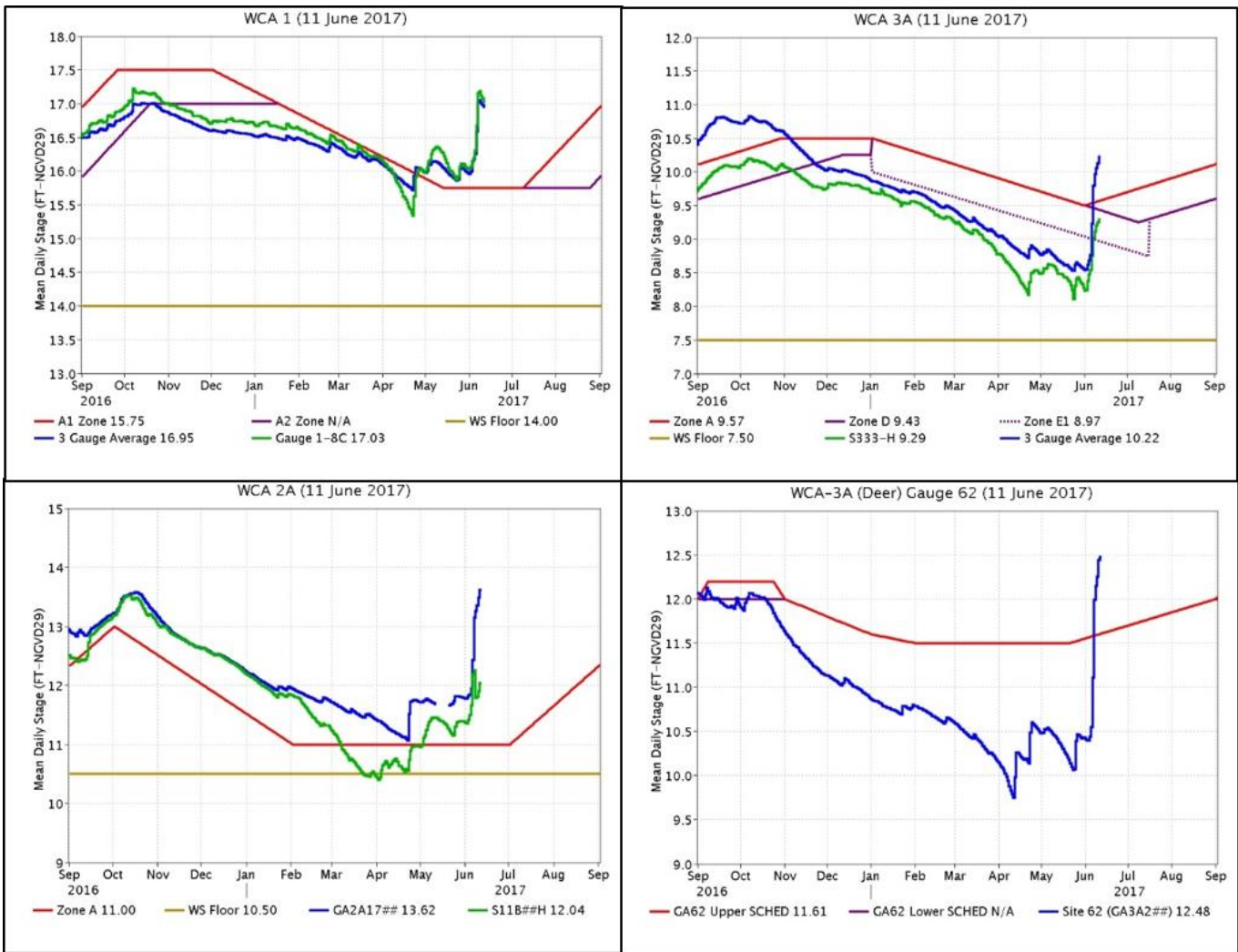


# SFWM PROVISIONAL RAINDAR 7-DAY RAINFALL ESTIMATES

FROM: 0530 EST, 06/05/2017 THROUGH: 0530 EST, 06/12/2017



Regulation Schedules: WCA-1 stage is 1.2 feet above Zone A. (.42 feet last week). In WCA-2A the marsh stage at gauge GA2A17 is currently 2.62 feet above zone A and canal stage at S11B is 1.04 feet above zone A. WCA-3A three-gauge average is 0.79 feet above zone A1. WCA-3A at gauge 62 (Northwest corner) remains .87 feet above schedule (last week 1.1 feet below).



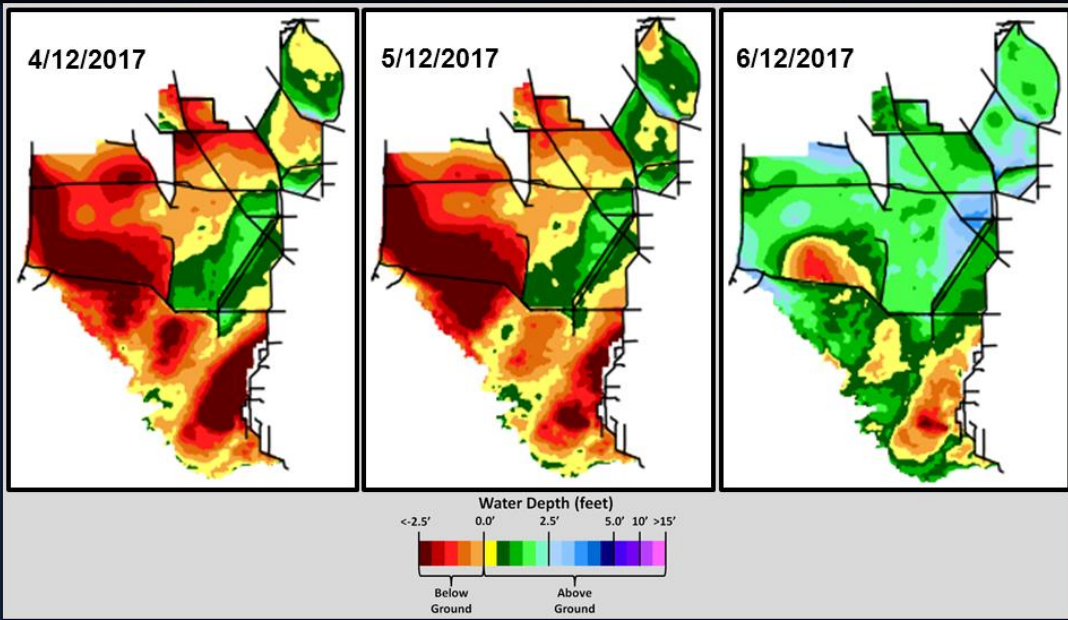
**Blue – wetlands**  
**Green – canals**

Water Depths and Changes: This week's range of water depths at monitored gauges other than in WCA-2B range from 0.83 feet (northeast SRS) to 2.57 feet (WCA-2A). Over the last week individual gauge changes ranged from +0.36 feet (WCA-3B) to +2.24 feet (Northeastern WCA-3). The SFWDAT Everglades difference map below highlights the dramatic changes in stage experienced by most of the system over the last week and month as a result of near record rainfall.

Pan evaporation was estimated to be 1.54, lower than the pre-project estimate of 1.59.



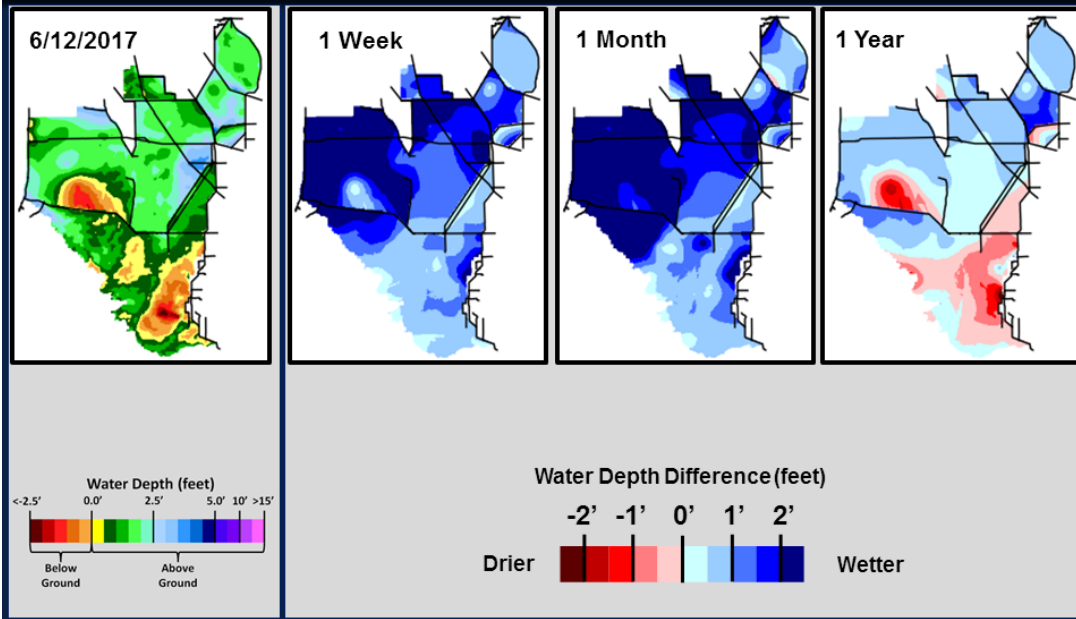
### SFWDAT Water Depth Monthly Snapshots



South Florida Water Depth Assessment Tool (SFWDAT)



### SFWDAT Everglades Difference Maps (Present - Past)



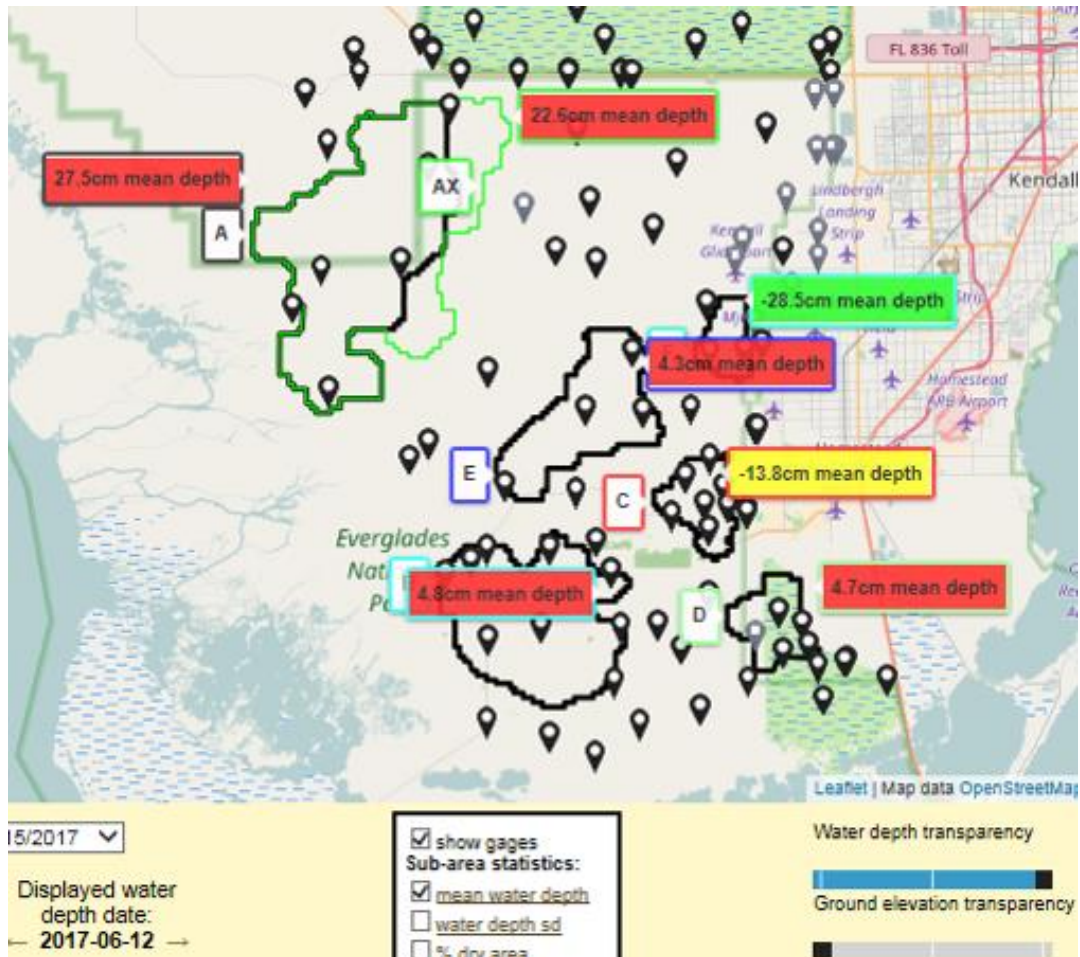
South Florida Water Depth Assessment Tool (SFWDAT)

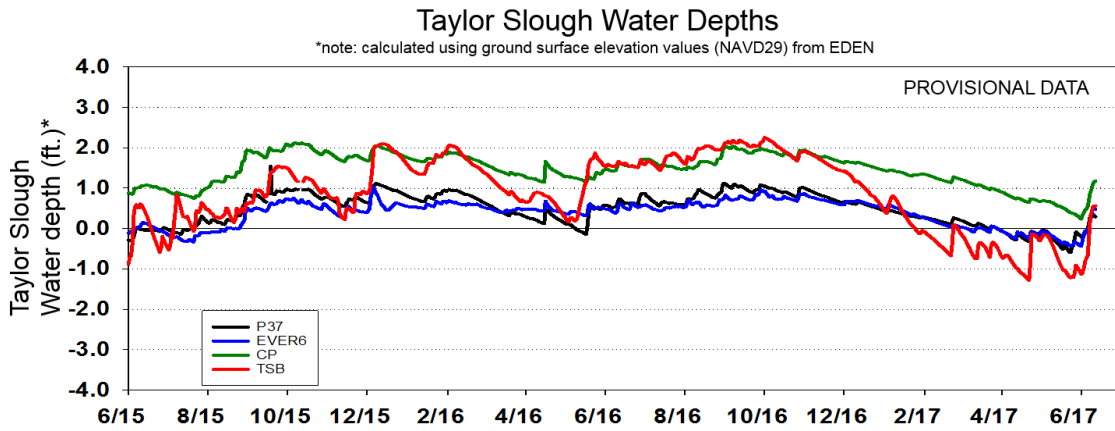
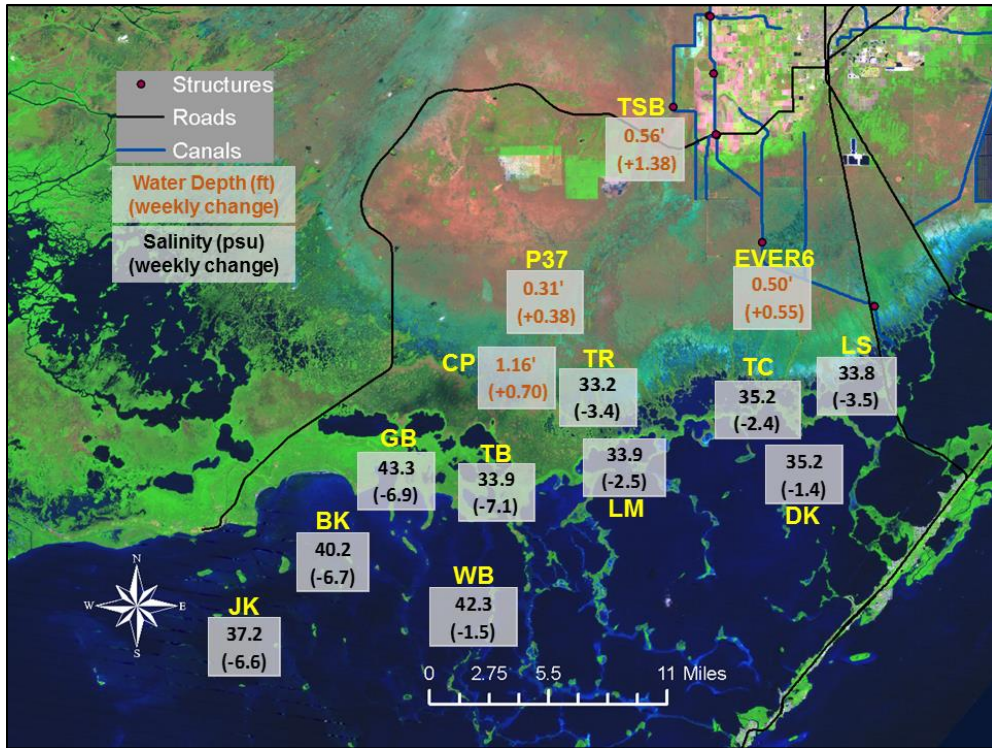
Wildlife update: Noted on flights this week and last, most of the remaining nestlings in WCA-1 (white ibis, great egrets, small herons) were close to fledging. There are still good numbers of nestlings at the major colonies in WCA-1. Many ibis and heron nestlings were seen flying nearby (so are very close to fledging) and many of them were being fed by parents, indicating successful foraging if not from the Everglades perhaps the soggy urban and agricultural landscape.

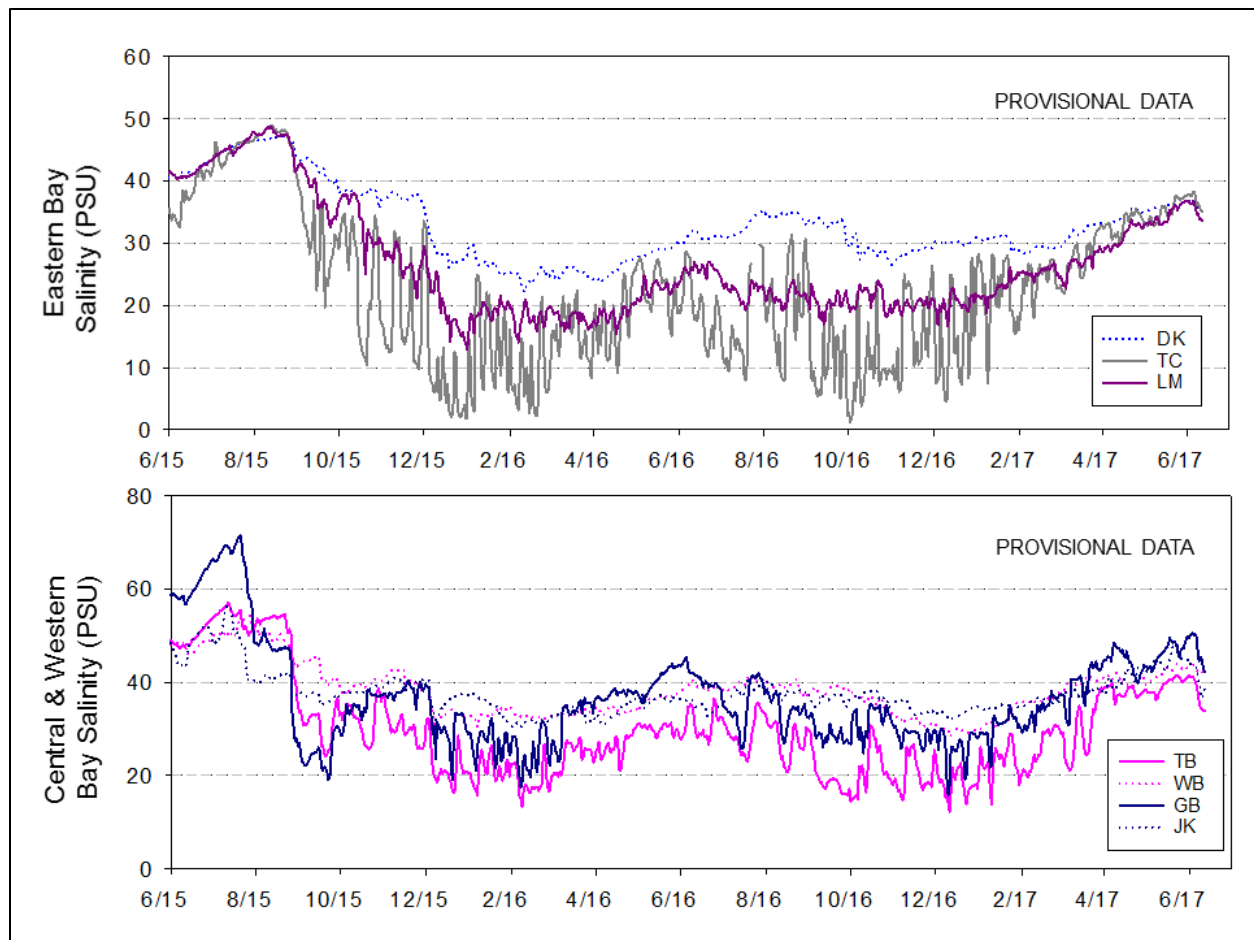


The vast majority of young storks fledged weeks ago and given the good foraging conditions of past weeks they should be in good health and experienced enough now to deal with the summer rains. It is expected that many will have moved north by now.

Recent rainfall resulted in changing conditions within the Cape Sable Seaside Sparrow breeding habitat. Five of the seven sub-population habitats are now outside of preferred mean water depth for sparrow breeding season.







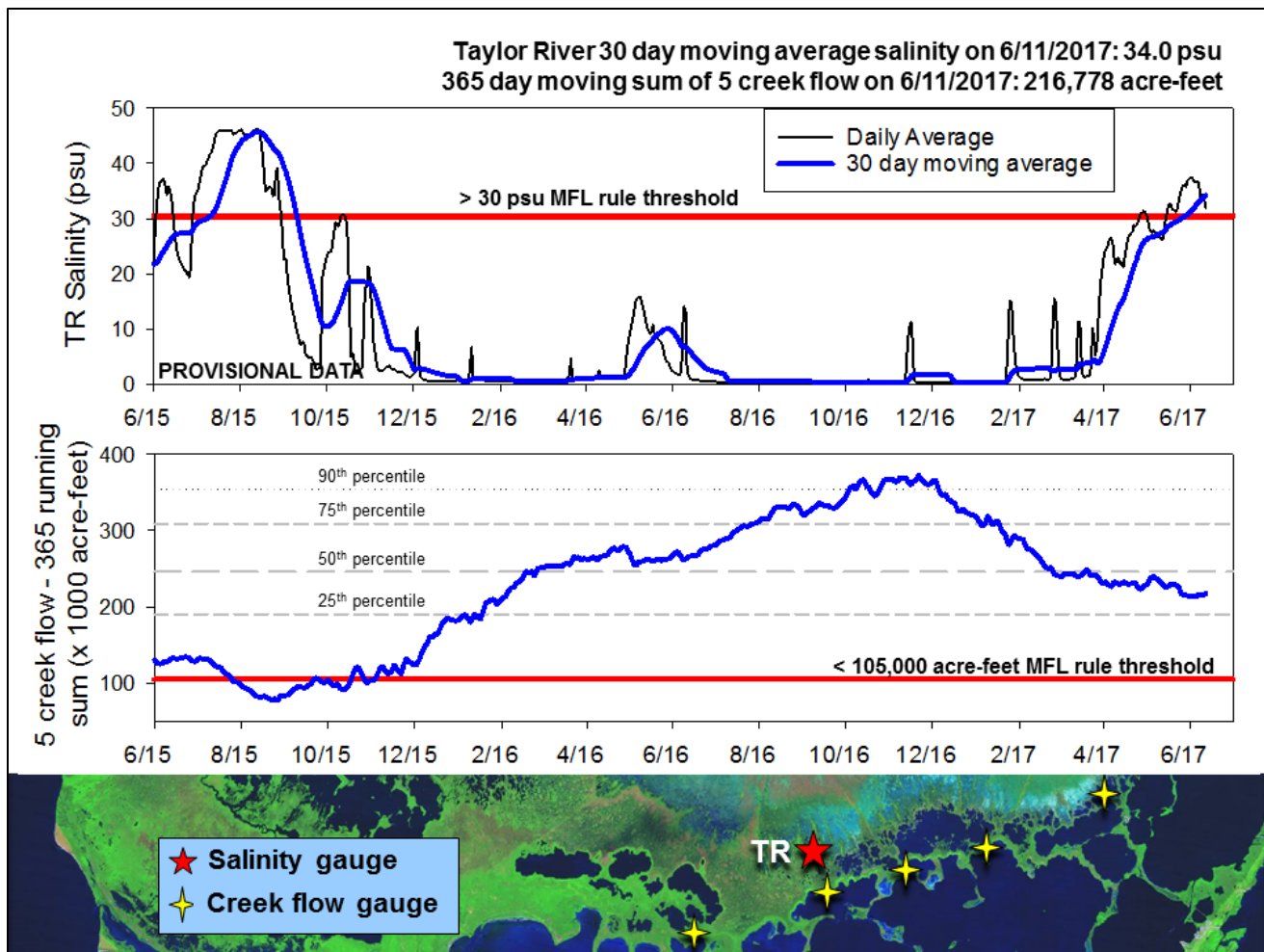
Taylor Slough stages: The heavy rain of the last week (average of 3.9 inches in Taylor Slough) raised water levels so that all stations in Taylor Slough are now above ground by at least 0.3 feet. Compared to historic averages, water levels are +2 to +4 inches above average.

Florida Bay salinity: Salinities in the Bay decreased -1 to -7 psu with the rain, and currently range from 34 psu in the eastern and central nearshore to 43 psu in the western nearshore. This is still average for western Florida Bay to 10 psu above average in the eastern nearshore.

#### Florida Bay MFL

Mangrove zone daily average decreased to 33 psu after peaking at 37 the previous week. The 30-day moving average increased +1.8 to end the week at 34.0 psu.

The cumulative weekly flow from the five creeks identified by the stars on the map was just -3,590 acre-feet as a result of negative flows Monday through Friday last week. The 365-day moving sum of flow from the five creeks, identified by stars on the map below, increased ~3,000 acre-feet to 216,778 acre-feet (still below the long-term average of 257,628 acre-feet). Creek flow is provisional data from the USGS and is highly variable.



## Water Management Recommendations

The rate of stage increase should be moderated as possible in all the WCAs, as apple snail production can be negatively affected by rapid changes in water depth.

The USFWS has made a request to hold water in WCA-1 during the transition from dry to wet season in order to facilitate invasive species management. At this late point in the wading bird nesting season, as long as operational reversals are avoided this request makes ecological sense.

More specific recommendations appear in the summary table below. The red text represents new or modified information or recommendations.

## Everglades Ecological Recommendations, June 13th, 2017 (red is new)

Area	Current Condition	Cause(s)	Recommendation	Reasons
<b>WCA-1</b>	Stages increased 0.68' to 0.82'	Rainfall, ET, management	Moderate ascension rates as possible. Releasing inflows through S-10s to moderate ascension is recommended. Maintaining water levels a minimum of 0.1 ft above WRS until early July is also recommended. Moderating flow rates through structures to 500 cfs steps is recommended.	Achieve high water targets (17.5 ft) to protect habitat and facilitate invasive plant treatments.
<b>WCA-2A</b>	Stages increased 1.81'	Rainfall, ET, management	Moderate ascension rates as possible. Moderating flow rates through structures to 500 cfs steps is recommended.	Protect habitat, wildlife and support apple snail reproduction.
<b>WCA-2B</b>	Stages increased 1.12'	Rainfall, ET, management	Moderate ascension rates as possible. Moderating flow rates through structures to 500 cfs steps is recommended.	Protect habitat, wildlife and support apple snail reproduction.
<b>WCA-3A NE</b>	Stages increased 2.24'	Rainfall, ET, management		
<b>WCA-3A NW</b>	Stages increased 2.01'	Rainfall, ET, management	Moderate ascension rates as possible. Moderating flow rates through structures to 500 cfs steps is recommended.	Protect habitat, wildlife and support apple snail reproduction.
<b>Central WCA-3A S</b>	Stages increased 1.41'	Rainfall, ET, management	Moderate ascension rates as possible. Moderating flow rates through structures to 500 cfs steps is recommended.	Protect habitat, wildlife and support apple snail reproduction.
<b>Southern WCA-3A S</b>	Stages increased 1.05'	Rainfall, ET, management		
<b>WCA-3B</b>	Stages increased 0.42'	Rainfall, ET, management	Moderate ascension rates as possible. Moderating flow rates through structures to 500 cfs steps is recommended.	Protect habitat, wildlife and support apple snail reproduction.
<b>ENP-SRS</b>	N/A	ET, rainfall, topography, management	Make discharges to the Park according to the 2012 WCP rainfall plan.	Keep peat wet to promote native habitat and maintain wetland plant and animal communities. Protect habitat and wildlife, including apple snail reproduction.
<b>ENP-CSSS habitats</b>	S-12A, S-12B, S-344, S-343A, S-343B are closed. S-333 closed	Rainfall, ET, management	Follow rainfall plan for releases and current ERTTP guidelines. Follow guidance in C-111 Western Spreader Canal Project operations manual. Care should be taken to avoid overdrying eastern subpopulations C and F.	Future operations need to continue to provide appropriate hydrological and habitat conditions for CSSS. Current and near term forecasted conditions are conducive for continuation of a successful sparrow breeding season.
<b>Taylor Slough</b>	Stage increases ranged +0.38' to +1.38'	Rain, ET, inflows	Move water southward as possible	When available provide freshwater buffer for ecosystems and slow recession rates.
<b>FB- Salinity</b>	Salinity decreases ranged -1 to -7 psu.	Rain, ET, inflows, wind	Move water southward as possible	When available provide freshwater to buffer hypersalinity conditions.