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M E M O R A N D U M

TO: John Mitnik, Chief, Engineering and Construction Bureau
Paul Linton, Administrator, Water Control Operations Section

FROM: SFWMD Staff Environmental Advisory Team

DATE: April 25, 2017

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

Some shower activity returning this weekend. A cold front has pushed through the area and high pressure is bringing dry conditions to the District which should continue through Wednesday. Some spotty shower activity will return Thursday and then widely scattered to scattered shower activity will pop up during the afternoons Friday and Saturday. A cold front is forecast to move into the District and stall next week and this system has the potential to increase daily shower activity.

Kissimmee

On Sunday, stage was 0.7 feet below regulation schedule in East Lake Toho and Lake Toho, and 1.3 feet below schedule in Kissimmee-Cypress-Hatchineha (KCH). Over the past week, discharge at S65, S65A, and S65E averaged 330, 248, and 267 cfs, respectively. Tuesday morning discharges were ~290 cfs, 193 cfs, and 256 cfs, respectively at S65, S65A, and S65E. Dissolved oxygen data in the Kissimmee River averaged 7.8 mg/L for the week (manual sondes at PC33 and PC62). Kissimmee River mean floodplain depth on Sunday was 0.06 feet. Recommendations: Reduce discharge at S65/S65A by 50 cfs to reduce rate of stage decline in KCH.

Lake Okeechobee

As of midnight April 23, 2017, Lake stage was 11.78 feet NGVD and in the Beneficial Use sub-band. The current weekly recession rate of 0.18 feet equates to a projected monthly recession rate of 0.72 feet which is well above the recommended 0.50 feet per month or lower guideline. The rain event over the weekend may have slowed the recession rate, however, it still remains too high and has been suboptimal for the past two months. Most of the marsh is now dry and much of Moonshine Bay, critical bird nesting and foraging habitat, is approaching dryness as well. For the remainder of the dry season, efforts should be made to limit the amount of water discharged from the Lake in an attempt to keep wading bird and snail kite foraging and nesting locations hydrated. The goal should be to slow the current recession rate and maintain it at below 0.50 feet per month. Thus far this snail kite nesting season there have been a total of 39 nests recorded on the Lake, thirteen of which are still active and eighteen have been deemed successful.

Estuaries

Total discharge to the St. Lucie estuary averaged 426 cfs over the past week with 0 cfs (0%) coming from Lake Okeechobee as the USACE has stopped flow through the S-80 structure for the foreseeable future. Salinities throughout the estuary were about the same as last week. The seven-day average salinity at the US1 Bridge remains in the fair range for adult oysters. Total inflow to the Caloosahatchee estuary averaged 457 cfs over the past week with 199 cfs (44%) coming from the Lake. The 30-day average surface salinity at the Ft. Myers monitoring station is 12.8 and has been above 10 for 28

consecutive days. The 30-day average surface salinity at Val I-75 is 5.8. Salinity conditions between Val I-75 and Ft. Myers are deteriorating for tape grass. Salinity conditions are in the good range for adult oysters at the Cape Coral Bridge, in the fair range at Shellpoint, and in the poor range at the Sanibel Causeway. The 30-day moving average salinity at the I-75 Bridge is forecast to be 9.5 in the next two weeks if no flow comes through the S-79 structure, and the daily salinity is forecast to reach 13.1.

Stormwater Treatment Areas

Over the past week, the STAs/FEBs received approximately 10,200 acre-feet of Lake releases. The total amount of Lake releases sent to the STAs/FEBs in WY2017 (since May 1, 2016) is approximately 241,900 acre-feet. Most STA cells are at or near target depths, except STA-5/6 emergent aquatic vegetation cells which are drying out. Operational restrictions are in place for structure repairs and vegetation rehabilitation in STA-1E. In addition, nests of MBTA-protected species have been observed in STA-1E. This week, if Lake releases are sent to the WCAs and the conditions allow, releases will be sent to STA-2 and STA-3/4.

Everglades

Heavy rainfall Sunday night focused on the northern part of the Everglades provided a reversal, the effects of which on wading bird nesting is unknown at this point, it may prove beneficial in prolonging suitable foraging conditions for wading birds or trigger nest abandonment. In Florida Bay mangrove zone salinities continue to rise. The daily average salinity at TR increased 4 psu, ending the week at 28 psu. The 30-day moving average increased 5.7 to end the week at 21.9 psu.

Supporting Information

KESSIMMEE BASIN

Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 0.03 inches of rainfall in the past week and the Lower Basin received 0.08 inches (SFWMD Daily Rainfall Report 04/24/2017).

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: 4/25/2017

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)						
							4/23/17	4/16/17	4/9/17	4/2/17	3/26/17	3/19/17	3/12/17
Lakes Hart and Mary Jane	S62	0	LKMJ	59.9	R	60.3	-0.4	-0.4	-0.3	-0.4	-0.4	-0.4	-0.4
Lakes Myrtle, Preston, and Joel	S57	0	S57	60.3	R	60.4	-0.1	-0.1	-0.1	-0.1	0.0	0.0	0.0
Alligator Chain	S60	0	ALLI	62.5	R	63.0	-0.5	-0.6	-0.7	-0.8	-0.8	-0.9	-0.9
Lake Gentry	S63	3	LKGT	60.5	R	60.5	0.0	-0.1	-0.2	-0.3	-0.3	-0.4	-0.4
East Lake Toho	S59	0	TOHOE	55.8	R	56.5	-0.7	-0.9	-1.0	-1.0	-1.2	-1.3	-1.2
Lake Toho	S61	72	TOHOW, S61	52.8	R	53.5	-0.7	-0.8	-1.0	-1.1	-1.2	-1.3	-1.2
Lakes Kissimmee, Cypress, and Hatchineha	S65	330	LKISSP, KUB011, LKIS5B	49.0	R	50.3	-1.3	-1.3	-1.3	-1.5	-1.4	-1.3	-1.0

* 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: 4/25/2017

Metric	Location	Sunday's 1-day average	Weekly Average**									
			4/23/17	4/16/17	4/9/17	4/2/17	3/26/17	3/19/17	3/12/17	3/5/17	2/26/17	2/19/17
Discharge (cfs)	S-65	324	330	344	292	361	626	885	899	877	732	710
Discharge (cfs)	S-65A	242	248	262	270	277	461	681	705	682	569	550
Discharge (cfs)	S-65D****	287	286	297	288	359	679	791	685	721	688	540
Discharge (cfs)	S-65E****	271	267	282	297	372	723	855	737	769	744	597
DO concentration (mg/L)***	Phase I river channel	7.3	7.8	8.1	7.7	7.8	8.9	8.8	8.4	8.0	7.7	8.3
Mean depth (feet)*	Phase I floodplain	0.06	0.06	0.06	0.06	0.06	0.11	0.17	0.12	0.07	0.07	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
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	
12/2/2016-1/3/2017	Reduce discharge at S65 to minimum (300 cfs +/- 50 cfs) using the table in Figure 8a. Continue reducing headwater stage at S65C at a rate of ~1 ft/week through mid-January per request from USACE.	To facilitate KRRP construction in Pool BC.	Implemented	USACE/WCO/KB Ops
12/20/2016	No new recommendations.		N/A	
12/13/2016	No new recommendations.		N/A	
12/6/2016	No new recommendations.		N/A	
11/29/2016	No new recommendations.		N/A	
11/22/2016	No new recommendations.		N/A	
11/15/2016	No new recommendations.		N/A	
11/8/2016	No new recommendations.		N/A	

KCOL Hydrographs (through Sunday midnight)

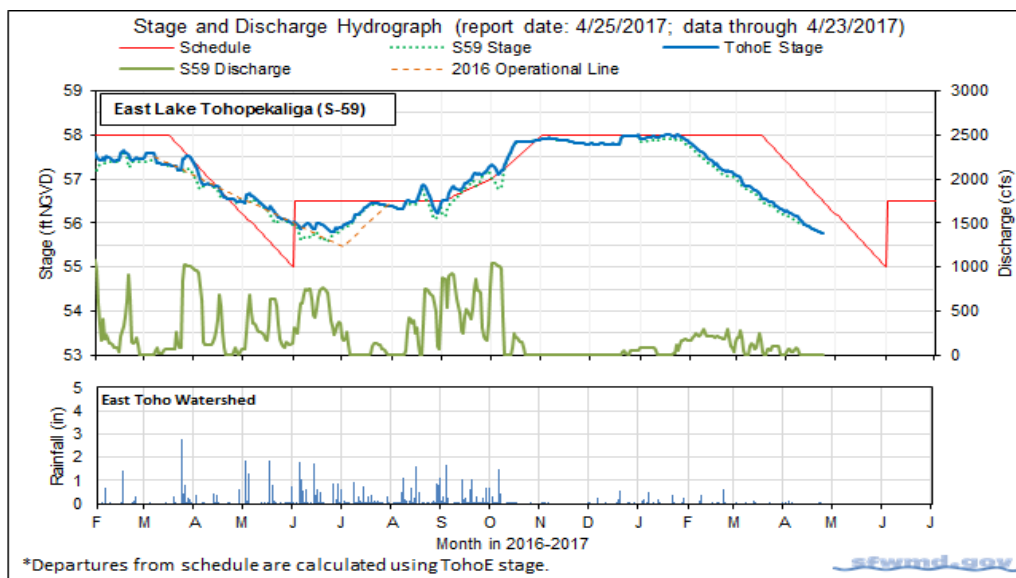


Figure 1.

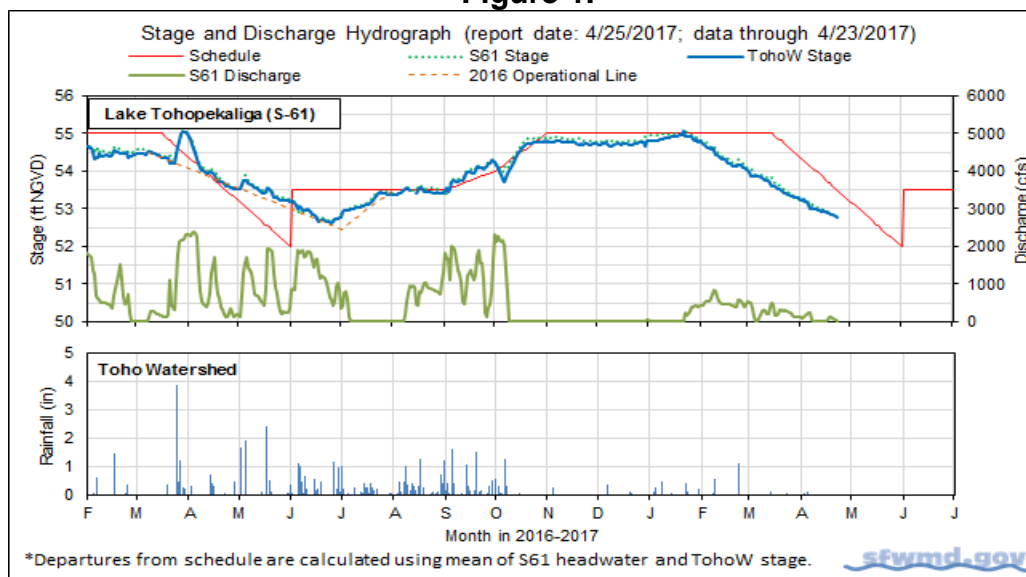


Figure 2.

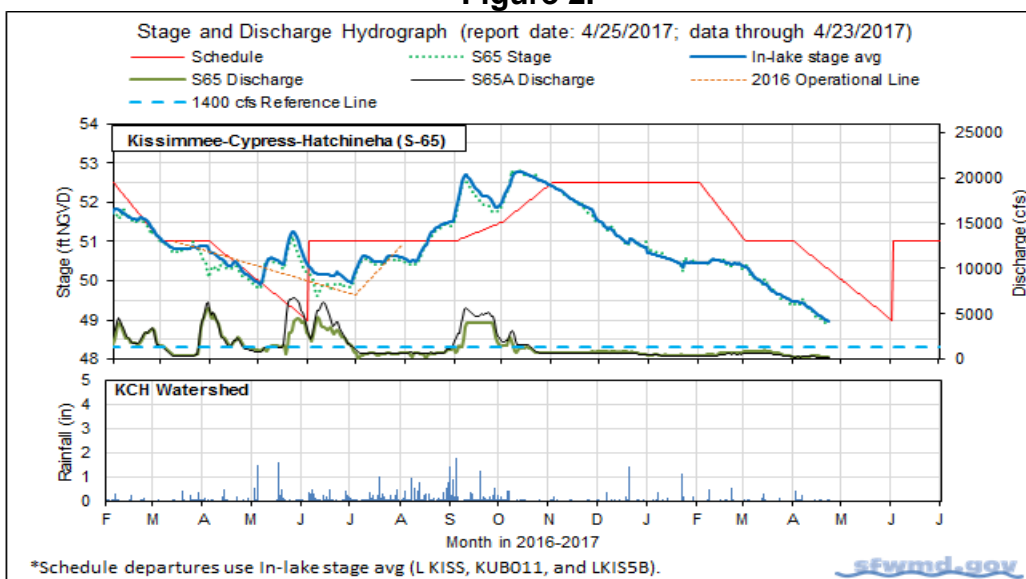


Figure 3.

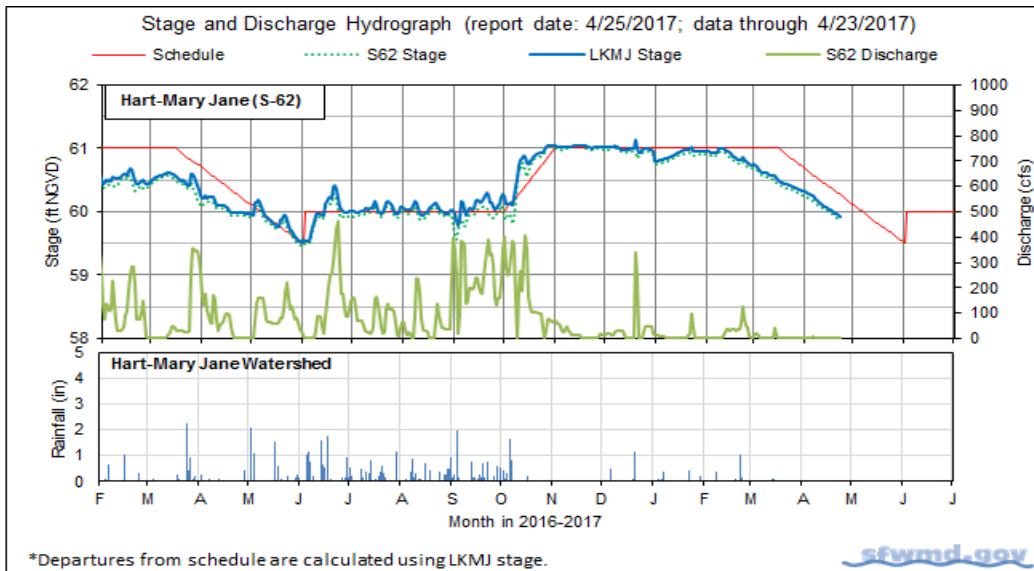


Figure 4.

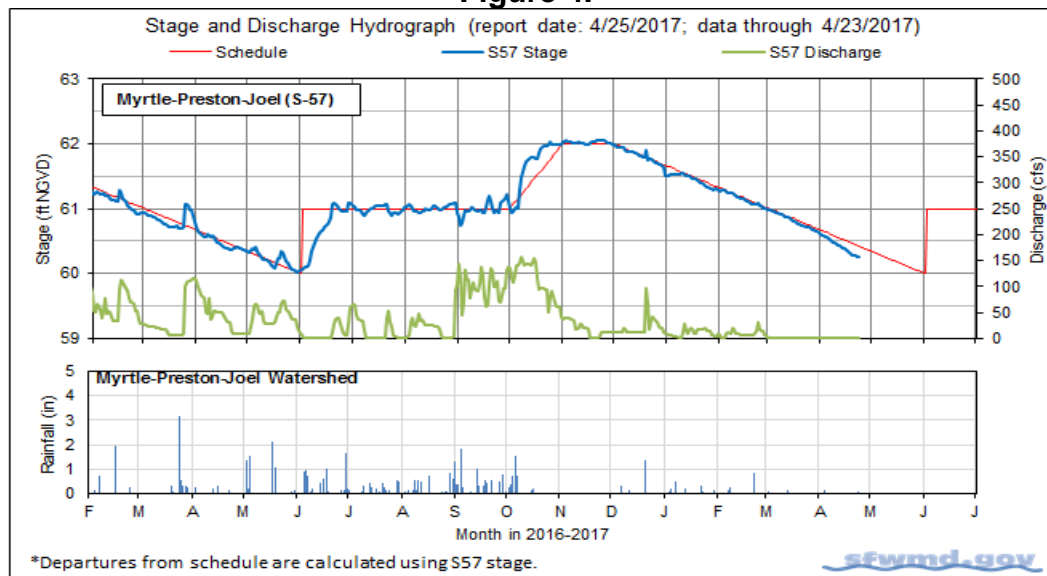


Figure 5.

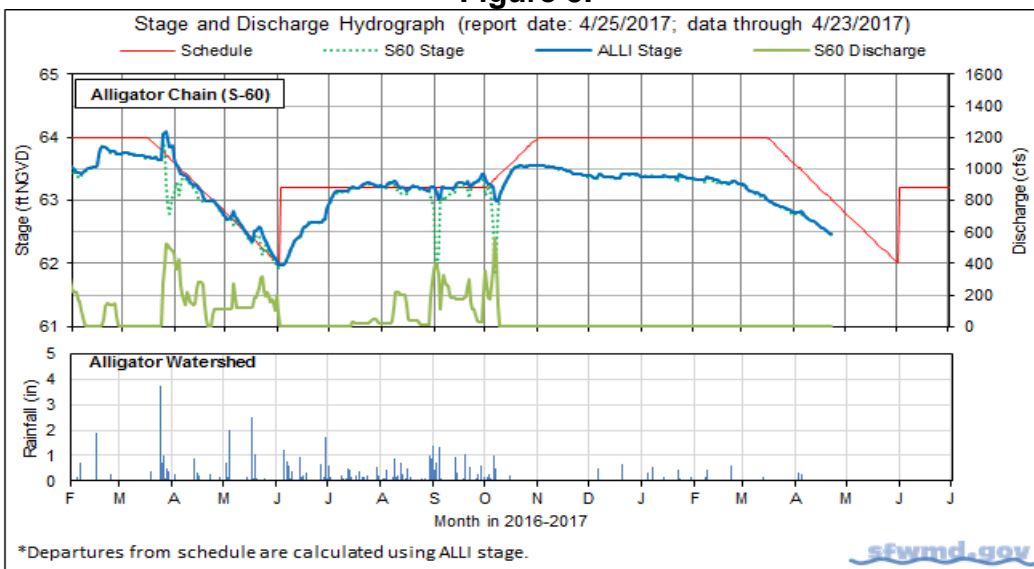


Figure 6.

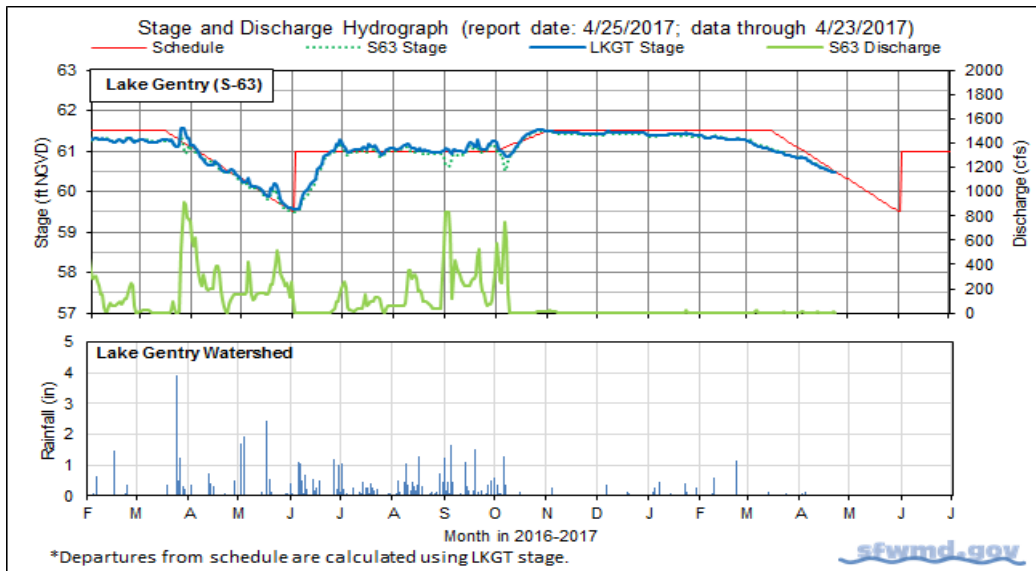


Figure 7.

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

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

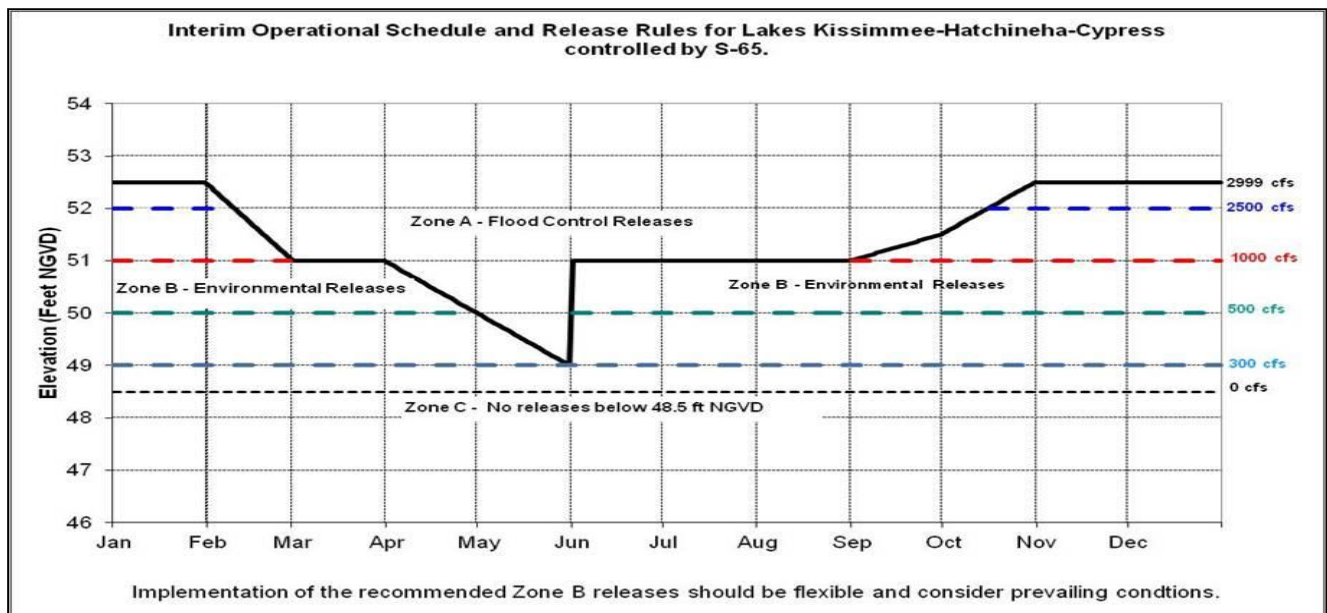


Figure 9. Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years or in Wet Season 2015.

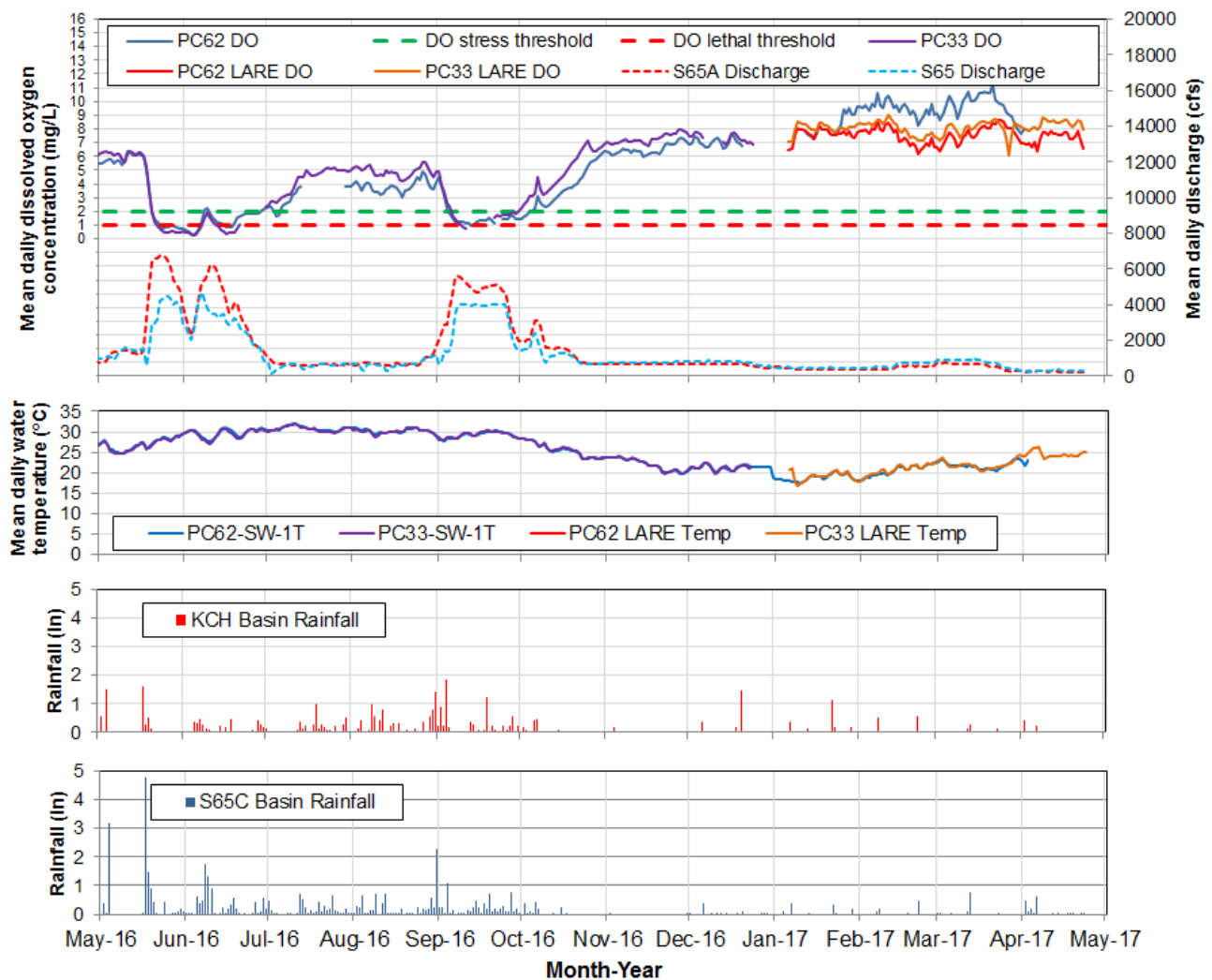


Figure 10. Mean daily Dissolved Oxygen, discharge, temperature and rainfall in the Phase I river channel.

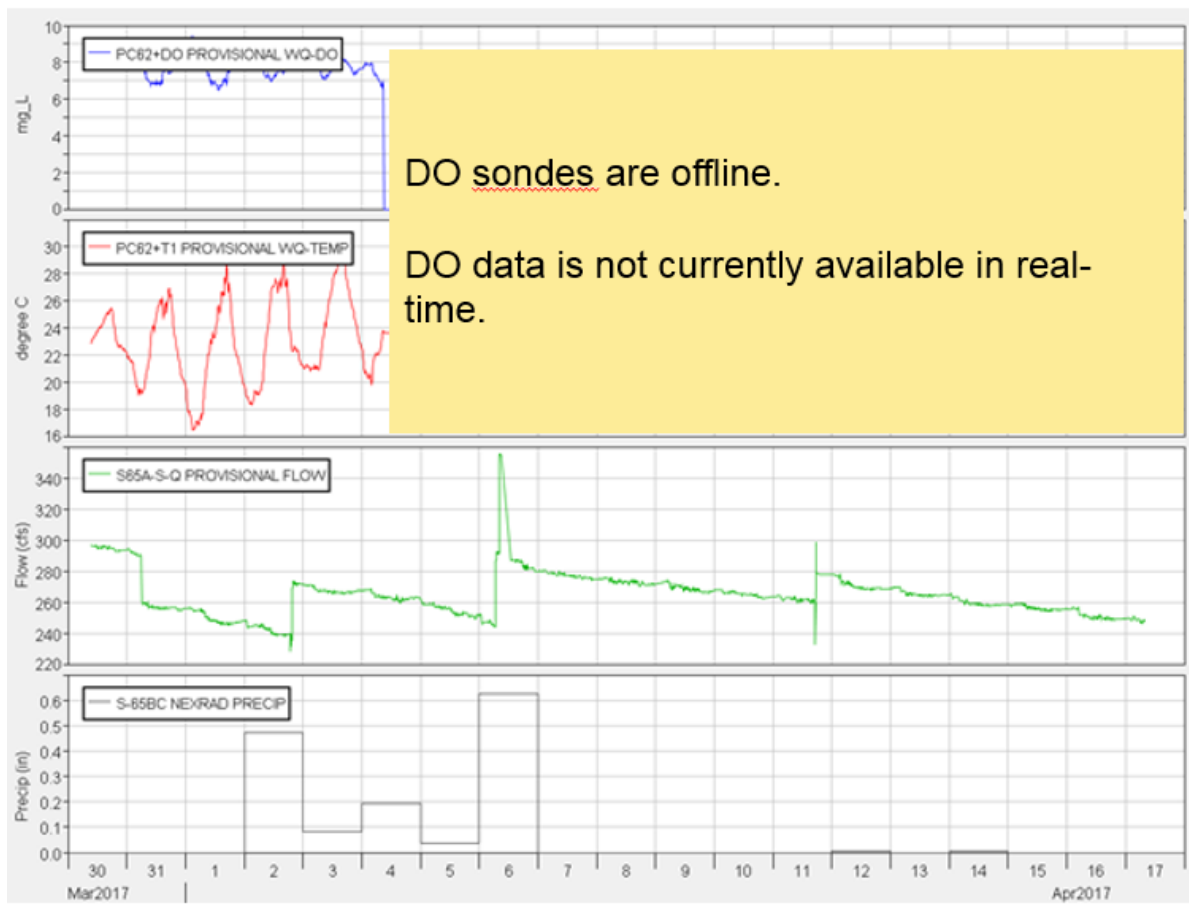


Figure 11. Phase I river channel dissolved oxygen and water temperature (measured at 15 minute intervals) and Pool BC daily rainfall.

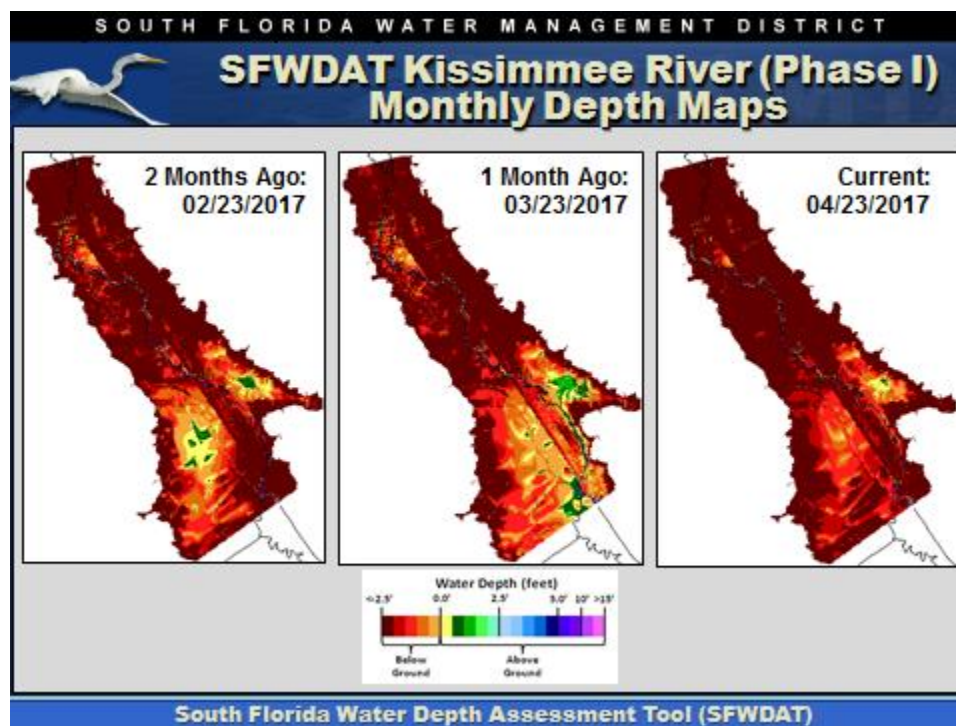
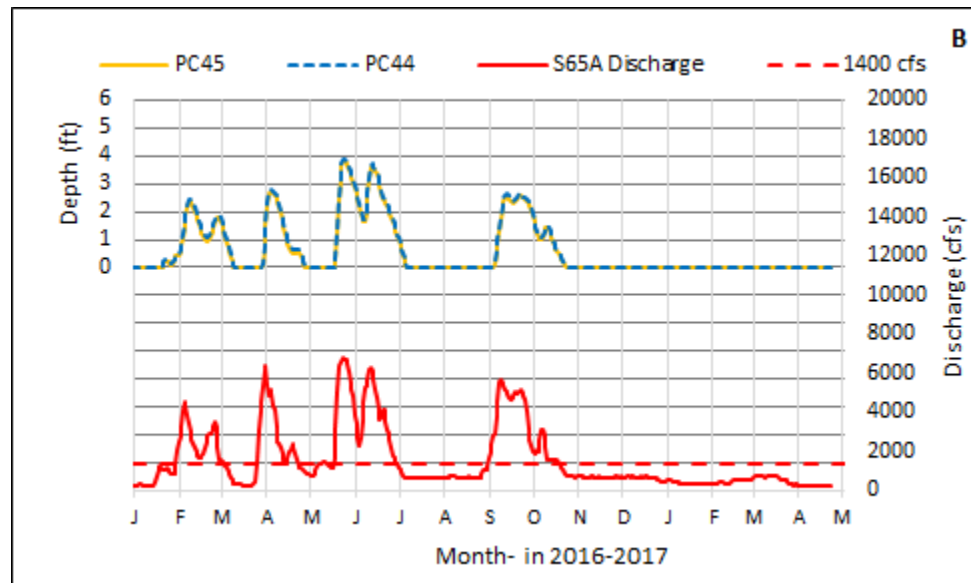
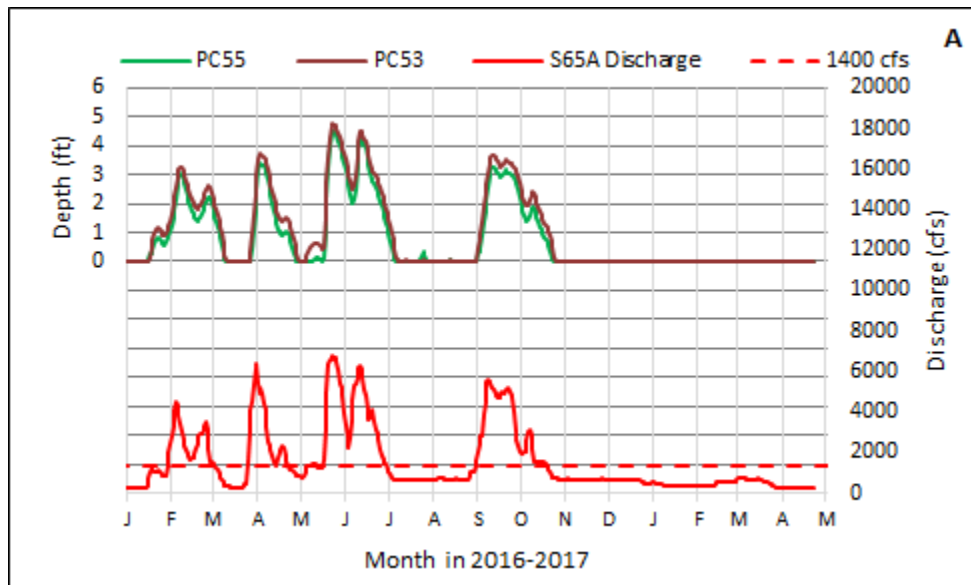


Figure 12. Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to Jan. 16, 2012.



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

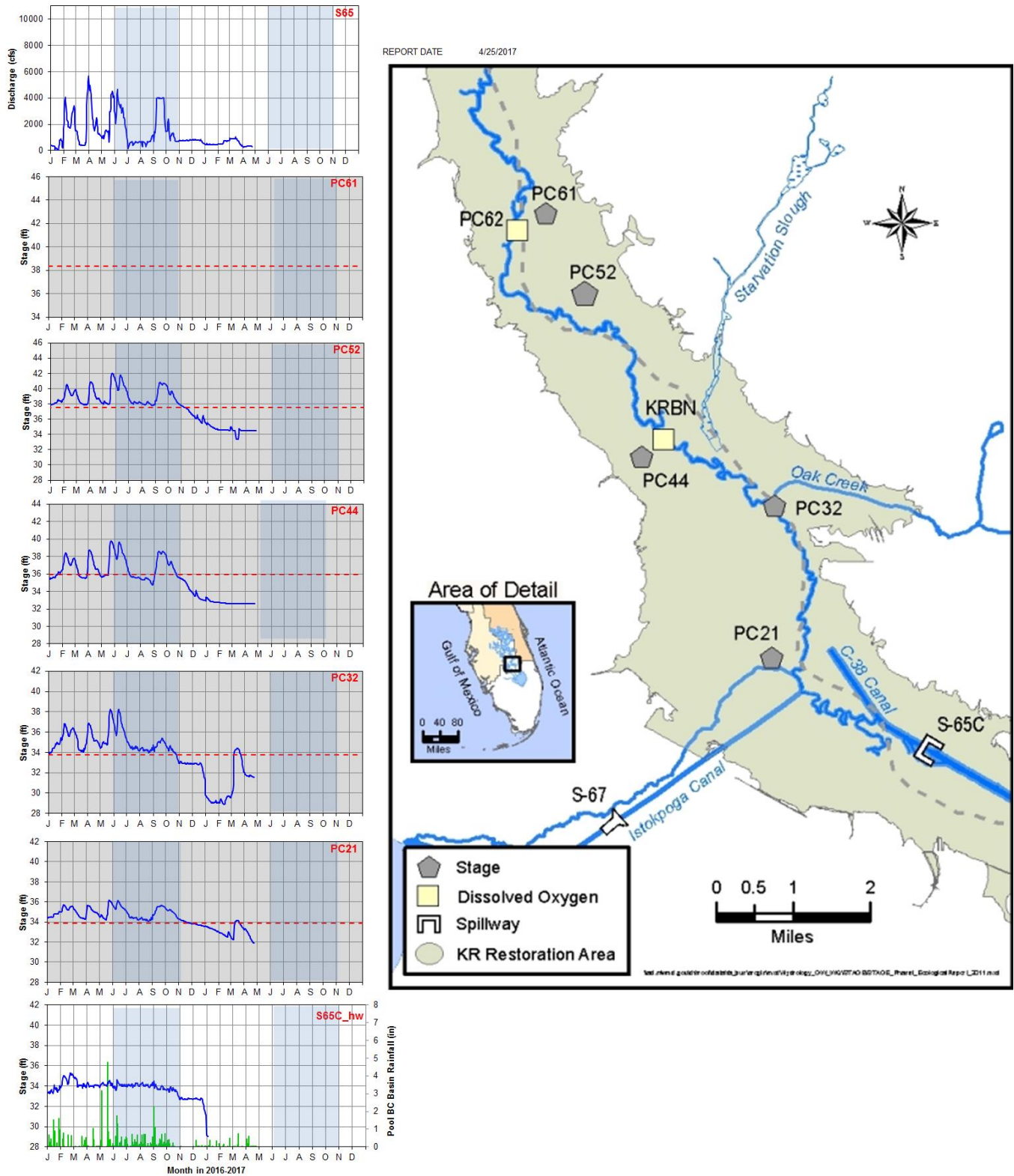


Figure 13. Discharge at S65, stages at five monitoring stations in the Phase I area of the Kissimmee River floodplain, and headwater stage at S65-C since January 1, 2015. The most recent data (~2 weeks) are provisional real-time data from SFWMD DualTrend; previous data are from SFWMD DB-HYDRO (validated).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



Figure 14. The Kissimmee Basin

LAKE OKEECHOBEE

According to the USACE web site, Lake Okeechobee stage is at 11.78 feet NGVD for the period ending at midnight on April 23, 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 decreased by 0.18 feet over the past week and is 0.95 feet lower than it was a month ago and 2.73 feet lower than it was a year ago (Figure 1). The Lake is currently in the Beneficial Use sub-band (Figure 2). According to RAINДАР, 0.83 inches of rain fell directly over the Lake during the past seven days (Figure 3). The Kissimmee Valley received less rainfall while most of the east coast received greater amounts of rainfall.

Based on USACE reported values, current Lake inflow is approximately 271 cfs as detailed below.

Structure	Flow cfs
S65E	0
S65EX1	271
S154	0
S84 & 84X	0
S71	0
S72	0
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	0
S2 Pumps	0
S3 Pumps	0
S4 Pumps	0

Current Lake outflow is approximately 2,173 cfs with 965 cfs exiting at S77, 624 cfs exiting at S308 and 699 cfs being directed south through S351, S352 and S354. Approximately 116 cfs is entering the Lake from the L8 canal through Culvert 10A. Corrected evapotranspiration value based on the L006 weather platform solar radiation data for this past week increased from 3,299 cfs last week to 3,472 cfs.

Change in elevation equivalents and average weekly flows (midnight April 17, 2017 to midnight April 23, 2017) for major structures are presented in Figure 4.

Based on the Lake Okeechobee wading bird habitat suitability index, there are currently approximately 23,261 acres of suitable foraging habitat for long-legged birds and 9,877 acres for long and short-legged birds on the Lake (Figure 5). Most of the marsh is now dry and much of Moonshine Bay is approaching dryness as well.

During the most recent Lake Okeechobee snail kite survey the Fish and Wildlife Commission reported three new snail kite nests, all in the Moonshine Bay treatment area (Figure 6). This brings the total nests recorded thus far this season to thirty-nine. Of the thirty-nine nests, thirteen are currently active,

eighteen have been deemed successful and eight have failed. Water depths under the nests range from 0 cm to less than 0.20 cm with many nests measuring zero. A significantly slower recession rate is needed to keep wading bird and snail kite foraging areas hydrated and to help maintain water levels under nests thereby reducing the risk of predation by raccoons and other animals.

The most recent imagery from the OLCI sensor (April 19 and April 22, 2017) indicates the algal bloom potential may be increasing, especially along the western and northwestern nearshore regions (Figure 7). However, during today's emergent vegetation survey flight, District staff reported turbid water but no visual blooms in the western Fisheating Bay as the imagery suggests. This new, more sensitive sensor may be overestimating the intensity of algal bloom potential indicating additional validation of the data is needed.

Water Management Recommendations

Lake stage is 11.78 feet NGVD and is in the Beneficial Use sub-band. The current weekly recession rate of 0.18 feet equates to a projected monthly recession rate of 0.72 feet which is well above the recommended 0.50 feet or less per month guideline. The rain event over the weekend may have slowed the recession rate, however, it still remains too high and has been suboptimal for the past two months. For the remainder of the dry season, efforts should be made to limit the amount of water discharged from the Lake in an attempt to keep wading bird and snail kite foraging and nesting locations hydrated.

The goal should be to slow the monthly recession rate to less than 0.50 feet per month. Actions which contribute to a slower recession are essential to protect critical components of the Lake's floral (bulrush and submerged aquatic vegetation) and faunal (wading birds, snail kites, apple snails and fish) communities.

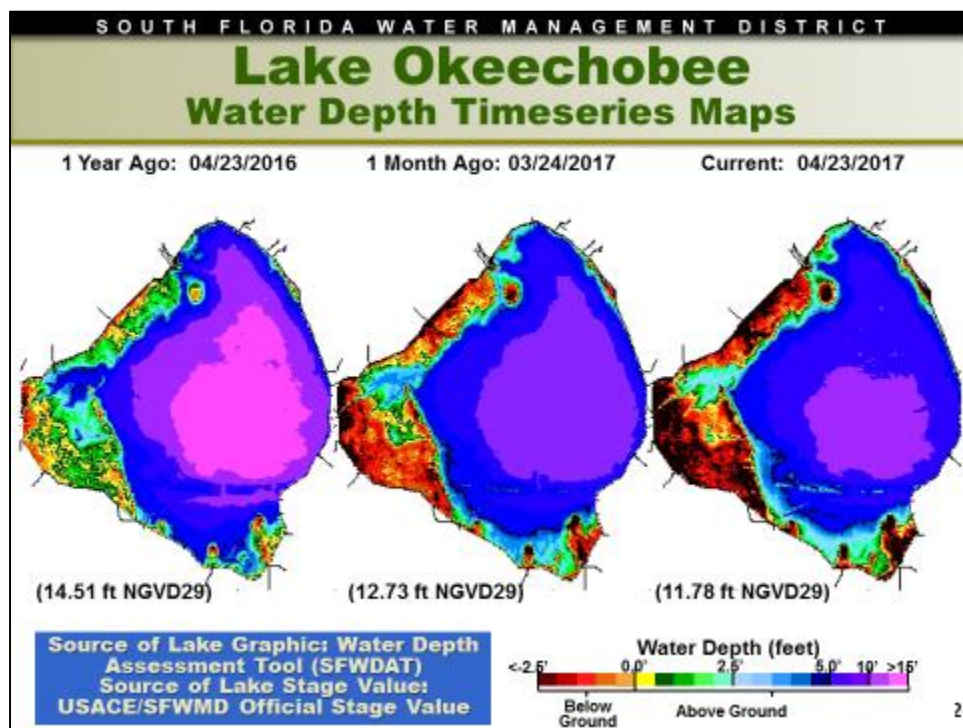


Figure 1

Weekly Stage Hydrograph

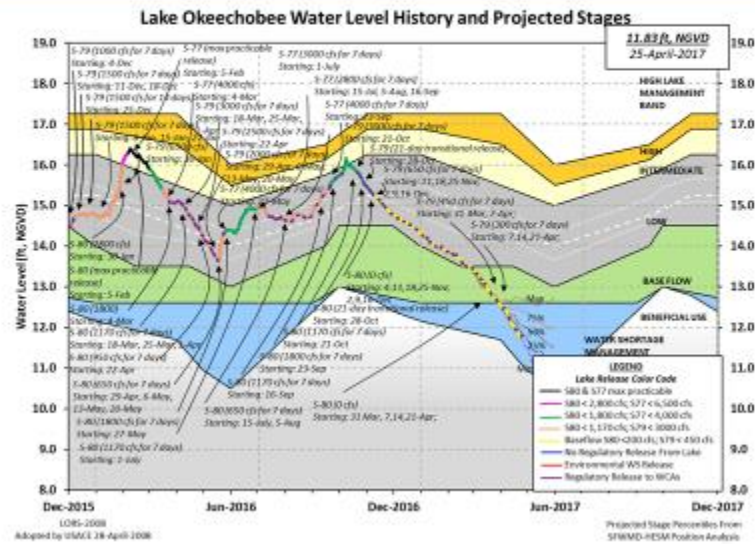


Figure 2

SFWMD PROVISIONAL RAINDAR 7-DAY BASIN RAINFALL ESTIMATES

FROM: 0815 EST, 04/17/2017

THROUGH: 0815 EST, 04/24/2017

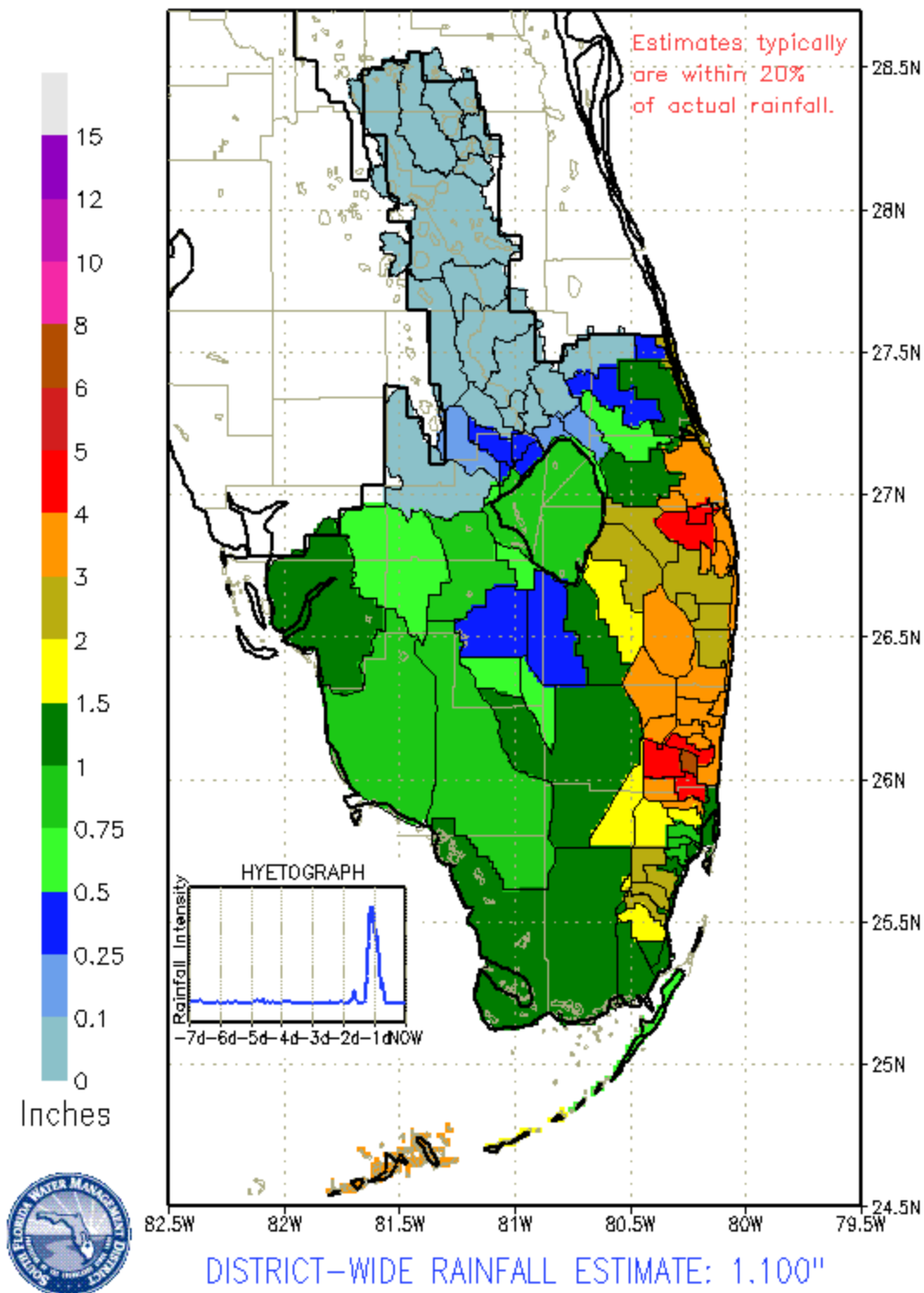


Figure 3

INFLOWS	Average Daily Flow Past Week cfs	Feet of Change Past Week
S65E & S65EX1	265	0.010
S71 & 72	0	0.000
S84 & 84X	0	0.000
Fisheating Creek	22	0.001
Rainfall	N.A.	0.069
OUTFLOWS	Average Daily Flow Past Week cfs	Feet of Change Past Week
S77	753	0.029
S308	193	0.008
S351	1352	0.053
S352	723	0.028
S354	756	0.030
L8	-67	-0.003
ET	3472	0.136

Figure 4

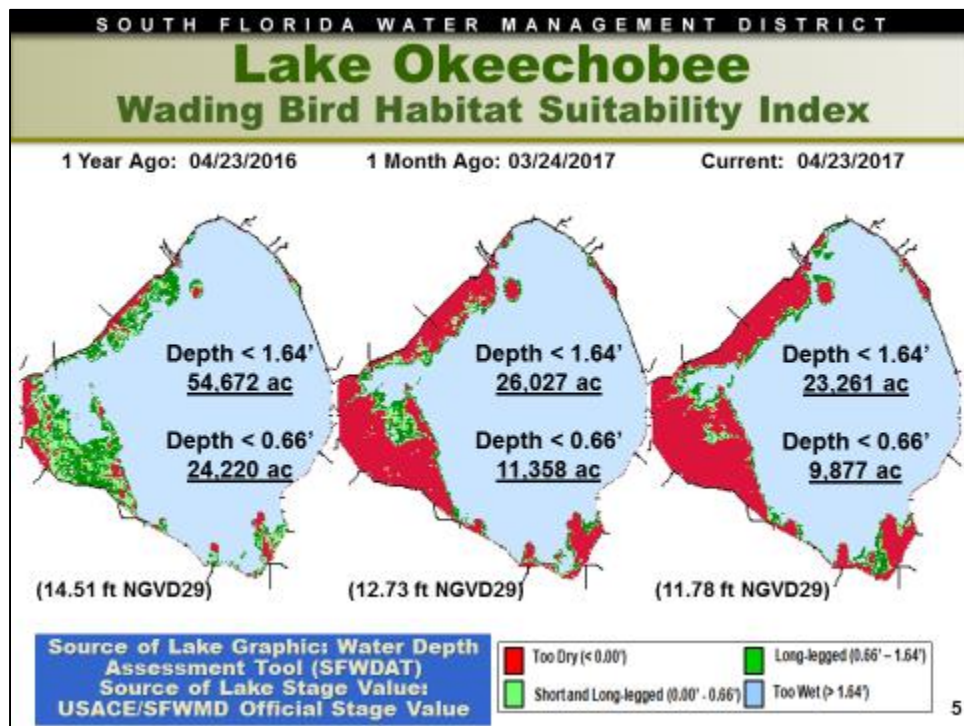


Figure 5



Figure 6

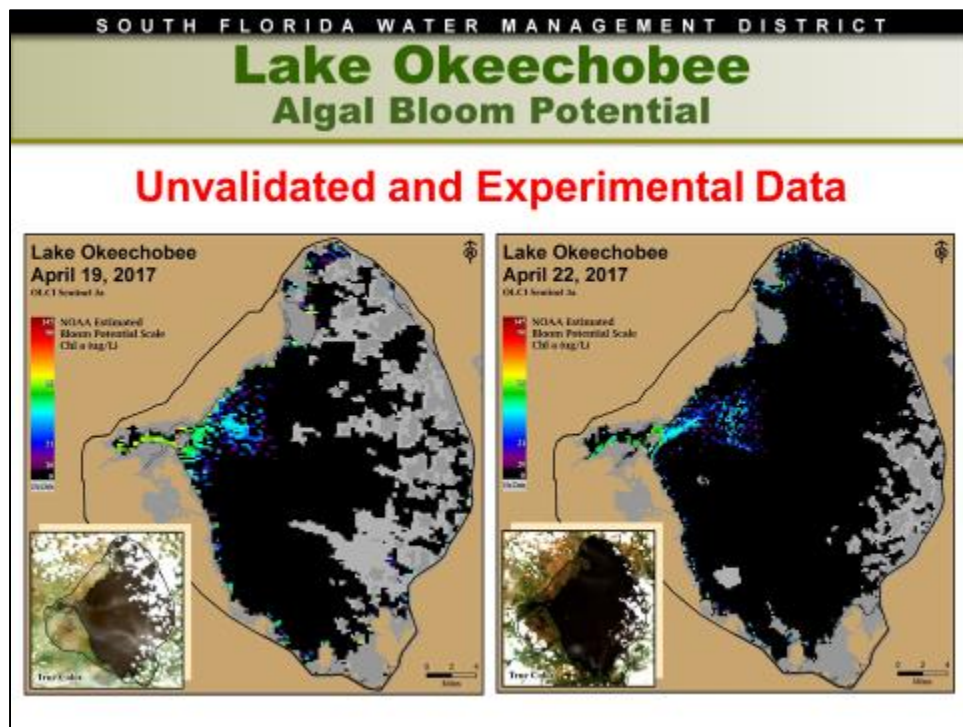


Figure 7

Lake Istokpoga

The annual recession from high pool to low pool stage on Lake Istokpoga continues. Stage is 38.14 feet NGVD as of April 23, 2017 and is currently 0.91 feet below its regulation schedule of 39.05 feet NGVD (Figure 8). Average flows into the Lake from Arbuckle and Josephine creeks were 1 cfs and 6 cfs respectively, similar to last week's total flow. Average discharge from S68 and S68X this past week was 87 cfs, an increase from the previous week's flow of 74 cfs. According to RAINДАР, 0.02 inches

of rain fell in the Lake Istokpoga watershed during the past seven days. There are currently nine active snail kite nests on the Lake (Figure 9).

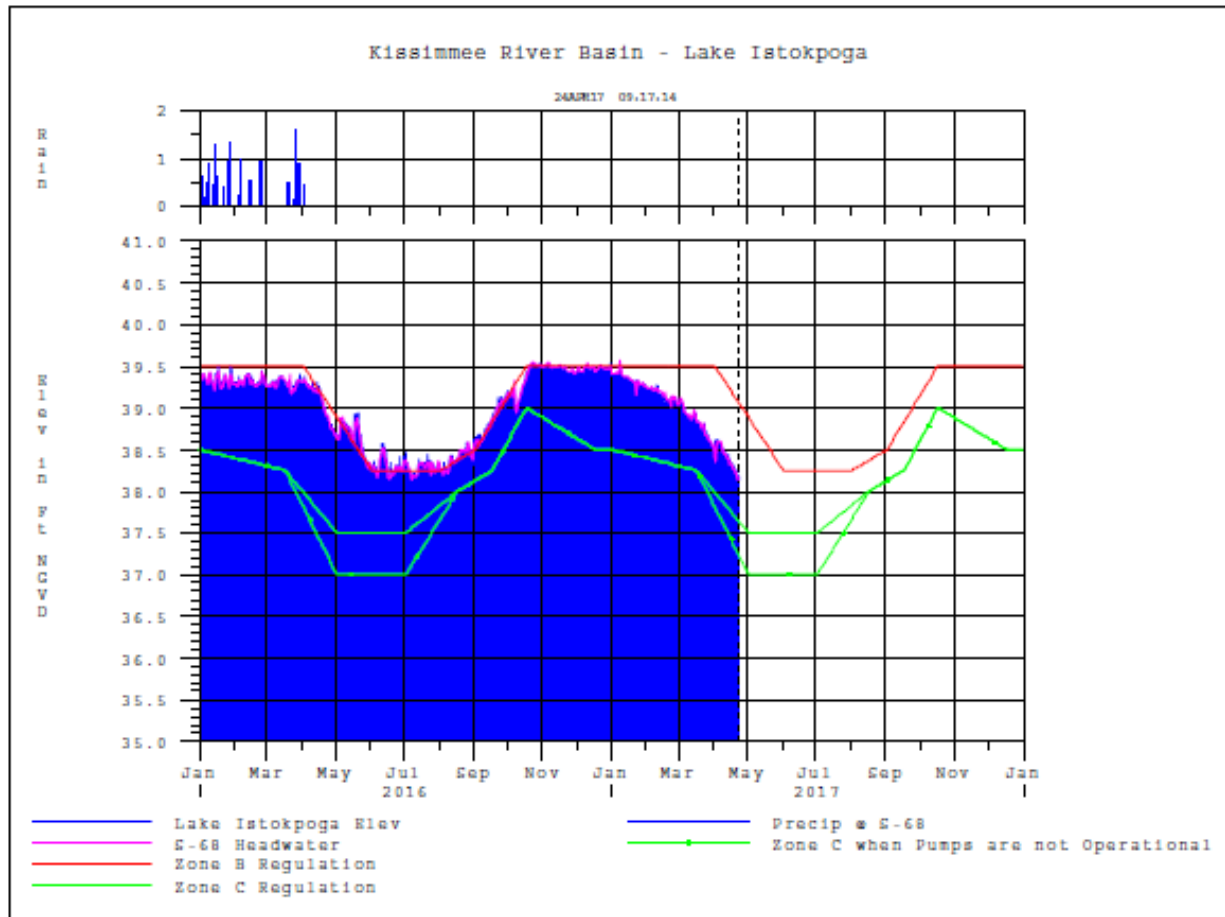


Figure 8



Figure 9

ESTUARIES

St. Lucie Estuary

Over the past week, provisional flows averaged about 0 cfs at S-80, 136 cfs downstream of S-308 (gates closed, lock open during the day and closed at night), 0 cfs at S-49 on C-24, 0 cfs at S-97 on C-23, and 40 cfs from Ten Mile Creek at the Gordy Road Structure. Average inflow from tidal basin tributaries is estimated to be 386 cfs (Figures 1 and 2). Total inflow averaged about 426 cfs last week and 179 cfs over last month.

Over the past week, salinity remained about the same 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 28.9. Salinity conditions in the middle estuary are in the fair 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)	26.6 (27.0)	27.7 (27.9)	NA ¹
US1 Bridge	28.7 (28.7)	29.1 (29.0)	10.0-26.0
A1A Bridge	34.0 (33.9)	34.4 (34.4)	NA

¹Envelope not applicable

Caloosahatchee Estuary

During the past week, provisional flows averaged approximately 676 cfs at S-77, 256 cfs at S-78, and 324 cfs at S-79. Average inflow from tidal basin tributaries is estimated to be 133 cfs (Figures 5 and 6). Total inflow averaged 457 cfs last week and 594 cfs over last month.

Over the past week, salinity increased 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, within the fair range at Shell Point, and likely within the poor range at Sanibel (Figure 9). The 30-day moving average surface salinity is 5.8 at Val I-75 and 12.8 at Ft. Myers. The 30-day moving average salinity at Ft. Myers has been above 10 for 28 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 be 9.5 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)	10.1 (5.0)	10.6 (5.3)	NA ¹
*Val I75	10.6 (5.3)	13.3 (8.5)	0.0-5.0 ²
Ft. Myers Yacht Basin	16.0 (12.4)	18.4 (15.6)	NA
Cape Coral	21.3 (20.8)	24.3 (23.0)	10.0-30.0
Shell Point	31.4 (31.3)	31.9 (32.5)	10.0-30.0
Sanibel	34.9 (34.7)	EM ³ (EM)	10.0-30.0

¹Envelope not applicable, ²Envelope is based on a 30-day average, ³Equipment Malfunction.

*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)	4.25 – 9.92	2.36 – 7.25	1.35 – 3.96
Dissolved Oxygen (mg/l)	3.71 – 7.13	4.78 – 6.69	No Data

The Florida Fish and Wildlife Research Institute reported on April 21, 2017, that *Karenia brevis*, the Florida red tide organism, was observed in background to very low concentrations in six samples collected from Lee County.

Water Management Recommendations

The 30-day average salinity at the I-75 Bridge is forecast to exceed 5 with no inflow at S-79, and the daily salinity is forecast to reach 13.1 within two weeks. Lake stage is in the Beneficial Use sub-band of 2008 LORS. The 2008 LORS/Adaptive Protocols recommend up to 300 cfs at S-79 with flow from Lake Okeechobee supplementing as needed. However, a release greater than 650 cfs is forecast to be required to achieve a 30-day average salinity below 5 at the I-75 Bridge.

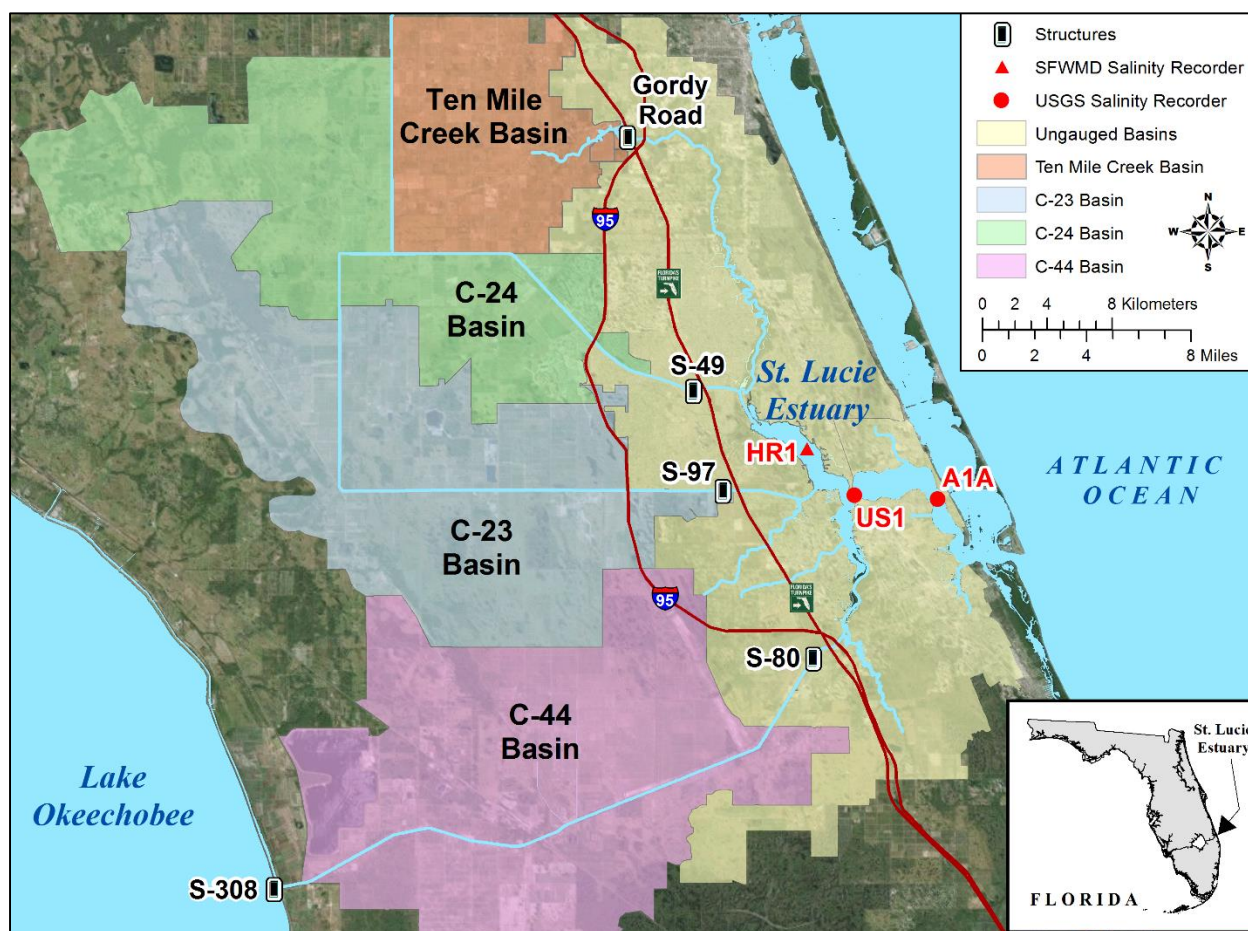


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

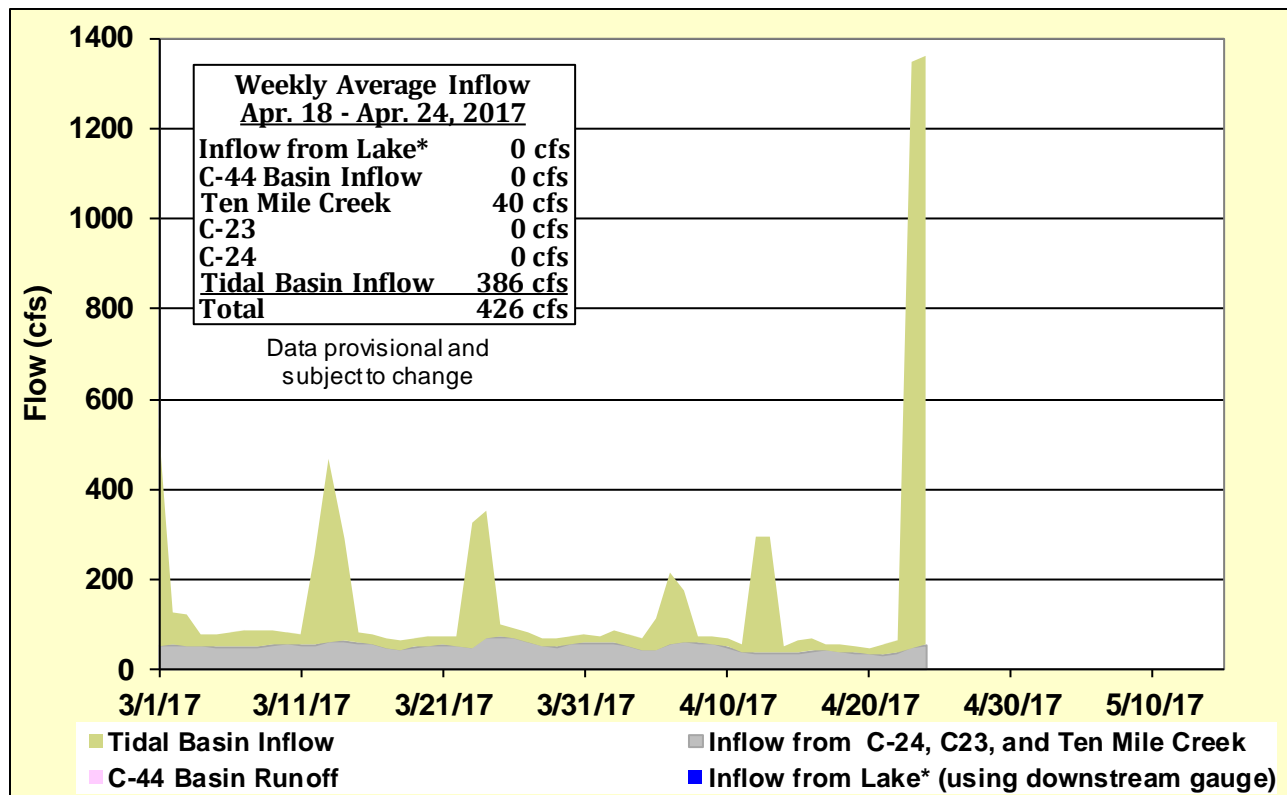


Figure 2. Estimated surface freshwater inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basins into the St. Lucie Estuary.

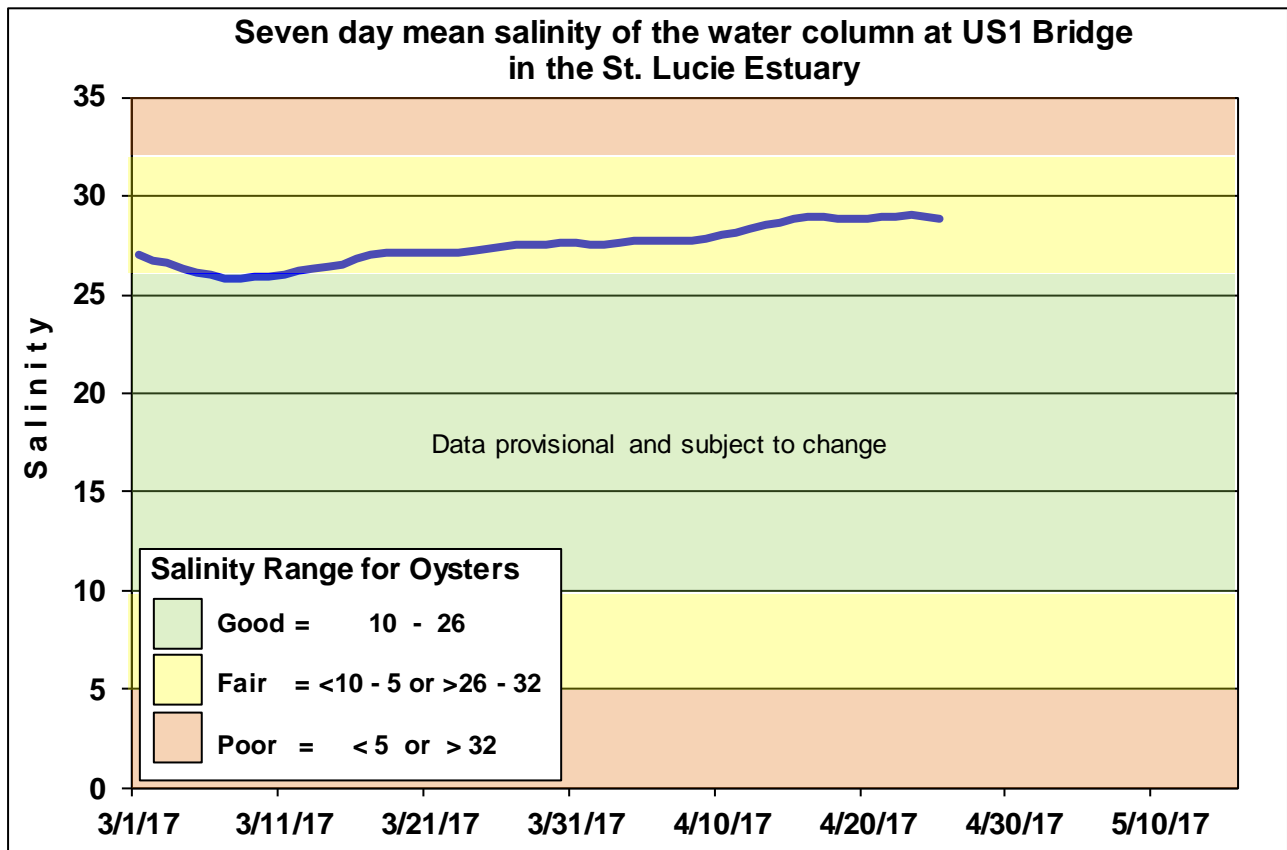


Figure 3. Seven-day mean salinity of the water column at the U.S. Highway 1 Bridge.

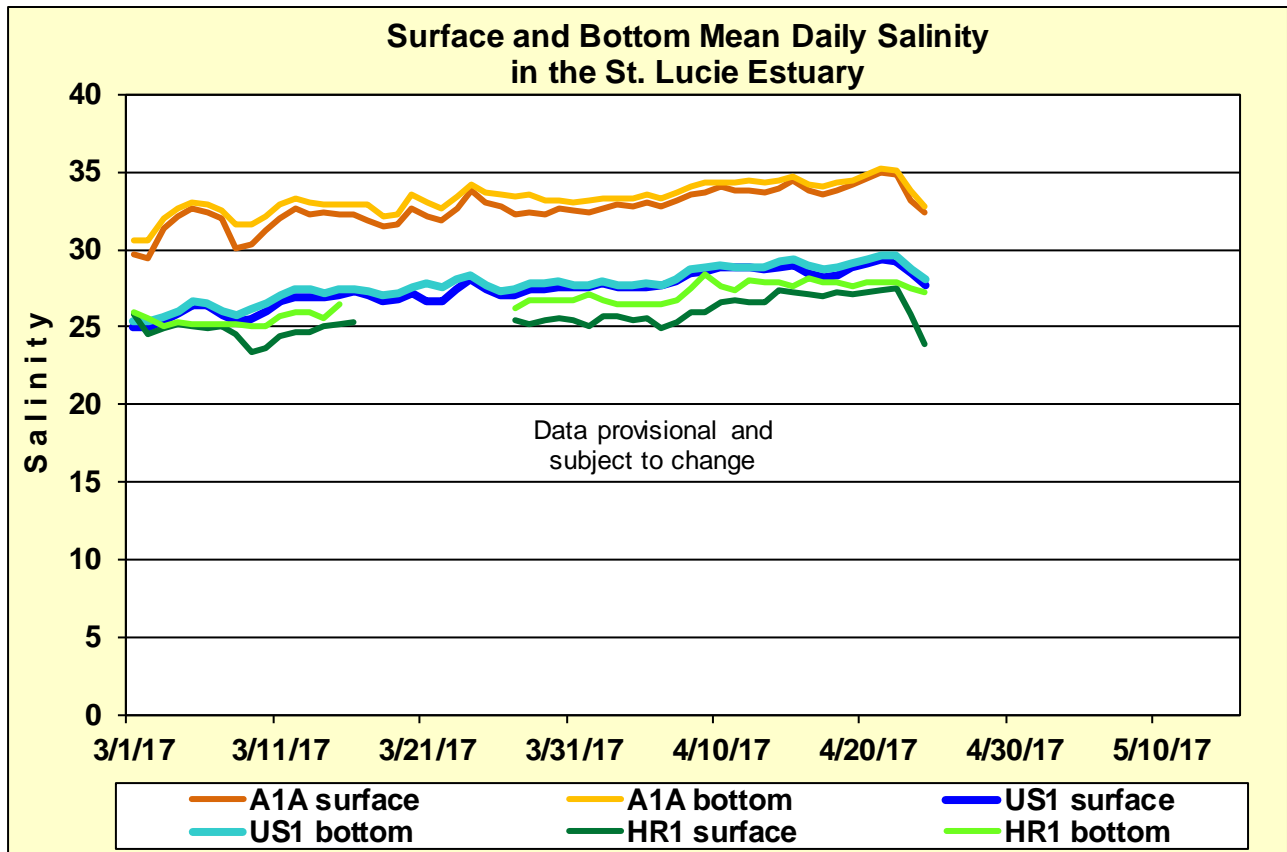


Figure 4. Daily mean salinity at the A1A, US1 and estimated HR1 stations.

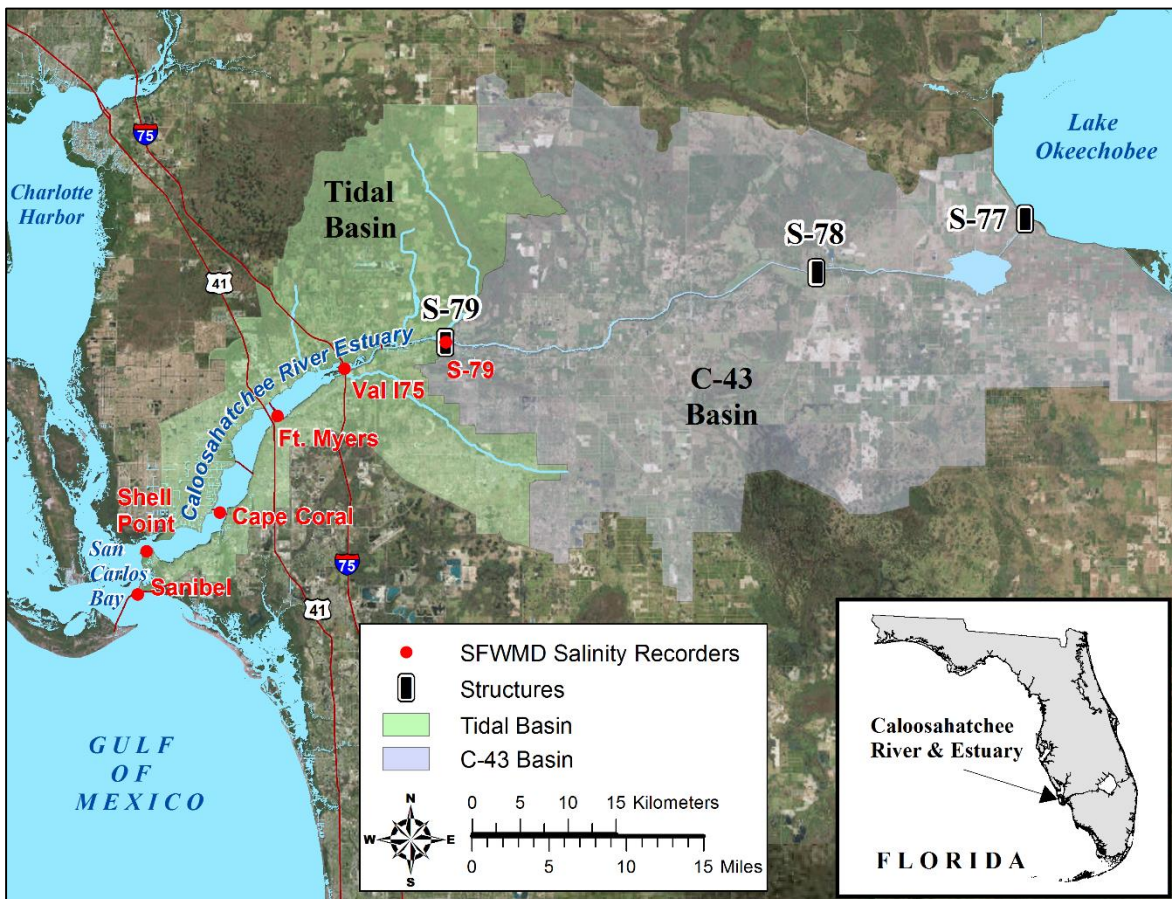


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

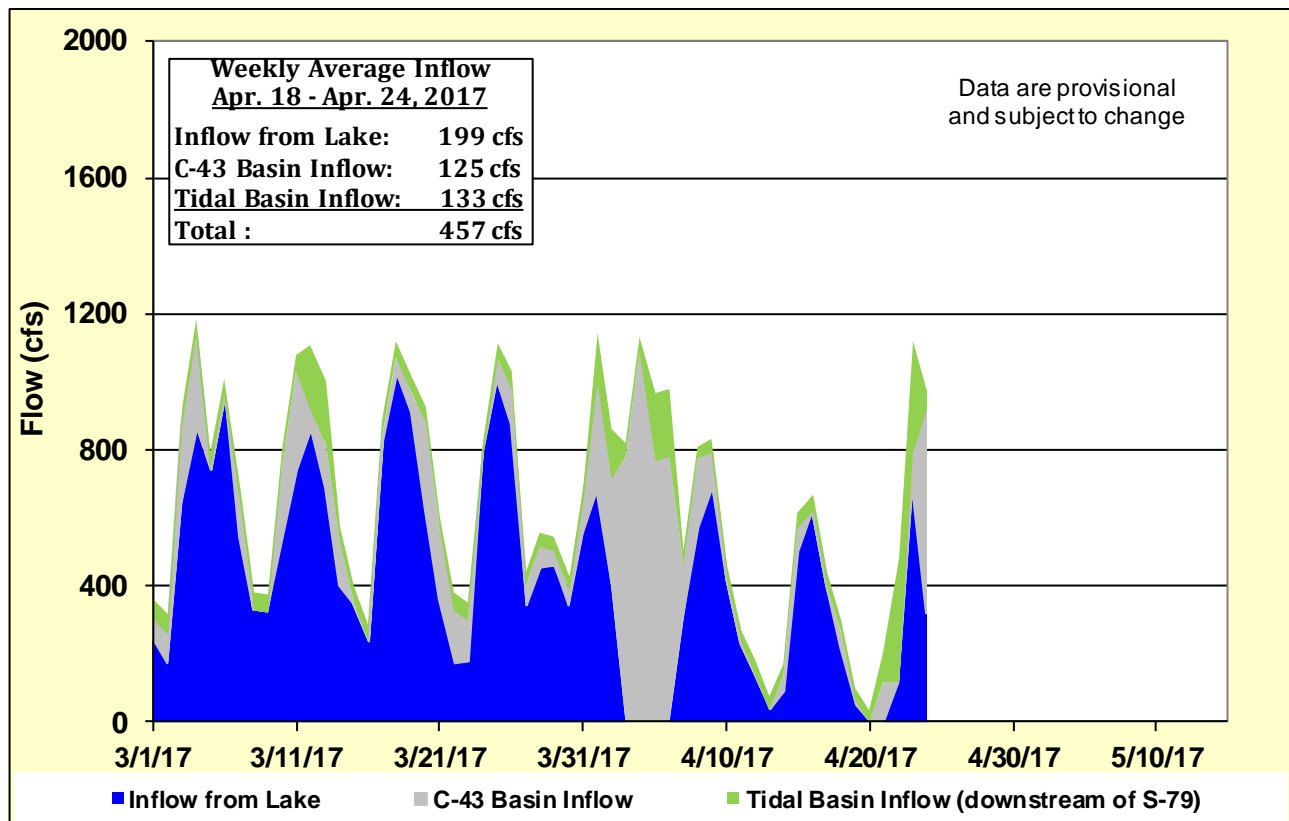
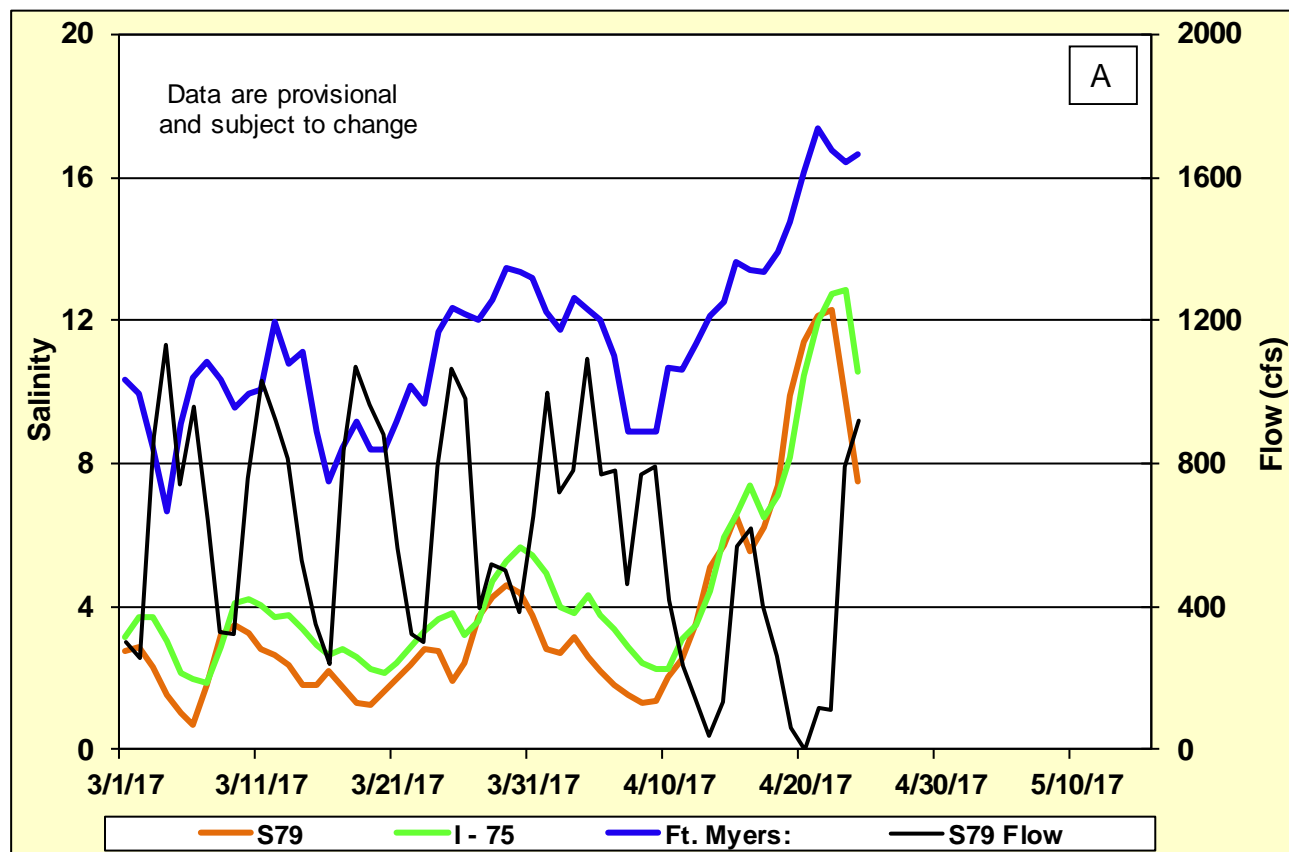


Figure 6. Freshwater inflows from Lake Okeechobee, runoff from the C-43 basin, and tributaries in the tidal basin into the Caloosahatchee River Estuary.



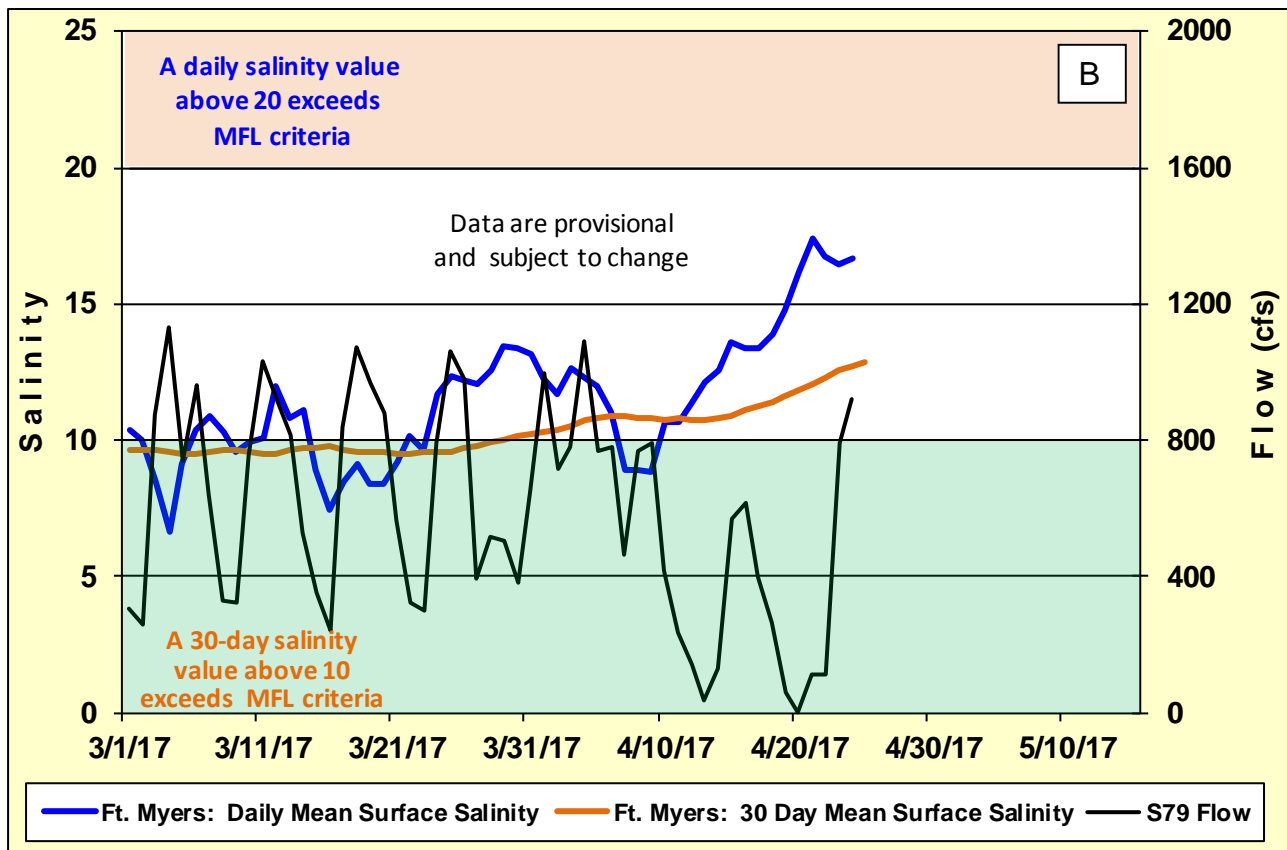


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations (A) and 30-day moving average salinity at Ft. Myers (B).

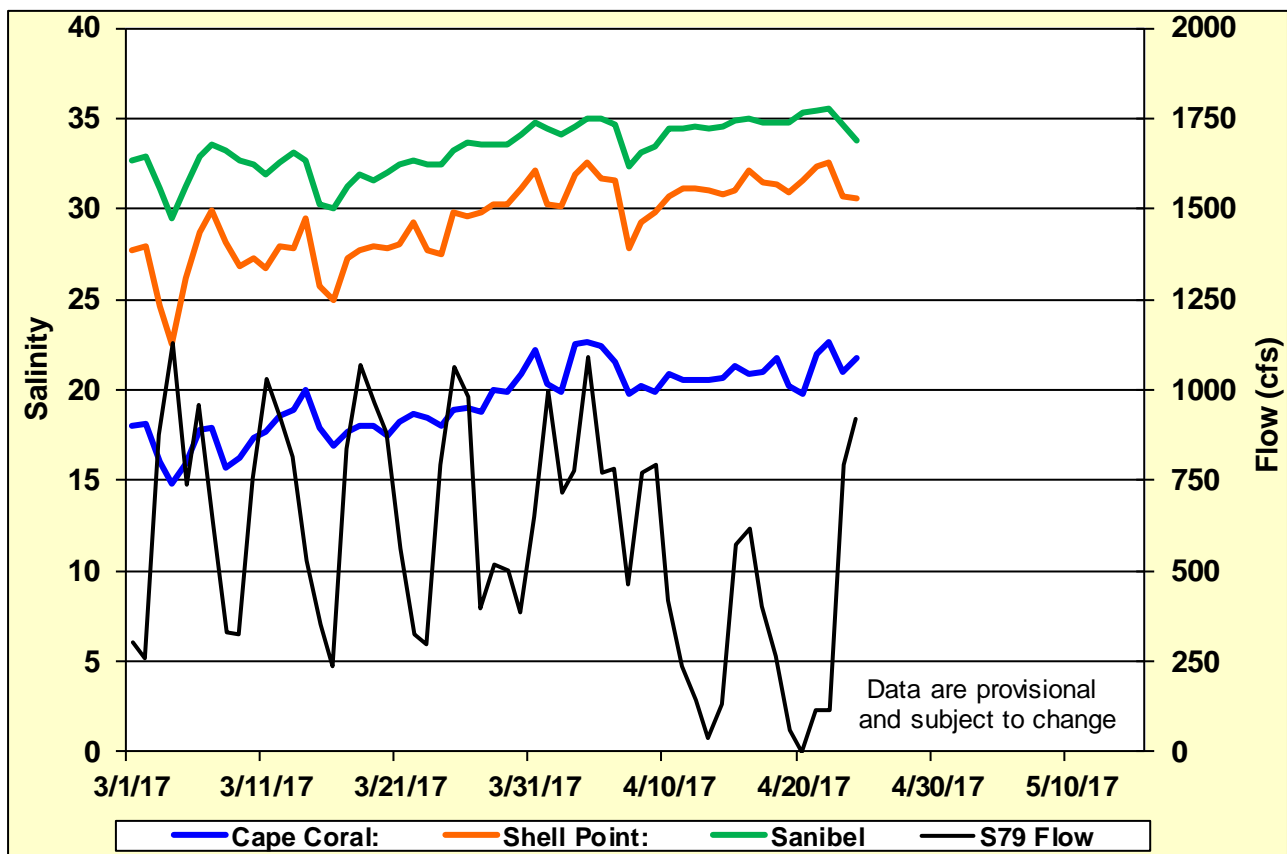


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

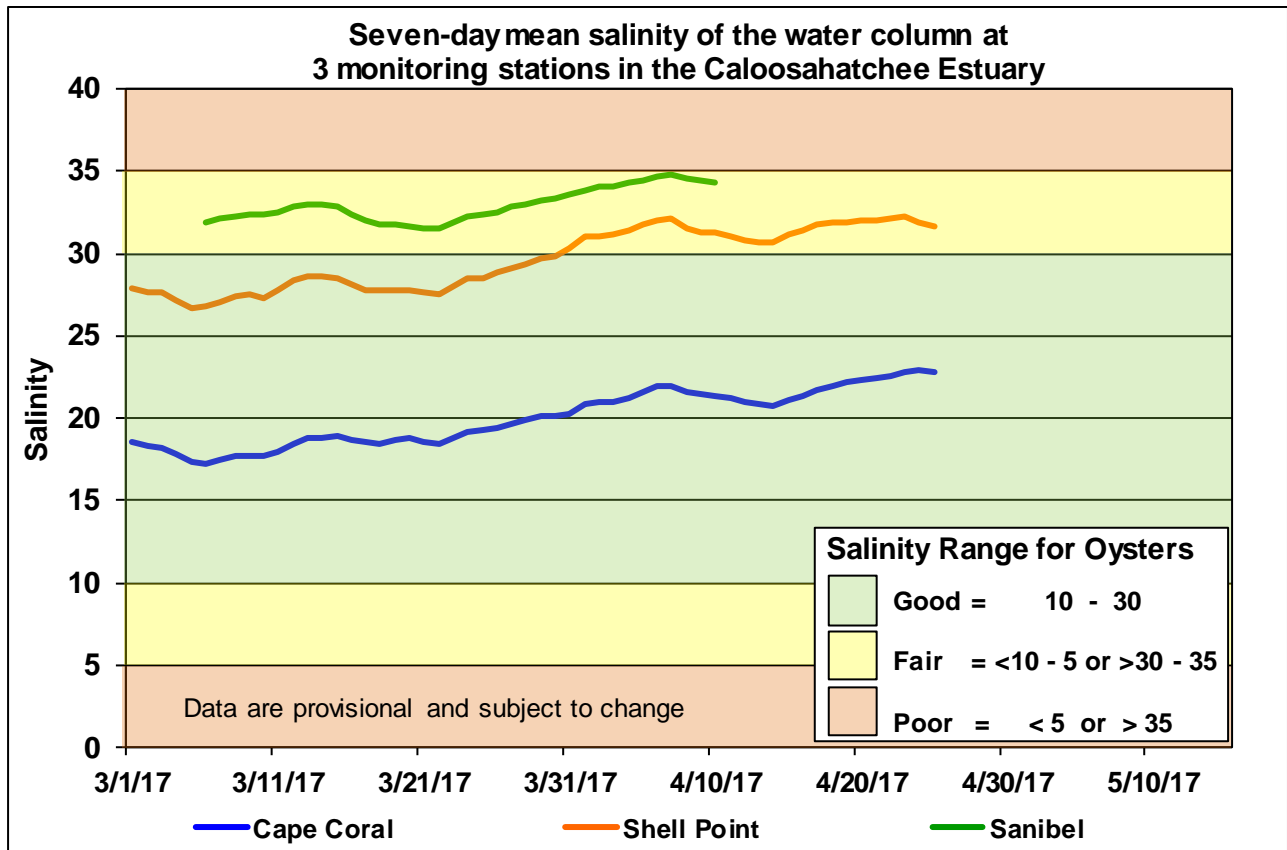


Figure 9. Seven-day mean salinity at Cape Coral Bridge, Shell Point and Sanibel Bridge monitoring stations.

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

Forecast 1: S-79 =0 cfs & TBR = 95 cfs

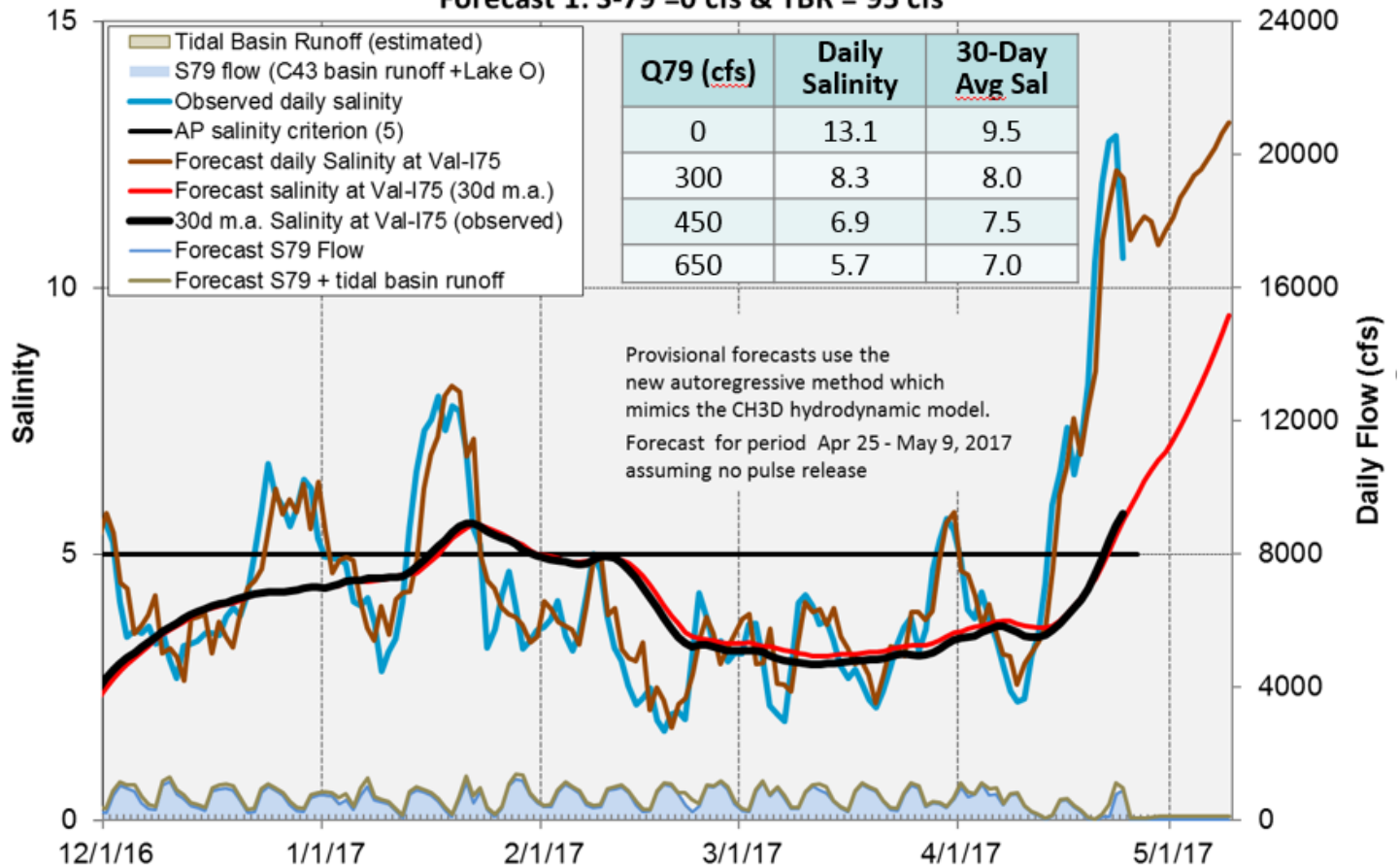


Figure 10. 14-day salinity forecast at Val I-75 assuming no releases at S-79.

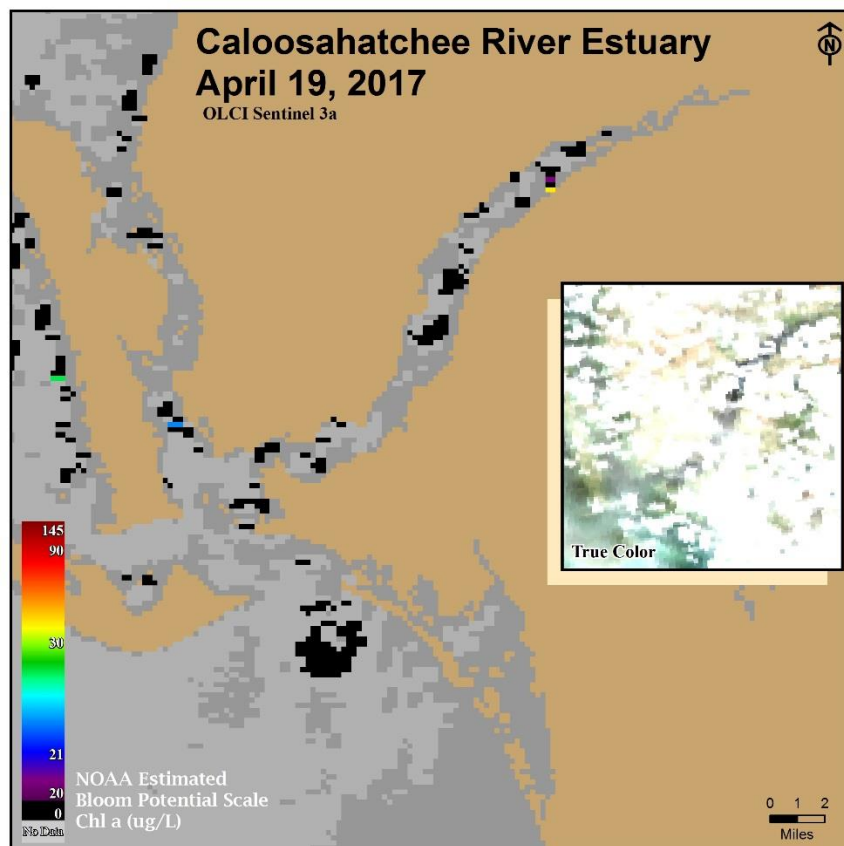
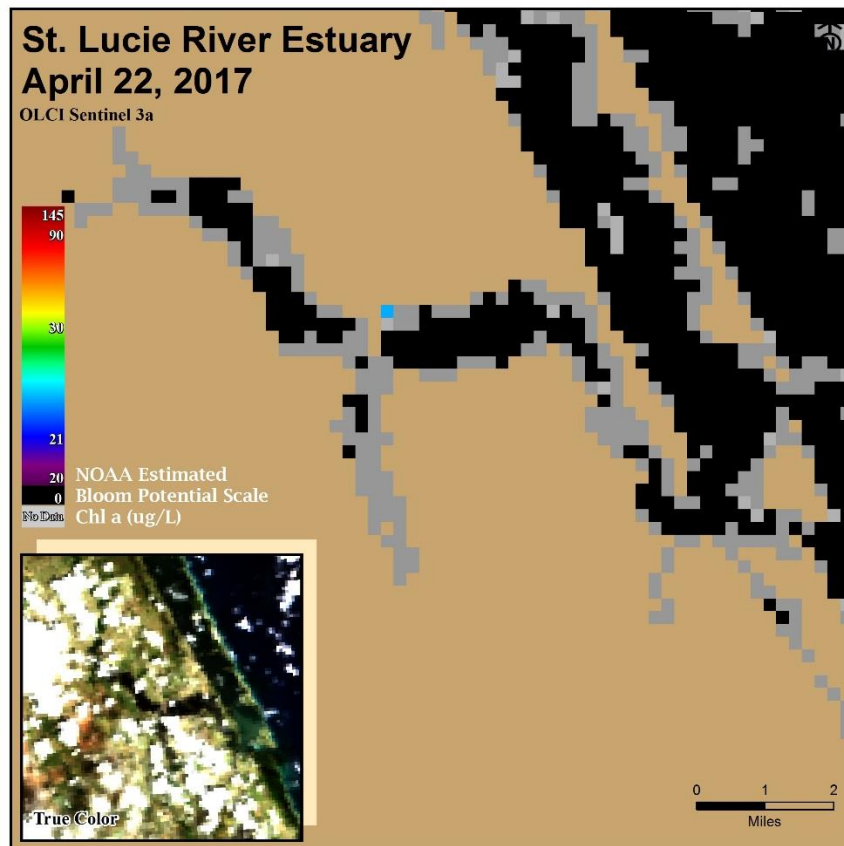
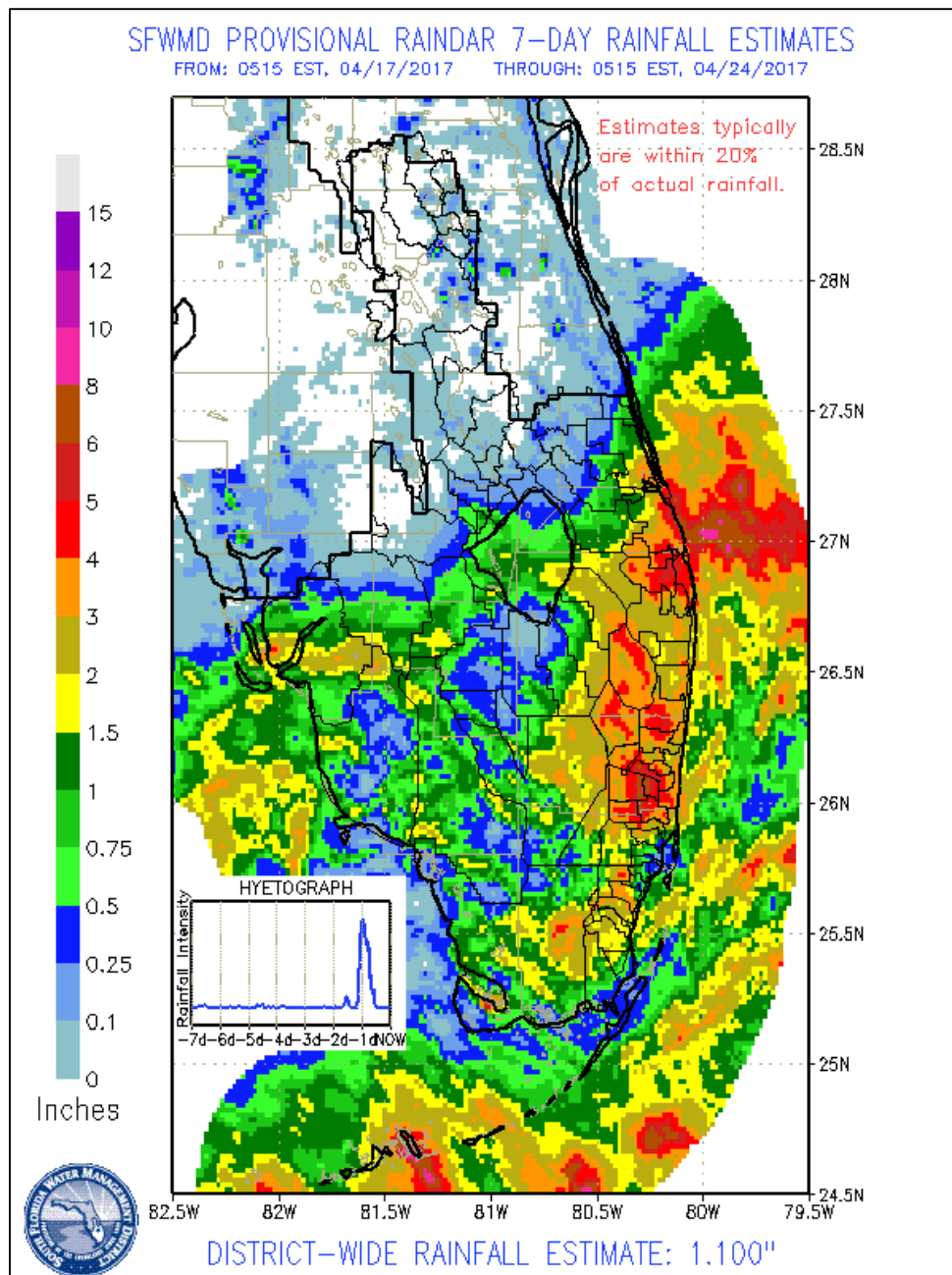


Figure 11. Sentinel 3a Satellite imagery provided by NOAA uses Ocean and Land Color Instrument (OLCI) to estimate cyanobacteria bloom potential in Caloosahatchee Estuary.

EVERGLADES

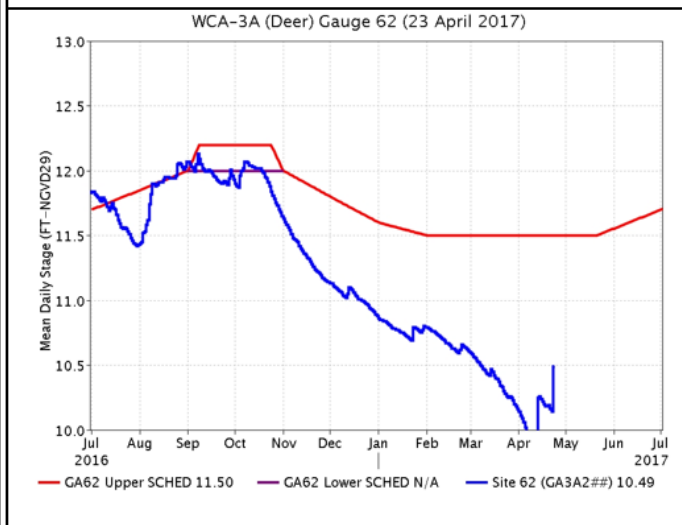
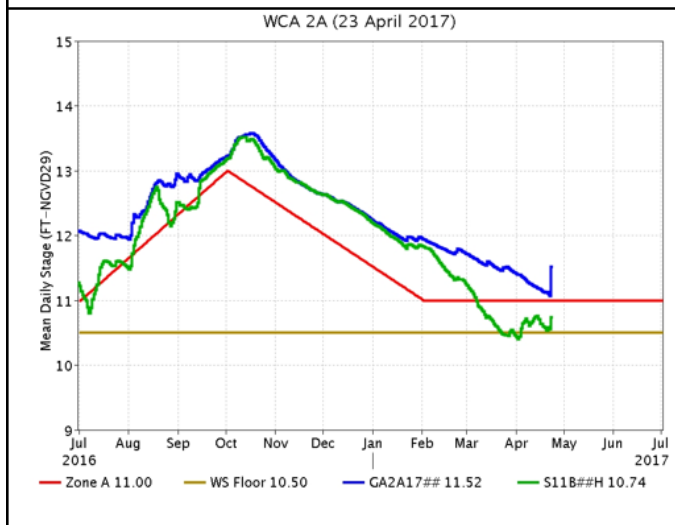
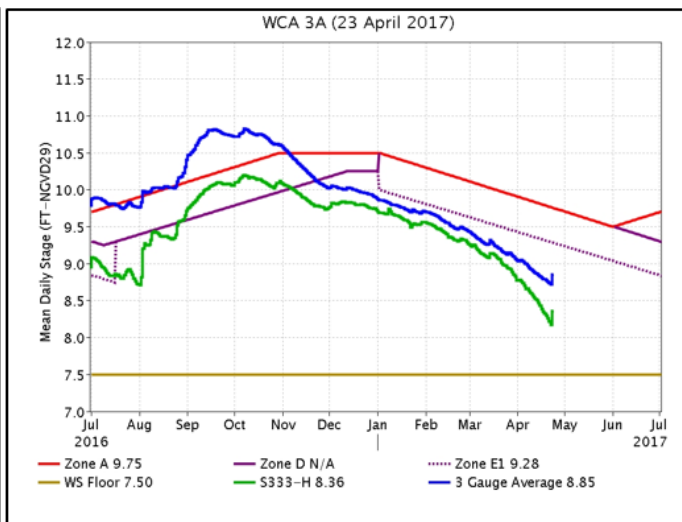
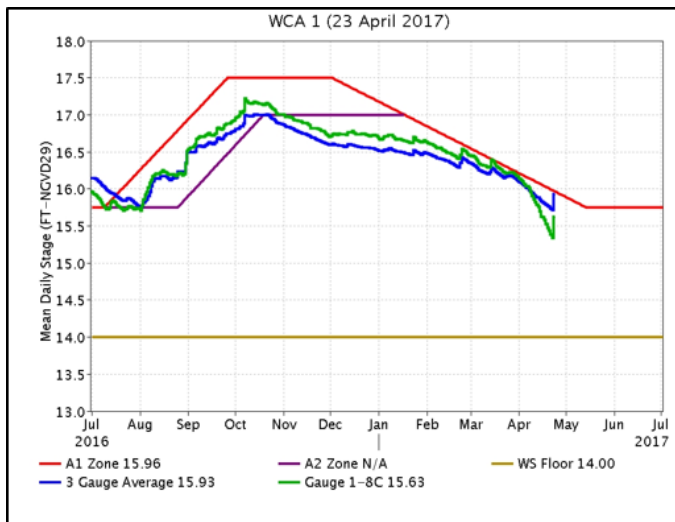
District wide rainfall averaged 1.10 inches over the last week, but was heaviest in WCA-1 and 2, thus the greatest stage change in those areas.

Everglades Region	Rainfall (Inches)	Stage Change (feet)	
WCA-1	3.63	0.24	Good
WCA-2A	3.62	0.56	Fair
WCA-2B	3.51	0.16	Poor
WCA-3A	1.50	0.19	
WCA-3B	1.65	0.06	
ENP	1.17	-0.02	



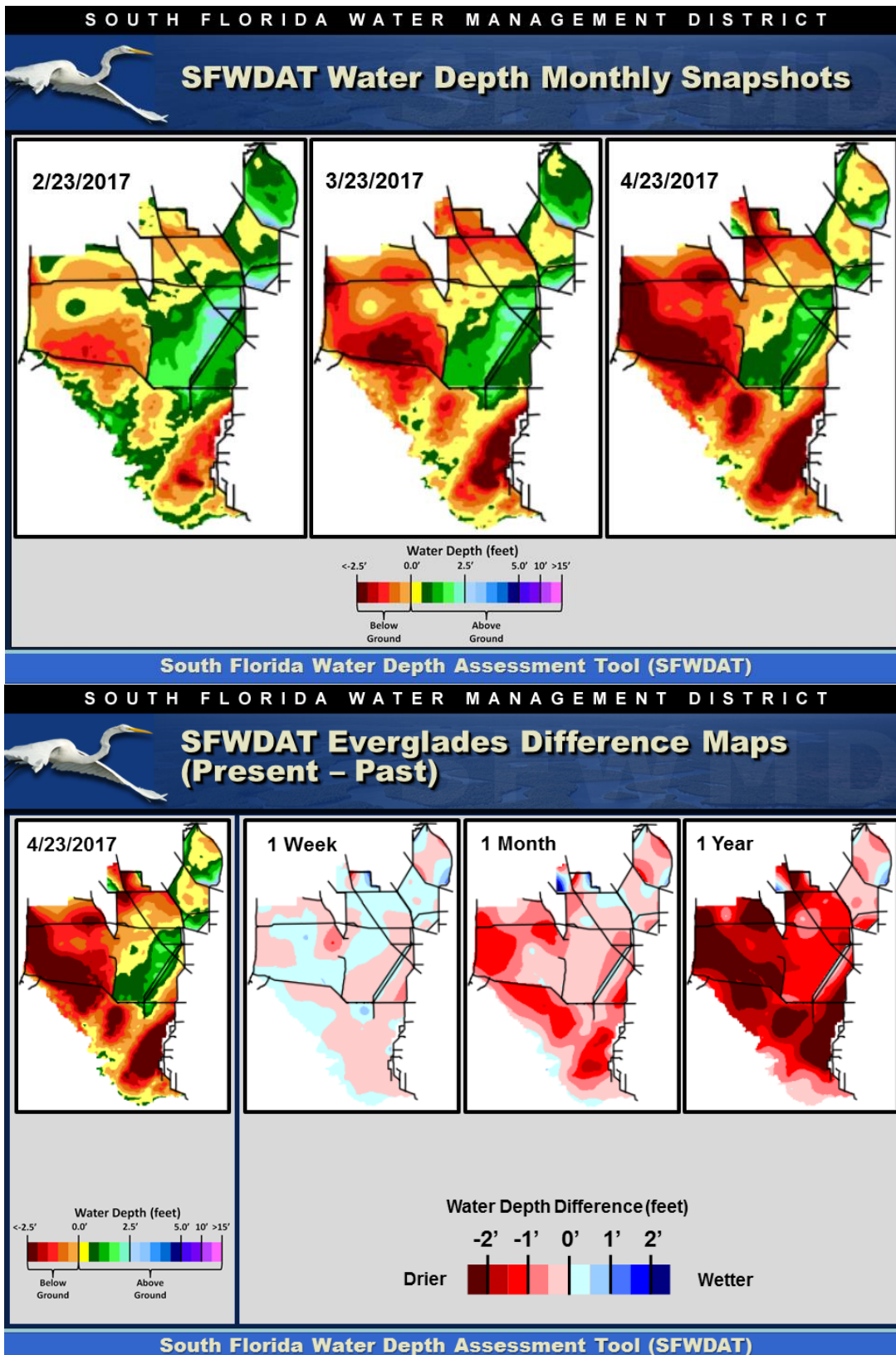
Regulation Schedules: WCA-1 increased to 0.03 feet below zone A1 returning to the regulation line. WCA-3A three-gauge average is 0.43 feet below zone E1, and continues a deviation from the regulation line.

In WCA-2A the marsh stage at gauge GA2A17 increased to 0.52 feet above zone A1 while the canal stage measured at the headwaters of S11B rose to 0.24 feet above the floor. WCA-3A at gauge 62 (Northwest corner) is 1.0 foot below schedule.



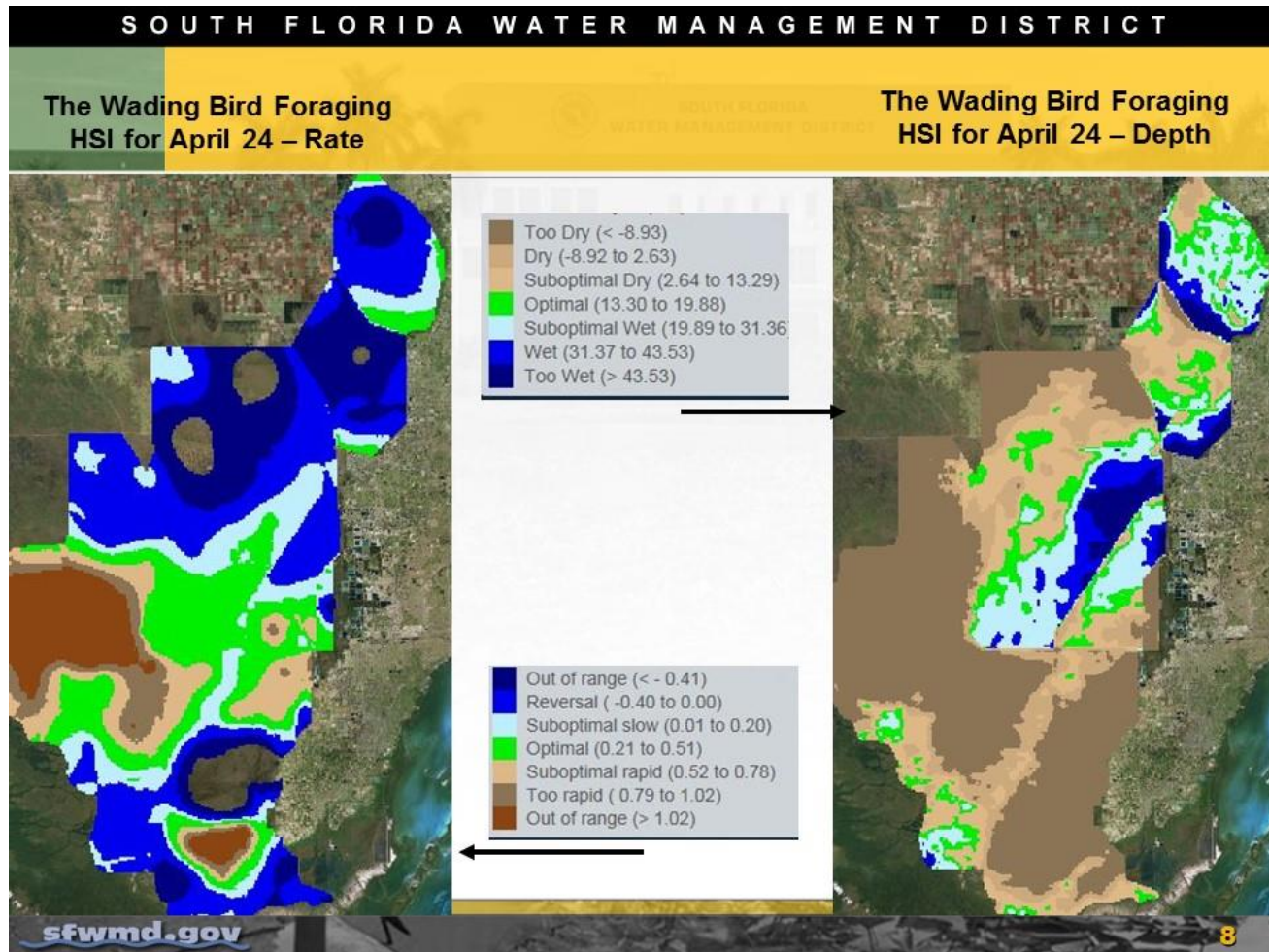
Blue – wetlands
Green – canals

Water Depths and Changes: This week's water depths at monitored gauges other than in WCA-2B range from -0.02 feet (northeast WCA-3A) to 1.43 feet (WCA-1). Over the last week individual gauge changes ranged from +.56 feet (WCA-2A) to -0.04 feet (WCA3-B). Pan evaporation averaged 1.53 inches.



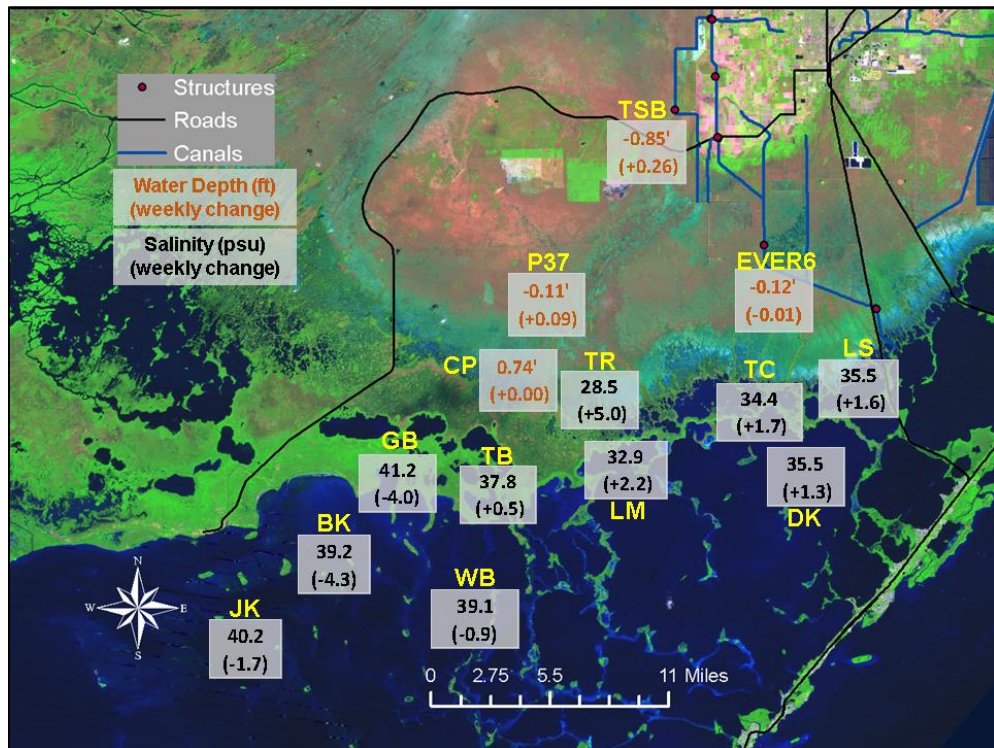
Wading Birds: Nesting/Foraging flight April 24, 2017. The large numbers of birds (mainly White Ibis) seen foraging in WCAs 1 and 2A in recent weeks have all but vanished. This could be problematic because there are currently about 7,000 White Ibis nests in the Refuge, and at this point it is not clear where they will find suitable foraging habitat. All of the largest White Ibis colonies seemed well (no nest abandonments yet) but any negative effect of Sunday's rainfall on nest survival will not be evident for a few days.

Birds continue to feed in quite large numbers in WCA-3A South, although in fewer numbers than they did last week. Also, many of the Wood Stork nestlings at the Jetport colonies (western WCA3AS) have now fledged and many are taking flight around the colonies. About one third of all nestlings remain at the colonies but many are likely to fledge soon given their advanced age.



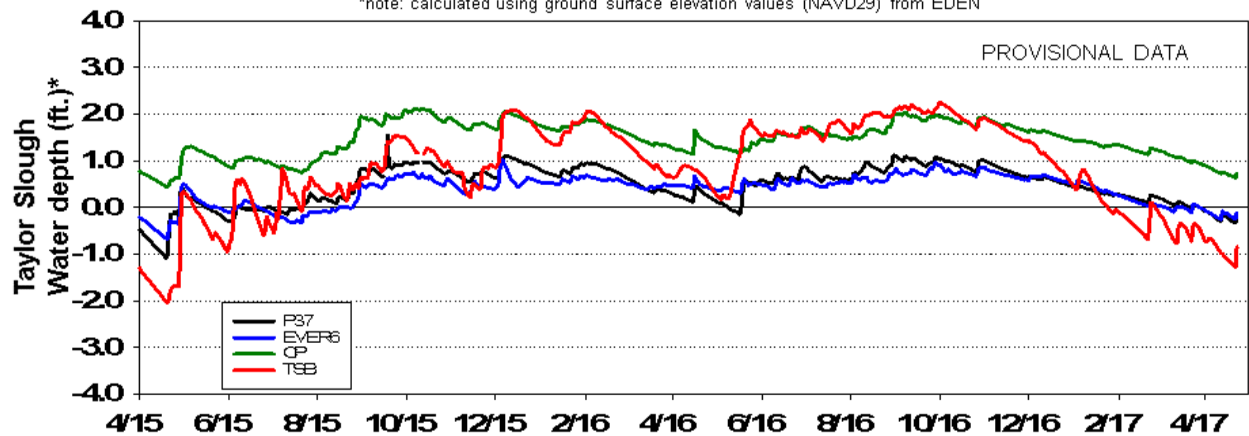
Taylor Slough: Water levels continued to decrease last week until the rainfall of Sunday caused increases. All stations showed a large increase on Sunday, and most showed an increase as a result. Compared to historic averages, water levels are mostly 1 to 3 inches above average with the exception being Northern Taylor Slough which is -2 inches below average.

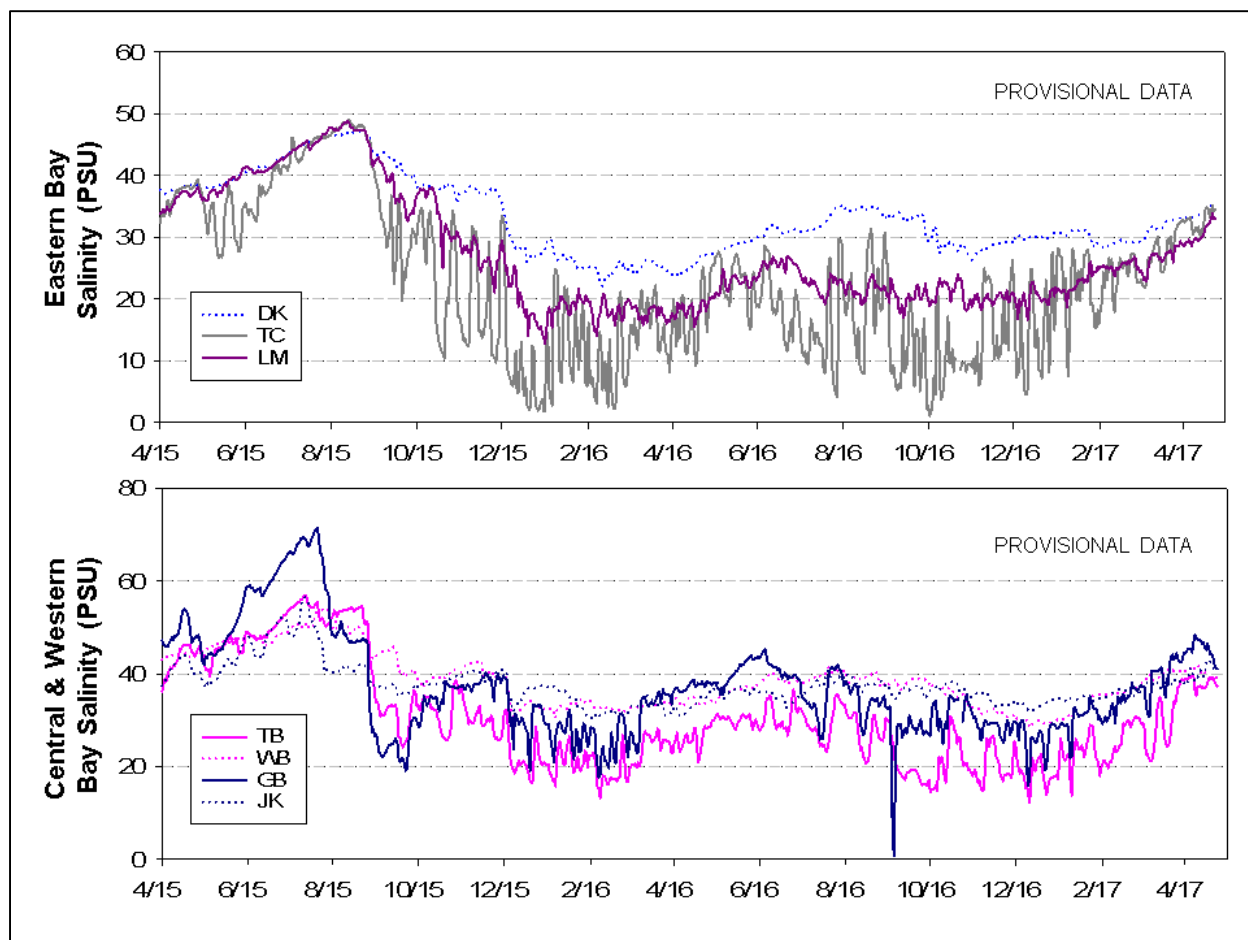
Florida Bay Salinity: Salinities in the Bay are currently average to +6 psu above average with the shallow western nearshore area now being average. The full impact of Sunday's rain, if any, will not be discernable until next week. Salinities currently range from 33 psu to 41 psu.



Taylor Slough Water Depths

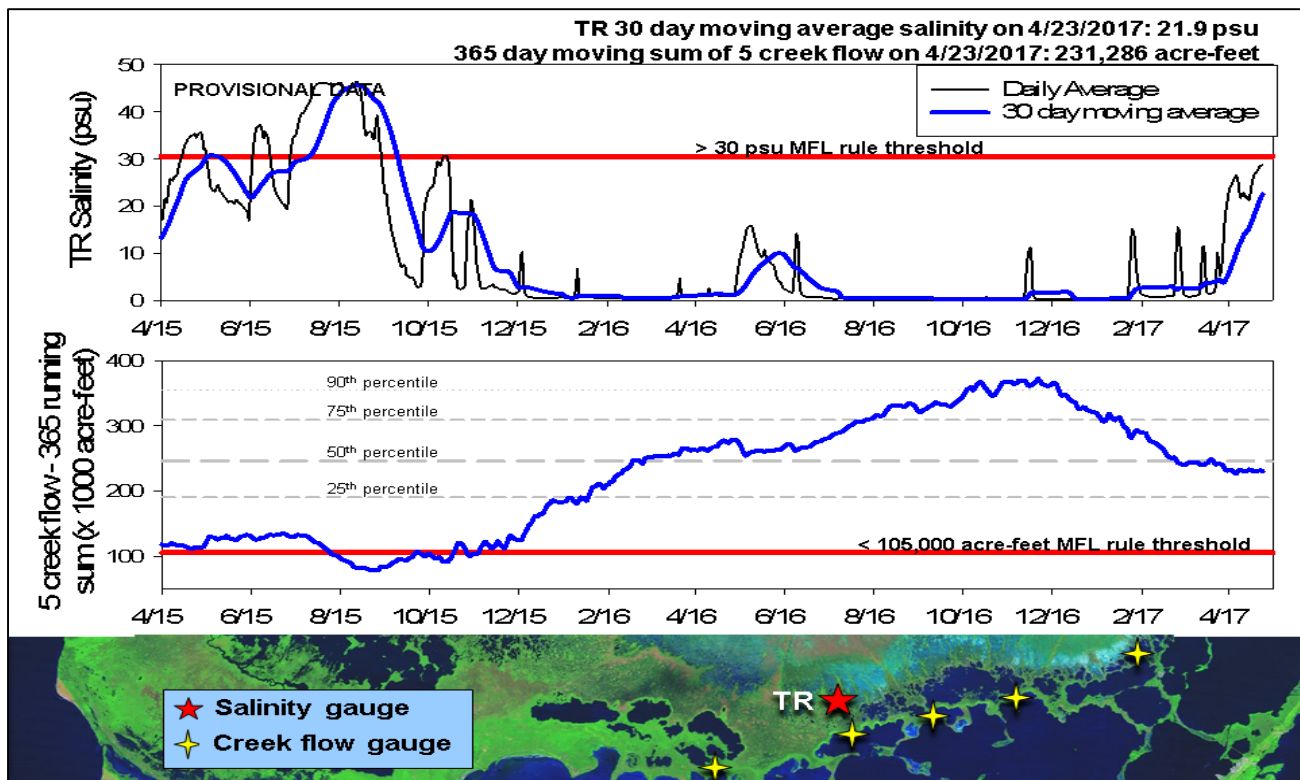
*note: calculated using ground surface elevation values (NAVD29) from EDEN





Florida Bay MFL: Mangrove zone salinities continue to rise. The daily average salinity at TR ended the week at 28 psu which is +4 psu higher than last week. The 30-day moving average increased 5.7 to end the week at 21.9 psu.

The weekly creek flow from the five creeks was just under -4,000 acre-feet. The 365-day moving sum of flow from the five creeks identified by stars on the map decreased about -900 acre-feet to end at 231,286 acre-feet (below the long-term average of 257,628 acre-feet).



Water Management Recommendations

- Given the large numbers of nesting White Ibis within WCA-1 or within a foraging flight to WCA-1 or WCA-2A we are recommending the suspension of any discharges into those areas to allow for a natural recession rate to resume. These two WCAs have been crucial in recent weeks in providing foraging habitat for the later nesting White Ibis and long nesting Wood Storks. If releases must be made into WCA-2 it is recommended to discharge into the northern side.
- WCA-3 north is providing very minimal foraging habitat at this time. That area of the Everglades may serve as a better location for any water discharged into the WCAs at this time.
- While Cape Sable Seaside Sparrow sub-population habitat areas are currently meeting the percent dry target, there remains a risk of over-drying later in the dry season. Water routed into those areas may serve to protect from that risk.

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

Everglades Ecological Recommendations, April 25th, 2017 (red is new)

Area	Current Condition	Cause(s)	Recommendation	Reasons
WCA-1	Stages increased 0.17' to 0.31'	Rainfall, ET, management	Operate for dry season conditions and, when possible, restrict recession rates to -0.03' to -0.07' per week. Allow natural recession to resume.	Retain water for the upcoming dry season while protecting habitat for apple snail production and wading bird breeding season.
WCA-2A	Stages increased 0.56'	Rainfall, ET, management	Maintain slower recession rates. Retain water and restrict recession rates to less than -0.09' per week. Allow to return to natural recession rates.	Protect habitat and wildlife. Support apple snails and nesting wading birds. Retain water to provide foraging habitat later in the breeding season.
WCA-2B	Stages increased 0.13' to 0.19'	Rainfall, ET, management	Restrict recession rates to -0.05' to -0.09' per week.	Protect habitat and wildlife. Support apple snails and nesting wading birds.
WCA-3A NE	Stages increased 0.29'	Rainfall, ET, management	Restrict recession rates to -0.05' to -0.07' per week to prevent the area from drying out too early for wading bird nesting. Water for northwestern 3A (via the G404) is also desired. NW area priority for STA inflows.	Protect habitat and wildlife. Support apple snails and nesting wading birds.
WCA-3A NW	Stages increased 0.39'	Rainfall, ET, management		
Central WCA-3A S	Stages increased 0.10'	Rainfall, ET, management	Restrict recession rates to -0.05' to -0.09' per week. When flows are changed a gradual reduction is recommended (stepping down over several days). Allow to return to natural recession rates.	Keeping depths below 2.5' at gauge 65 is important to allow tree island vegetation to recover from stress of the recent extended inundation duration. Protect habitat, wildlife and support wading bird nesting.
Southern WCA-3A S	Stages decreased -0.02'	Rainfall, ET, management		
WCA-3B	Stages changed -0.04' to +0.13'	Rainfall, ET, management	Restrict recession rates to -0.05' to 0.-09' per week.	Protect habitat and wildlife and provide conditions for wading bird nesting season. Provide conditions to support apple snails.
ENP-SRS	Stages decreased -0.02'	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.
ENP-CSSS habitats	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 ERTD guidelines. Follow guidance in C-111 Western Spreader Canal Project operations manual. Care should be taken to avoid overdrying eastern subpopulations C and F. Some inflows into the eastern area could be beneficial, particularly if it benefits the rest of the system.	Future operations need to continue to provide appropriate hydrological and habitat conditions for CSSS. Current and forecasted conditions are conducive for a successful sparrow breeding season. Dry conditions are expected for much of the sparrow breeding season.
Taylor Slough	Stages changed by -0.01' to +0.26'	Rain, ET, inflows	Move water southward as possible	Provide freshwater buffer for ecosystems, maintain low salinity conditions downstream, and maintain slow recession rates.
FB- Salinity	Average to +6 psu above average	Rain, ET, inflows, wind	Move water southward as possible	Maintain low salinity conditions and prevent early salinity increases.