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 27, 2017

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

Above average rains are predicted today, then average to below average rains are likely tomorrow through the early part of the weekend. Morning balloon data shows a significant increase in moisture and instability associated with a deep layered trough digging through the southeast US. Light south to southwest steering winds will yield slow moving heavy showers and thunderstorms initially moving inland with the sea breeze before storms turn northeastward during the afternoon. This wind regime generally favors a focus east of Lake Okeechobee. Low to mid-level high pressure attempts to ridge back into South Florida tomorrow as the trough begins to exit, a significant decrease in activity with a focus around and west of the Lake is expected.

Kissimmee

On Sunday, stage was 0.6 feet below regulation schedule in East Lake Toho, 0.6 feet below regulation schedule in Lake Toho, and 1.3 feet below schedule in Kissimmee-Cypress-Hatchineha. Over the past week, discharge at S65, S65A, and S65E averaged 455, 1291, and 1462 cfs, respectively. Tuesday morning discharges were: ~748, 806, and 1157 cfs respectively at S65, S65A, and S65E. Dissolved oxygen data in the Kissimmee River averaged 0.5 mg/L for the week (manual sondes at PC33 and PC62). Kissimmee River mean floodplain depth on Sunday was 1.15 feet. It is important to allow stages in KRR project area to decline to facilitate dissolved oxygen recovery. The recommendation for the period from 6/22 to 6/25 was to reduce discharge by 150 cfs each day, then hold flows at approximately 800 cfs through 6/26 until additional data are available. Recommendation on 6/26 remains to hold 800 cfs at S65A until further notice.

Lake Okeechobee

Lake stage is 12.28 feet NGVD having increased by 0.24 over the past week and 1.19 feet over the past month. The 2017 wading bird and snail kite seasons are winding down as no wading bird flocks were observed on the Lake and no new snail kite nests were recorded during last week's surveys. The current weekly ascension rate of 0.24 feet equates to a projected ascension rate of 0.96 feet per month which is almost double the optimal 0.50 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 potential drowning of both native and exotic apple snail egg clutches. Any activities that reduce the current rate of water level rise in Lake Okeechobee would be ecologically beneficial and would be protective of the Lake's emergent wetland and submerged aquatic flora and its associated fauna.

Estuaries

Total discharge to the St. Lucie estuary averaged 1693 cfs over the past week with no flow from Lake Okeechobee. Salinities were lower compared to last week. The 7-day average salinity at the US1 Bridge is now in the poor range for adult oysters. Total inflow to the Caloosahatchee estuary averaged 4310 cfs over the past week with no flow from the Lake. The 30-day average surface salinity at the Ft. Myers monitoring station is 6.5 PSU, which is below the MFL salinity exceedance threshold of 10 PSU. The 30-day average surface salinity at Val I-75 is 2.7 PSU. Salinity conditions between Val I-75 and Ft. Myers are improving for tape grass. Salinity conditions are in the poor range for adult oysters at the Cape Coral Bridge, and in the good range at Shellpoint and the Sanibel Causeway. 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.

Stormwater Treatment Areas

Over the past week, the STAs/FEBs did not receive 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 at or above target depths. Operational restrictions are in place for vegetation rehabilitation in STA-1E. The nest of an Endangered Species Act (ESA) 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

Stages continue to increase in all the WCAs except for WCA-1, water levels in WCA-2A are about 3 feet above the regulation schedule, while in WCA-3A it is about 1.4 feet above the regulation schedule. At the gauge 65 location within southern WCA-3A the water depth is 2.9 feet; depths above 2.5 feet are considered stressful for tree island forests (currently exceeded for 10 days). As of Sunday, the 30-day moving average salinity decreased by 2.6 PSU to end the week at 30.4 PSU, which is still above the Florida Bay MFL. However, the current 30-day moving average salinity at the ENP Taylor River site is now 29.8 PSU, which is slightly under the 30 PSU threshold. Salinity at this site was above 30 PSU on 5/26 making the duration for this exceedance 31 days. Maintaining natural rehydration rates and distribution is now the eco-hydrology focus as wading bird nesting season nears completion. Area-specific recommendations are included at the end of this report.

Supporting Information

KISSIMMEE BASIN

Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 1.42 inches of rainfall in the past week and the Lower Basin received 0.57 inches (SFWMD Daily Rainfall Report 6/26/2017).

Upper Kissimmee Basin

Stages and departures in the Kissimmee Chain of Lakes (KCOL) are shown in Table1.

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: 6/27/2017

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)						
							6/25/17	6/18/17	6/11/17	6/4/17	5/28/17	5/21/17	5/14/17
Lakes Hart and Mary Jane	S62	75	LKMJ	60.0	R	60.0	**0.0**	-0.1	0.1	-0.4	-0.1	-0.2	-0.3
Lakes Myrtle, Preston, and Joel	S57	7	S57	60.9	R	61.0	**-0.1**	0.0	-0.5	-1.1	-0.4	-0.4	-0.3
Alligator Chain	S60	0	ALLI	62.7	R	63.2	**-0.5**	-0.6	-0.9	-1.1	-0.3	-0.4	-0.4
Lake Gentry	S63	0	LKGT	60.3	R	61.0	**-0.7**	-0.9	-1.2	-1.3	0.0	0.0	-0.1
East Lake Toho	S59	269	TOHOE	55.9	R	56.5	**-0.6**	-0.5	-0.8	-1.2	-0.1	-0.2	-0.3
Lake Toho	S61	856	TOHOW, S61	52.9	R	53.5	**-0.6**	-0.5	-0.8	-1.1	-0.1	-0.2	-0.3
Lakes Kissimmee, Cypress, and Hatchineha	S65	455	KUB011, LKIS5B	49.7	R	51.0	**-1.3**	-1.6	-2.3	-2.6	-0.9	-1.2	-1.2

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: **6/27/2017**

Metric	Location	Sunday's 1-day average	Weekly Average**									
			6/25/17	6/18/17	6/11/17	6/4/17	5/28/17	5/21/17	5/14/17	5/7/17	4/30/17	4/23/17
Discharge (cfs)	S-65	774	**455**	20	37	145	190	237	234	258	283	330
Discharge (cfs)	S-65A	848	**1291**	477	175	126	121	160	167	184	205	248
Discharge (cfs)	S-65D****	1524	**1426**	584	307	174	157	182	198	252	253	286
Discharge (cfs)	S-65E****	1577	**1462**	643	350	161	159	182	173	260	225	267
DO concentration (mg/L)***	Phase I river channel	0.2	**0.5**	3.5	5.2	7.2	7.9	7.7	8.0	7.4	7.9	7.8
Mean depth (feet)*	Phase I floodplain	1.15	**0.88**	0.27	0.13	0.05	0.05	0.05	0.05	0.05	0.05	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
6/26/2017	Hold 800 cfs at S65A until further notice.	Maintain reduced discharge to allow stages in KRR project area to decline to facilitate DO recovery.	Implemented	KB Ops
6/22/2017	Reduce discharge by 150 cfs each day on Thursday 6/22, Friday 6/23, Saturday 6/24, and Sunday 6/25. After the Sunday reduction hold at approximately 800 cfs through Monday when new DO data should be available to help guide next steps.	Attempt to allow Kissimmee River dissolved oxygen concentration to rise.	Implemented	KB Ops
6/20/2017	Maintain 1400 cfs at S65A as KCH stage continues to rise. Supplement declining S65A basin runoff by increasing discharge at S65 as needed.	Transition from current operations to 2017 Wet Season discharge plan.	Implemented	KB Ops, SFWMD Water Management
6/15/2017	Attempt to slow the rates of stage rise in Lakes Toho and East Toho by increasing discharge from S59 into Toho and S61 into KCH.	Slow rates of rise in Lakes Toho and East Toho.	Implemented	KB Ops, SFWMD Water Management
6/15/2017	Increase discharge from S65A as necessary using the discharge rates of change table in Figure 8a.	Lower stage in Pool A following rainfall directly over the S65A Basin.	Implemented	SFWMD Water Management, KB Ops
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	

KCOL Hydrographs (through Sunday midnight)

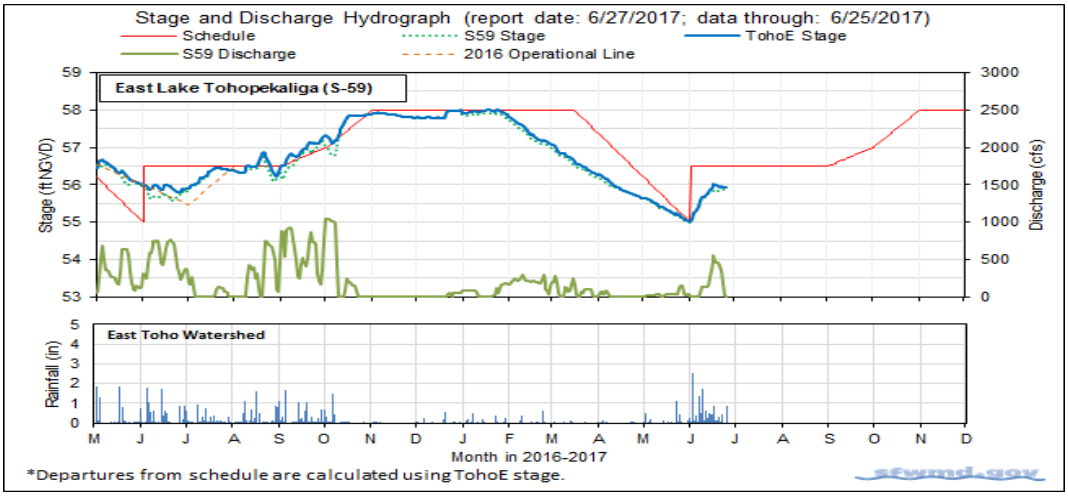


Figure 1.

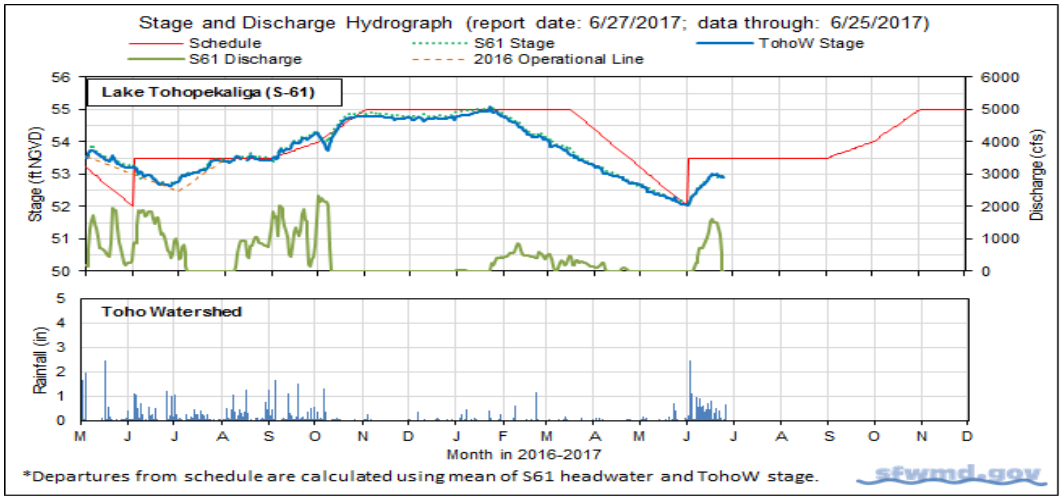


Figure 2.

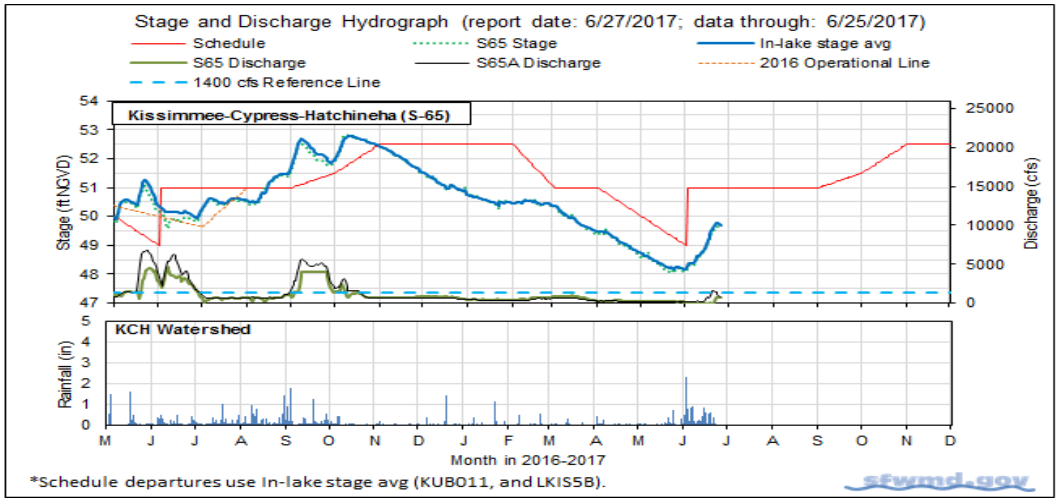


Figure 3.

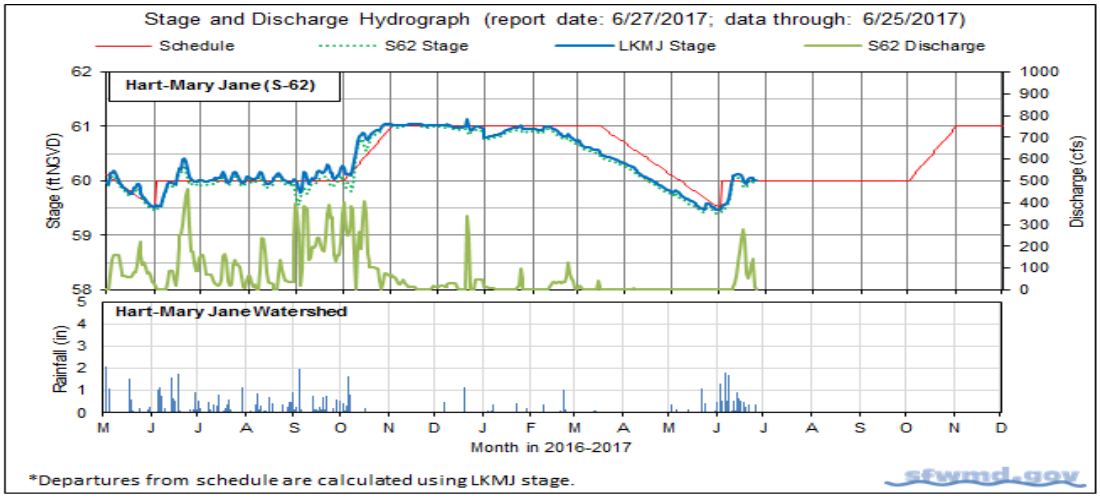


Figure 4.

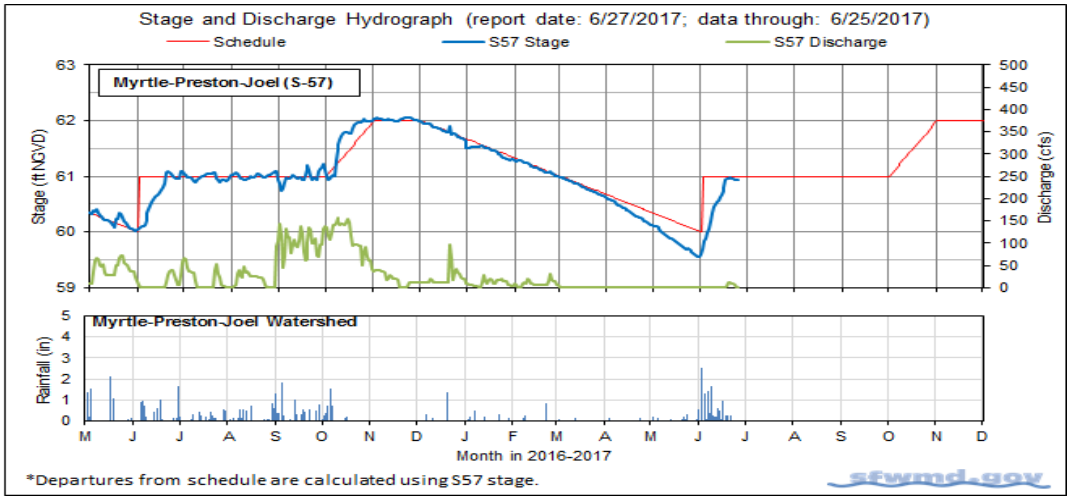


Figure 5.

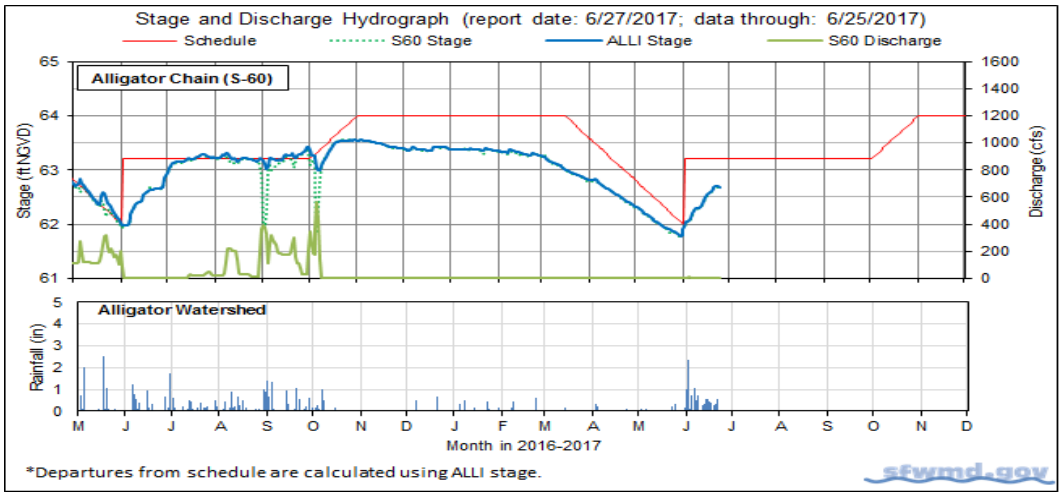


Figure 6.

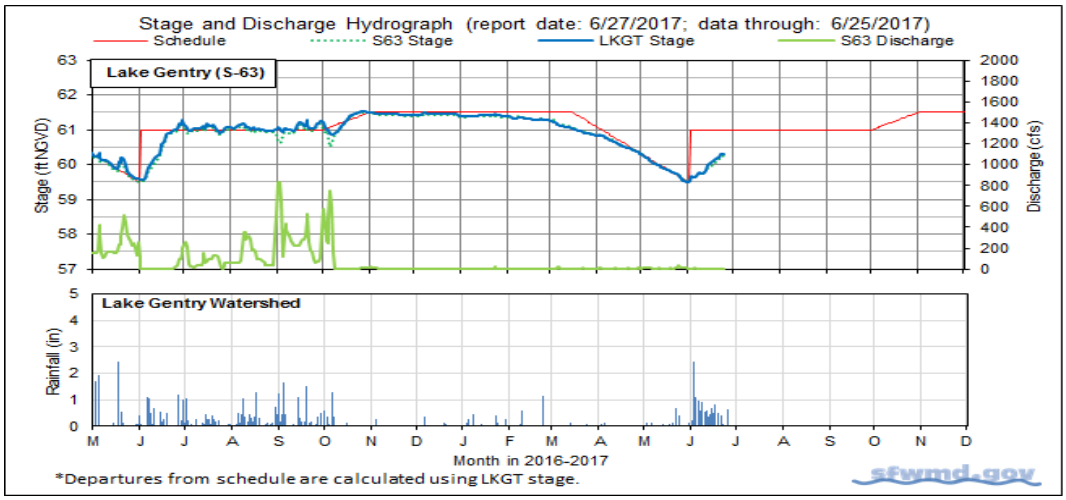


Figure 7.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

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

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

15

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

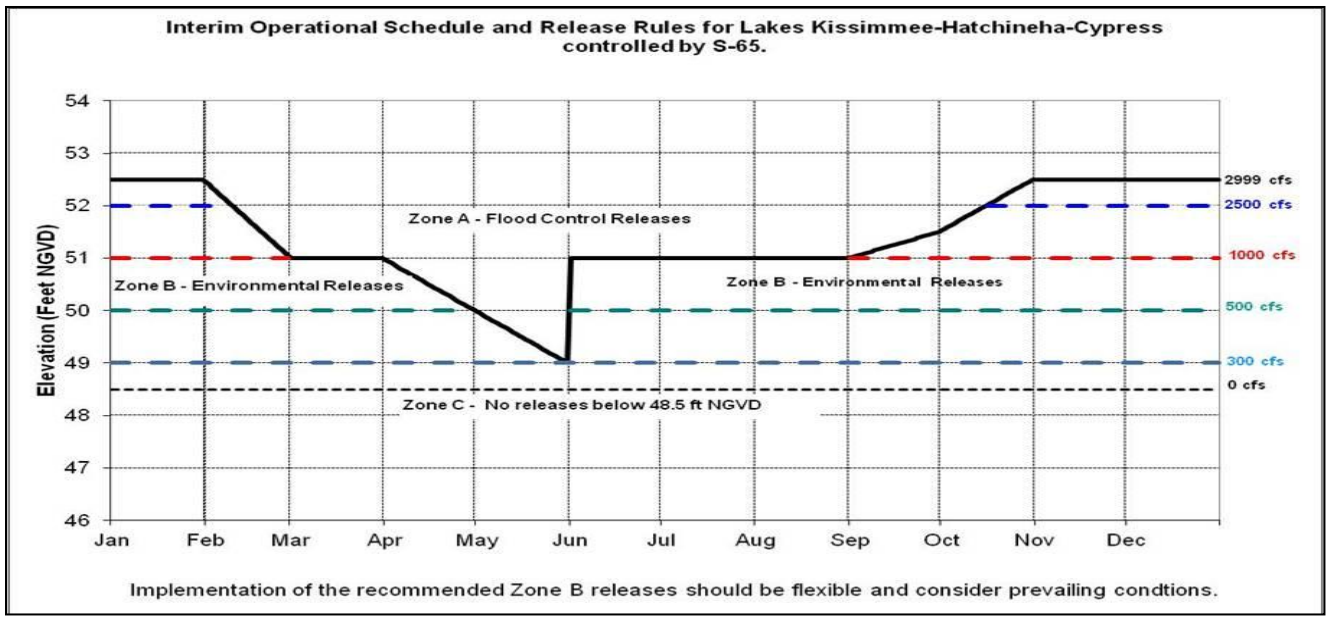
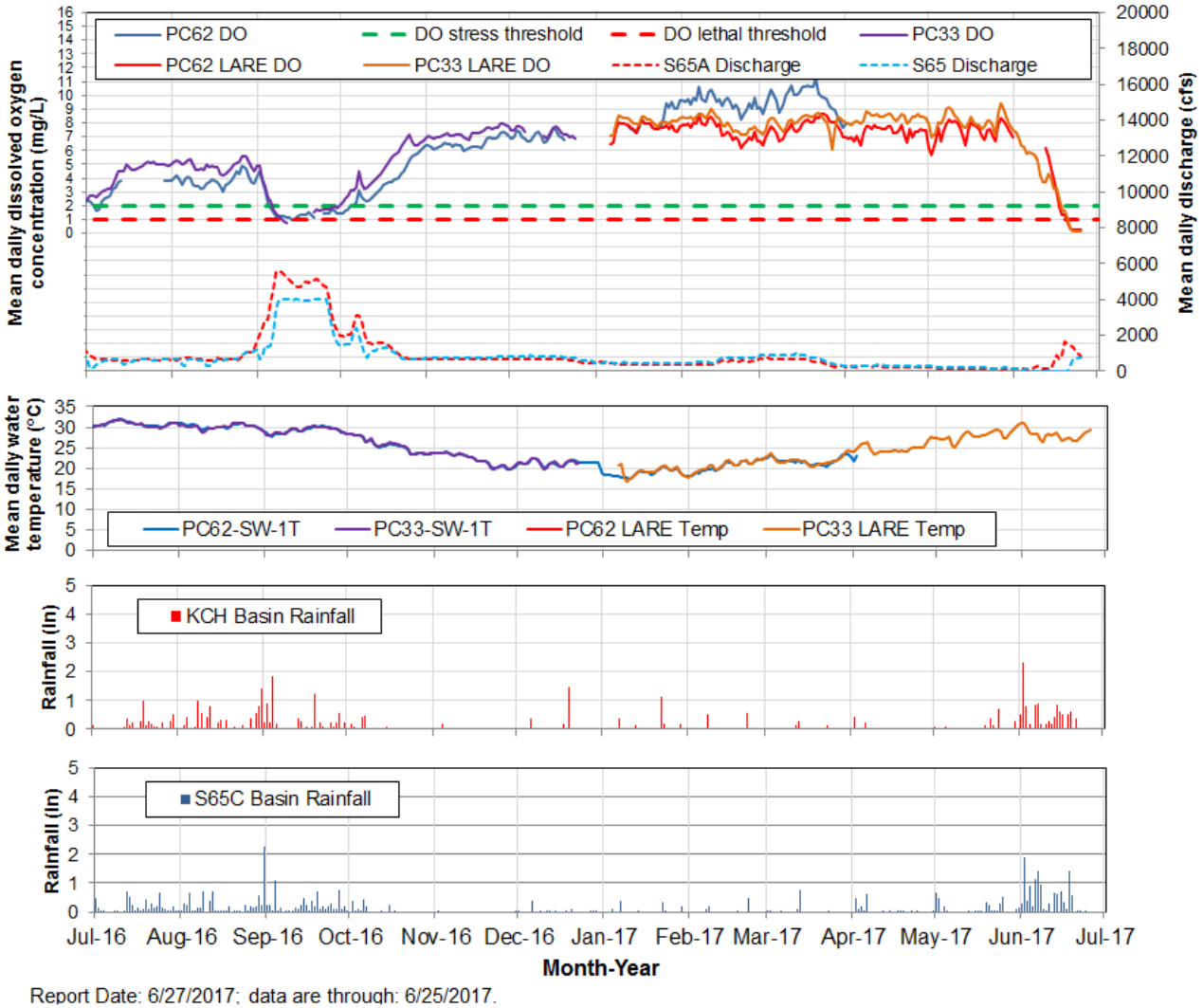


Figure 9. Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years or in Wet Season 2015.



Report Date: 6/27/2017; data are through: 6/25/2017.

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

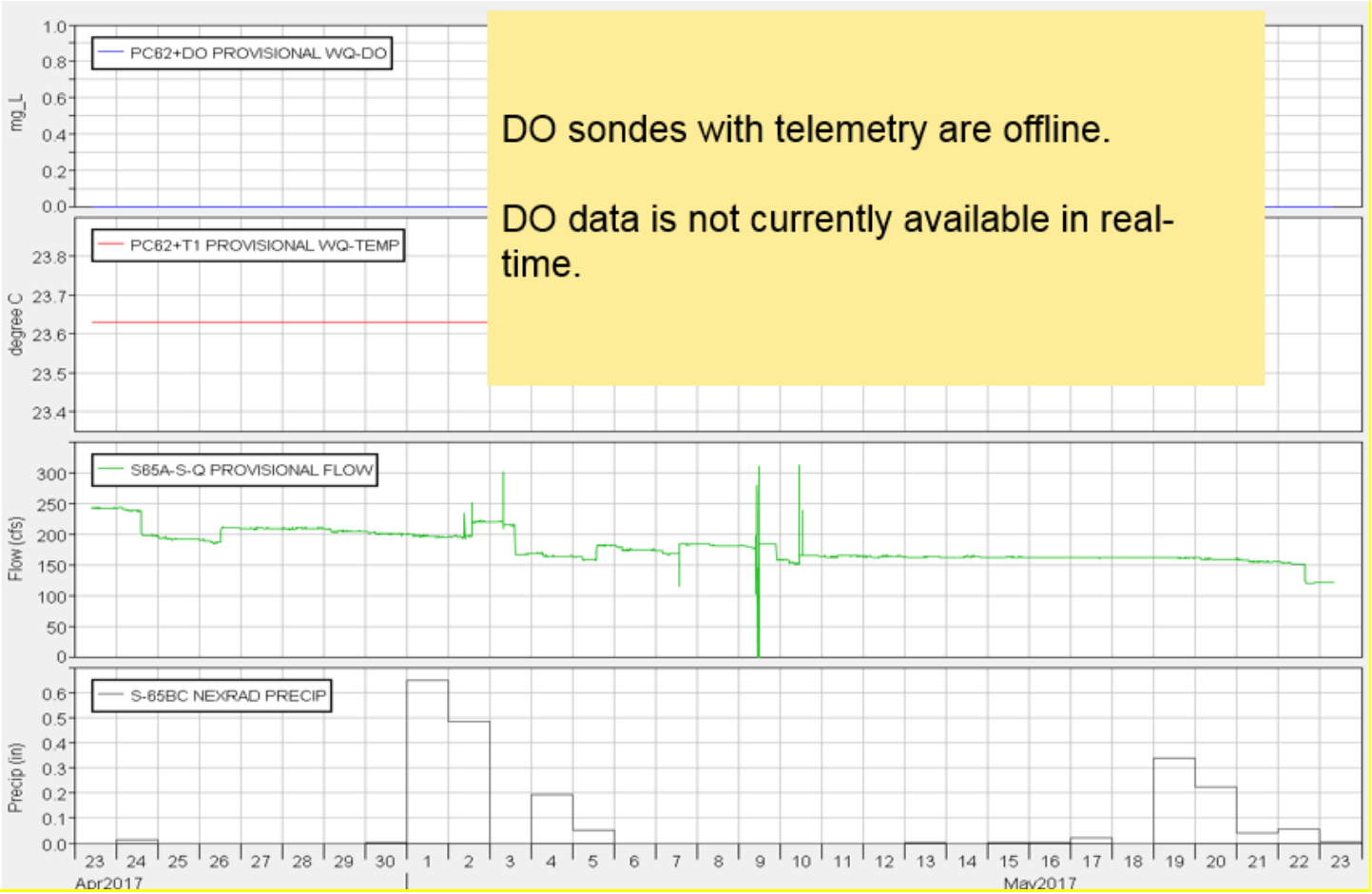


Figure 11. Phase I river channel dissolved oxygen and water temperature (measured at 15 minute intervals) and Pool BC daily rainfall.

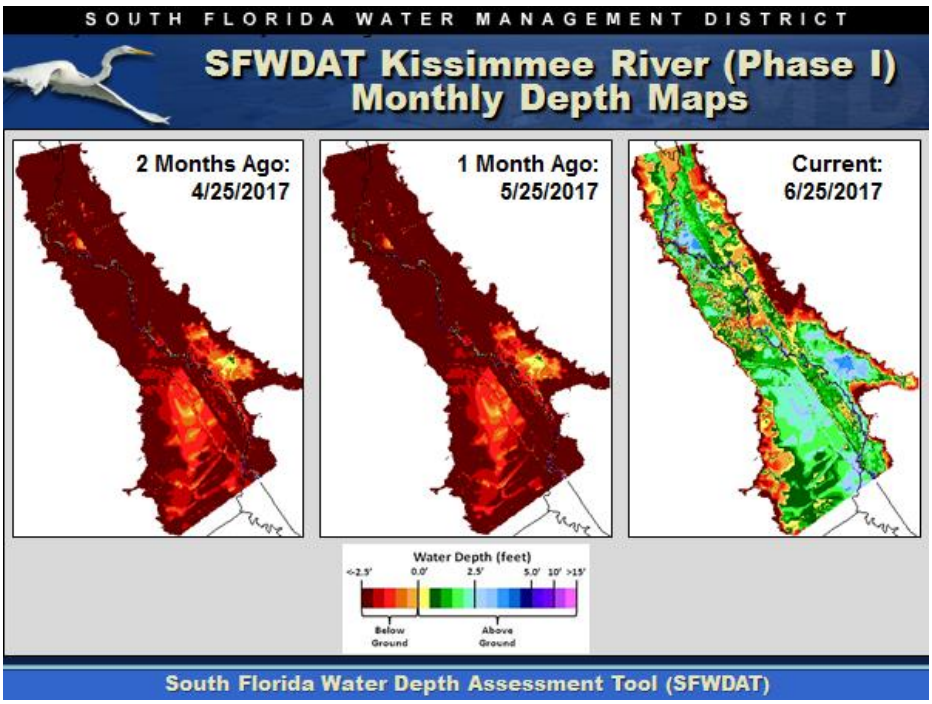
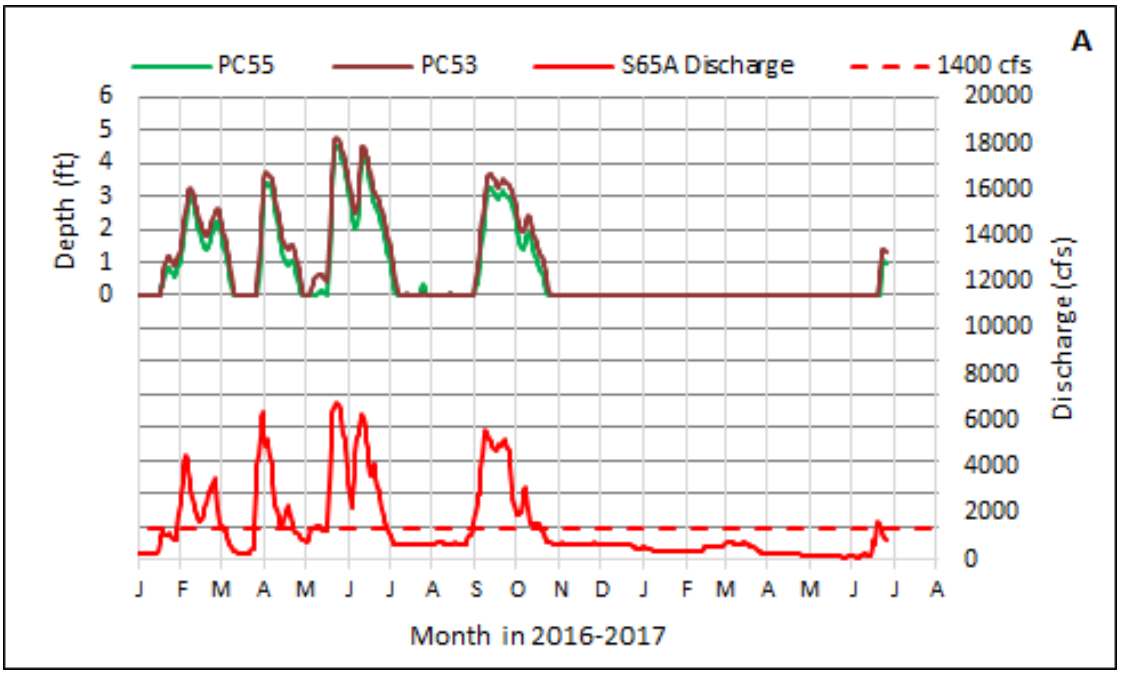
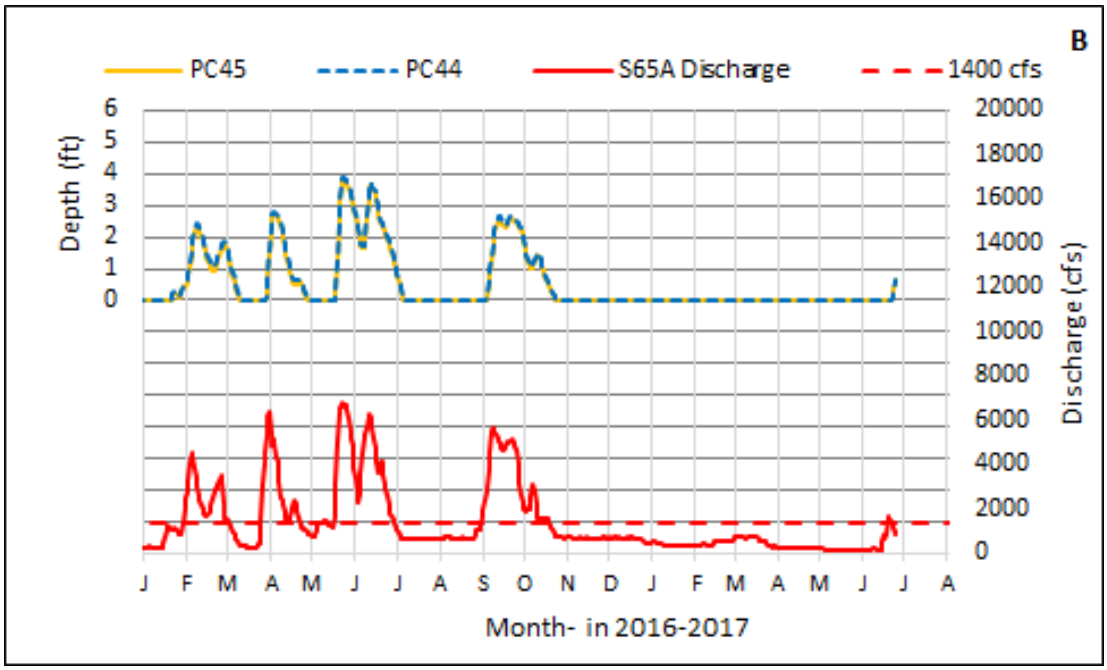


Figure 12. Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to Jan. 16, 2012.





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

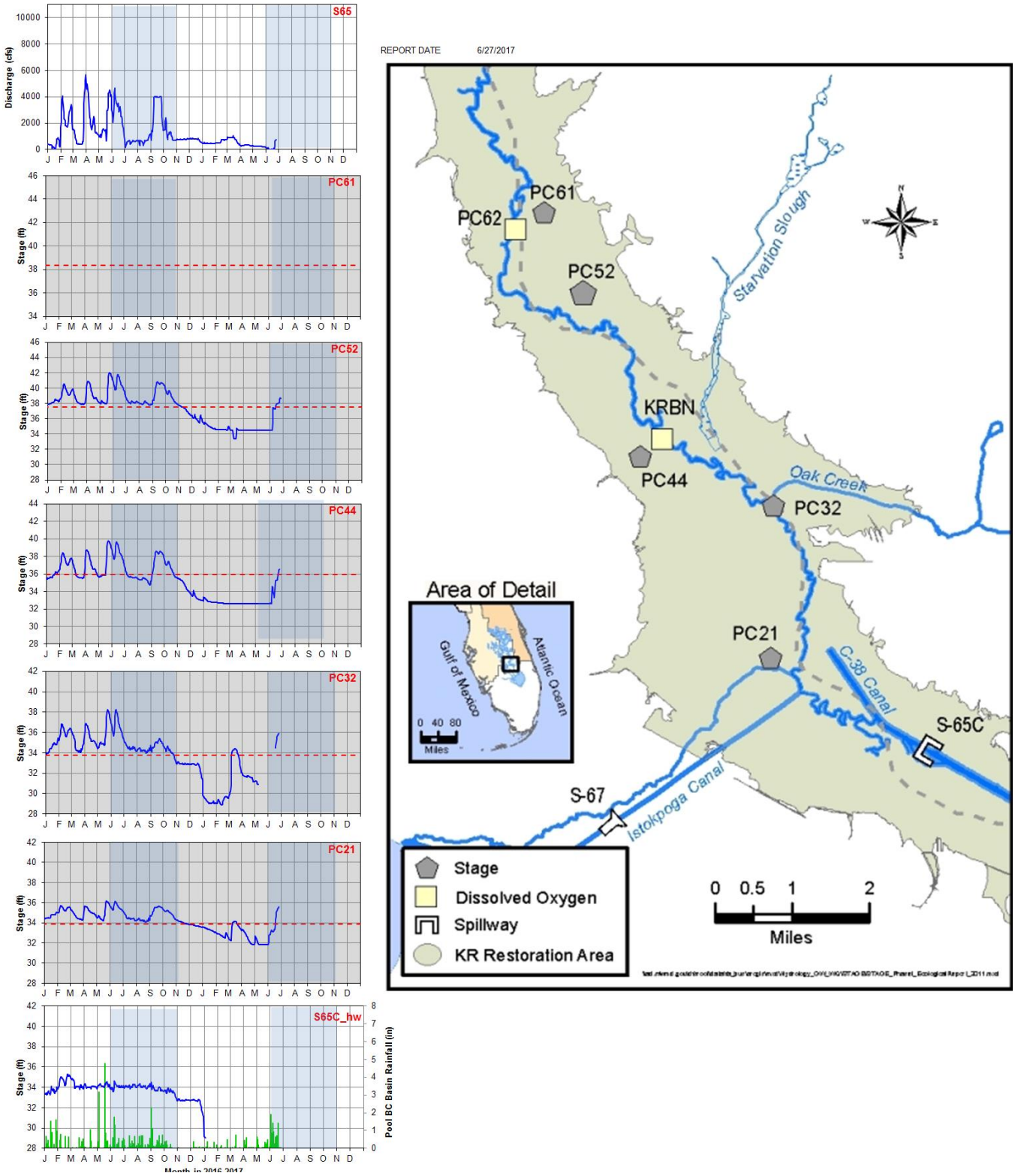


Figure 13. Discharge at S65, stages at five monitoring stations in the Phase I area of the Kissimmee River floodplain, and headwater stage at S65-C since January 1, 2015. The most recent data (~2 weeks) are provisional real-time data from SFWMD DualTrend; previous data are from SFWMD DB-HYDRO (validated).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

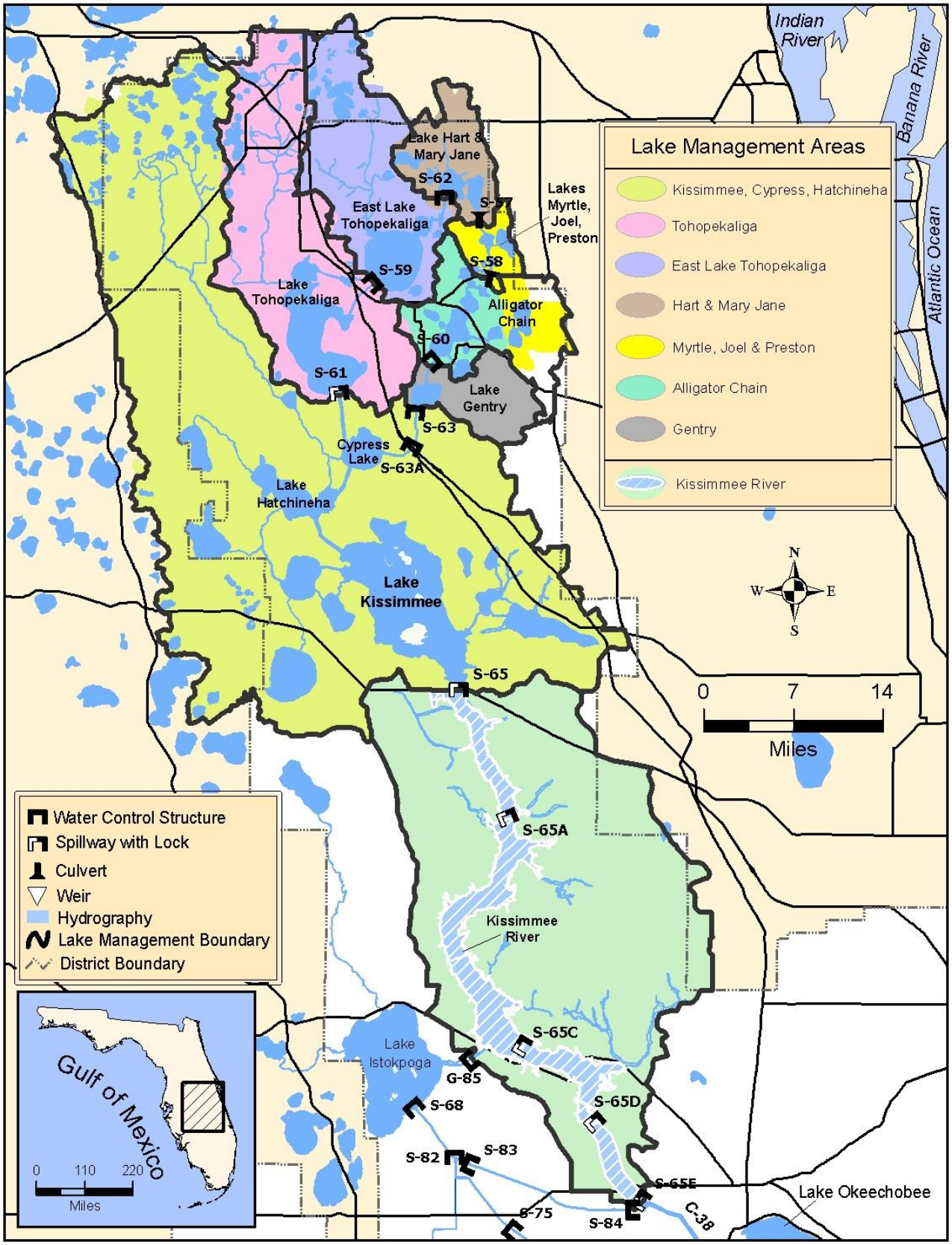


Figure 14. The Kissimmee Basin.

LAKE OKEECHOBEE

According to the United States Army Corps of Engineers (USACOE) web site, Lake Okeechobee stage is at 12.28 feet NGVD for the period ending at midnight on June 25, 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 0.24 feet over the past week and is 1.19 feet higher than it was a month ago and 2.63 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, 0.65 inches of rain fell directly over the Lake during the past seven days (Figure 3). Similar or greater amounts of rain fell in most of the watershed except for the lower Kissimmee Valley, most of the east coast and due south of the Lake which received less amounts of rainfall.

Based on USACOE reported values, current Lake inflow is approximately 4,453 cfs as detailed below.

Structure	Flow cfs
S65E	0
S65EX1	1577
S154	0
S84 & 84X	65
S71	0
S72	67
C5 (Nicodemus slough dispersed storage)	0
S191	0
S133 PUMPS	0
S127 PUMPS	0
S129 PUMPS	0
S131 PUMPS	0
S135 PUMPS	0
Fisheating Creek	1031
S2 Pumps	1713
S3 Pumps	0
S4 Pumps	0

Current Lake outflow is actually negative, totaling -752 cfs. Approximately 600 cfs is entering the Lake through S308 and 340 cfs is entering from the L8 canal through Culvert 10A. Approximately 169 cfs of outflow is being directed south through S351, 12 cfs is exiting through S131 Culverts, six cfs is exiting through S127 Culverts and two cfs is exiting through S77. The corrected evapotranspiration value based on the L006 weather platform solar radiation data increased from 2,508 cfs the previous week to 3,260 cfs for this past week.

Change in elevation equivalents and average weekly flows (midnight June 19, 2017 to midnight June 25, 2017) for major structures are presented in Figure 4.

Based on the Lake Okeechobee wading bird habitat suitability index, there are currently approximately 24,495 acres of suitable foraging habitat for long-legged birds and 10,365 acres for long and short legged birds on the Lake (Figure 5). However, the 2017 wading bird season is winding down, as evidenced by the lack of flocks seen on the Lake during the June 22, 2017 wading bird survey (Figure 6). Consequently, minimal impacts to wading birds are expected from the recent rise in Lake levels.

No new snail kite nests were recorded during the June (Survey 6) survey and only 22 snail kites were observed on the Lake (Figure 7). Of the 39 total nests thus far this season, 21 were deemed successful, 11 have failed and seven had unknown fates.

The most recent satellite imagery (June 16 and June 23) indicates that the northern and western regions continue to have potentially elevated chlorophyll values. However, cloud cover obscured most of the Lake in the June 23 image (Figure 8).

Water Management Recommendations

The Lake is 12.28 feet NGVD having increased by 0.24 feet over the past week. This ascension rate equates to a projected ascension rate of 0.96 feet per month which is almost double the optimal 0.50 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 too rapid (greater than 0.50 feet per month) of a rise in Lake stage.

Any activities that reduce the current rate of water level rise in Lake Okeechobee would be ecologically beneficial and would be protective of the Lake's emergent wetland and submerged aquatic flora and its associated fauna.

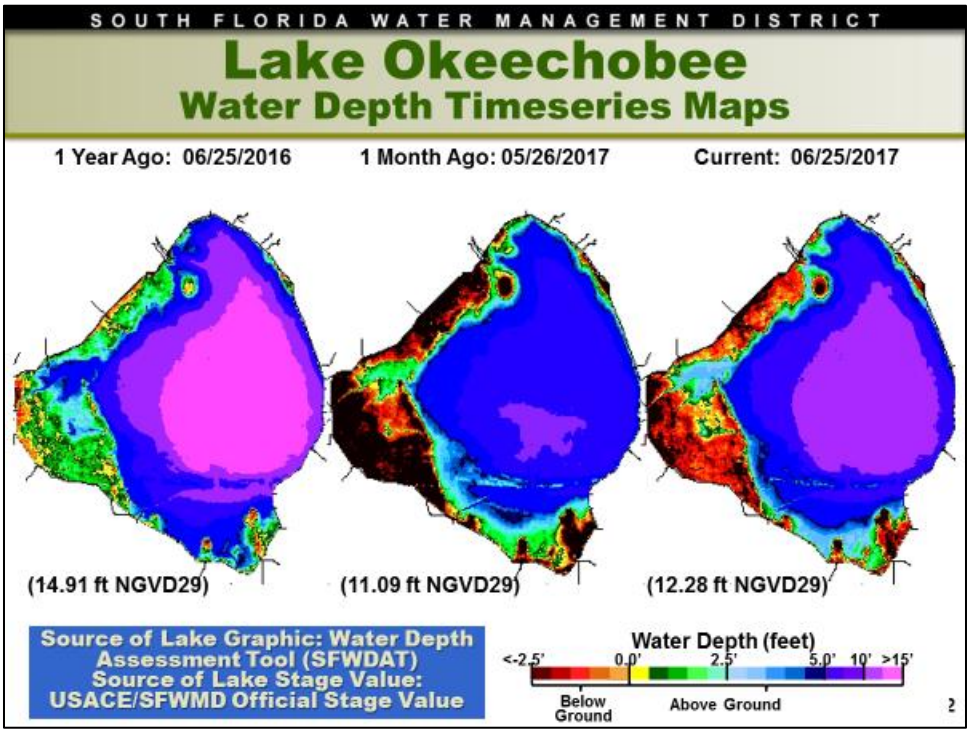


Figure 1

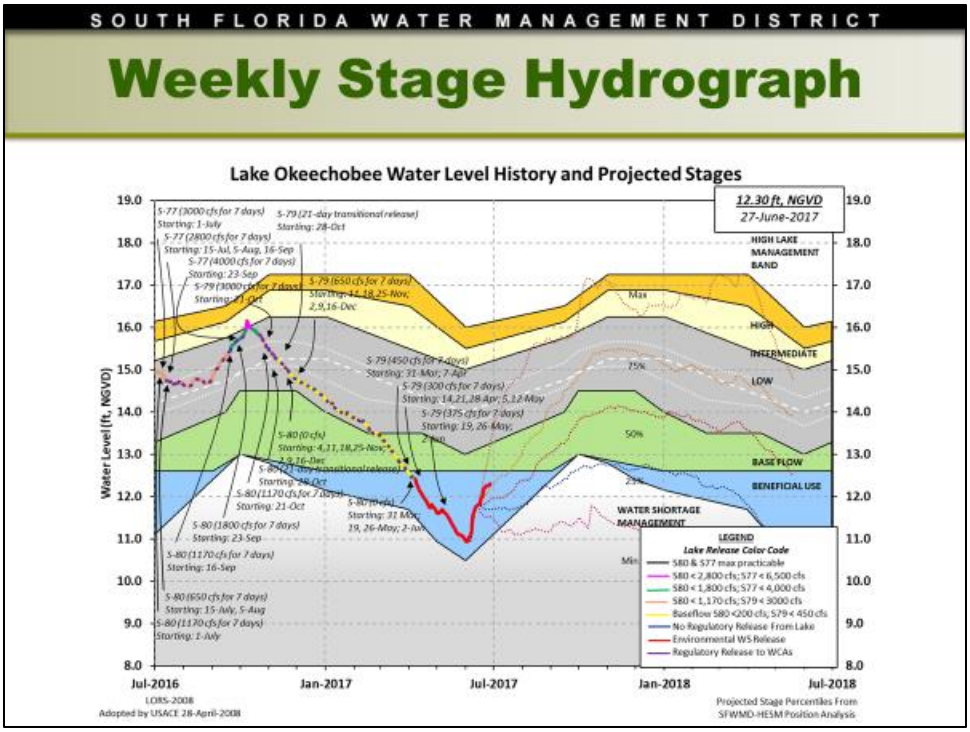

SOUTH FLORIDA WATER MANAGEMENT DISTRICT
Weekly Stage Hydrograph
Lake Okeechobee Water Level History and Projected Stages
12.30 ft, NGVD
27-June-2017
HIGH LAKE MANAGEMENT BAND
HIGH
INTERMEDIATE
LOW
BASE FLOW
BENEFICIAL USE
WATER SHORTAGE MANAGEMENT
Max
75%
50%
25%
Min
Water Level (ft, NGVD)
Jul-2016
Jan-2017
Jul-2017
Jan-2018
Jul-2018
LEGEND
Lake Release Color Code
LORS-2008
Adopted by USACE 28-April-2008
Projected Stage Percentiles From SFWMD-HESM Position Analysis

Figure 2

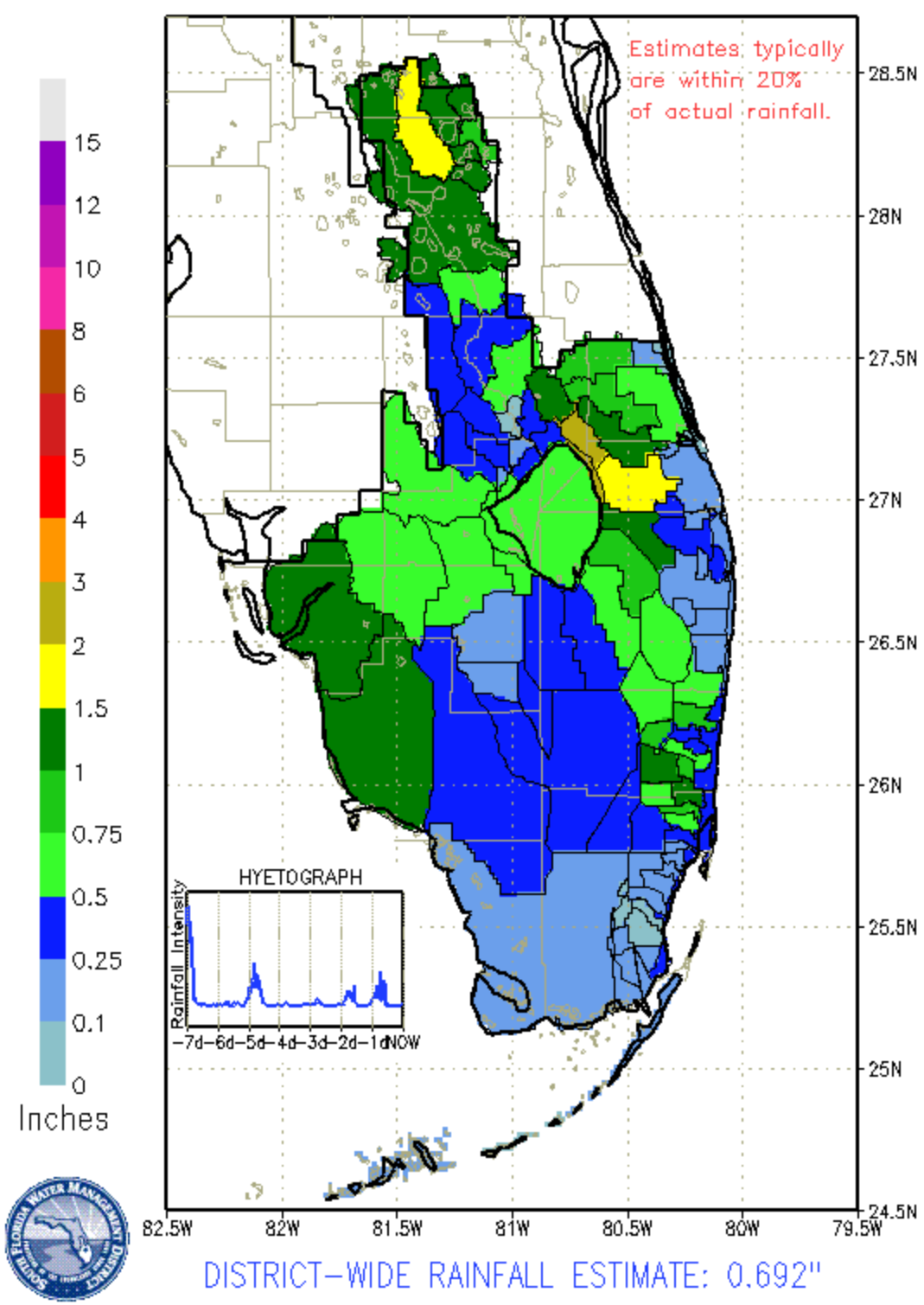

SFWMD PROVISIONAL RAINDAR 7-DAY BASIN RAINFALL ESTIMATES
FROM: 1130 EST, 06/19/2017 THROUGH: 1130 EST, 06/26/2017
Estimates typically are within 20% of actual rainfall.
15
12
10
8
6
5
4
3
2
1.5
1
0.75
0.5
0.25
0.1
0
Inches
HYETOGRAPH
Rainfall Intensity
-7d-6d-5d-4d-3d-2d-1d NOW
28.5N
28N
27.5N
27N
26.5N
26N
25.5N
25N
24.5N
82.5W
82W
81.5W
81W
80.5W
80W
79.5W
DISTRICT-WIDE RAINFALL ESTIMATE: 0.692"

Figure 3

INFLOWS	Average Daily Flow Past Week cfs	Feet of Change Past Week
S65E & S65EX1	1404	0.053
S71 & 72	423	0.016
S84 & 84X	1486	0.056
Fisheating Creek	630	0.024
Rainfall	N.A.	0.054
OUTFLOWS	**Average Daily Flow Past Week cfs**	**Feet of Change Past Week**
S77	6	0.000
S308	-888	-0.034
S351	0	0.000
S352	0	0.000
S354	0	0.000
L8	-337	-0.013
ET	3260	0.124

Figure 4

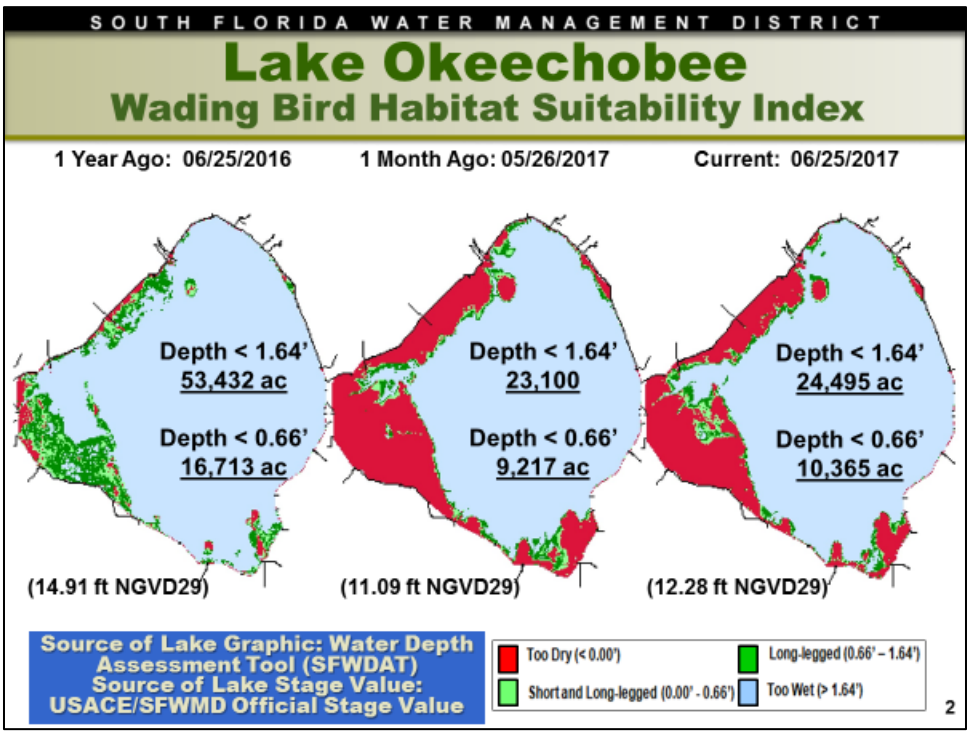


Figure 5

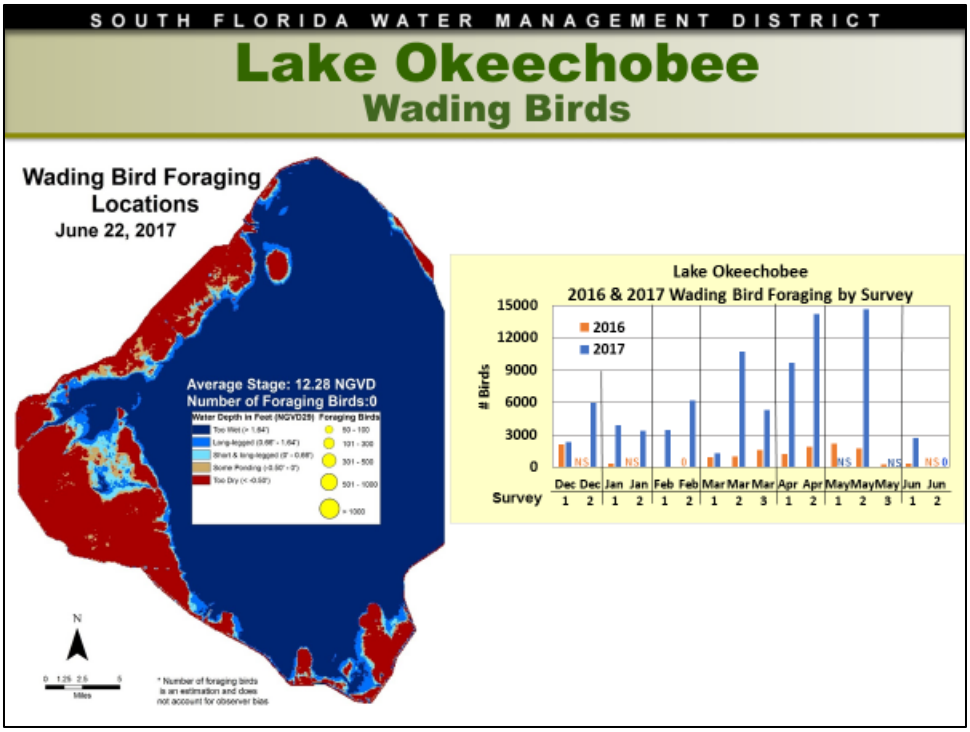


Figure 6

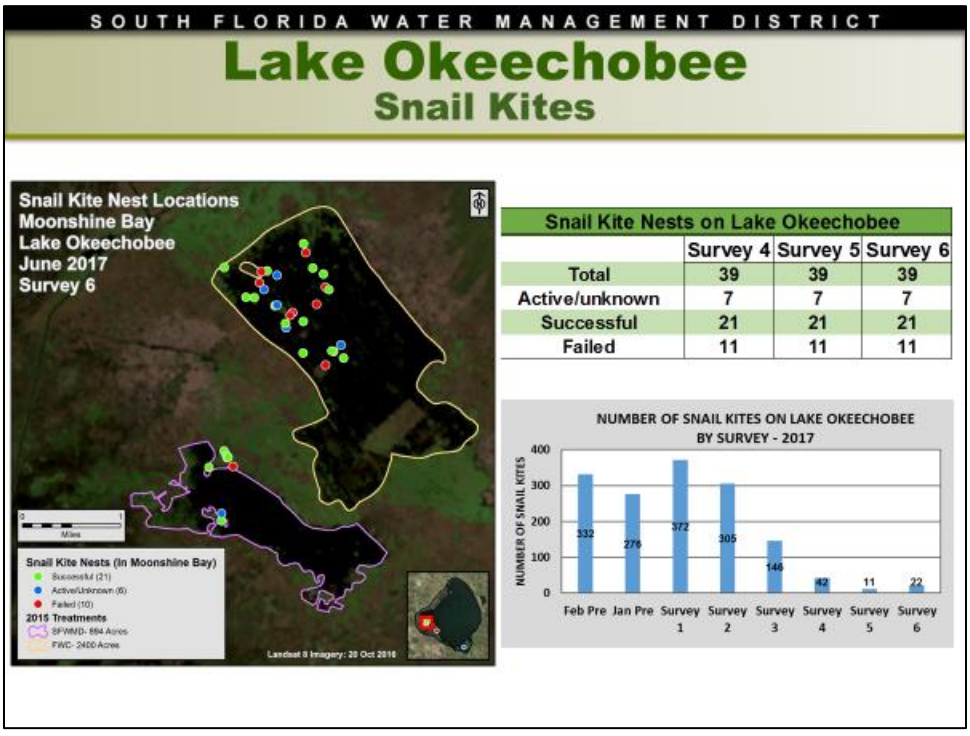


Figure 7

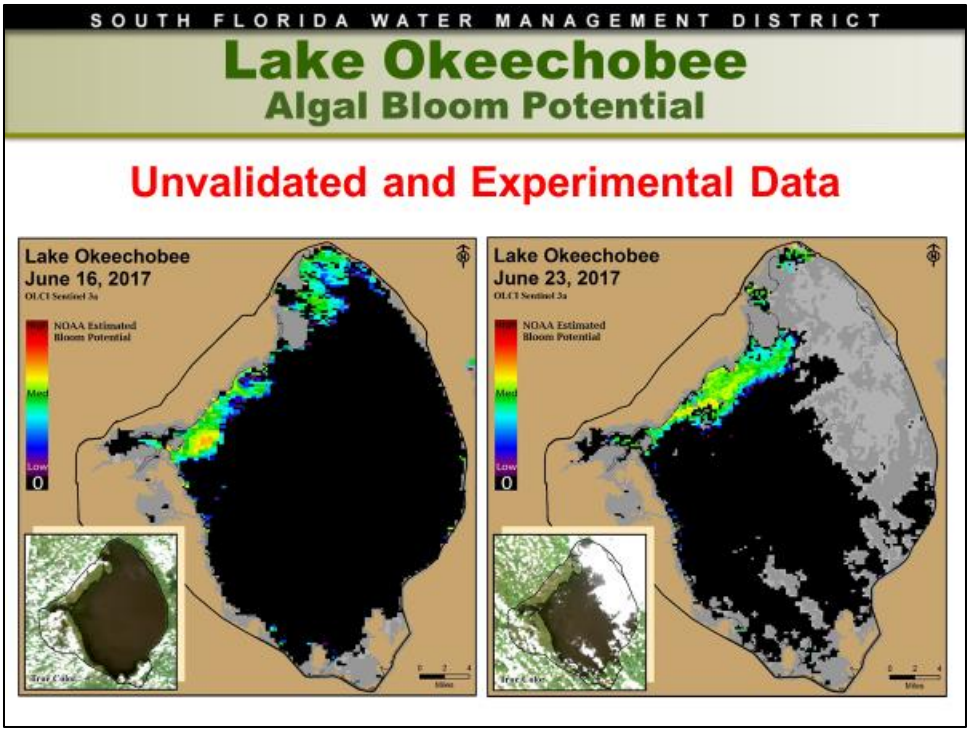


Figure 8

Lake Istokpoga:

Lake Istokpoga stage is 38.10 feet NGVD as of midnight June 25, 2017 and is currently 0.15 feet below its low pool regulation schedule of 38.25 feet NGVD (Figure 9). Average flows into the Lake from Arbuckle and Josephine creeks over the past week increased to 578 cfs and 121 cfs, respectively. Average discharge from S68 and S68X this past week was 1,387 cfs, an increase from the previous week's flow of 777 cfs. According to RAINDAR, 0.49 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 and only 38 snail kites were observed on the Lake compared to 118 observed on the previous survey (Figure 10). Of the 14 nests recorded thus far this season 6 were deemed successful and 8 have failed.

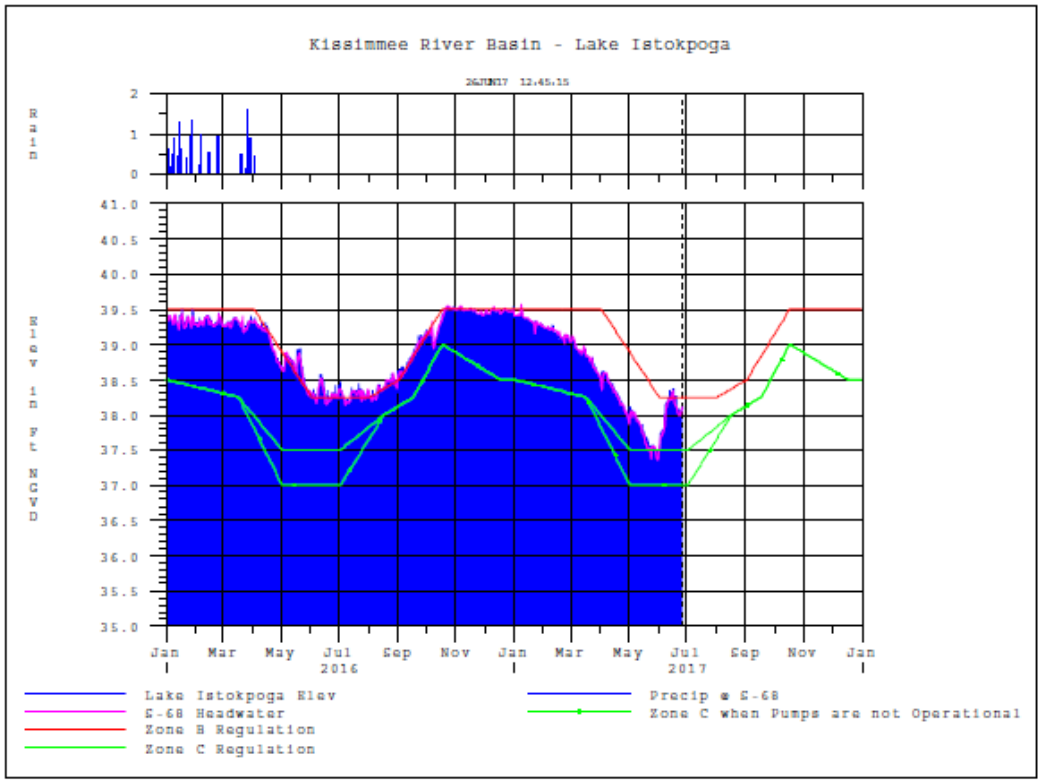


Figure 9

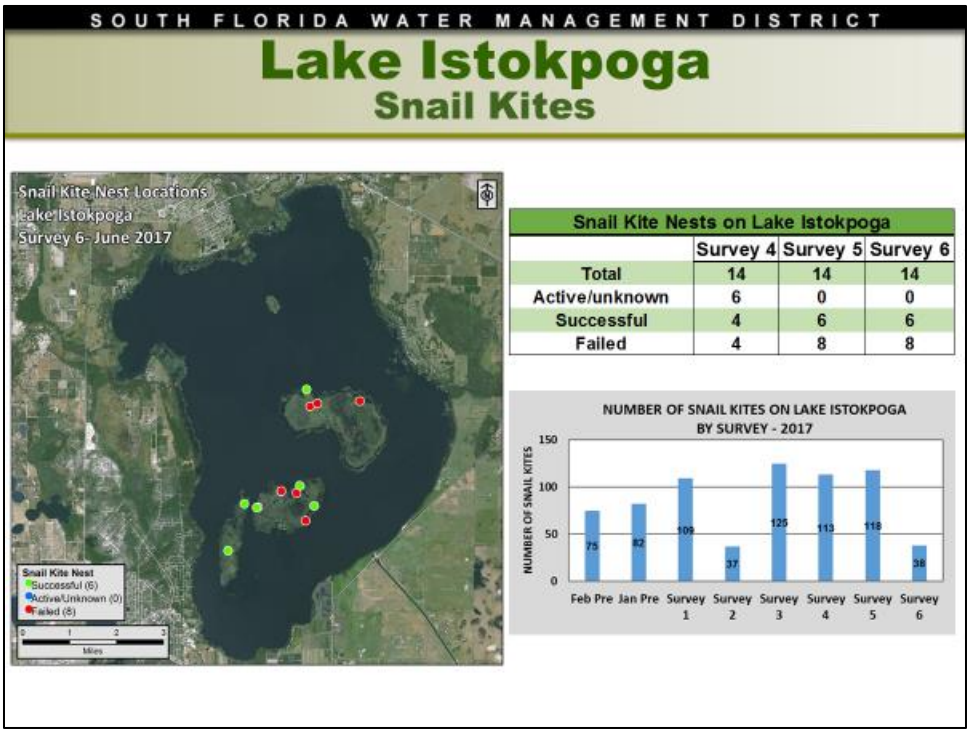


Figure 10

ESTUARIES

St. Lucie Estuary:
Over the past week, provisional flows averaged about 0 cfs at S-80, 793 cfs downstream of S-308 flowing into Lake Okeechobee, 414 cfs at S-49 on C-24, 579 cfs at S-97 on C-23, and 323 cfs from Ten Mile Creek at the Gordy Road Structure. Average inflow from tidal basin tributaries is estimated to be 377 cfs (Figures 1 and 2). Total inflow averaged about 1693 cfs last week and 1899 cfs over last month.

Over the past week in the estuary, surface salinity decreased downstream of US1 Bridge and increased at A1A Bridge (Table 1, Figures 3 and 4). The seven-day moving average salinity of the water column at the US1 Bridge is about 4.1. Salinity conditions in the middle estuary are in the poor 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)	**0.8** (NR[2])	**1.4** (NR)	NA[1]
US1 Bridge	**3.5** (7.3)	**4.7** (9.0)	10.0-26.0
A1A Bridge	**19.3** (17.8)	**20.9** (21.9)	NA

[1]Envelope not applicable and [2]Not Reporting

Caloosahatchee Estuary:
During the past week, provisional flows averaged approximately 0 cfs at S-77, 902 cfs at S-78, and 2596 cfs at S-79. Average inflow from tidal basin tributaries is estimated to be 1714 cfs (Figures 5 & 6). Total inflow averaged 4310 cfs last week and 4816 cfs over last month.

Over the past week in the estuary, salinity decreased downstream of Cape Coral and increased upstream of Shell Point (Table 2, Figures 7 and 8). The seven-day average salinity values are poor for adult oysters at Cape Coral, and within the good range at Shell Point, and at Sanibel (Figure 9). The 30-day moving average surface salinity is 2.7 at Val I-75 and 6.5 at Ft. Myers. Salinity conditions between Val I-75 and Ft. Myers are improving for tape grass.

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)	**0.3** (0.2)	**0.3** (0.2)	NA[1]
*Val I75	**0.3** (0.4)	**0.3** (0.8)	0.0-5.0[2]
Ft. Myers Yacht Basin	**0.3** (1.3)	**0.4** (2.1)	NA
Cape Coral	**3.8** (4.8)	**5.7** (6.1)	10.0-30.0
Shell Point	**16.9** (16.1)	**19.4** (17.0)	10.0-30.0
Sanibel	**28.8** (27.3)	**29.2** (27.1)	10.0-30.0

[1]Envelope not applicable and [2]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 *a* (µg/l)	5.89 – 6.74	5.66 – 16.12	2.34 – 20.28
Dissolved Oxygen (mg/l)	2.25 – 3.84	3.43 – 5.27	No Data

The Florida Fish and Wildlife Research Institute reported on June 23, 2017, that *Karenia brevis, the Florida red tide organism,* was observed at background concentrations in one sample collected from Lee County.

Water Management Recommendations

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.

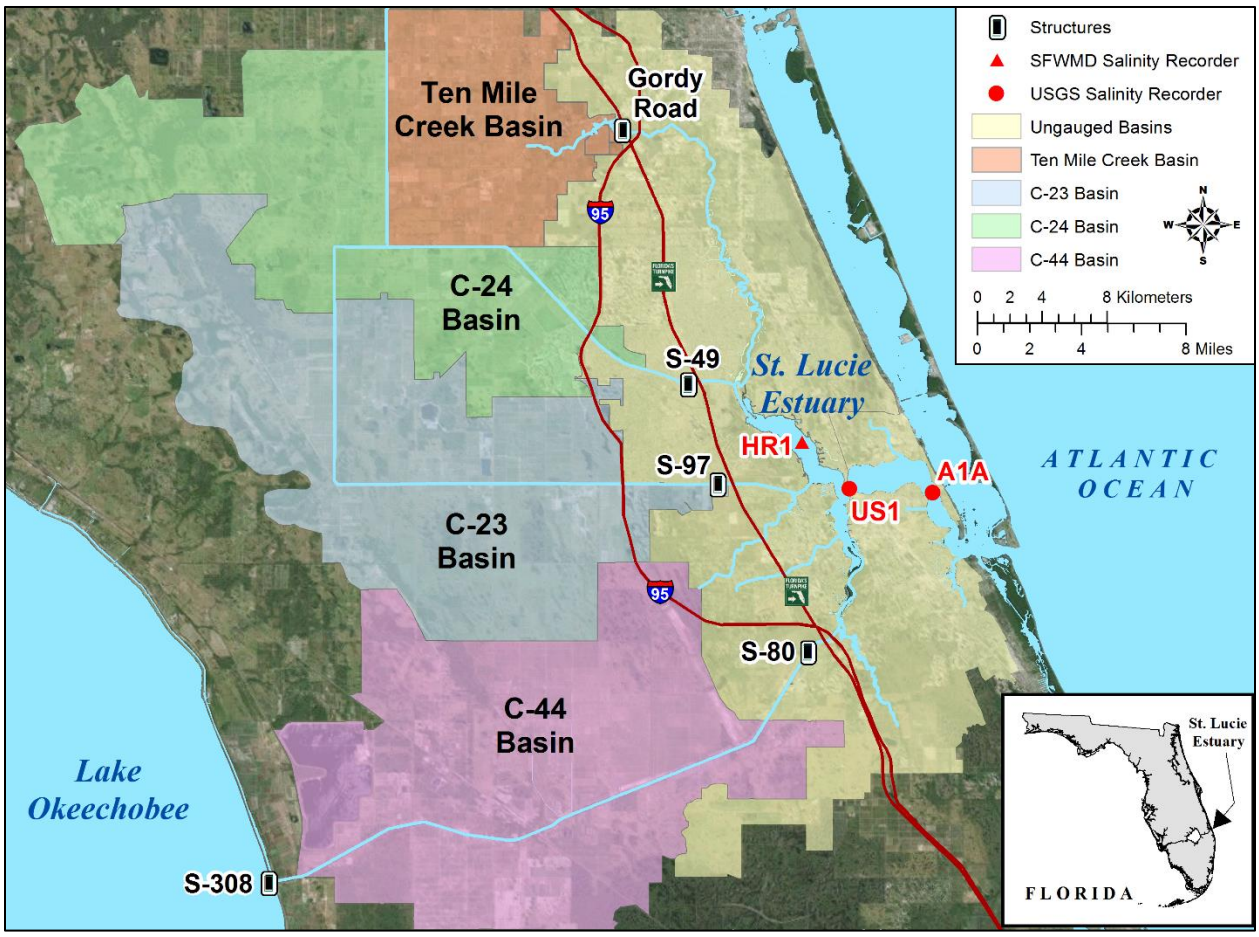


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

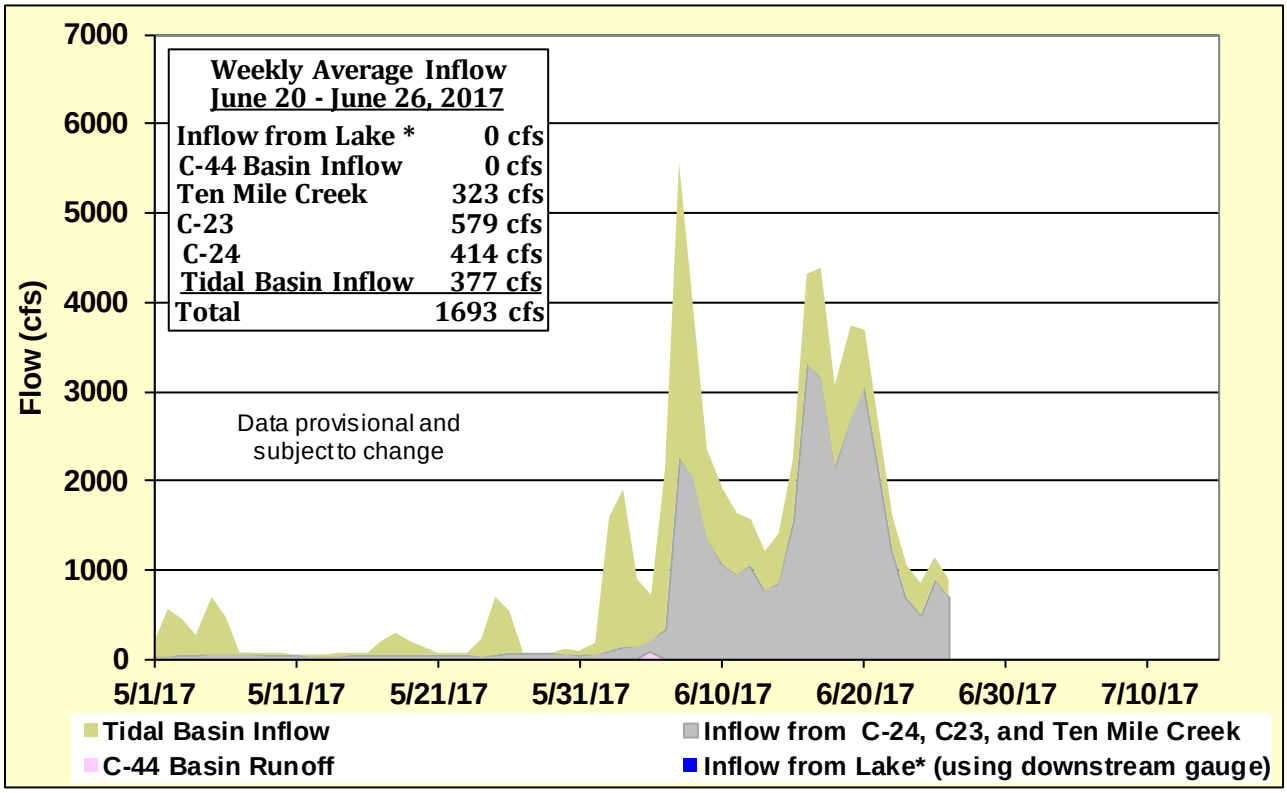


Figure 2. Estimated surface freshwater inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basins into the St. Lucie Estuary.

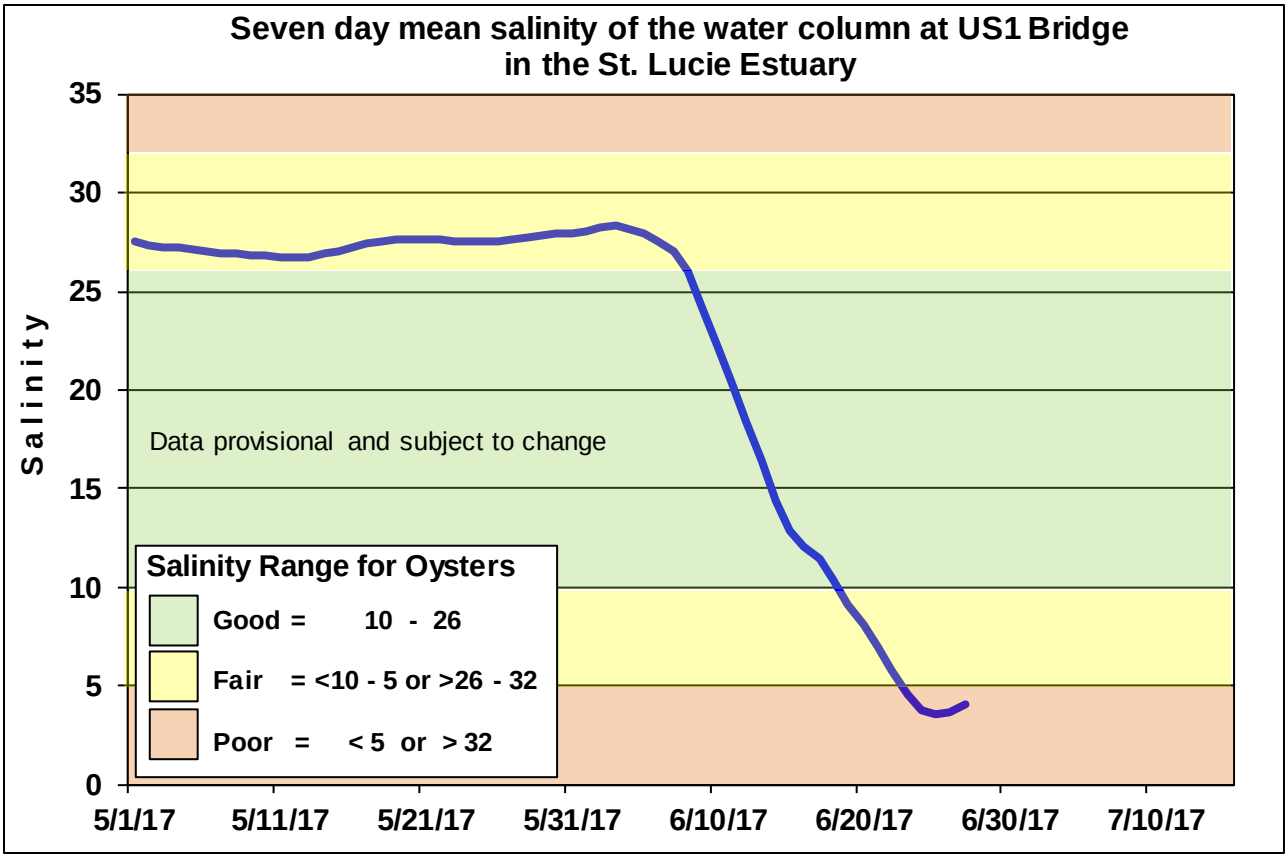


Figure 3. Seven-day mean salinity of the water column at the U.S. Highway 1 Bridge.

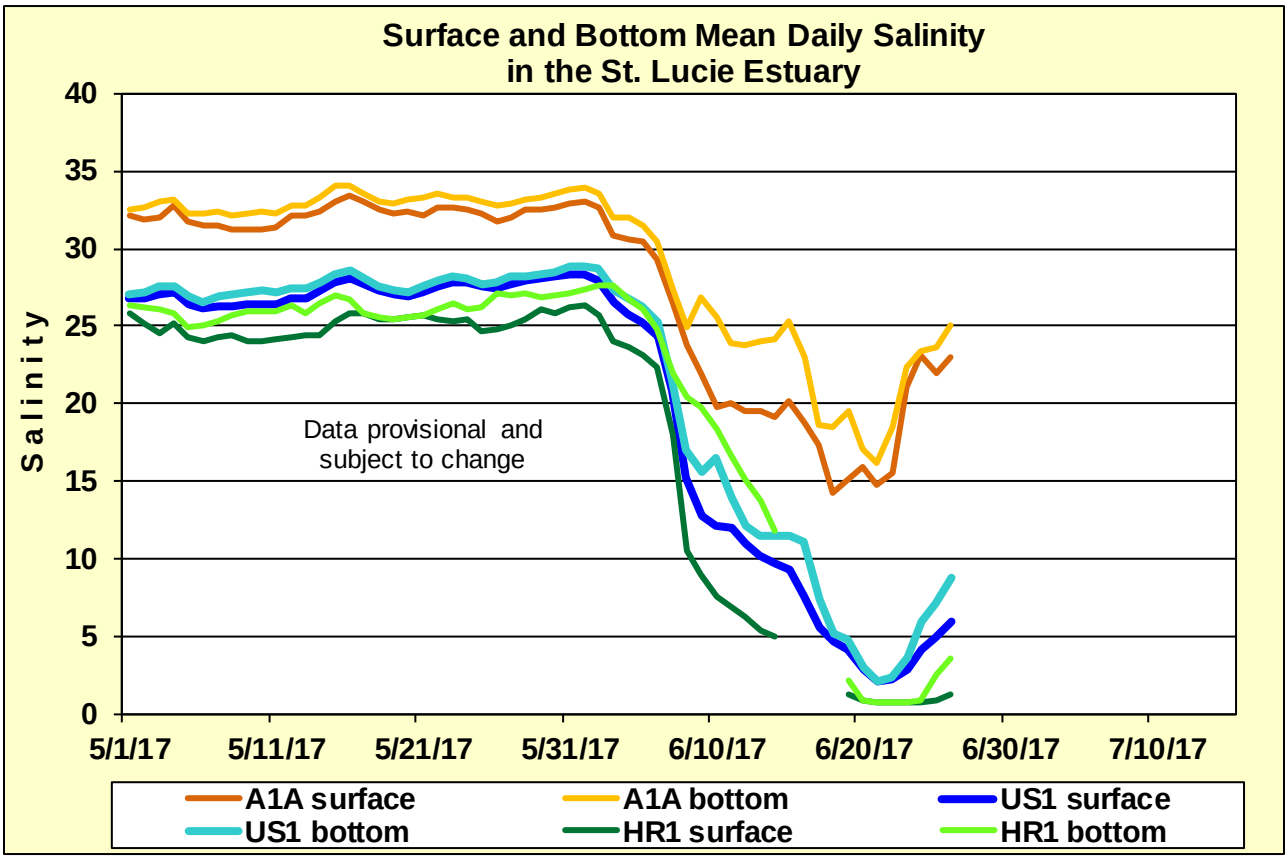


Figure 4. Daily mean salinity at the A1A, US1 and estimated HR1 stations.

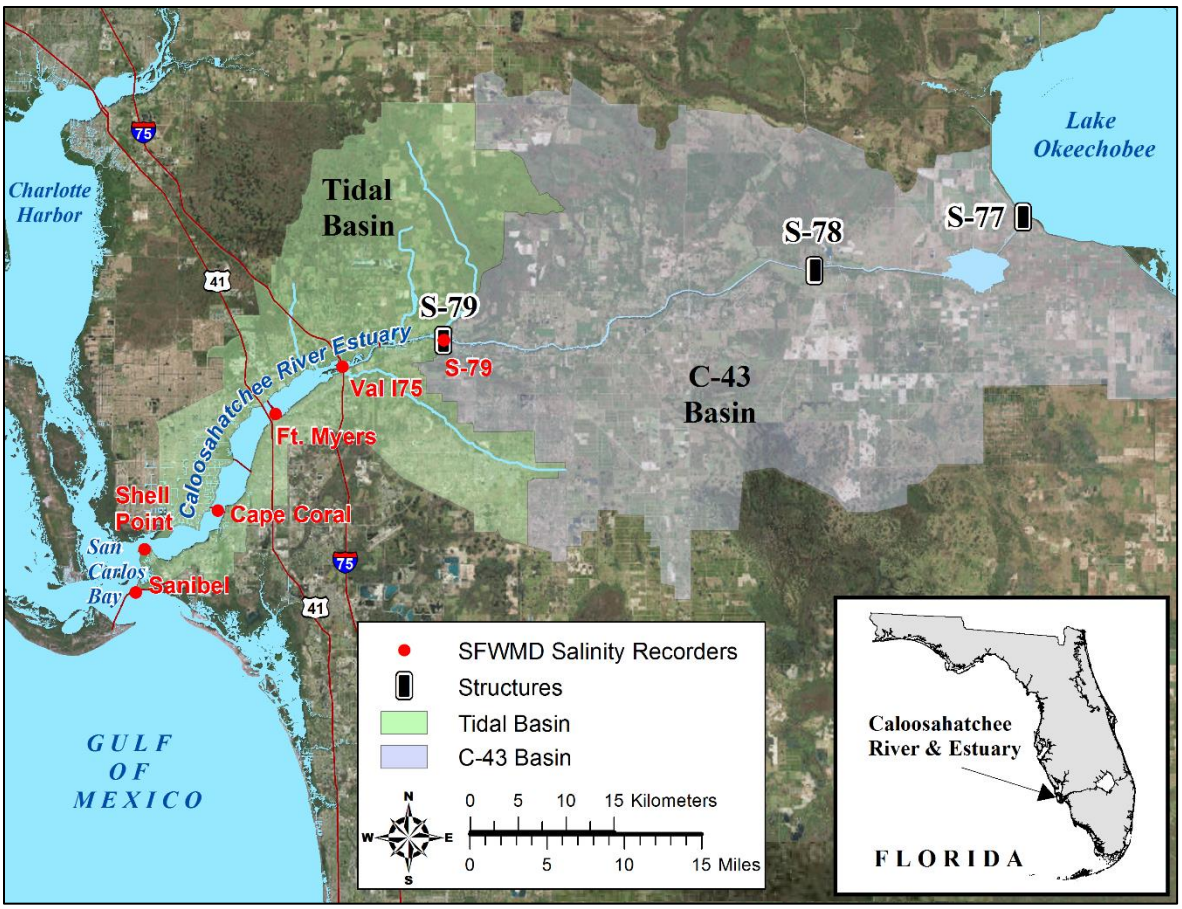


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

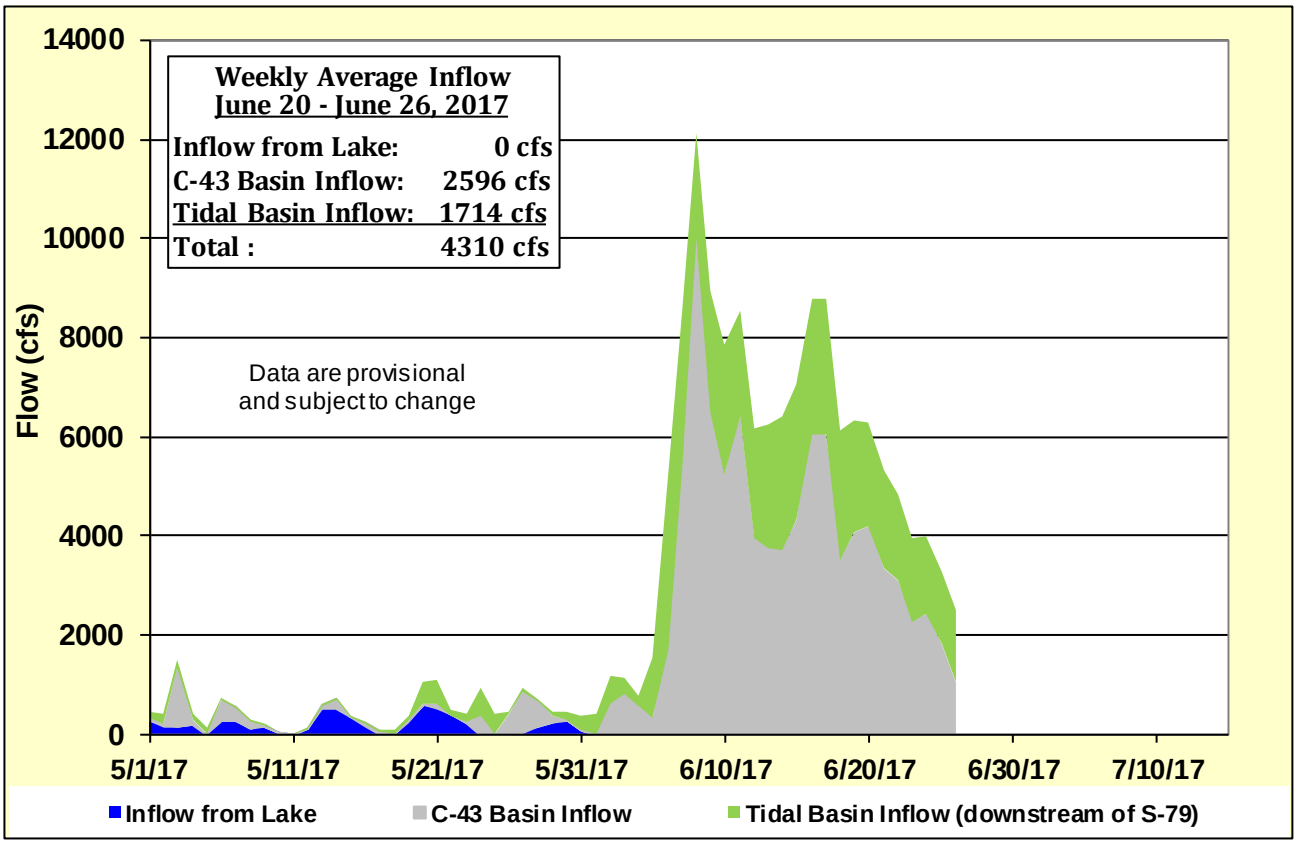
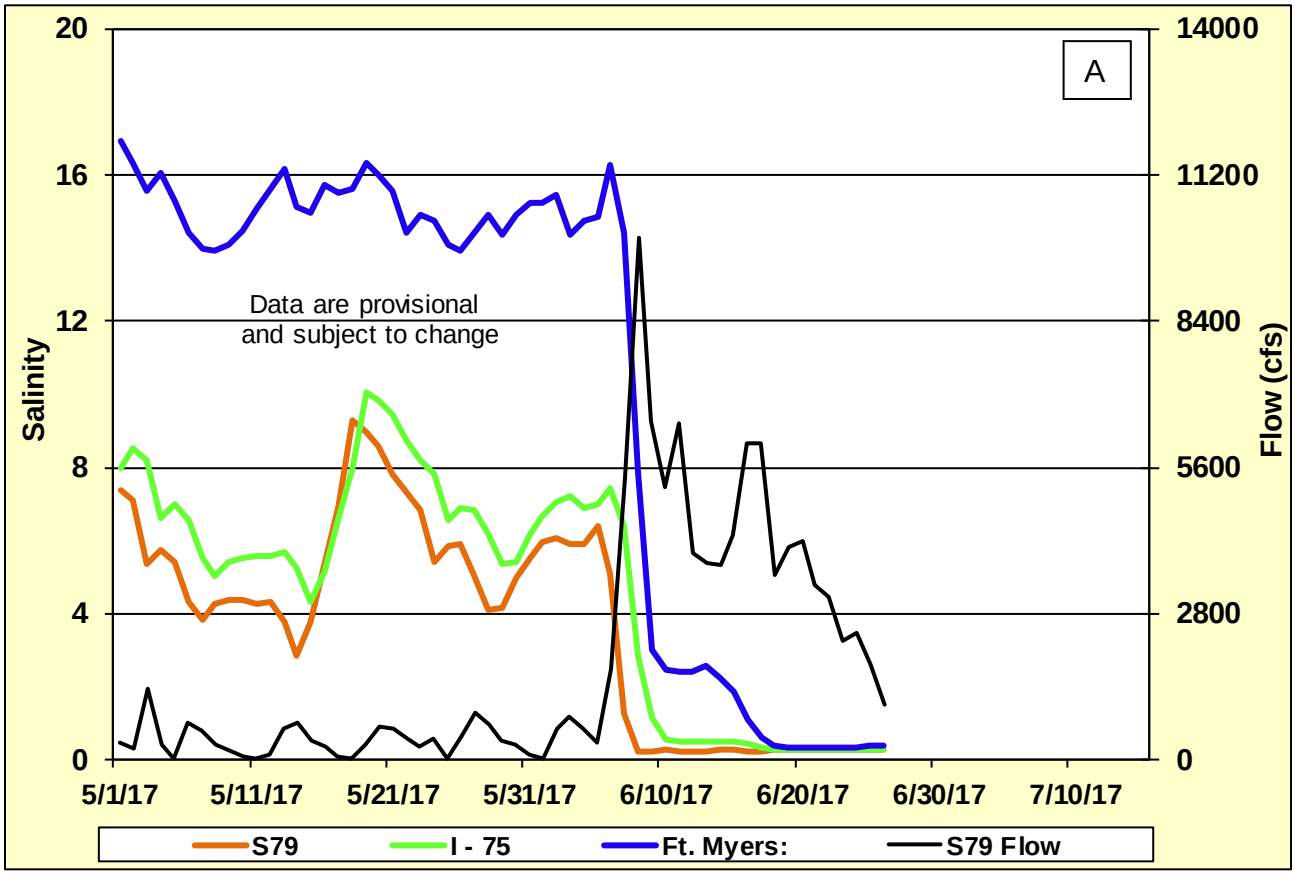


Figure 6. Freshwater inflows from Lake Okeechobee, runoff from the C-43 basin, and tributaries in the tidal basin into the Caloosahatchee River Estuary.



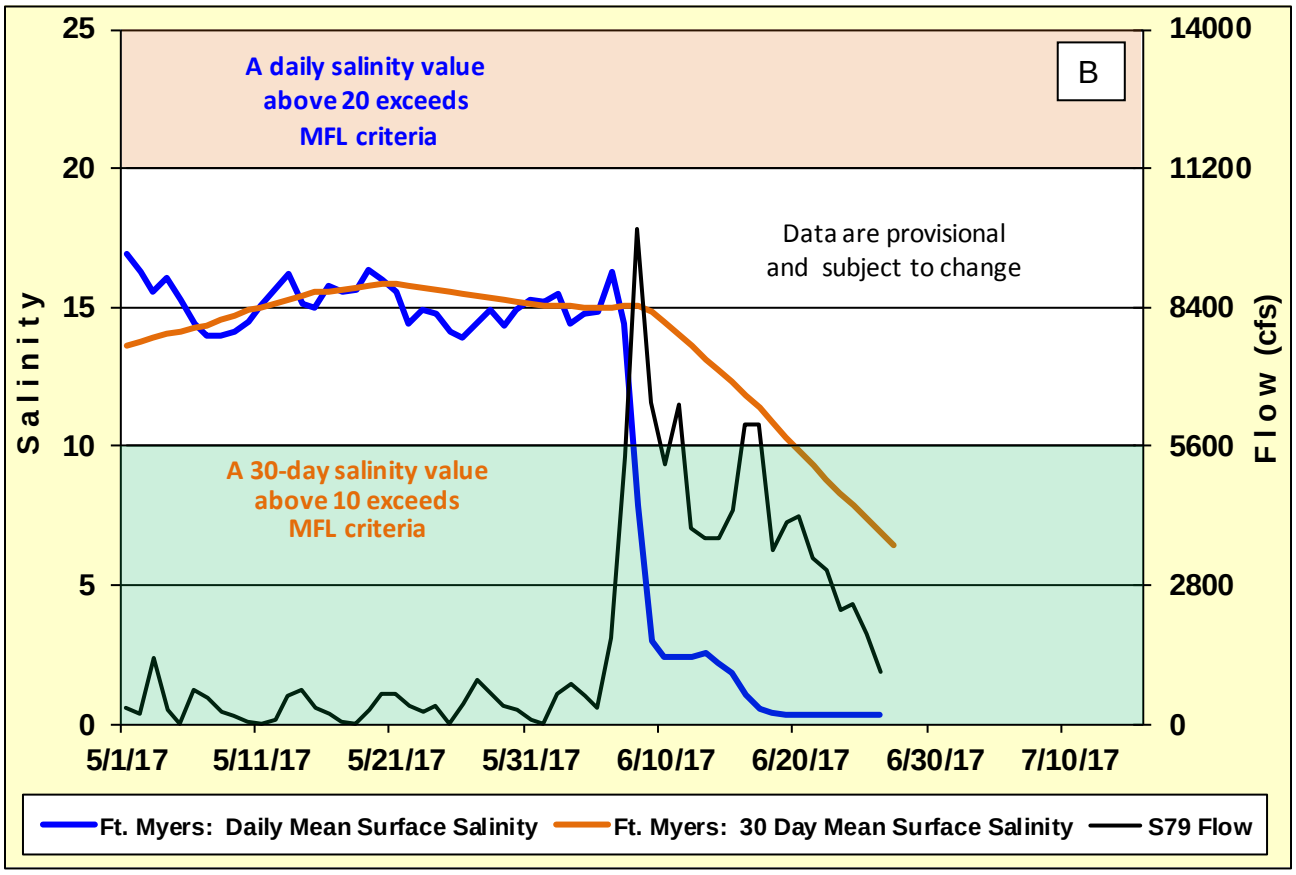


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations (A) and 30-day moving average salinity at Ft. Myers (B).

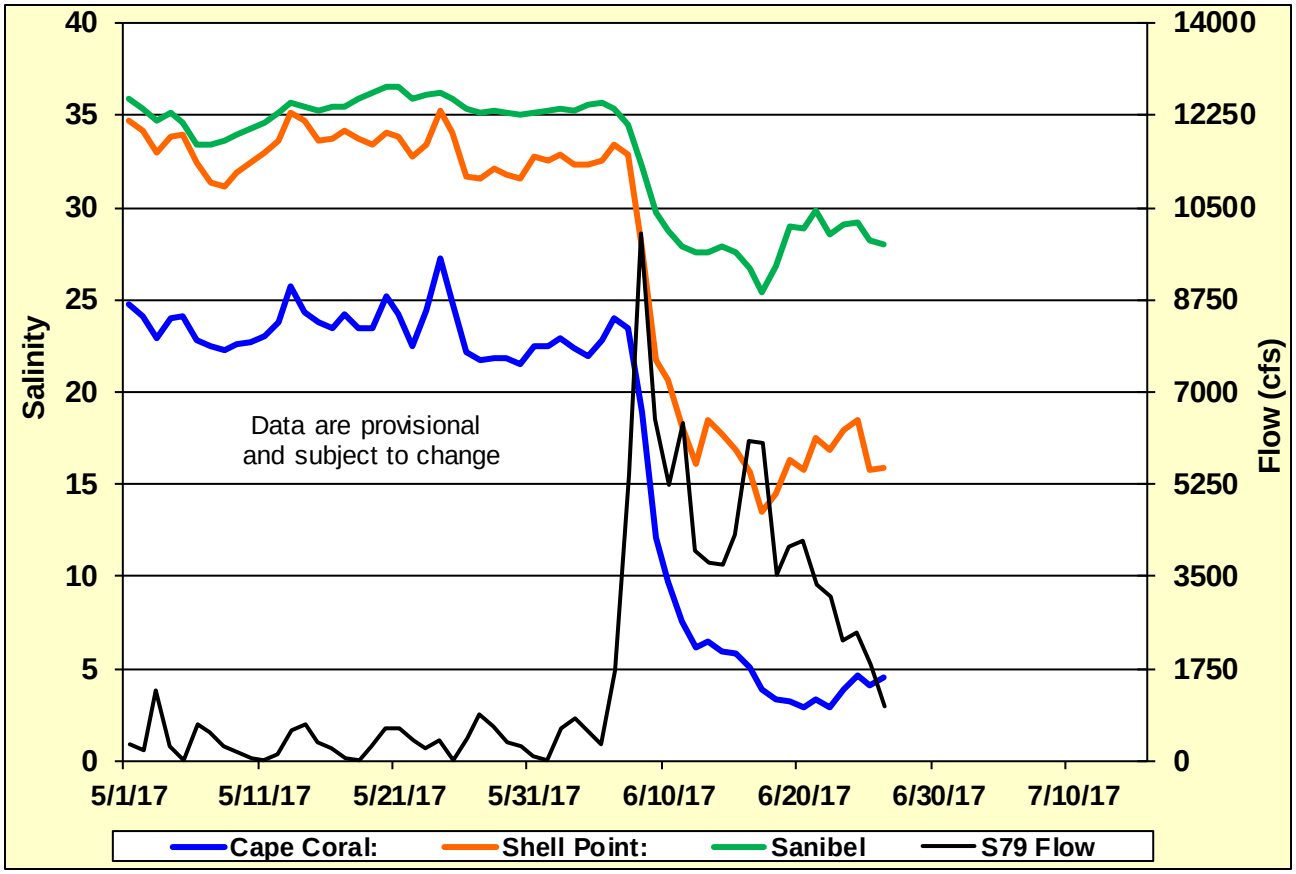


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

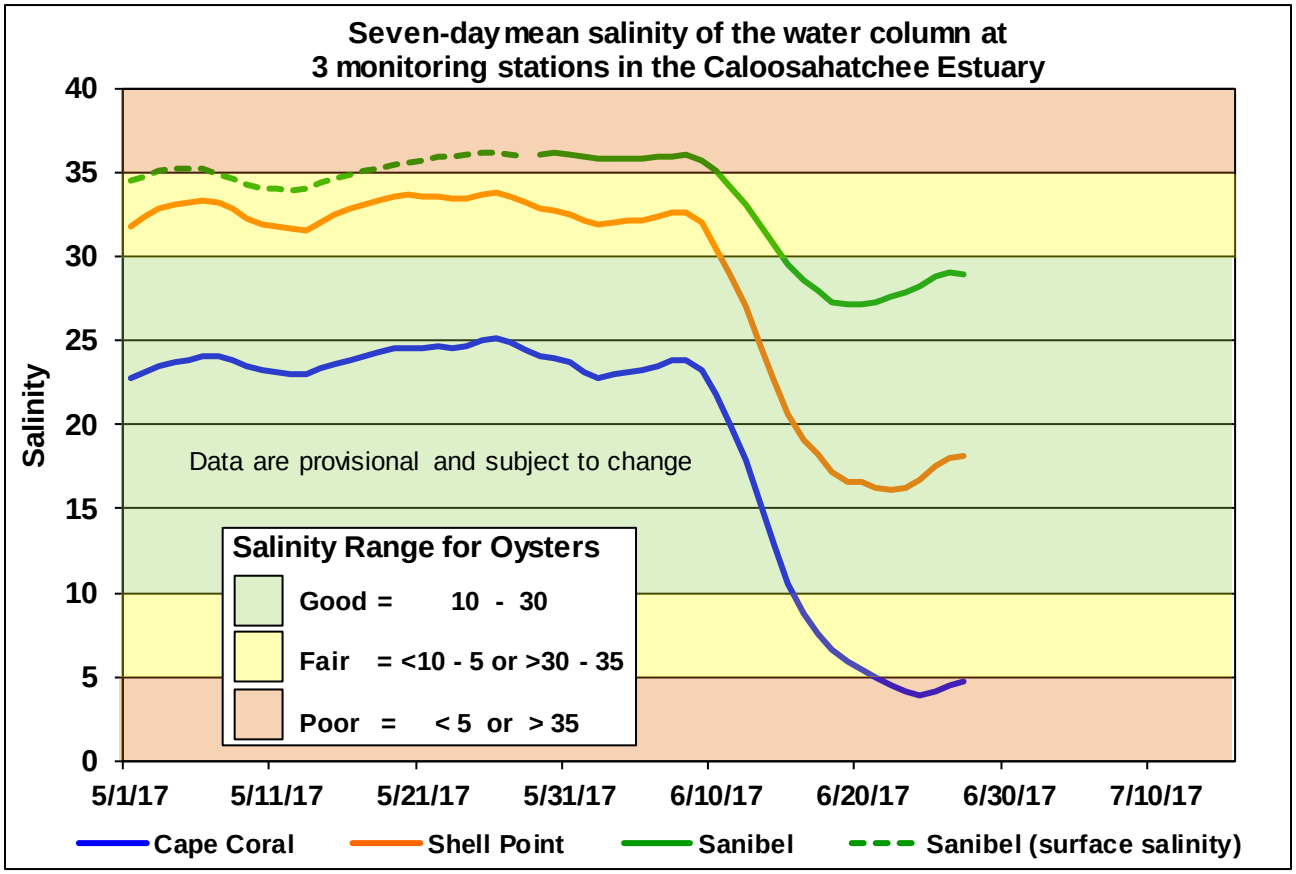
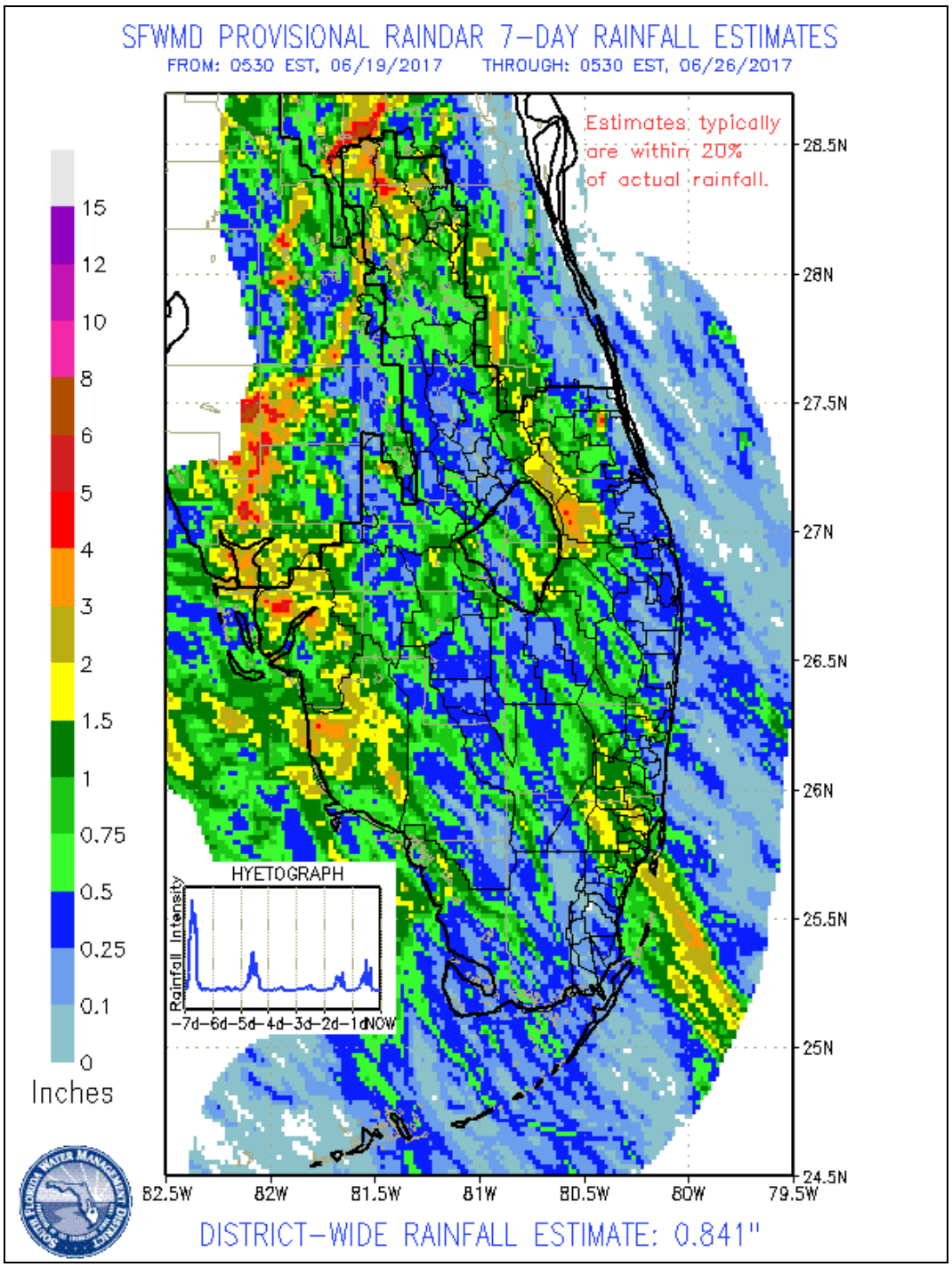


Figure 9. Seven-day mean salinity at Cape Coral Bridge, Shell Point and Sanibel Bridge monitoring stations.

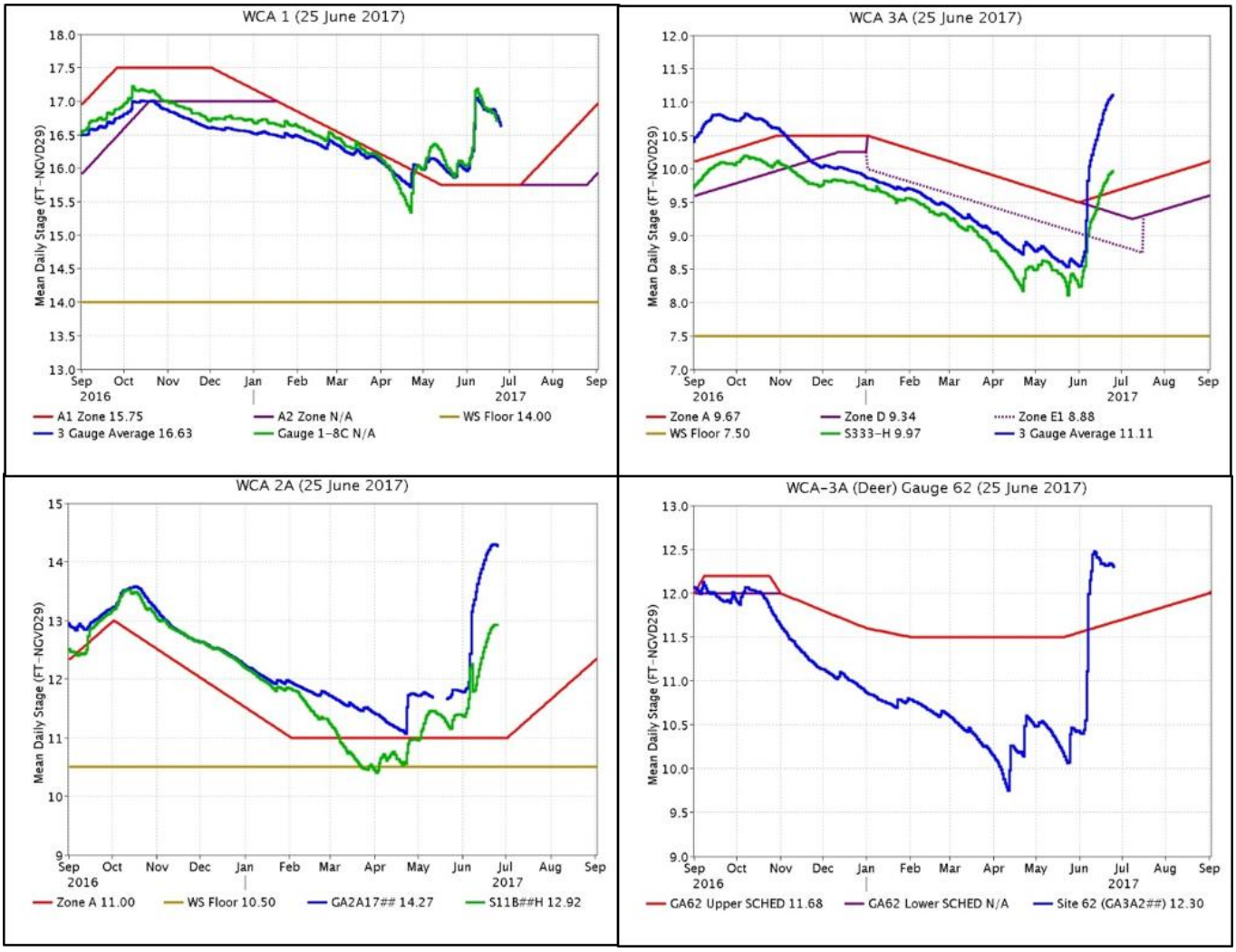
EVERGLADES

Run off from recent weeks' heavy rains making its way into the Everglades as well as consistent rain across the basin cause stages to climb except in WCA-1.

Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	0.67	-0.27
WCA-2A	0.74	0.09
WCA-2B	1.05	0.10
WCA-3A	0.59	0.26
WCA-3B	0.81	0.14
ENP	0.47	0.25



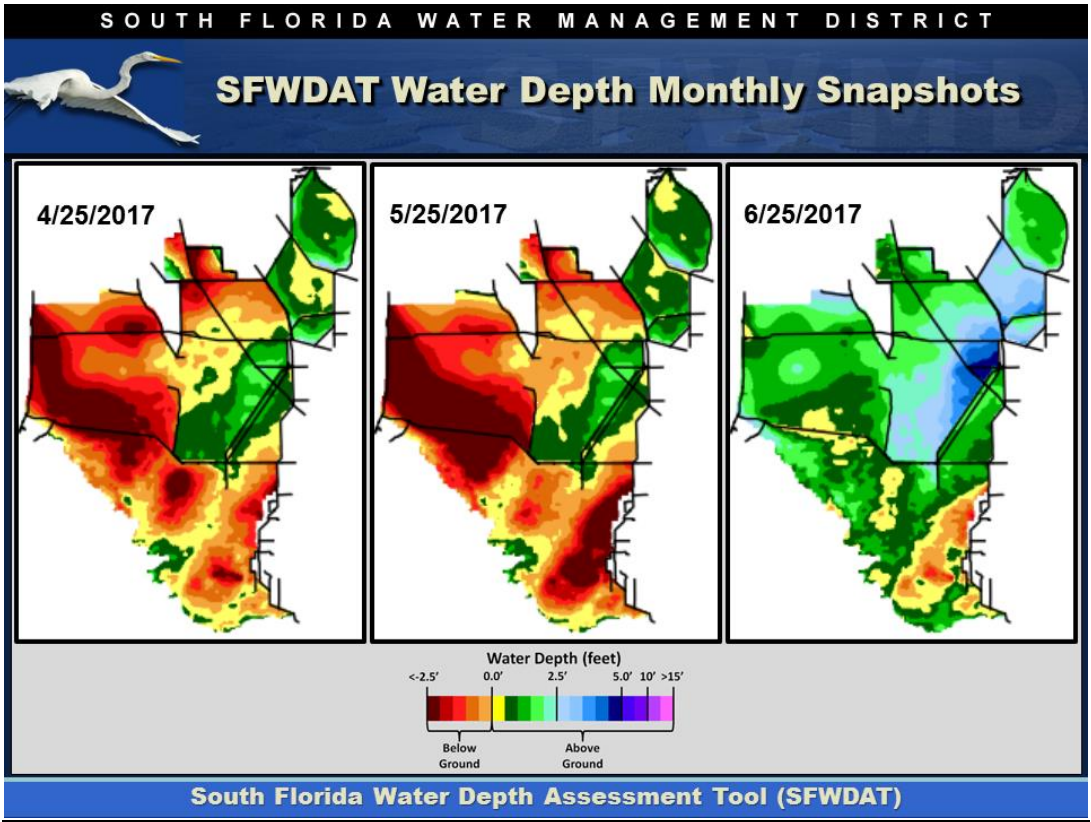
Regulation Schedules: WCA-1 stage is 0.88 feet above Zone A. WCA-2A the marsh stage at gauge GA2A17 is currently 3.27 feet above zone A (0.11 increase from last week) and canal stage at S11B is 1.92 feet above zone A. WCA-3A three-gauge average is 1.44 feet above zone A1, 1.77 feet above zone D and 2.23 above zone E1. WCA-3A at gauge 62 (Northwest corner) is 0.62 feet above schedule (.08 closer than last week).

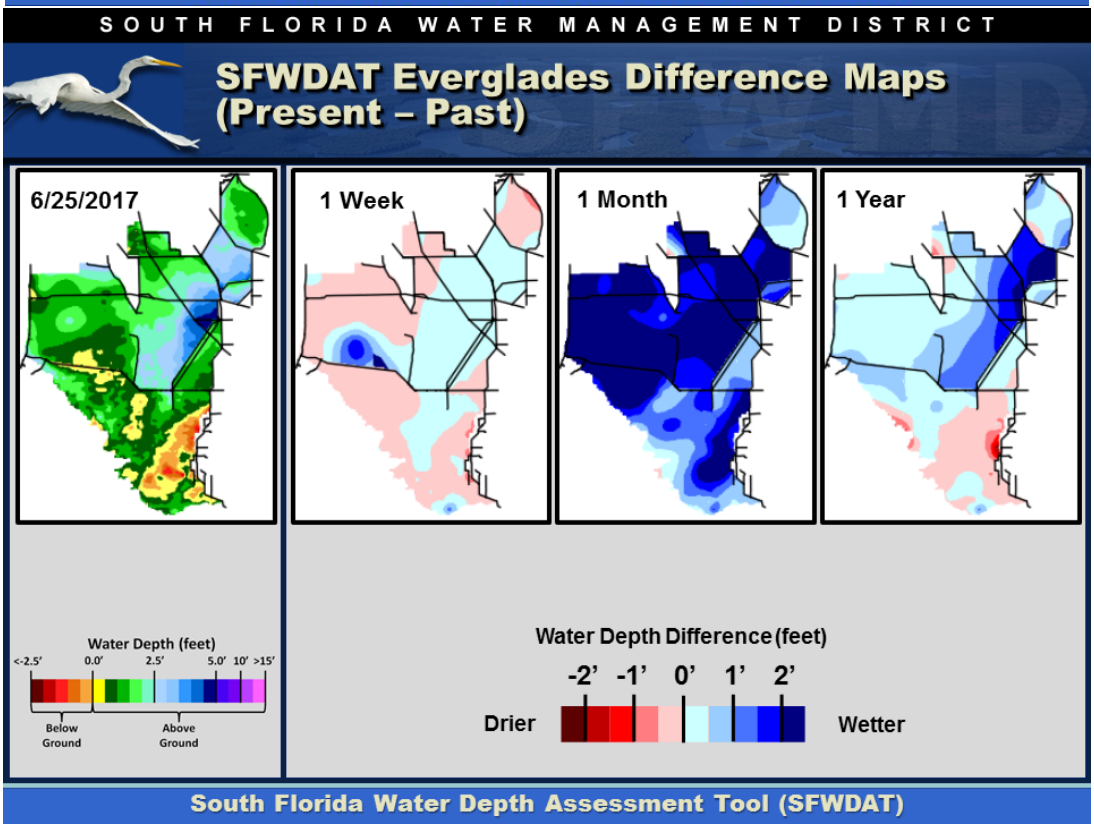


Blue – wetlands
Green – canals

Water Depths and Changes: This week's range of water depths at monitored gauges other than in WCA-2B range from 1.20 feet (WCA-3B SRS1) to 3.16 feet (WCA-2A). Over the last week individual gauge changes ranged from +0.47 feet (Northeast WCA-3A) to -0.40 feet (East Central WCA-1).

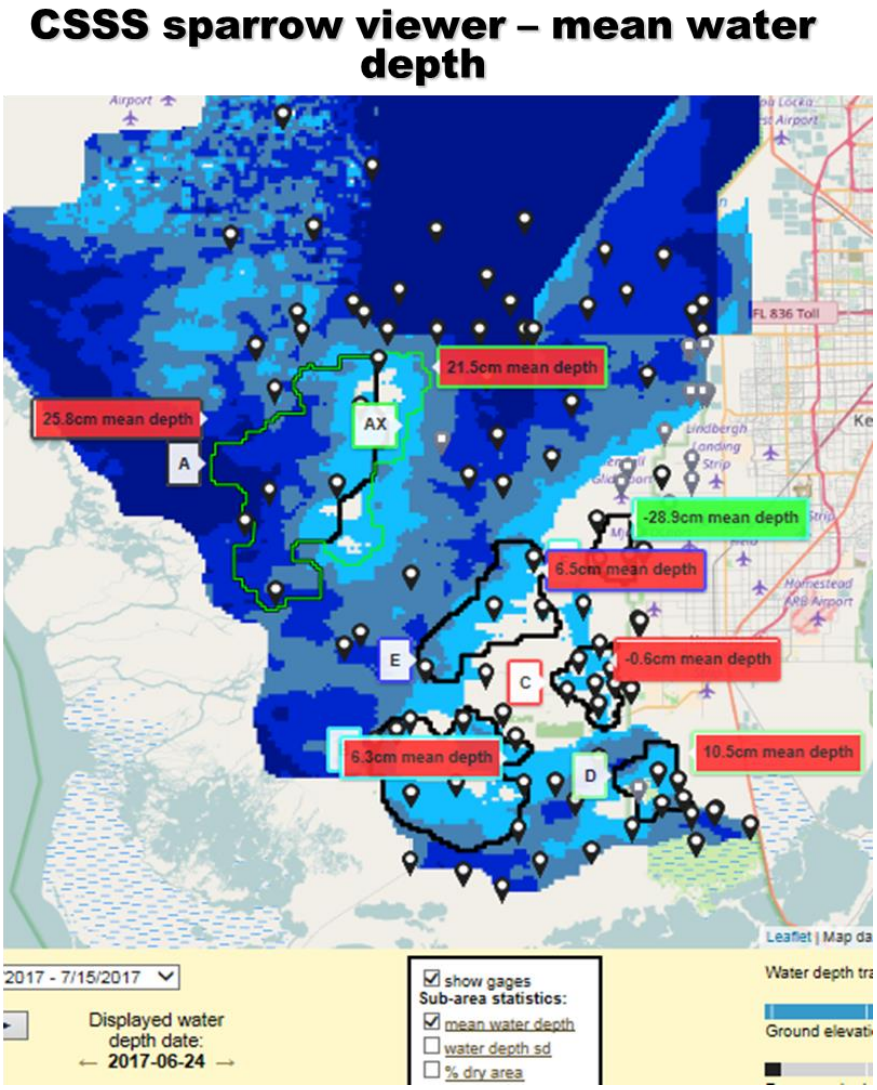
Pan evap. was estimated to be 1.52 inches, equivalent to the pre-project estimate.

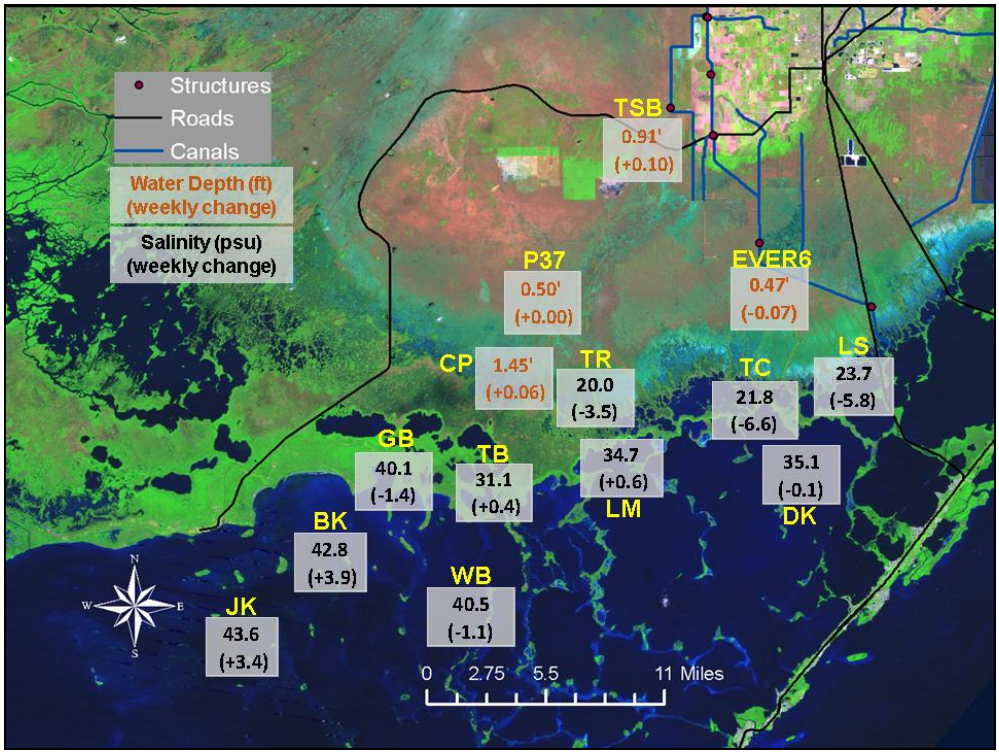


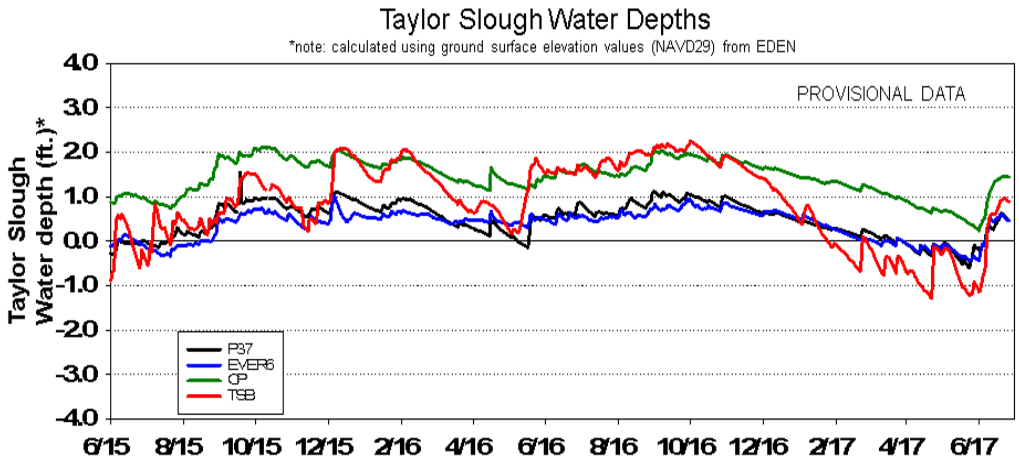


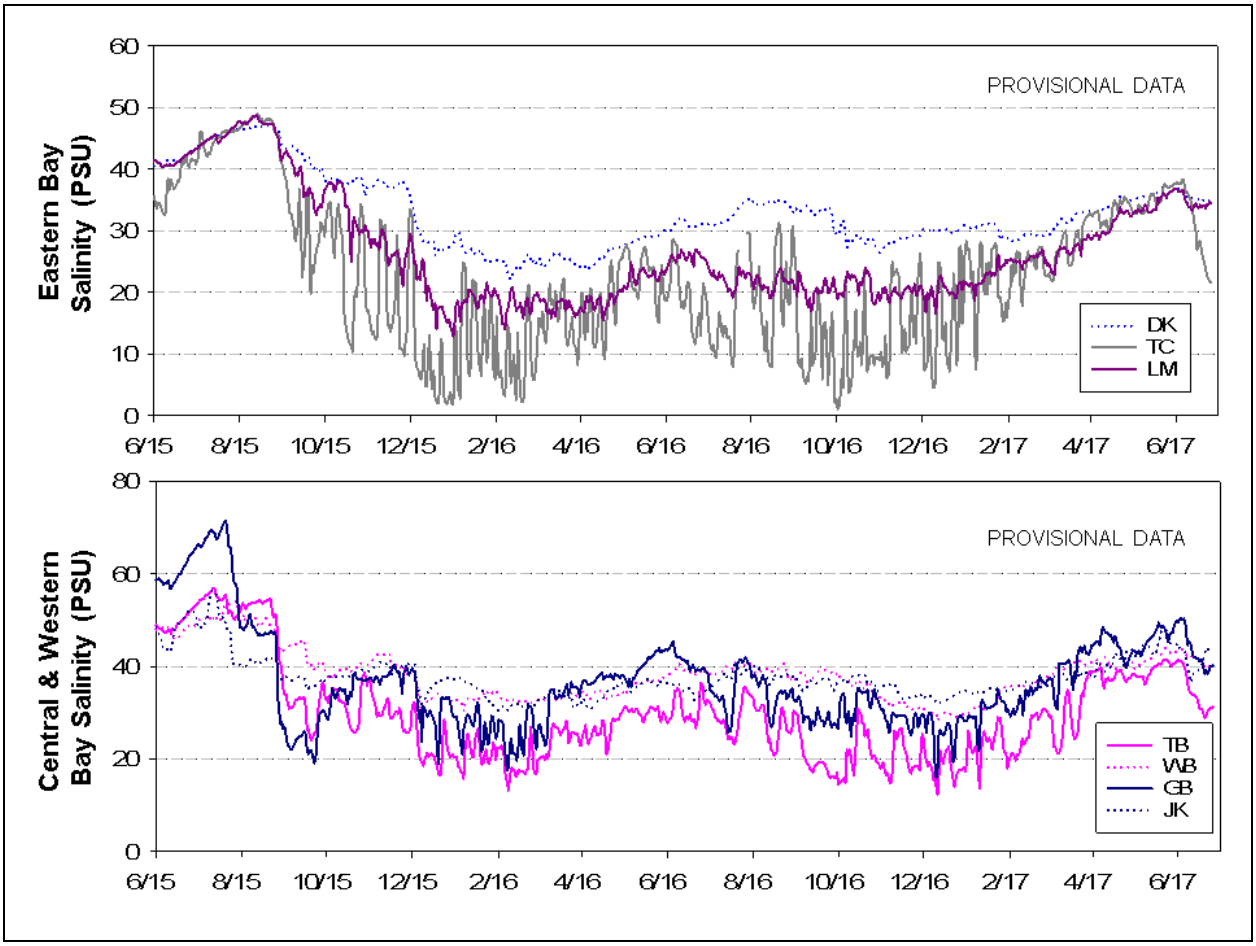
Wildlife update: Sparrows have been observed breeding in all subpopulations monitored. Presently, nests are active in subpopulations A, B and C. All study sites are now largely inundated.

There was a widespread multi-day rain event across the entire peninsula but local rainfall accumulation was not excessive. The eastern study sites received most of their rain on 7 June (1-2”). This was not nearly as much as was received in a band just north of ENP; up to 10-15 inches of rain fell in some areas.




Structures
Roads
Canals
Water Depth (ft)
(weekly change)
Salinity (psu)
(weekly change)
TSB
0.91'
(+0.10)
P37
0.50'
(+0.00)
EVER6
0.47'
(-0.07)
CP
1.45'
(+0.06)
TR
20.0
(-3.5)
TC
21.8
(-6.6)
LS
23.7
(-5.8)
GB
40.1
(-1.4)
TB
31.1
(+0.4)
34.7
(+0.6)
LM
35.1
(-0.1)
DK
BK
42.8
(+3.9)
WB
40.5
(-1.1)
JK
43.6
(+3.4)
N
W
E
S
0
2.75
5.5
11 Miles


Taylor Slough Water Depths
*note: calculated using ground surface elevation values (NAVD29) from EDEN
PROVISIONAL DATA
Taylor Slough
Water depth (ft.)*
4.0
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
-4.0
P37
EVER6
CP
TSB
6/15
8/15
10/15
12/15
2/16
4/16
6/16
8/16
10/16
12/16
2/17
4/17
6/17



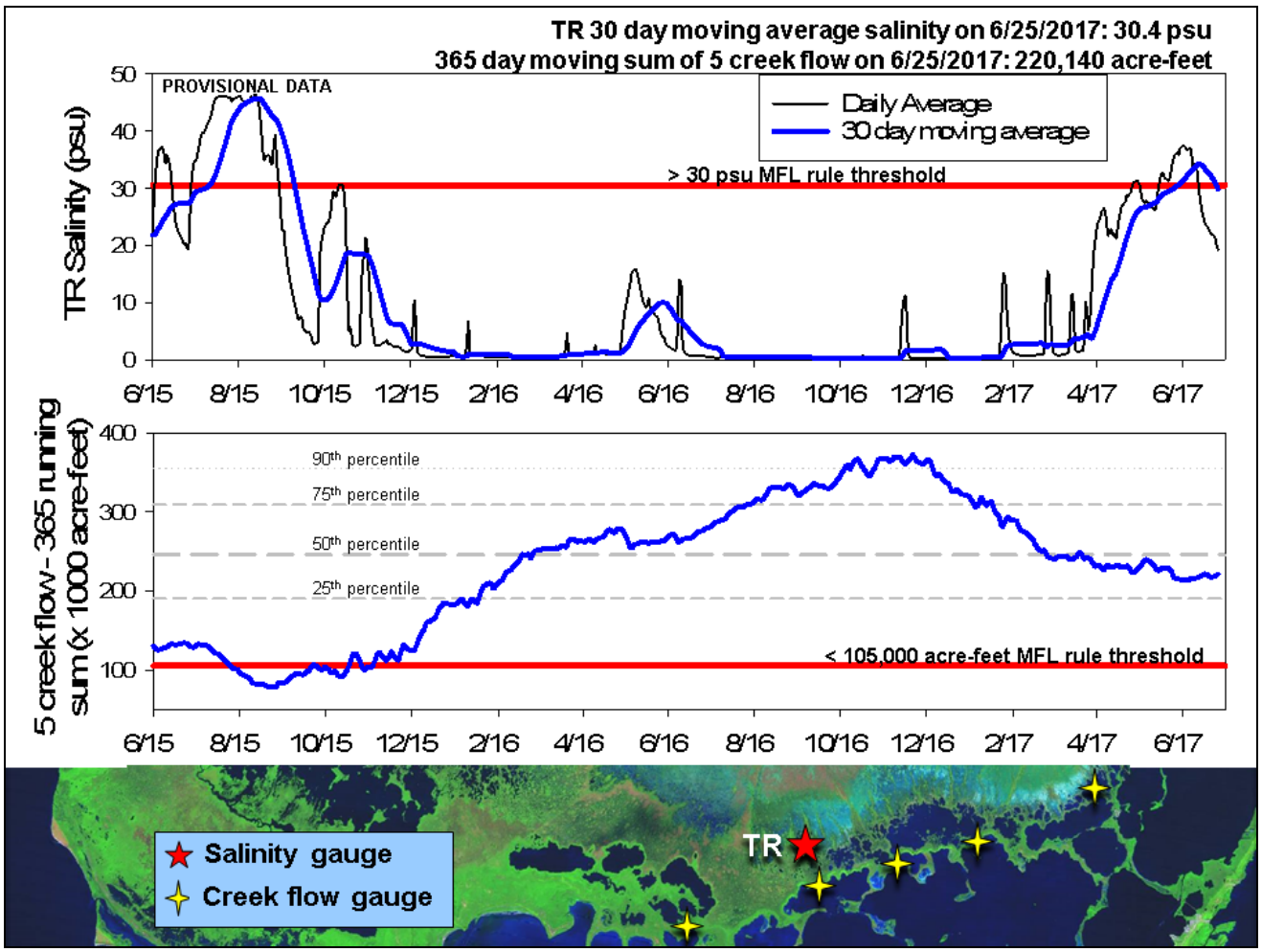
Taylor Slough stages: Less than an inch of rain fell within Taylor Slough and over Florida Bay this last week. Water level changes this past week ranged from −0.07 to +0.10 feet. All gauges measured at least 0.4 feet of water depth. Compared to historic averages, water levels are +3 inches above average.

Florida Bay salinity: Salinities changes in the Bay ranged from −7 in the eastern nearshore to +4 psu in the western Bay, and currently range from 22 psu in the eastern nearshore to 44 psu in the western Bay. This is up to 6 psu higher than the historic averages for the region.

Florida Bay MFL

As of 6/25/17, the 30-day moving average decreased by 2.6 PSU to end the week at 30.4 PSU, still above the Florida Bay MFL. However as of 6/27/17, the 30-day moving average salinity at the ENP Taylor River site declined to 29.8 PSU, officially under the 30 PSU threshold. It went above 30 PSU on 5/26 making the duration for this exceedance 31 days.

The cumulative weekly flow from the five creeks identified by the stars on the map was just over 6,700 acre-feet which is close to the historic average for this time of year. The 365-day moving sum of flow from the five creeks identified by stars on the map decreased to 220,144 acre-feet (600 acre-feet less than last week's and 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 flux should be moderated as possible in all the WCAs, as apple snail production can be negatively affected by rapid changes in water depth. Returning to a natural recession rate and limiting ascensions to .25feet/week will help to avoid drowning of apple snail egg clusters.

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 27th, 2017 (red is new)

Area	Current Condition	Cause(s)	Recommendation	Reasons
WCA-1	Stages decreased from -0.17' to -0.40'	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.
WCA-2A	Stages increased 0.09	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.
WCA-2B	Stages increased 0.10	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.
WCA-3A NE	Stages increased 0.47'	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.
WCA-3A NW	Stages decreased 0.02'	Rainfall, ET, management		
Central WCA-3A S	Stages increased 0.30'	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.
Southern WCA-3A S	Stages increased 0.28'	Rainfall, ET, management		
WCA-3B	Stages changed from +0.13' to -0.01	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.
ENP-SRS	Stages decreased 0.06'	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.
ENP-CSSS habitats	6 of the 7 sub-population habitats are outside of preferred range mean water depth for CSSS breeding season	Rainfall, ET, management	Follow rainfall plan for releases and current ERTP 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 forcasted conditions are conducive for continuation of a successful sparrow breeding season.
Taylor Slough	Stage changes ranged -0.07' to +0.10'	Rain, ET, inflows	Move water southward as possible	When available provide freshwater buffer for ecosystems and slow recession rates.
FB- Salinity	Salinity changes ranged -7 to +4 psu.	Rain, ET, inflows, wind	Move water southward as possible	When available provide freshwwater to buffer hypersalinity conditions.