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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 18, 2017

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

Widely scattered showers/storms mainly interior west this afternoon and widely scattered showers south tomorrow. Morning balloon data showed good moisture again over southern FL. Look for daytime heating and southeast flow to focus a few afternoon storms over Collier and Lee counties with some showers extending eastward around the Lake. Steering winds change to the northeast on Wednesday with some drier air arriving. Expect a few showers south and possibly near the west coast tomorrow. Light to locally moderate showers are likely extreme south on Thursday, then drier Friday before activity probably expands back northward over the peninsula on Saturday.

Kissimmee

On Sunday, stage was 0.9 feet below regulation schedule in East Lake Toho, 0.8 feet below regulation schedule in Lake Toho, and 1.3 feet below schedule in Kissimmee-Cypress-Hatchineha. Over the past week, discharge averaged 344, 262, and 282 cfs at S65, S65A, and S65E, respectively. Tuesday morning discharges were: ~344 cfs, and 262 cfs, and 282 cfs respectively at S65, S65A, and S65E. Dissolved oxygen data in the Kissimmee River averaged 8.6 mg/L for PC33 manual sonde (April 10-12). Kissimmee River mean floodplain depth on Sunday was 0.06 feet. No new recommendations.

Lake Okeechobee

As of midnight April 16, 2017, Lake stage was 11.96 feet NGVD and in the Beneficial Use sub-band. The current weekly recession rate of 0.29 feet equates to a projected monthly recession rate of 1.16 feet which is over twice the recommended 0.50 feet per month or lower guideline. The goal should be to slow the current recession rate and maintain it at below 0.50 feet per month. The April 13, 2017 wading bird foraging survey indicated that there were approximately 9,671 wading birds foraging on the Lake and an estimated 2,000 to 3,000 more wading birds conducting nesting activities in colonies. The most recent satellite imagery (April 15, 2017) indicated the algal bloom potential may be increasing, especially along the western and northwestern nearshore regions. However, during the April 13th wading bird survey flight, District staff reported no visual blooms in the western Fisheating Bay as the imagery suggests indicating additional validation of the data is needed from this new sensor.

Estuaries

Total discharge to the St. Lucie estuary averaged 127 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 increased compared to 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 367 cfs over the past week with 289 cfs (79%) coming from the Lake. The 30-day average surface salinity at the Ft. Myers monitoring station is 11.4 and has been above 10 for 21

consecutive days. The 30-day average surface salinity at Val I-75 is 4.0. 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, while in the fair range at Shellpoint and the Sanibel Causeway. The 30-day moving average salinity at the I-75 Bridge is forecast to be 6.3 in the next two weeks if no flow comes through the S-79 structure, and the daily salinity is forecast to reach 9.6.

Stormwater Treatment Areas

Over the past week, the STAs/FEBs received approximately 8,000 acre-feet of Lake releases. The total amount of Lake releases sent to the STAs/FEBs in WY2017 (since May 1, 2016) is approximately 231,700 acre-feet. Most STA cells are at or near target depths, except STA-5/6 emergent aquatic vegetation (EAV) 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

Rainfall over the last week was inconsistent throughout the Everglades leading to uneven recession rates across the WCAs and ENP. The current good to excellent wading bird nesting season is balanced by the concern that foraging conditions could dry out before white ibis and wood storks fledge chicks. Operational discharge seems to be having the desired effect slowing the rate of recession in the central to southern part of WCA-2A. Rising 30-day salinities at the TR site in Florida Bay is eliciting some concern. No wading bird flights were conducted this week. Current modeling indicates very similar foraging conditions as last week. An estimated 15,000 pairs of white ibis and 1000 wood storks are nesting in the WCAs.

Supporting Information

KISSIMMEE BASIN

Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 0.00 inches of rainfall in the past week and the Lower Basin received 0.02 inches (SFWMD Daily Rainfall Report 04/17/2017).

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: 4/18/2017

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)						
							4/16/17	4/9/17	4/2/17	3/26/17	3/19/17	3/12/17	3/5/17
Lakes Hart and Mary Jane	S62	0	LKMJ	60.0	R	60.4	-0.4	-0.3	-0.4	-0.4	-0.4	-0.4	-0.4
Lakes Myrtle, Preston, and Joel	S57	0	S57	60.4	R	60.5	-0.1	-0.1	-0.1	0.0	0.0	0.0	0.0
Alligator Chain	S60	0	ALLI	62.6	R	63.2	-0.6	-0.7	-0.8	-0.8	-0.9	-0.9	-0.8
Lake Gentry	S63	3	LKGT	60.6	R	60.7	-0.1	-0.2	-0.3	-0.3	-0.4	-0.4	-0.3
East Lake Toho	S59	0	TOHOE	55.9	R	56.8	-0.9	-1.0	-1.0	-1.2	-1.3	-1.2	-1.1
Lake Toho	S61	0	TOHOW, S61	53.0	R	53.8	-0.8	-1.0	-1.1	-1.2	-1.3	-1.2	-1.1
Lakes Kissimmee, Cypress, and Hatchineha	S65	344	LKISSP, KUB011, LKIS5B	49.2	R	50.5	-1.3	-1.3	-1.5	-1.4	-1.3	-1.0	-0.7

* 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: 4/18/2017

Metric	Location	Sunday's 1-day average	Weekly Average**									
			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	2/12/17
Discharge (cfs)	S-65	337	344	292	361	626	885	899	877	732	710	507
Discharge (cfs)	S-65A	251	262	270	277	461	681	705	682	569	550	387
Discharge (cfs)	S-65D****	289	297	288	359	679	791	685	721	688	540	538
Discharge (cfs)	S-65E****	237	282	297	374	723	855	737	769	744	597	523
DO concentration (mg/L)***	Phase I river channel	N/A	8.6	8.2	8.5	8.9	8.8	8.4	8.0	7.7	8.3	9.0
Mean depth (feet)*	Phase I floodplain	0.06	0.06	0.06	0.07	0.11	0.17	0.12	0.07	0.07	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
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)

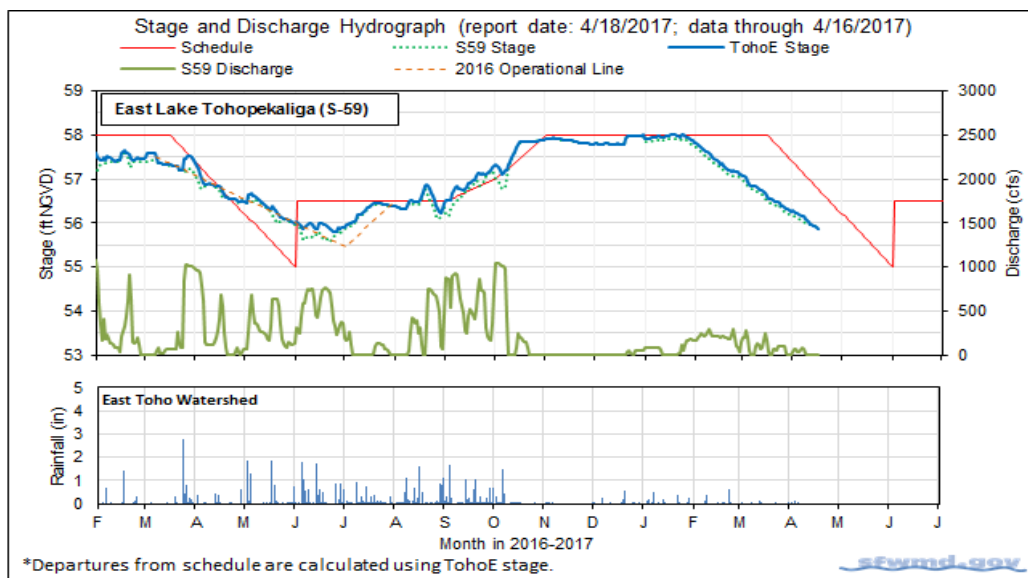


Figure 1.

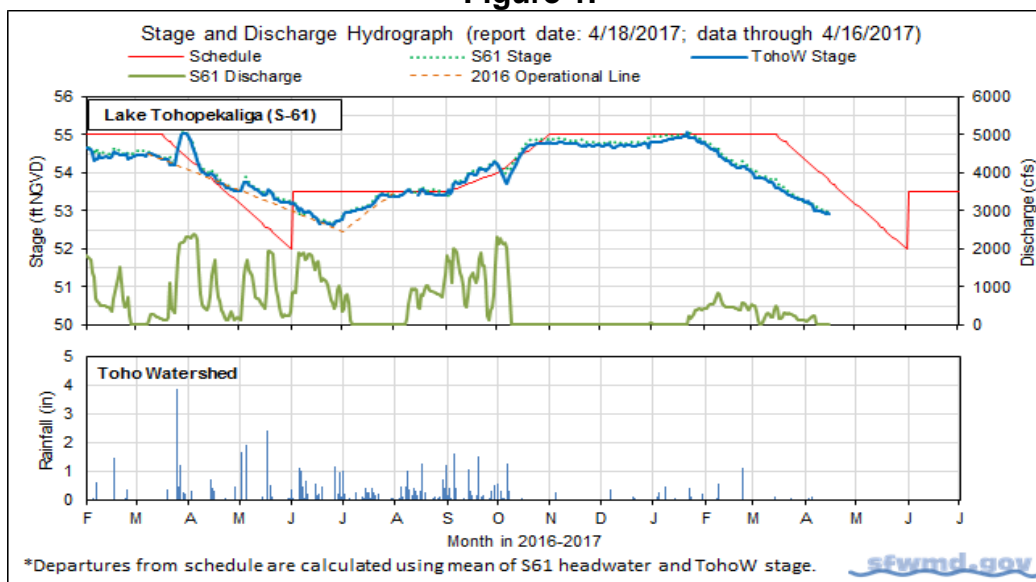


Figure 2.

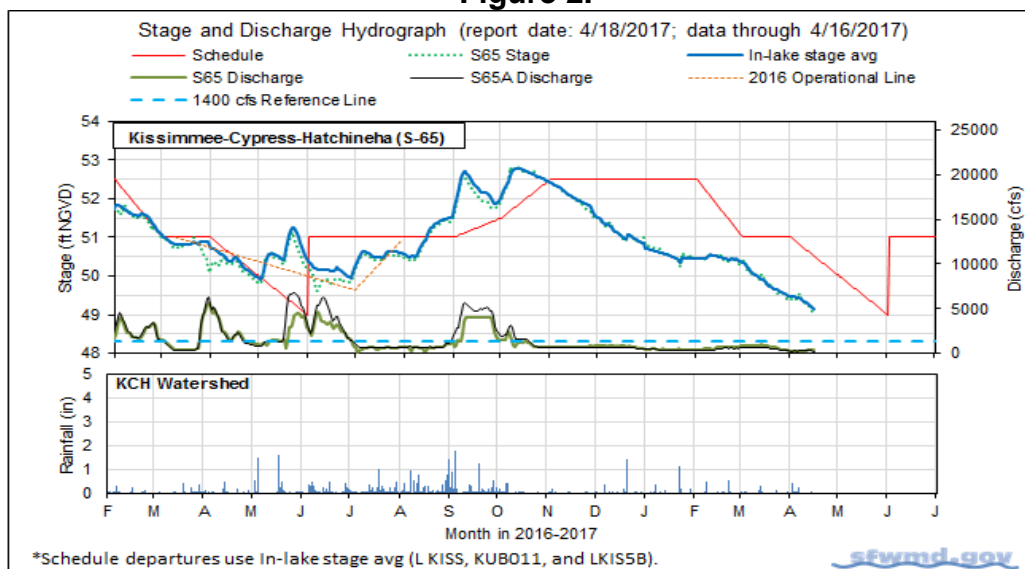


Figure 3.

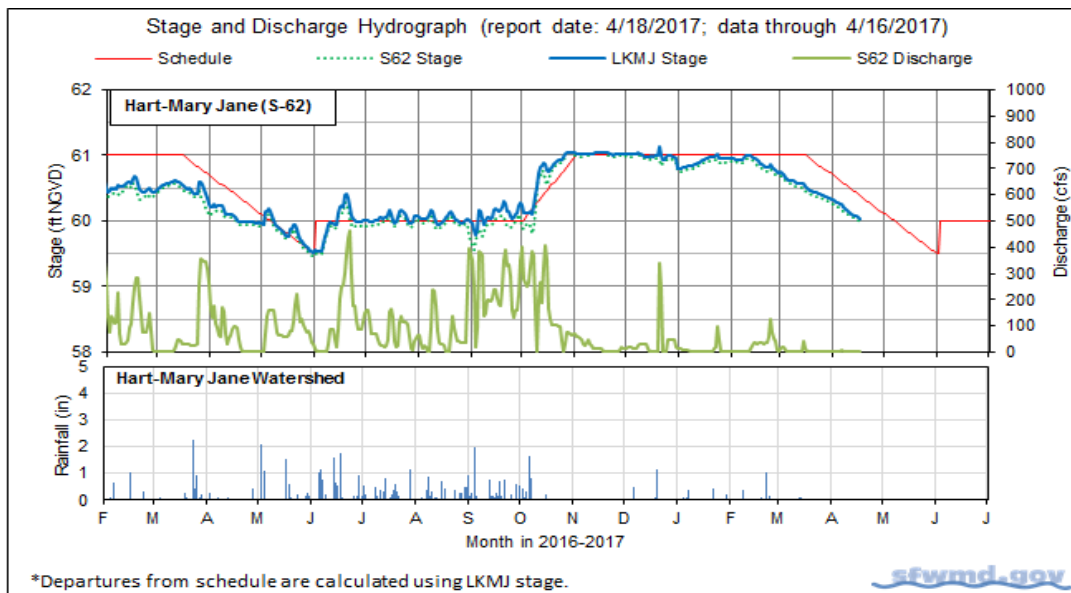


Figure 4.

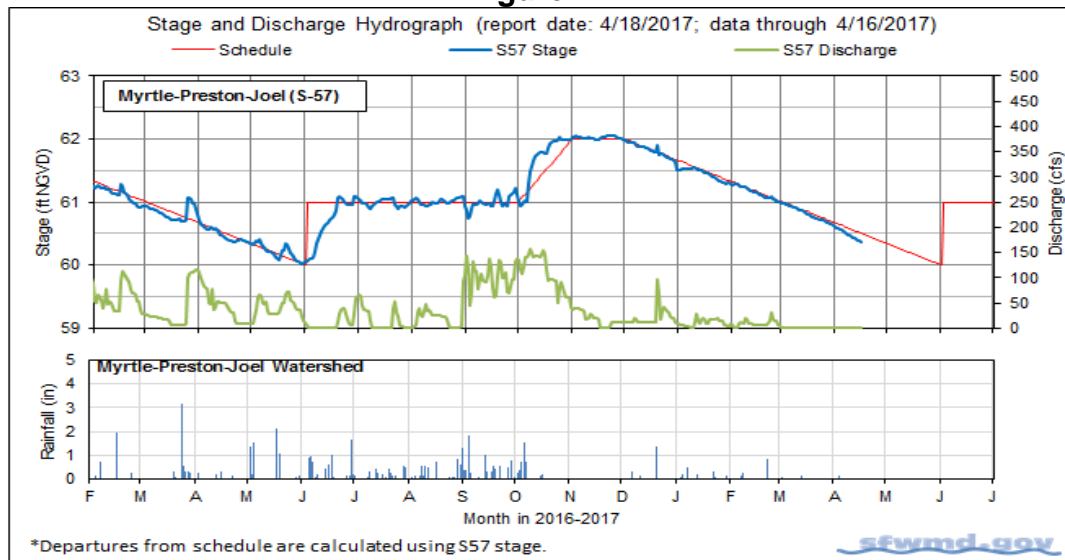


Figure 5.

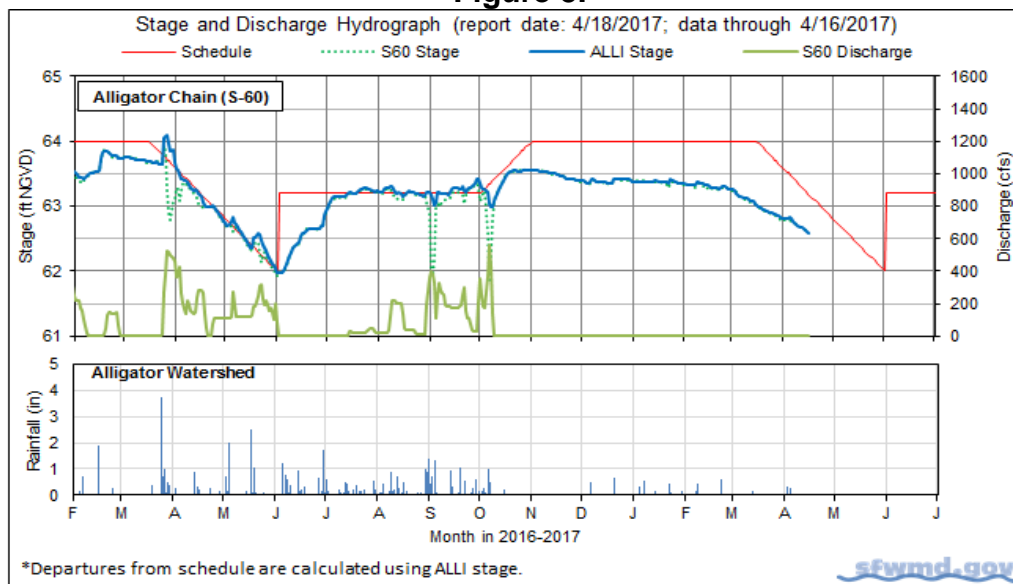


Figure 6.

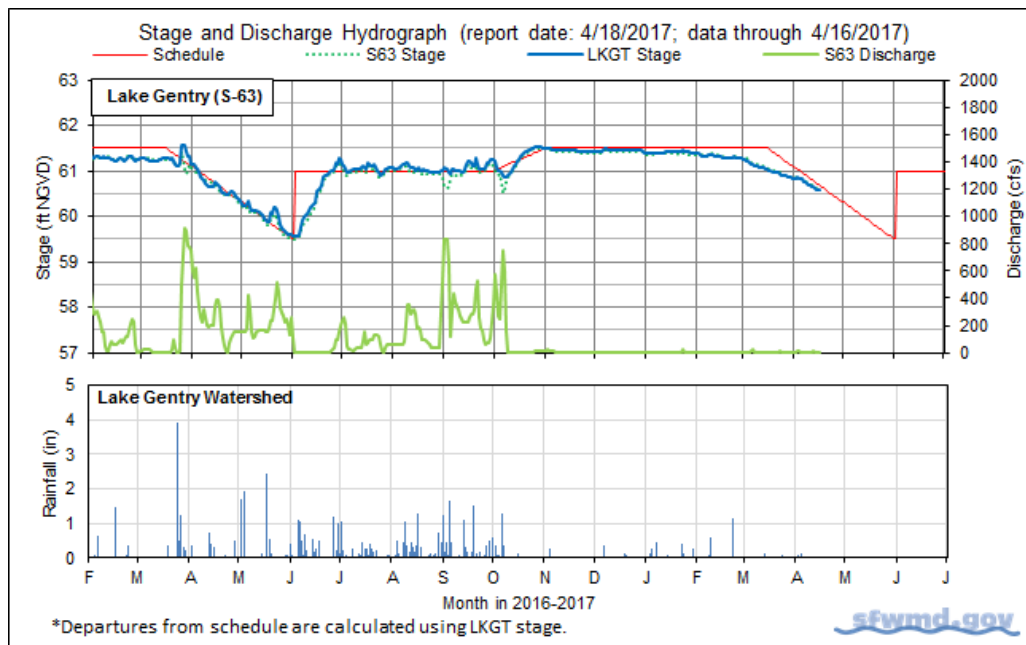


Figure 7.

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.

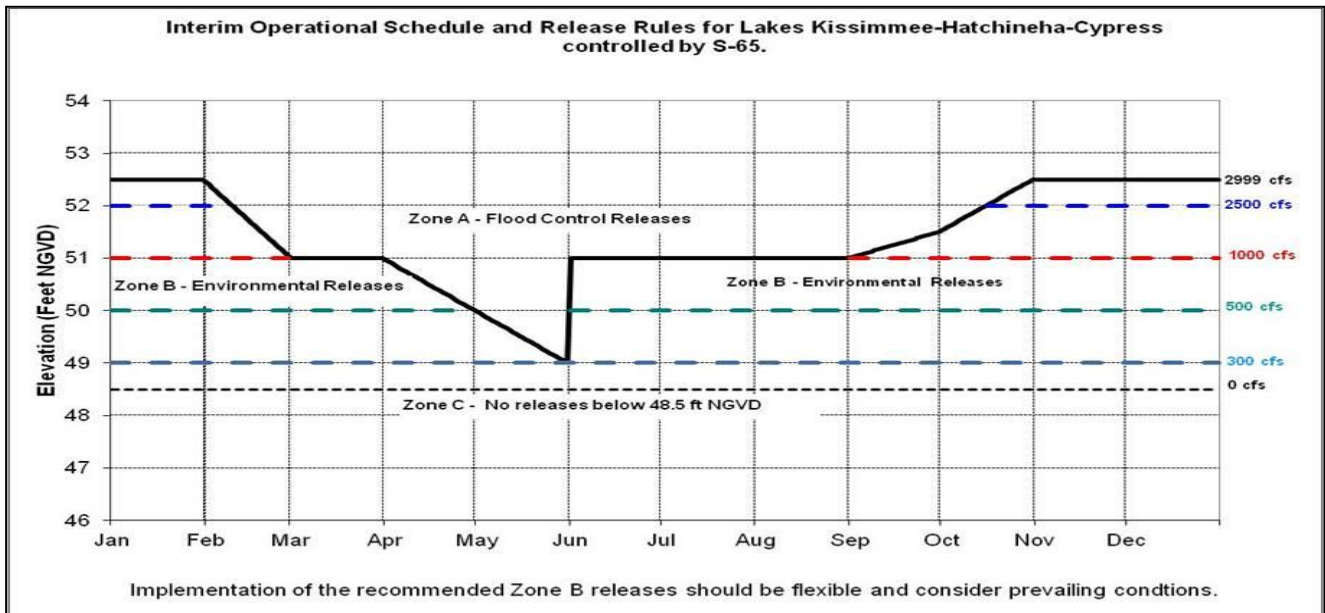


Figure 9. Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years or in Wet Season 2015.

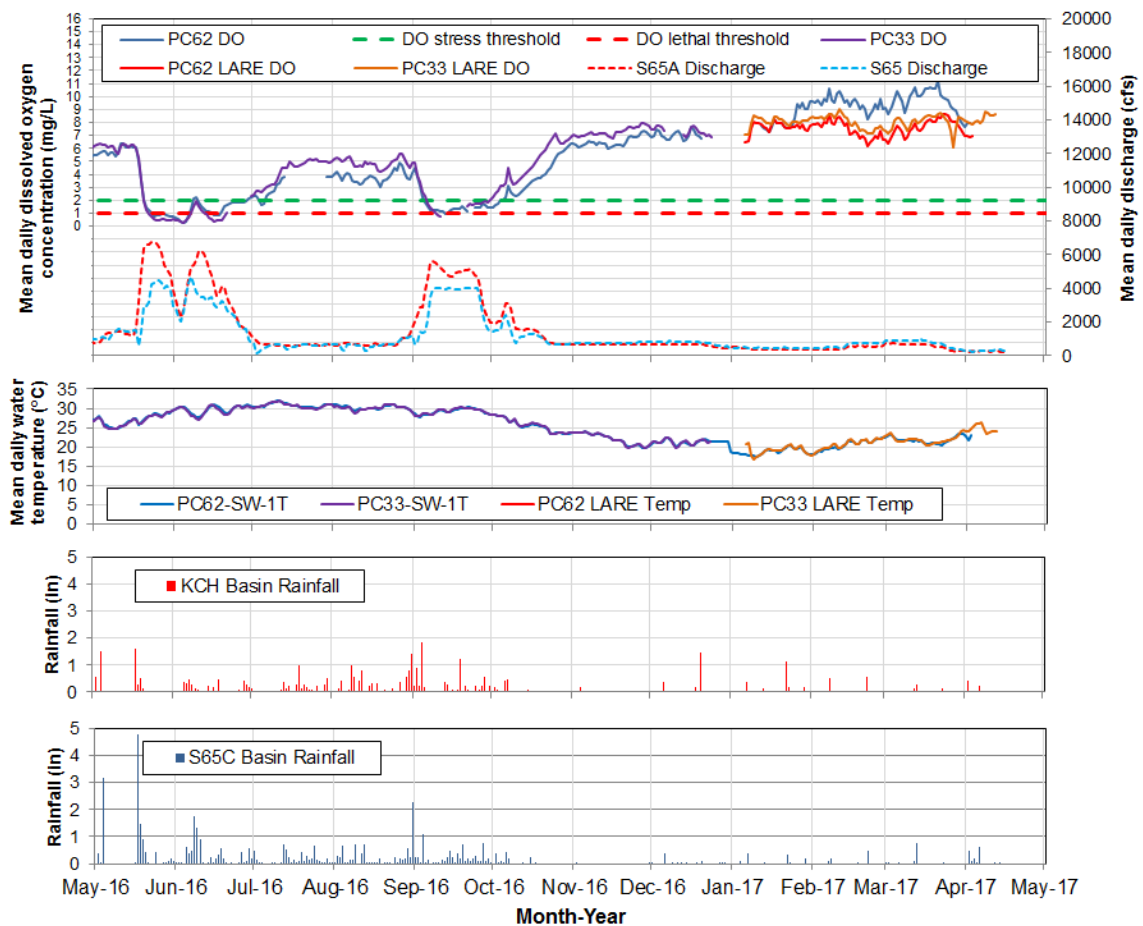
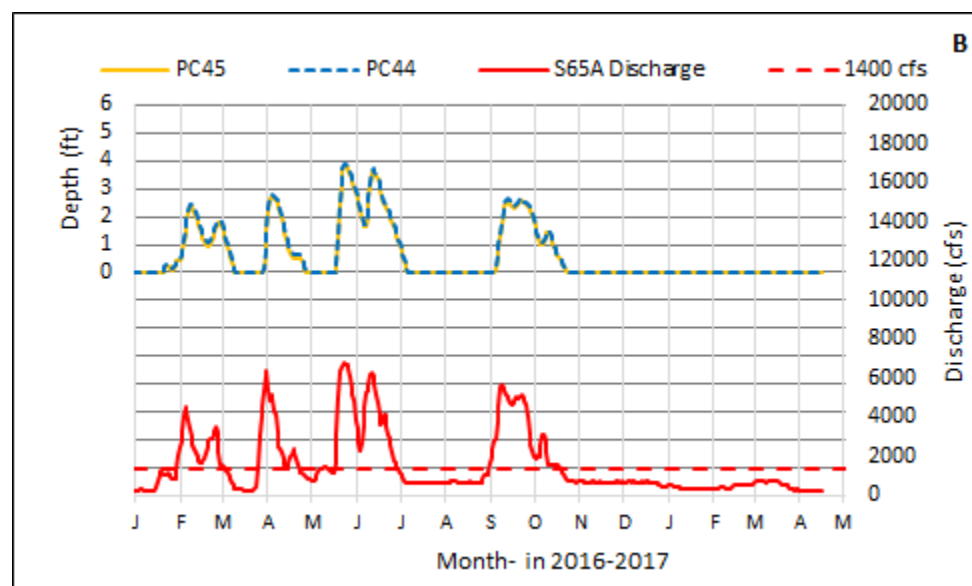
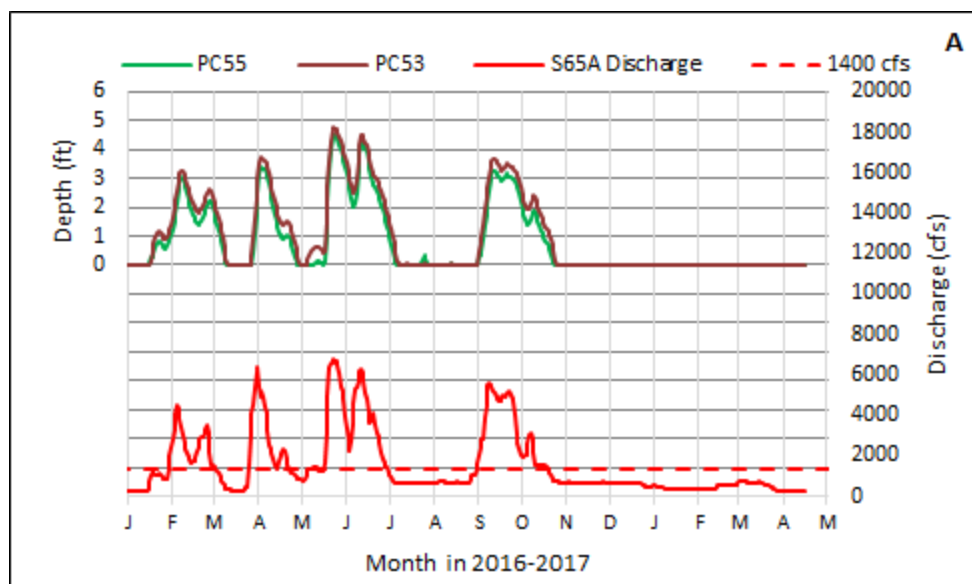


Figure 10. Mean daily Dissolved Oxygen, discharge, temperature and rainfall in the Phase I river channel.



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

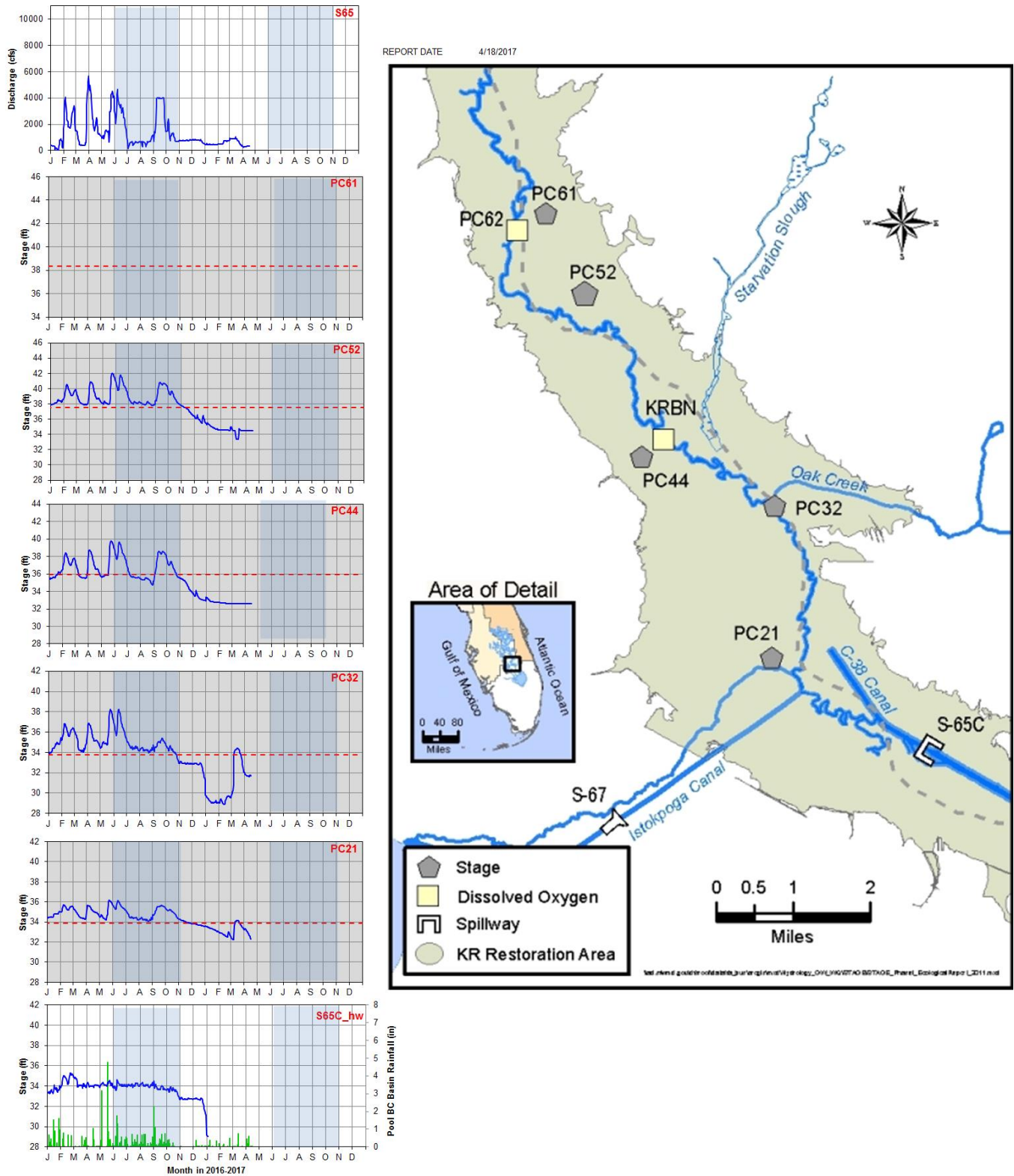


Figure 13. Discharge at S65, stages at five monitoring stations in the Phase I area of the Kissimmee River floodplain, and headwater stage at S65-C since January 1, 2015. The most recent data (~2 weeks) are provisional real-time data from SFWMD DualTrend; previous data are from SFWMD DB-HYDRO (validated).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



Figure 14. The Kissimmee Basin.

LAKE OKEECHOBEE

As of midnight April 16, 2017, Lake stage was 11.96 feet NGVD and in the Beneficial Use sub-band. The current weekly recession rate of 0.29 feet equates to a projected monthly recession rate of 1.16 feet which is over twice the recommended 0.50 feet per month or lower guideline. The goal should be to slow the current recession rate and maintain it at below 0.50 feet per month. The April 13, 2017 wading bird foraging survey indicated that there were approximately 9,671 wading birds foraging on the Lake and an estimated 2,000 to 3,000 more wading birds conducting nesting activities in colonies. The most recent satellite imagery (April 15, 2017) indicated the algal bloom potential may be increasing, especially along the western and northwestern nearshore regions. However, during the April 13th wading bird survey flight, District staff reported no visual blooms in the western Fisheating Bay as the imagery suggests indicating additional validation of the data is needed from this new sensor.

Hydrologic Conditions

According to the United States Corps of Engineers (USACOE) web site, Lake Okeechobee stage is at 11.96 feet NGVD for the period ending at midnight on April 16, 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 0.29 feet over the past week and is 0.95 feet lower than it was a month ago and 2.77 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, 0.03 inches of rain fell directly over the Lake during the past seven days (Figure 3). Similar or less amounts of rain fell to the north and west of the Lake while most of the east coast and portions of the southern watershed received greater amounts of rainfall. The upper Kissimmee valley received no rainfall.

Based on USACOE reported values, current Lake inflow is approximately 237 cfs as detailed below.

Structure	Flow cfs
S65E	0
S65EX1	237
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 5,727 cfs with 1,198 cfs exiting at S77, 2,395 cfs exiting at S308 and 2,277 cfs being directed south through S351, S352 and S354. Approximately 143 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 decreased slightly from 3,453 cfs last week to 3,299 cfs.

Change in elevation equivalents and average weekly flows (midnight April 10, 2017 to midnight April 16, 2017) for major structures are presented in Figure 4.

Based on the Lake Okeechobee wading bird habitat suitability index, there are currently approximately 23,657 acres of suitable foraging habitat for long-legged birds and 10,015 acres for long and short legged birds on the Lake (Figure 5). The most recent wading bird foraging survey (April 13, 2017) indicated that there were about 9,671 wading birds foraging on the Lake (Figure 6) and an estimated 2,000 to 3,000 more wading birds conducting nesting activities in colonies. Currently, conditions are acceptable but very tenuous for wading birds as well as for snail kites. A significantly slower recession rate is needed to keep wading bird and snail kite foraging areas hydrated and to help maintain water levels under wading bird and snail kite nests thereby reducing the risk of predation by raccoons and other animals.

Satellite imagery from a higher resolution sensor (OLCI) aboard the Sentinel 3a satellite is now available. This sensor has increased spatial resolution (300 m compared to 1 km for MODIS) and more optimal spectral bands for increased detection of the phycocyanin pigments found in cyanobacteria. The most recent imagery from this new OLCI sensor (April 14 and April 15, 2017) indicated the algal bloom potential may be increasing, especially along the western and northwestern nearshore regions (Figure 7). However, during the April 13 wading bird survey flight, District staff reported no visual blooms in the western Fisheating Bay as the imagery suggests indicating additional validation of the data is needed from this new sensor.

Water Management Recommendations

Lake stage is 11.96 feet NGVD and is in the Beneficial Use sub-band. The current weekly recession rate of 0.29 feet equates to a projected monthly recession rate of 1.16 feet which is over twice the recommended 0.50 feet or less per month guideline. A too rapid decrease in lake levels may jeopardize the wading bird and snail kite nesting seasons by drying out wading bird and snail kite foraging locations and lowering water levels under nests allowing for increased risk of predation.

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 SAV) and faunal (wading birds, snail kites, apple snails and fish) communities.

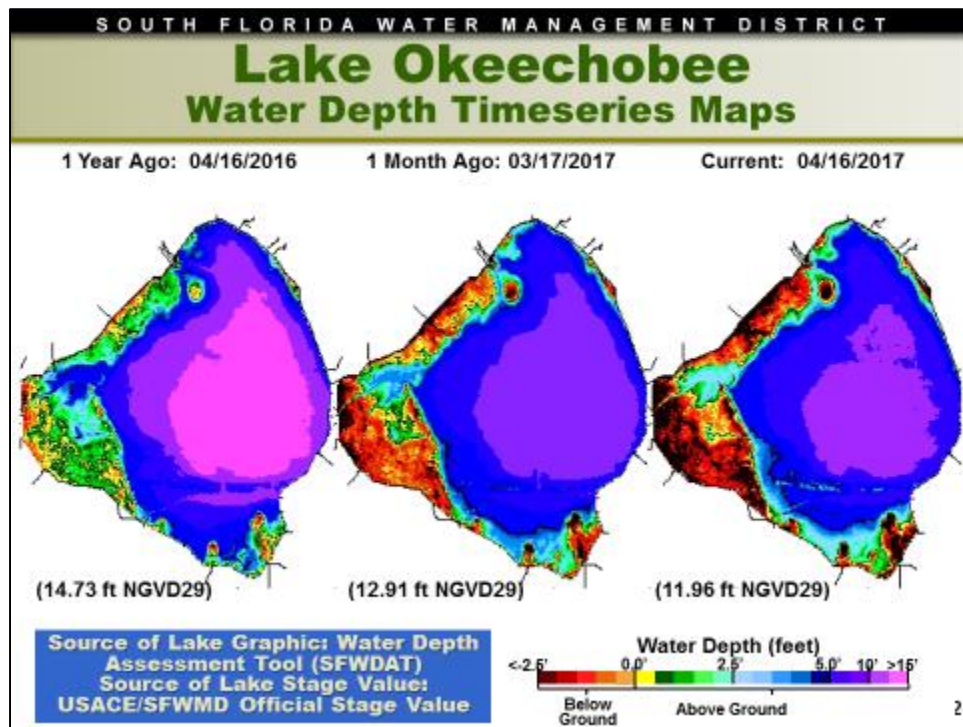


Figure 1

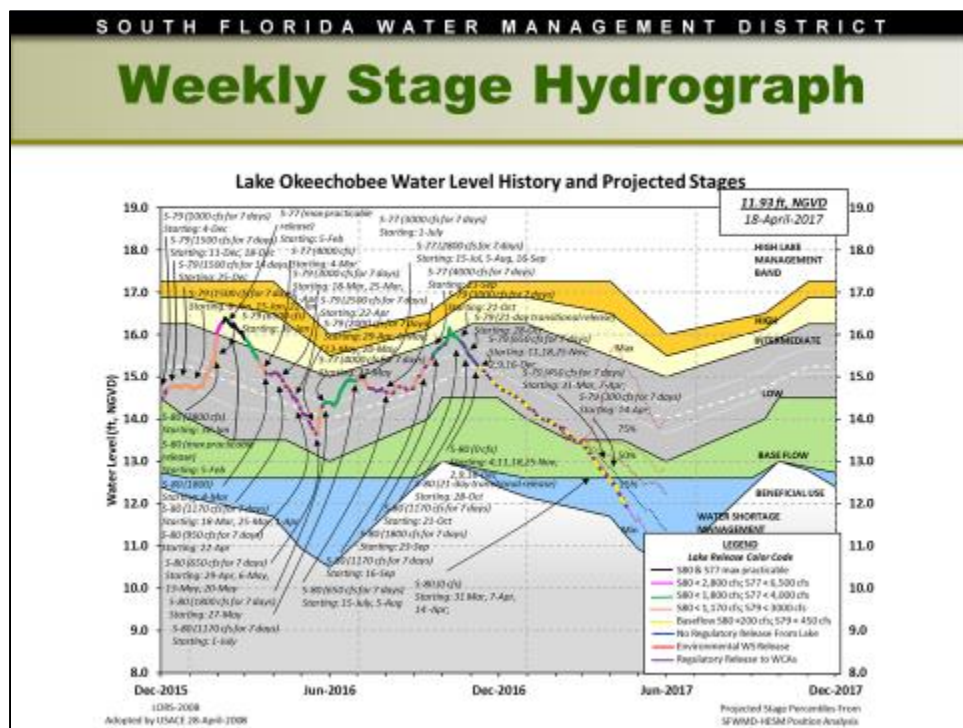


Figure 2

SFWMD PROVISIONAL RAINDAR 7-DAY BASIN RAINFALL ESTIMATES

FROM: 2045 EST, 04/09/2017

THROUGH: 2045 EST, 04/16/2017

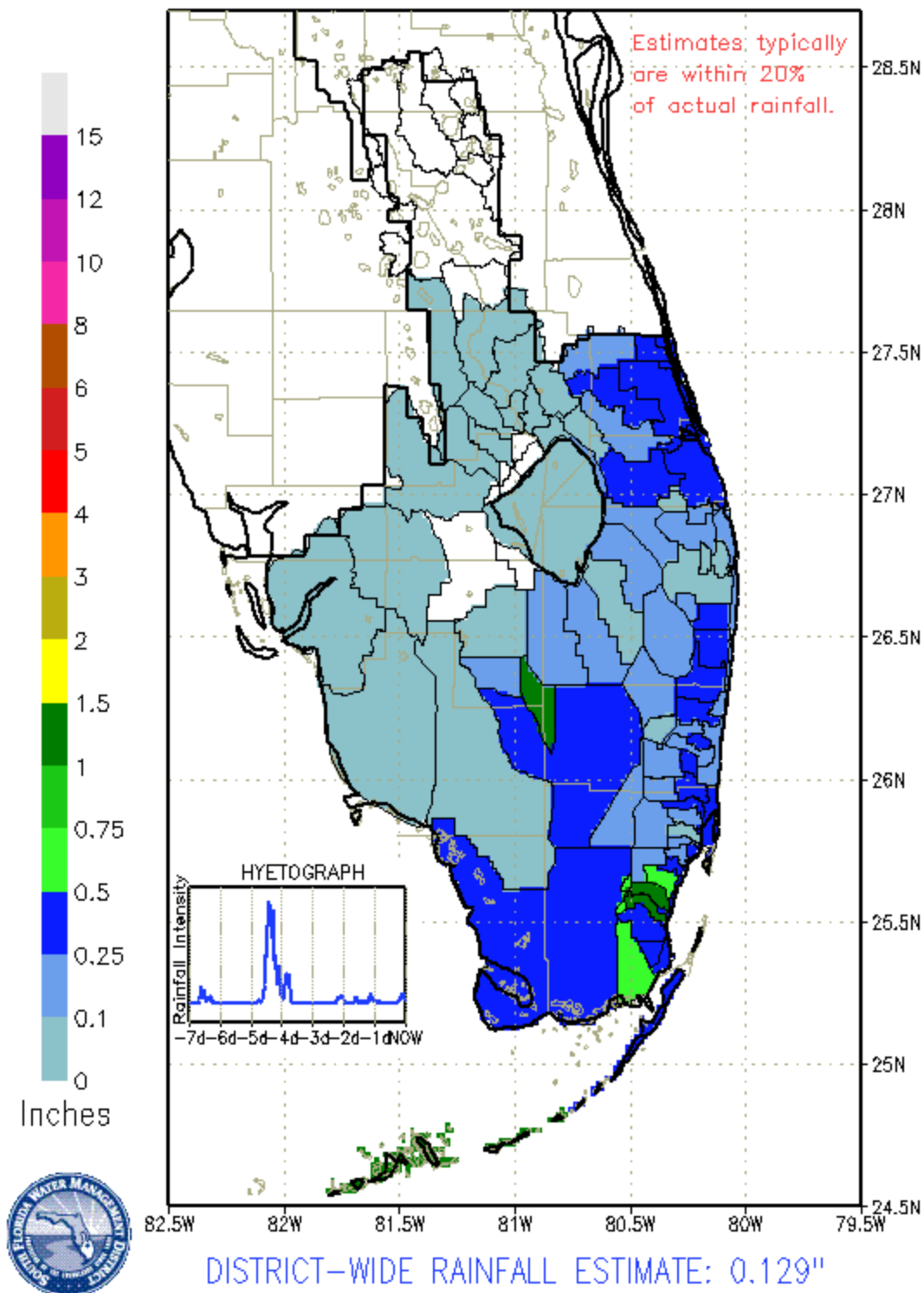


Figure 3

	Average Daily Flow Past Week cfs	Feet of Change Past Week
S65E & S65EX1	289	0.011
S71 & 72	0	0.000
S84 & 84X	0	0.000
Fisheating Creek	39	0.002
Rainfall	N.A.	0.003
OUTFLOWS	Average Daily Flow Past Week cfs	Feet of Change Past Week
S77	860	0.033
S308	111	0.004
S351	1406	0.054
S352	775	0.030
S354	784	0.030
L8	-16	-0.001
ET	3299	0.128

Figure 4

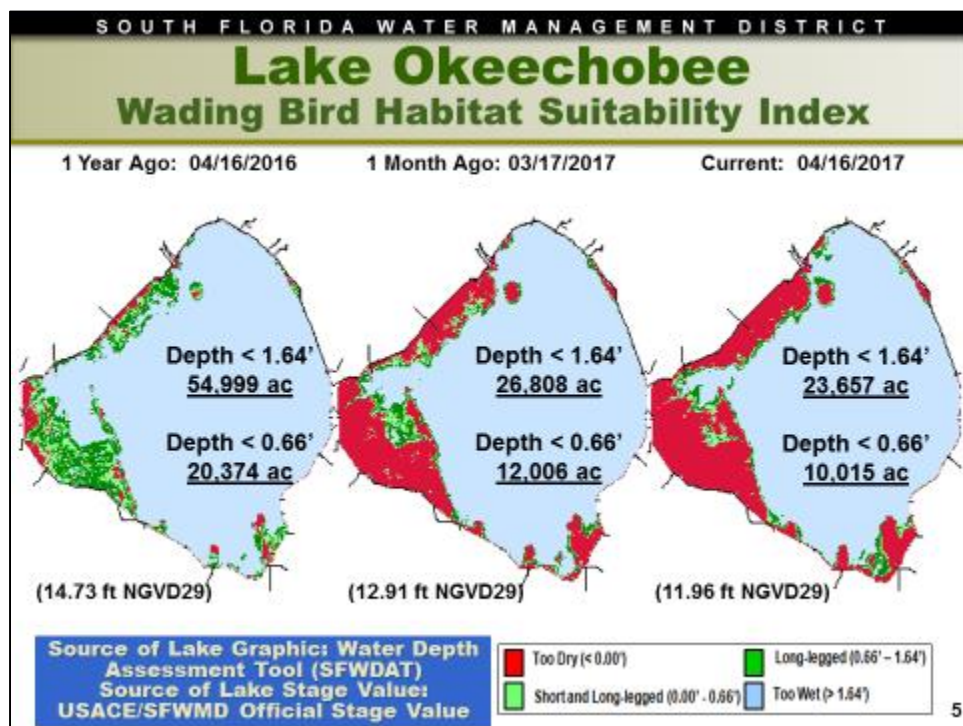


Figure 5

Lake Istokpoga:

The annual recession from high pool to low pool stage on Lake Istokpoga is underway. Stage is 38.31 feet NGVD as of April 16, 2017 and is currently 0.88 feet below its regulation schedule of 39.19 feet NGVD (Figure 8). Average flows into the Lake from Arbuckle and Josephine creeks were one cfs and nine cfs respectively, which is a decrease compared to last week's total flow. Average discharge from S68 and S68X this past week was 74 cfs, an increase from the previous week's flow. According to RAINДАР 0.02 inches of rain fell in the Lake Istokpoga watershed during the past seven days.

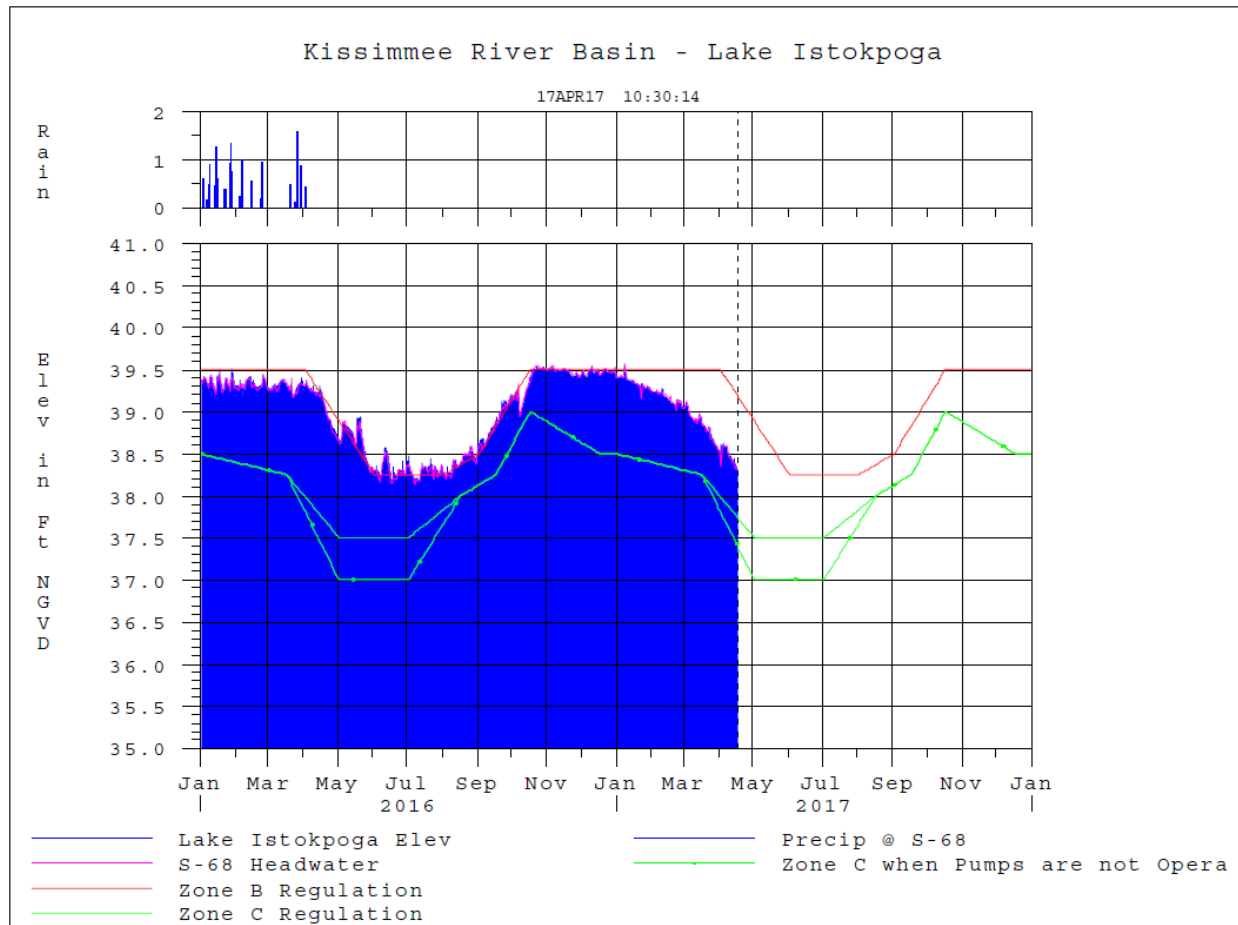


Figure 8

ESTUARIES

St. Lucie Estuary:

Over the past week, provisional flows averaged about 0 cfs at S-80, 137 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 38 cfs from Ten Mile Creek at the Gordy Road Structure. Average inflow from tidal basin tributaries is estimated to be 89 cfs (Figures 1 and 2). Total inflow averaged about 127 cfs last week and 115 cfs over last month.

Over the past week, salinity increased 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)	27.0 (25.7)	27.9 (27.1)	NA ¹
US1 Bridge	28.7 (28.1)	29.0 (28.2)	10.0-26.0
A1A Bridge	33.9 (33.3)	34.4 (33.8)	NA

¹Envelope not applicable

Caloosahatchee Estuary:

During the past week, provisional flows averaged approximately 883 cfs downstream of S-77, 362 cfs at S-78, and 306 cfs at S-79. Average inflow from tidal basin tributaries is estimated to be 61 cfs (Figures 5 and 6). Total inflow averaged 367 cfs last week and 666 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 and in the fair range at Shell Point and at Sanibel (Figure 9). The 30-day moving average surface salinity is 4.0 at Val I-75 and 11.4 at Ft. Myers. The 30-day moving average salinity at Ft. Myers has been above 10 for 21 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 6.3 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)	5.0 (1.8)	5.3 (1.9)	NA ¹
*Val I75	5.3 (3.0)	8.5 (4.9)	0.0-5.0 ²
Ft. Myers Yacht Basin	12.4 (10.4)	15.6 (11.3)	NA
Cape Coral	20.8 (21.1)	23.0 (21.3)	10.0-30.0
Shell Point	31.3 (30.5)	32.5 (31.6)	10.0-30.0
Sanibel	34.7 (34.0)	EM ³ (34.6)	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)	4.53 – 8.84	3.28 – 7.59	Data Suspect
Dissolved Oxygen (mg/l)	4.45 – 7.26	5.90 – 8.01	No Data

The Florida Fish and Wildlife Research Institute reported on April 13, 2017, that *Karenia brevis*, the Florida red tide organism, persists in Southwest Florida from Manatee to Lee counties. *Karenia brevis* was observed in background to low concentrations in twenty-one samples collected from Lee County. Over the past week, respiratory irritation has been reported at Bowman's Beach in Lee County.

Water Management Recommendations

The 30-day average salinity at the I-75 Bridge is forecast to exceed five with no inflow at S-79, and the daily salinity is forecast to reach 9.6 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, only a release of 650 cfs is forecast to keep the 30-day average salinity below five at the I-75 Bridge.

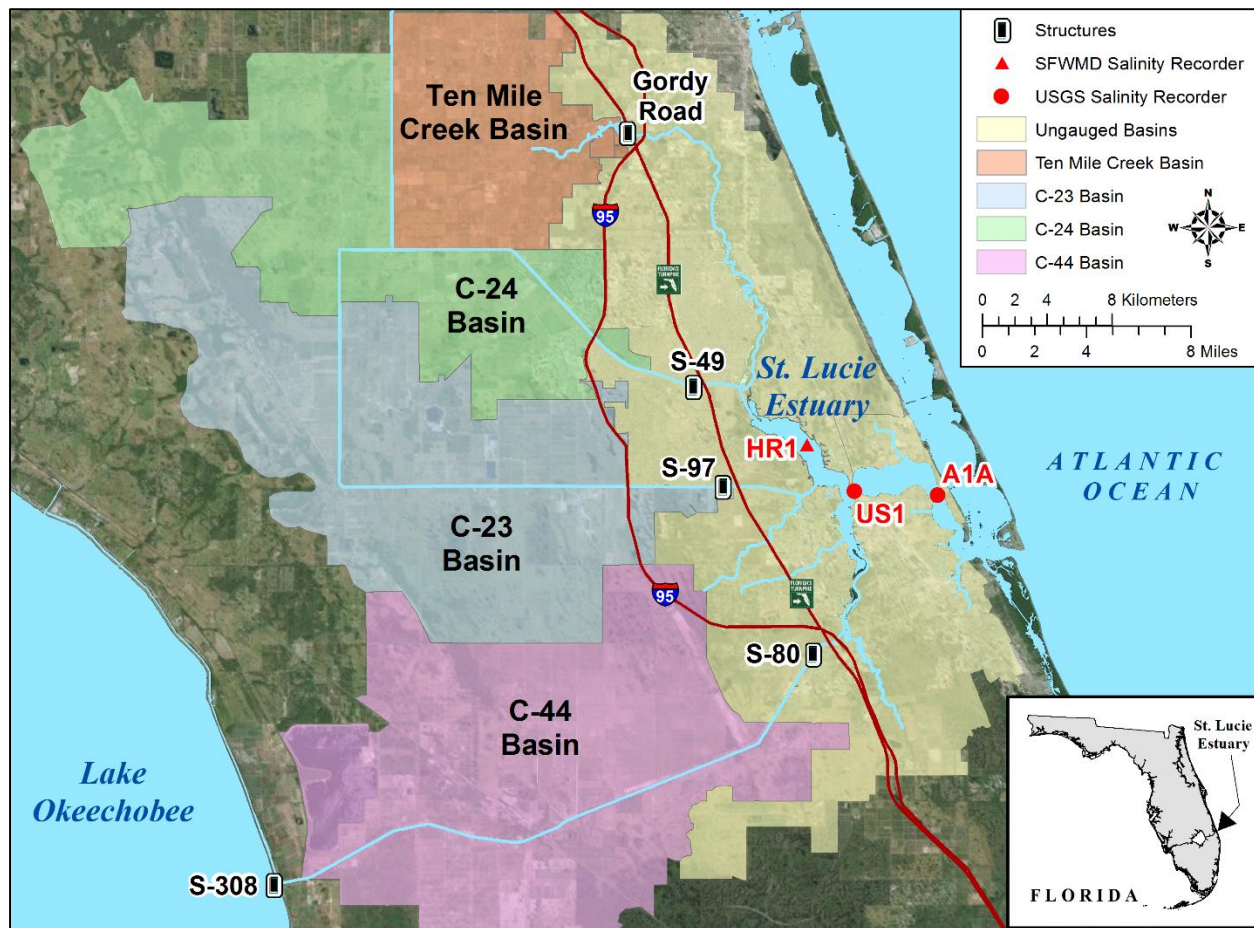


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

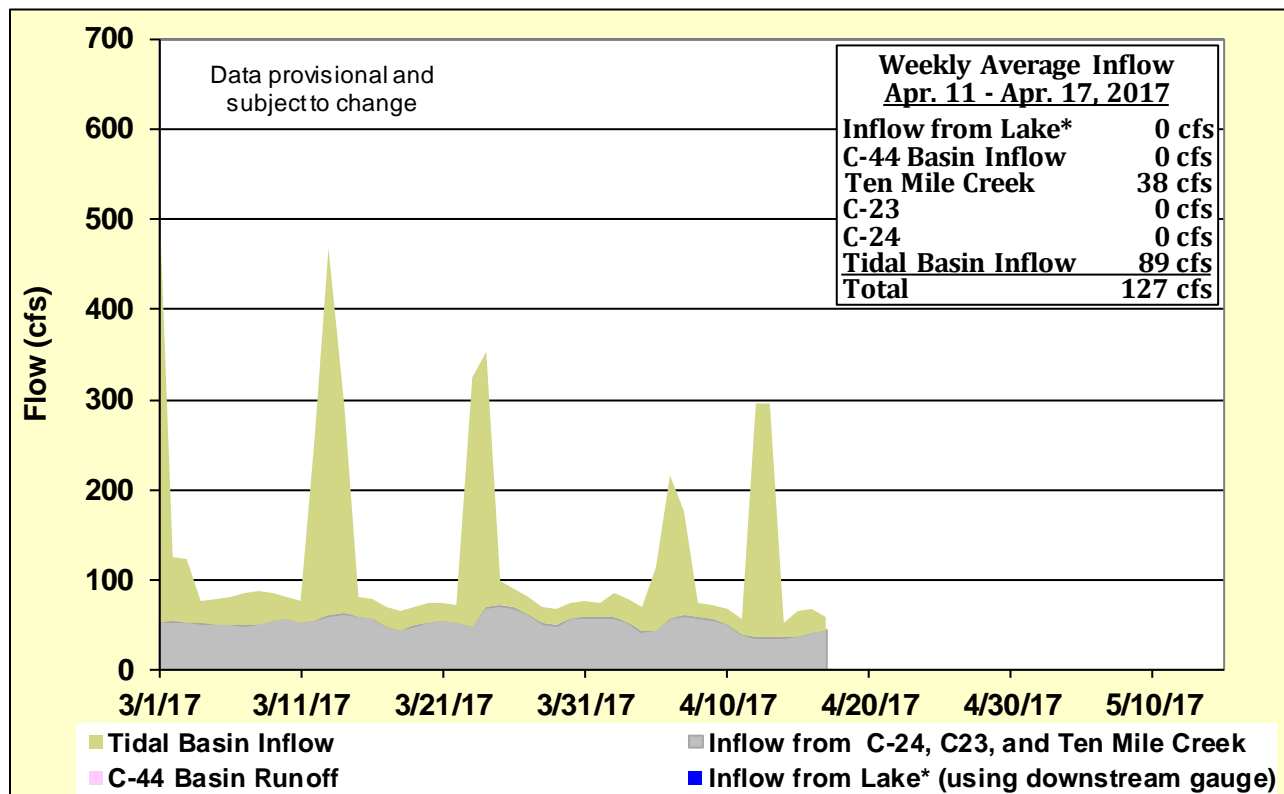


Figure 2. Estimated surface freshwater inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basins into the St. Lucie Estuary.

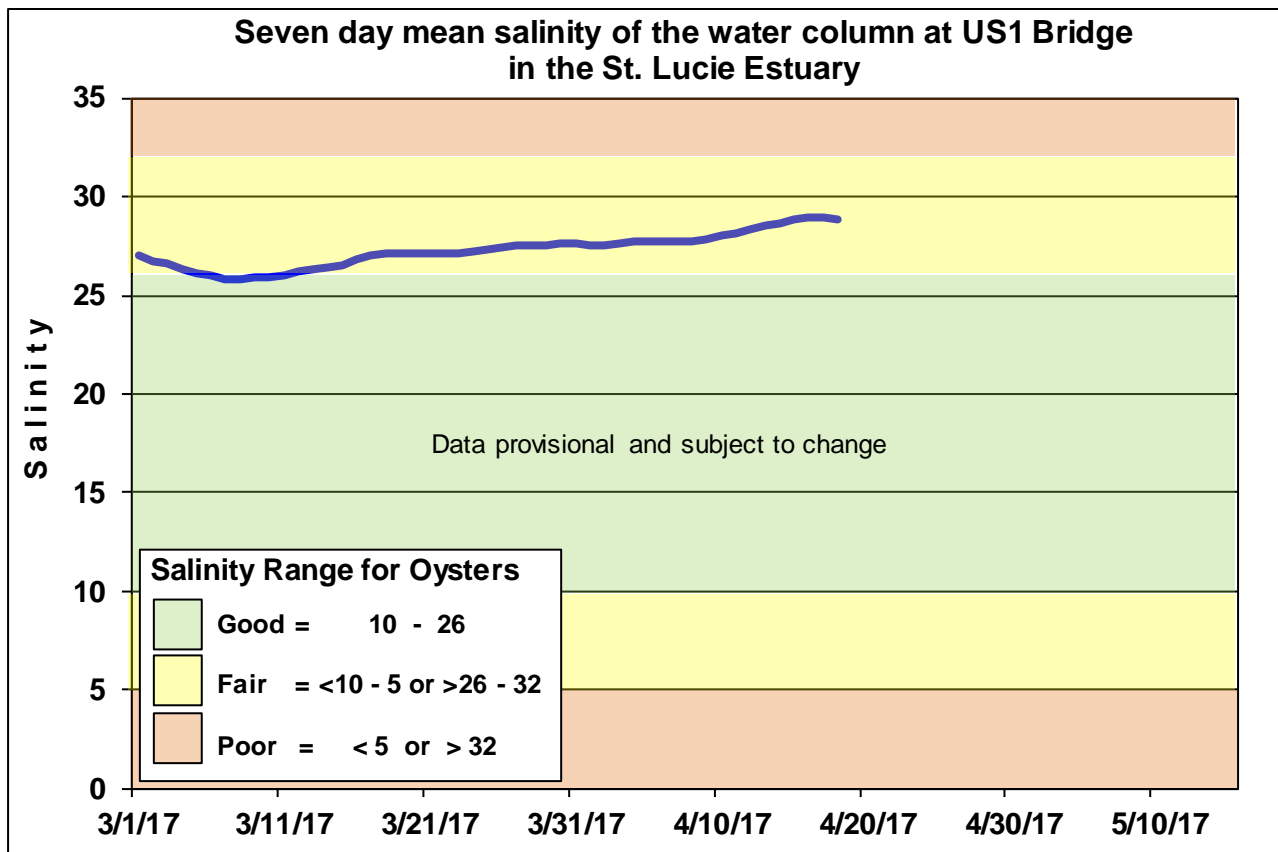


Figure 3. Seven-day mean salinity of the water column at the U.S. Highway 1 Bridge.

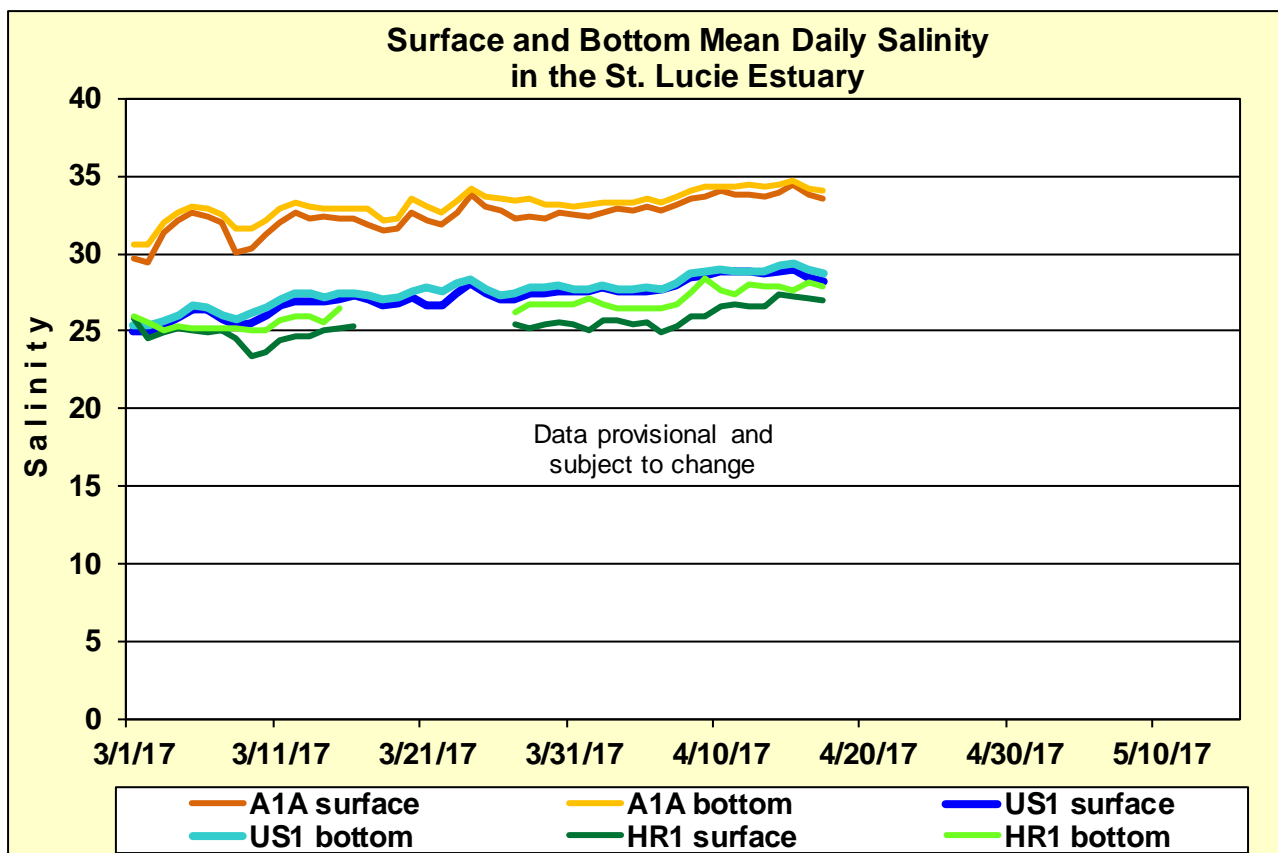


Figure 4. Daily mean salinity at the A1A, US1 and estimated HR1 stations.

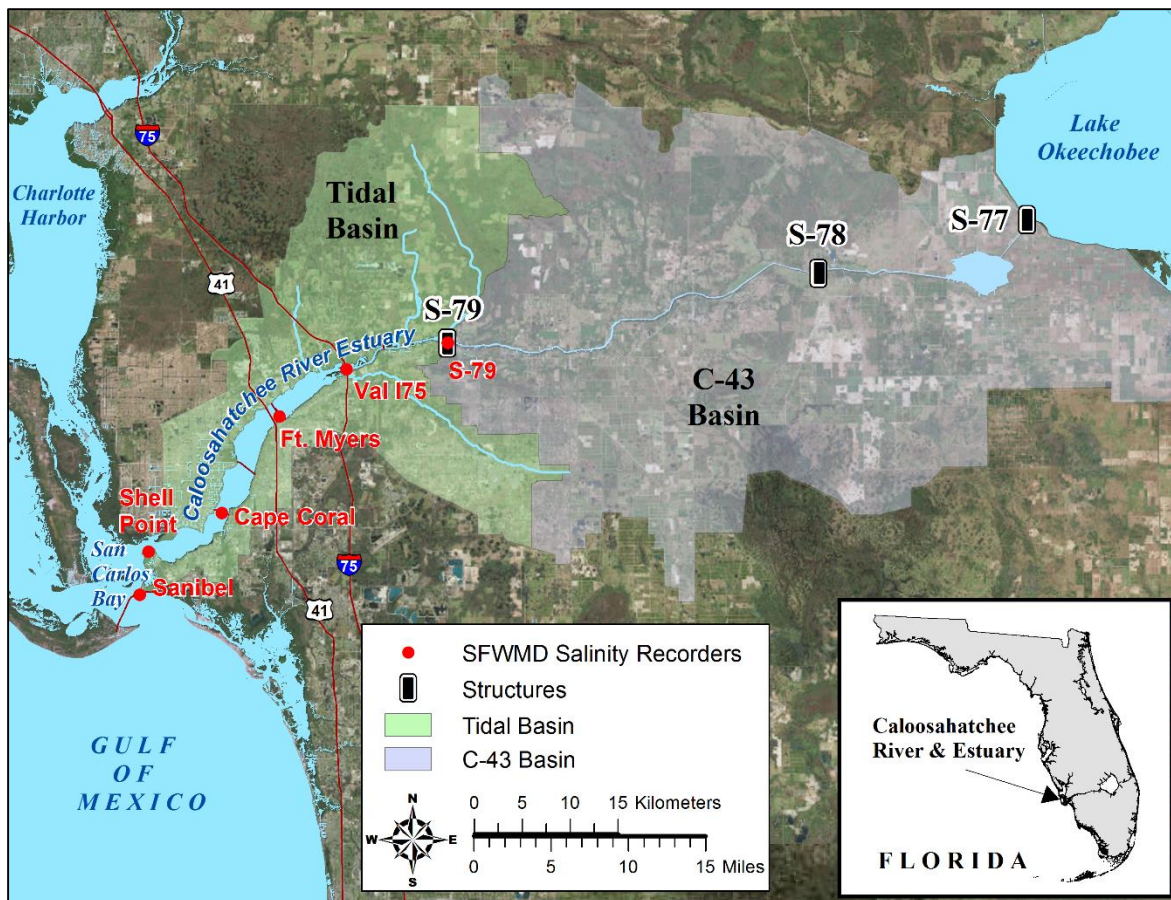


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

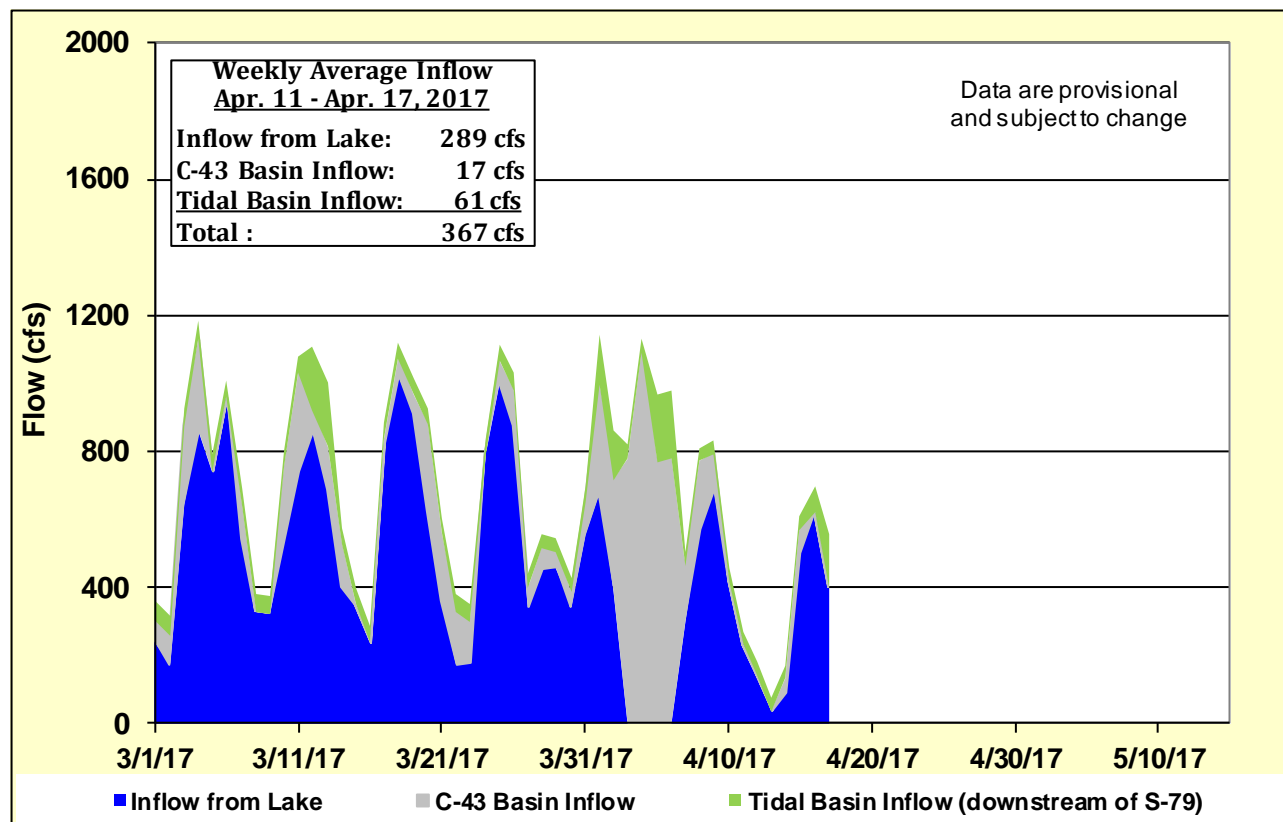


Figure 6. Freshwater inflows from Lake Okeechobee, runoff from the C-43 basin, and tributaries in the tidal basin into the Caloosahatchee River Estuary.

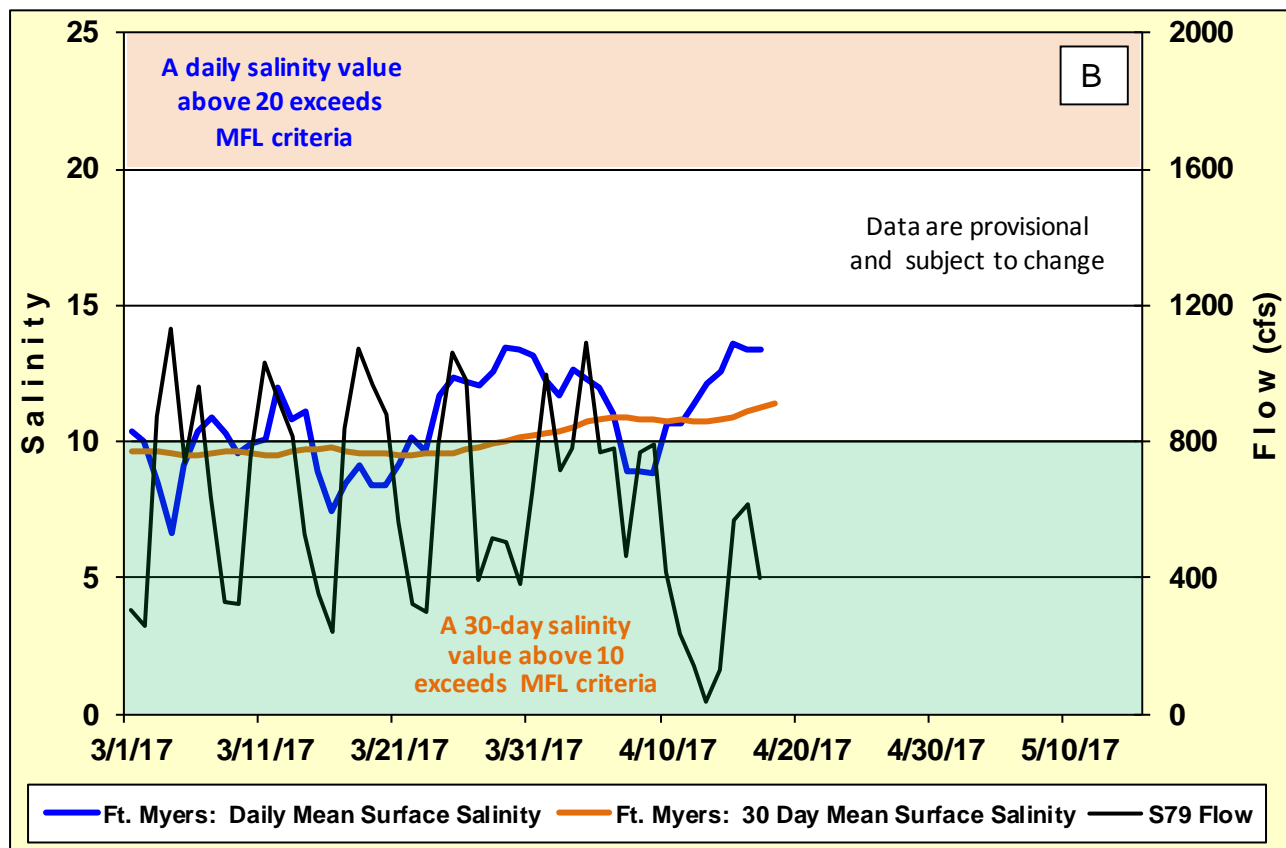
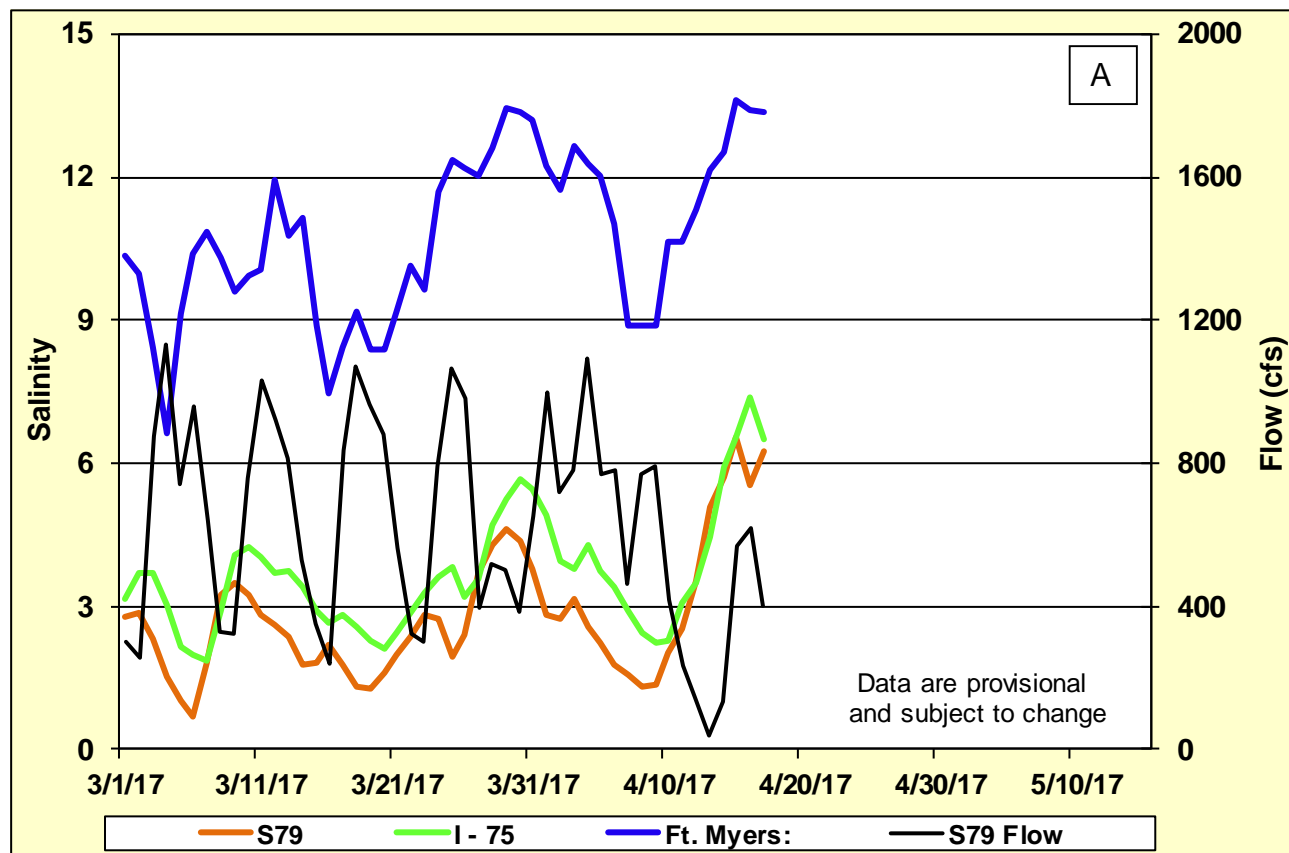


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations (A) and 30-day moving average salinity at Ft. Myers (B).

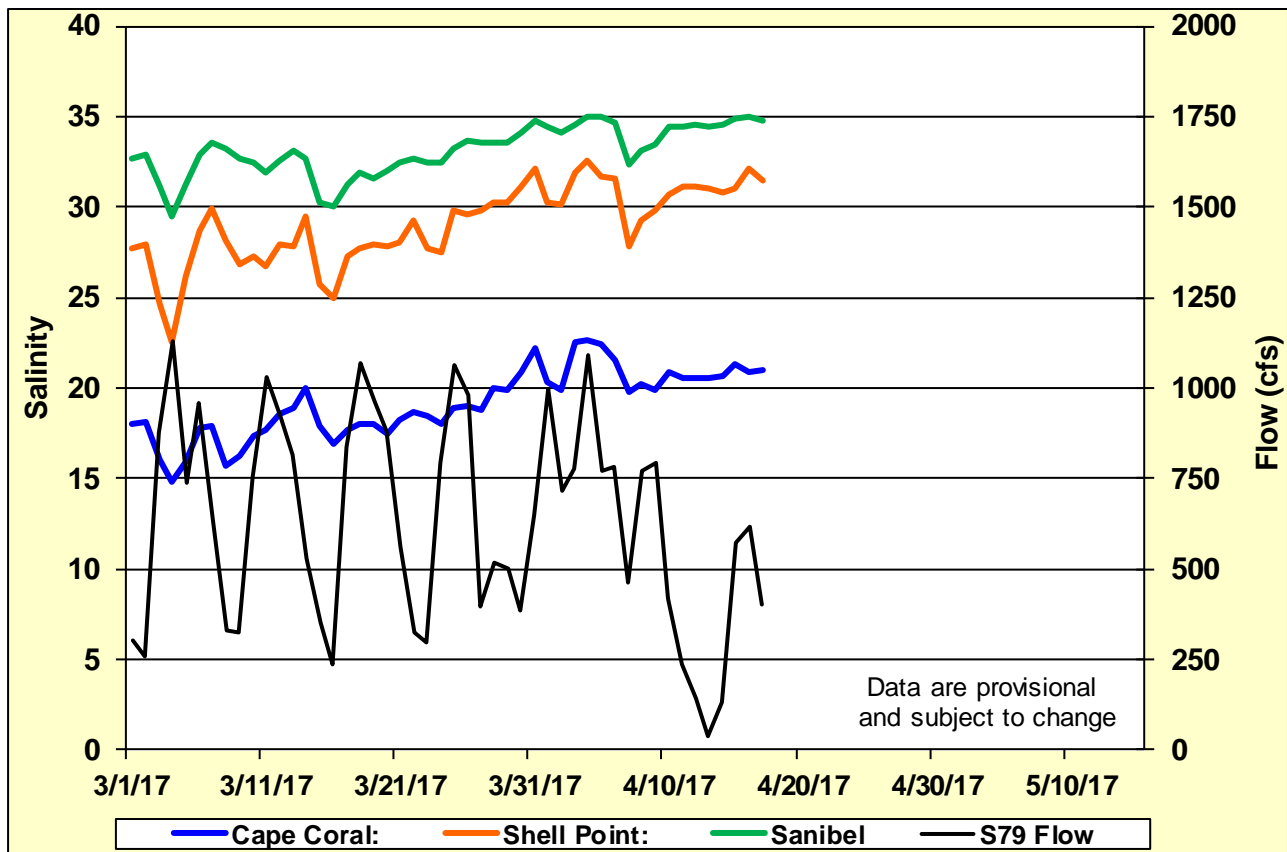


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

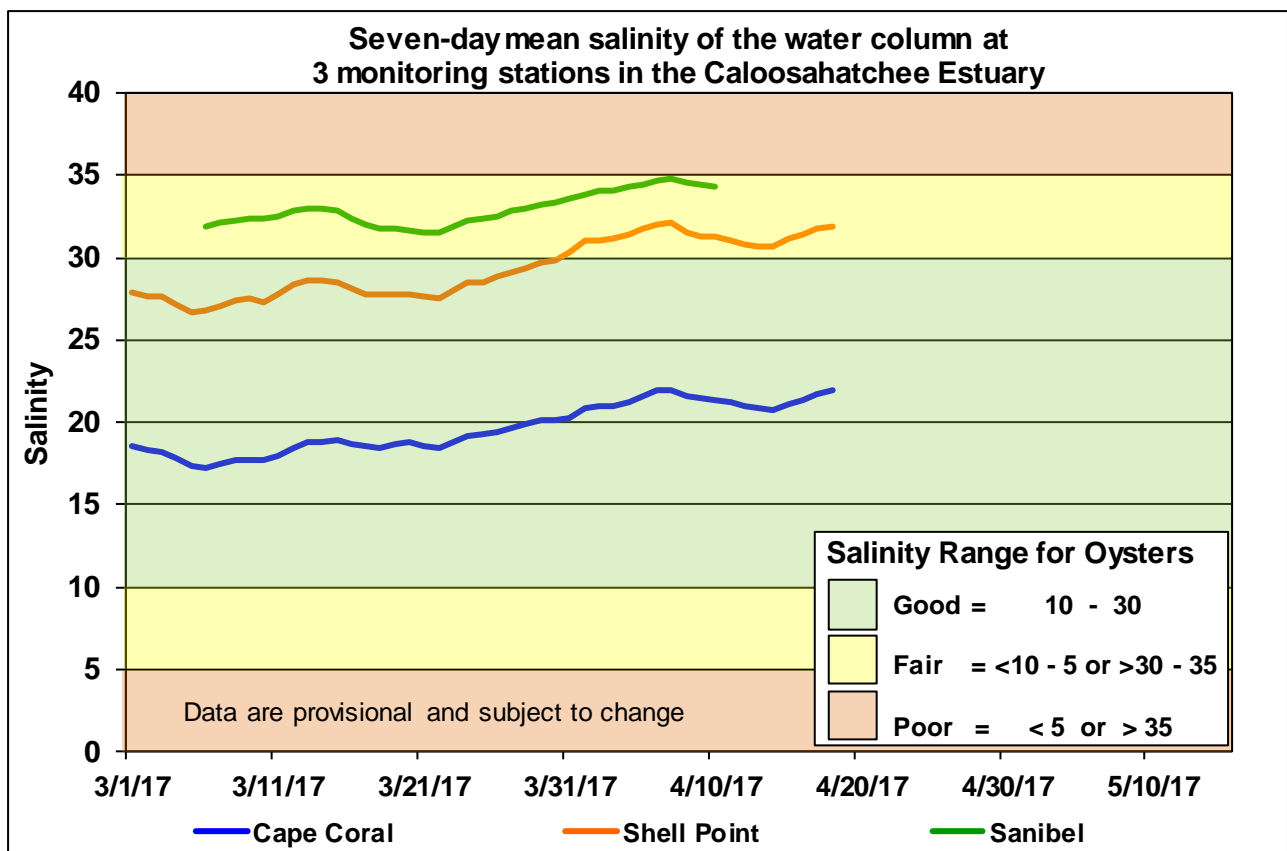


Figure 9. Seven-day mean salinity at Cape Coral Bridge, Shell Point and Sanibel Bridge monitoring stations.

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

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

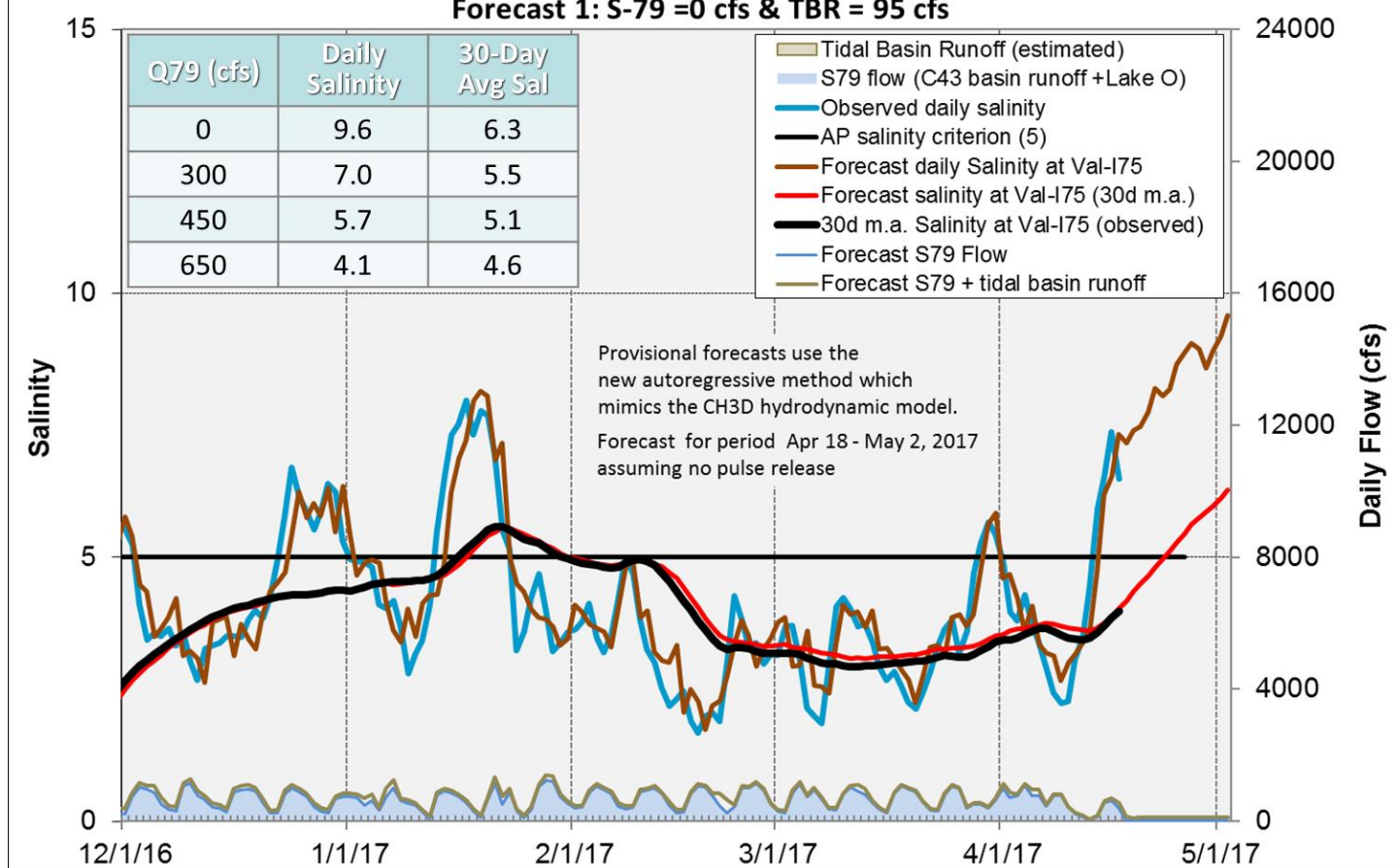


Figure 10. 14-day salinity forecast at Val I-75 assuming no releases at S-79.

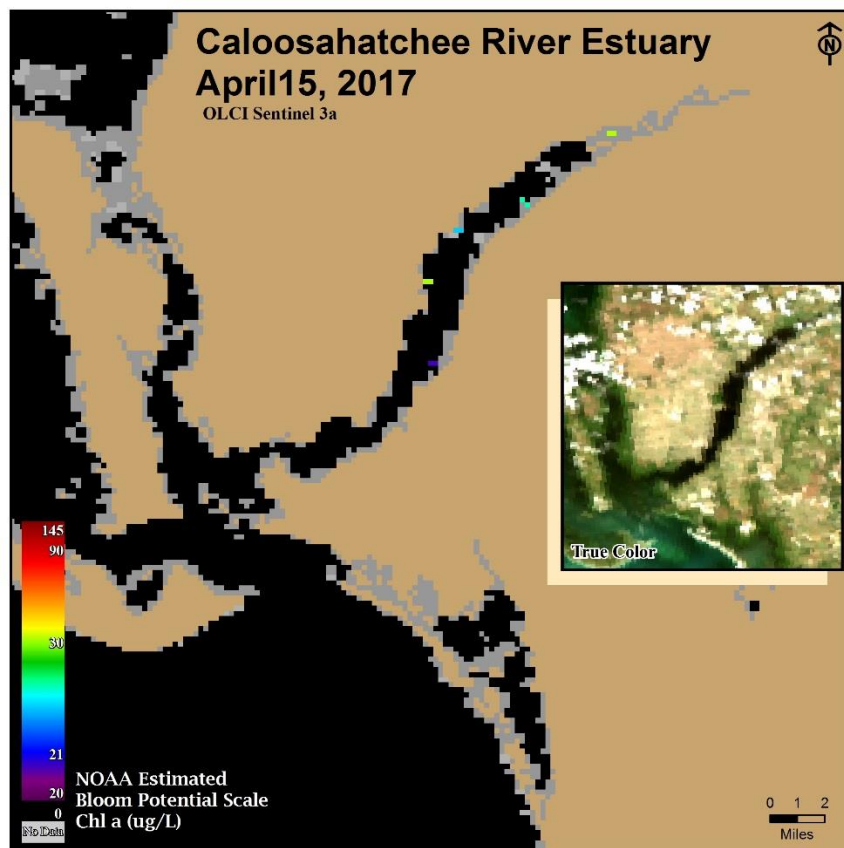
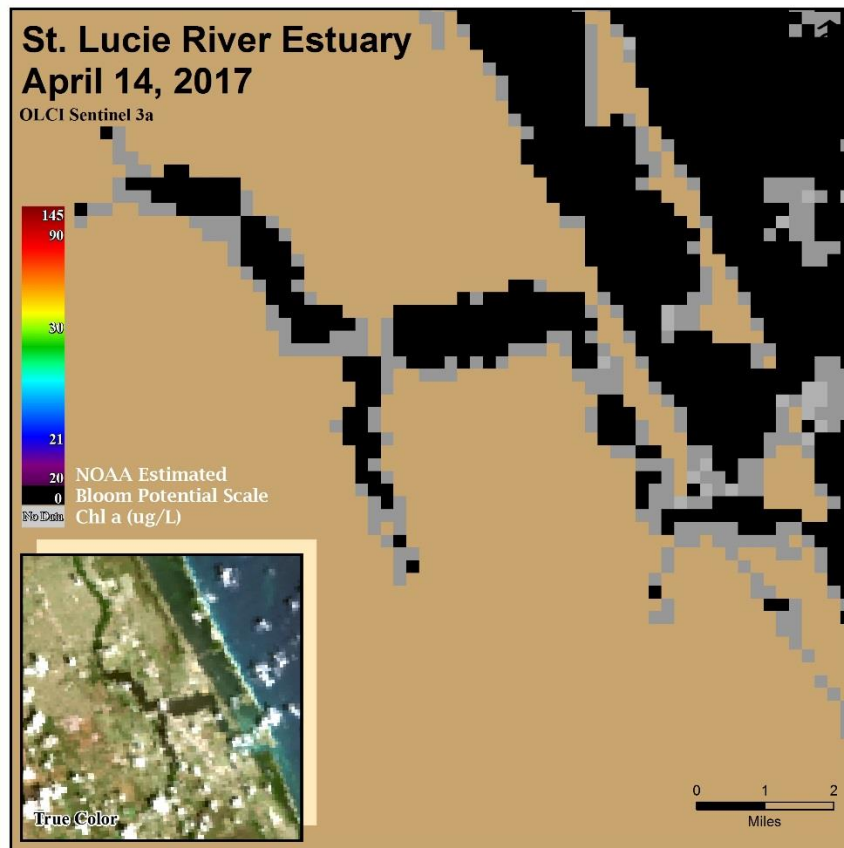

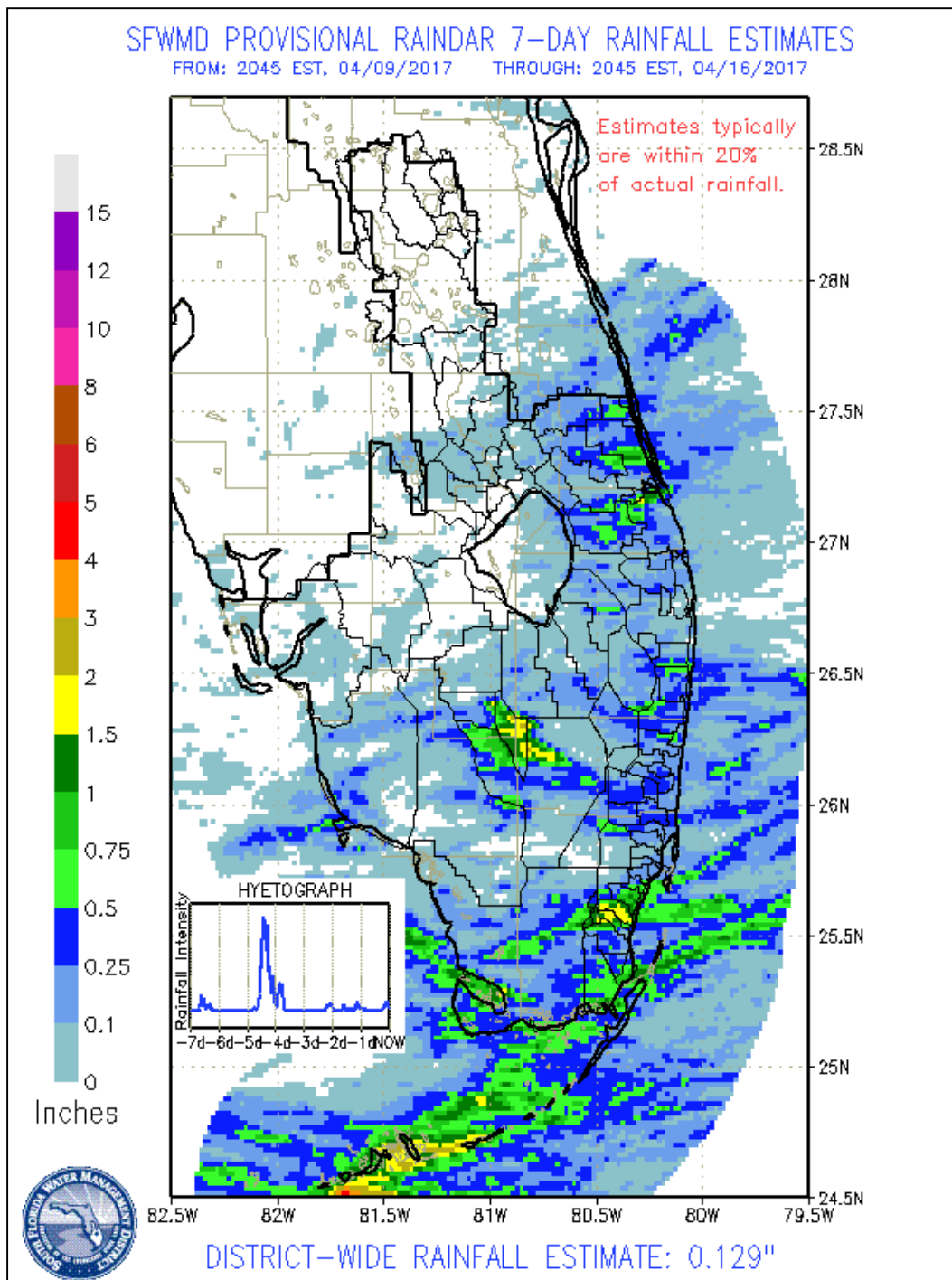


Figure 11. Sentinel 3a Satellite imagery provided by NOAA uses Ocean and Land Color Instrument (OLCI) to estimate cyanobacteria bloom potential in Caloosahatchee Estuary.

EVERGLADES

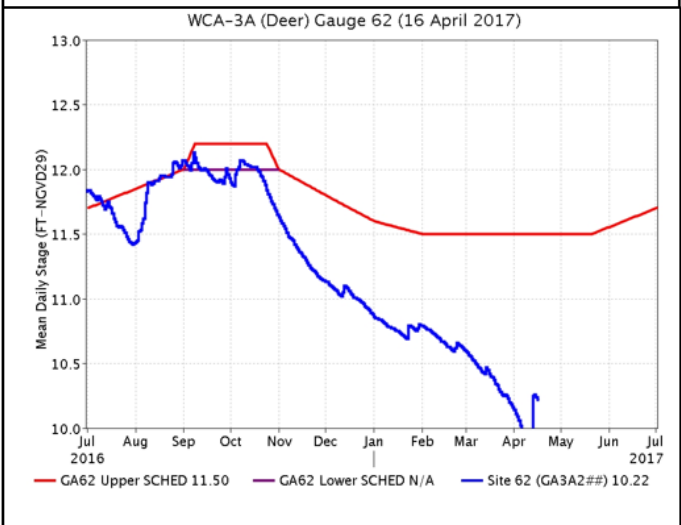
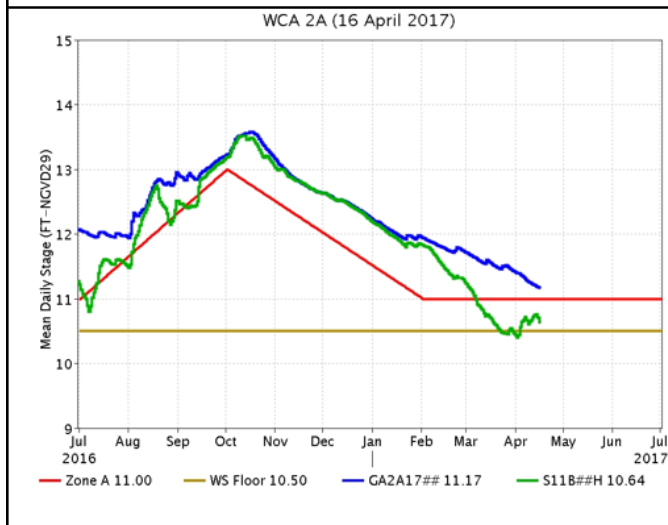
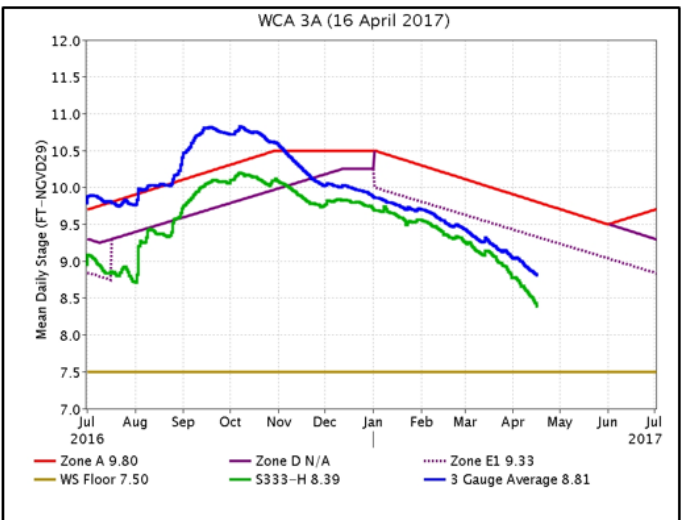
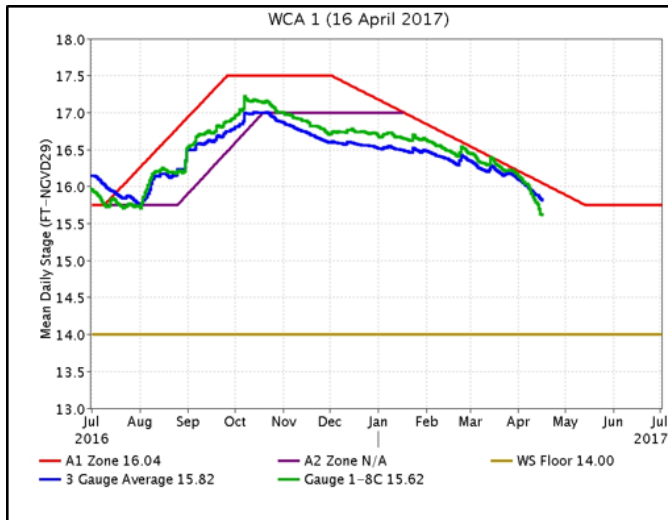
District wide rainfall of 0.129 inches over the last week was inconsistent throughout the Everglades leading to uneven recession rates across the WCAs and ENP. Heavy rain in the northwest corner of WCA-3A (near gauge 62) most likely skewed the average used for this reporting. WCA-3 gauges 63,64 and 65 averaged a -0.12 drop. Current depth conditions suggest that at these rates, optimal conditions for wading bird foraging cannot be sustained throughout the nesting season.

Everglades Region	Rainfall (Inches)	Stage Change (feet)	
WCA-1	0.17	-0.12	
WCA-2A	0.20	-0.09	
WCA-2B	0.05	-0.19	
WCA-3A	0.29	0.01	
WCA-3B	0.13	-0.14	
ENP	0.30	-0.33	



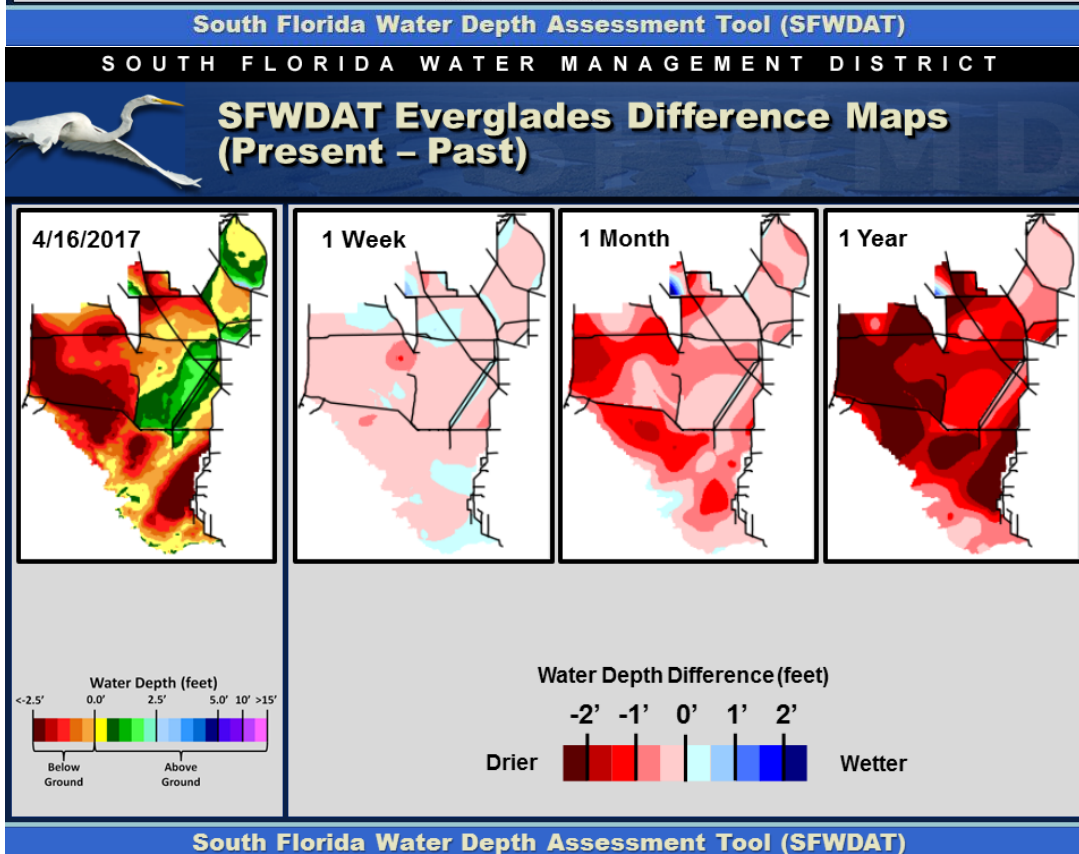
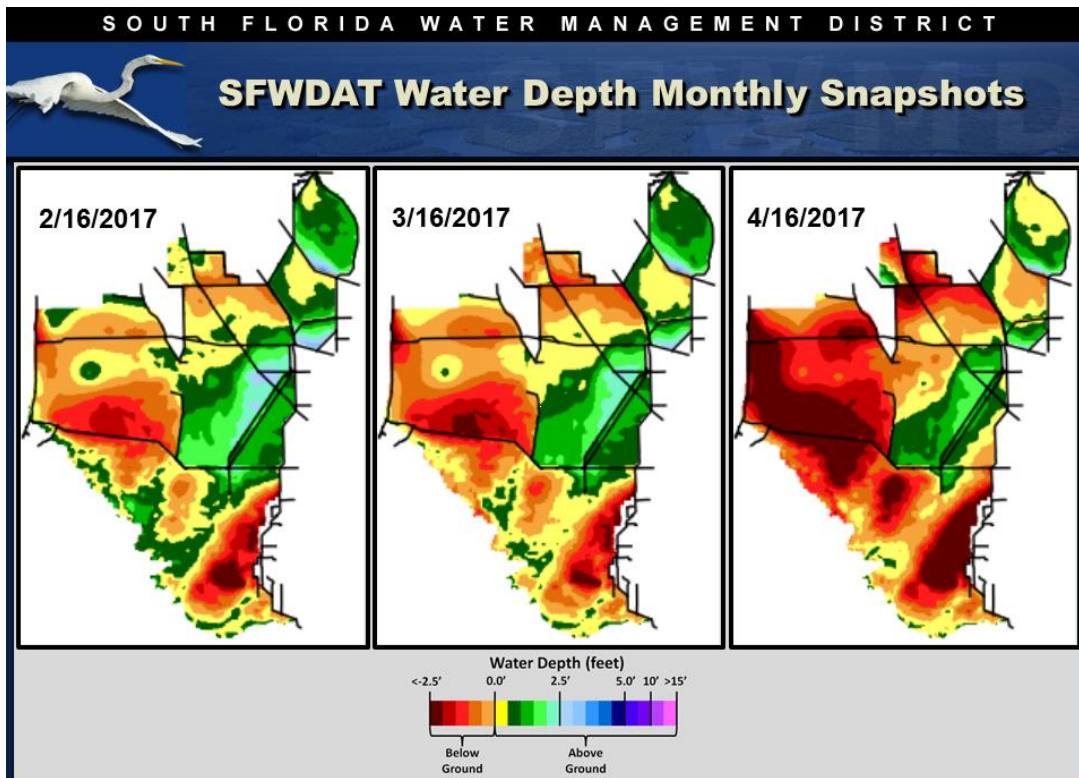
Regulation Schedules: WCA-1 increased to 0.22 feet below zone A1 and is deviating from the regulation line. WCA-3A three-gauge average is 0.52 feet below zone E1, and continues to deviate from the regulation line.

In WCA-2A the marsh stage at gauge GA2A17 dropped to 0.17 feet above zone A1 while the canal stage measured at the headwaters of S11B rose to 0.14 feet above the floor. WCA-3A at gauge 62 (Northwest corner) remains greater than 1.5 feet below schedule.



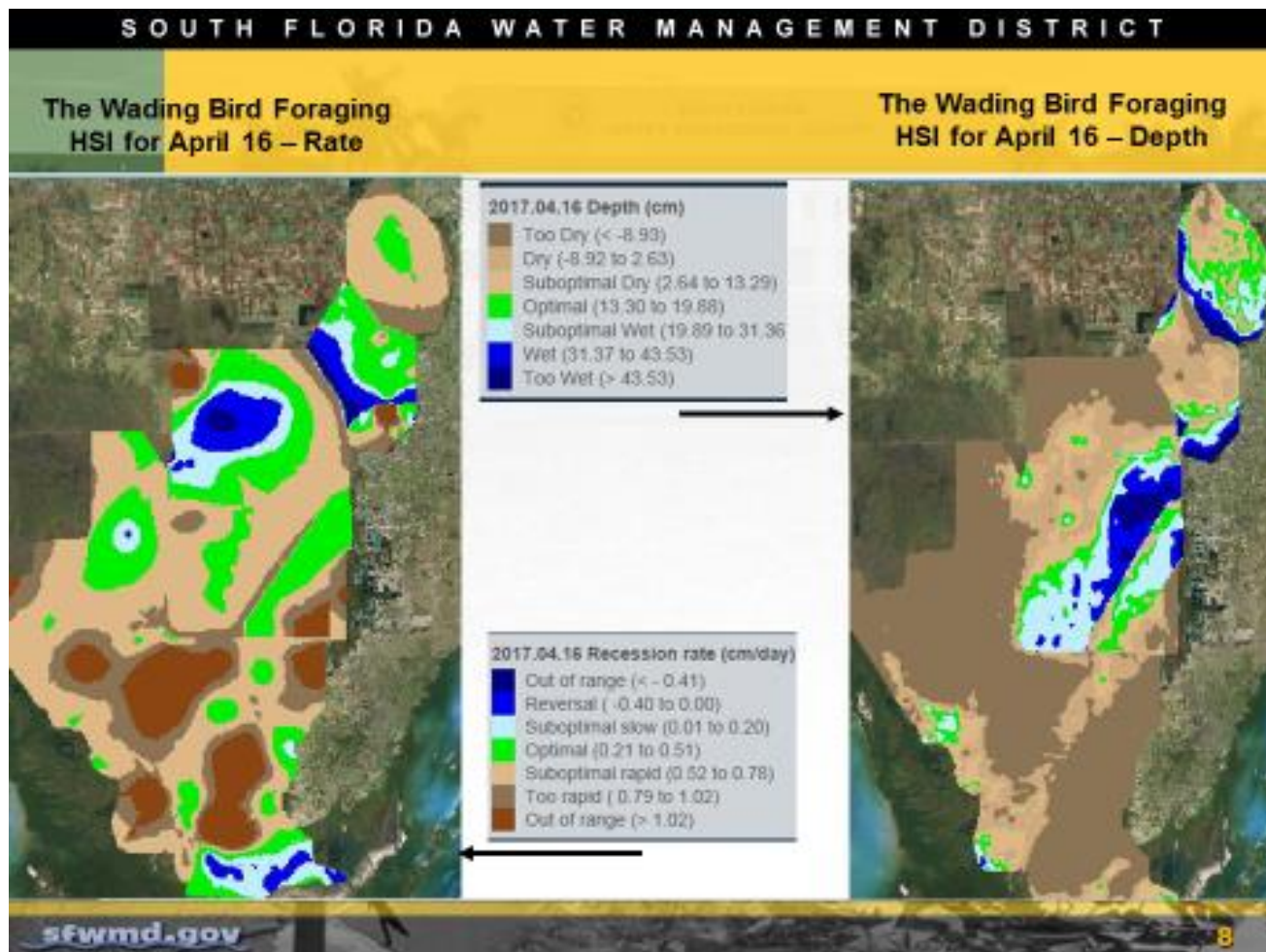
Blue – wetlands
Green – canals

Water Depths and Changes: This week's water depths at monitored gauges other than in WCA-2B range from -0.31 feet (northeast WCA-3A) to 1.33 feet (southern WCA-3A). Over the last week individual gauge changes ranged from +.40 feet to -0.33 feet.



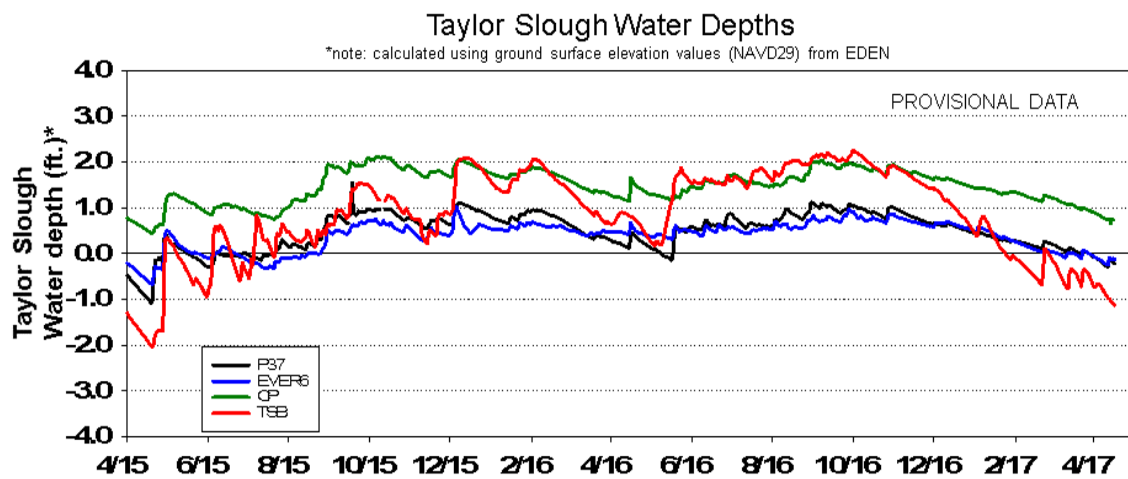
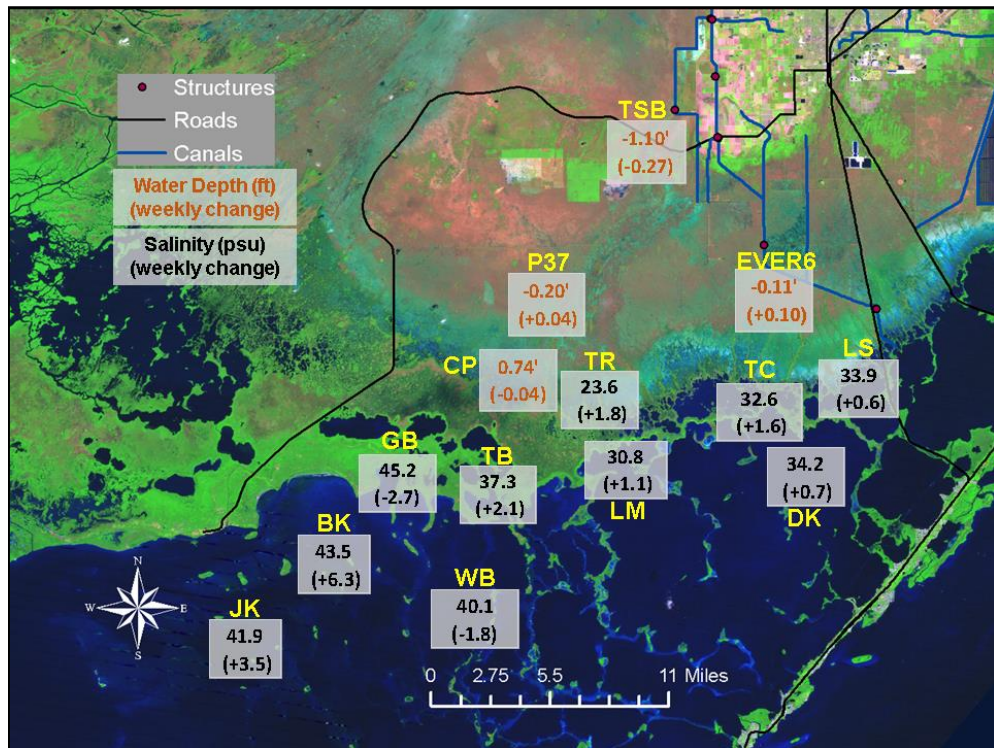
Wading Birds: No wading bird flights were conducted in the last week however foraging behavior is expected to be the same as last week with large numbers of mixed species wading bird flocks feeding throughout the Everglades in areas where depths are currently optimal for wading bird foraging (see green areas on the depth Habitat Suitability Index below right).

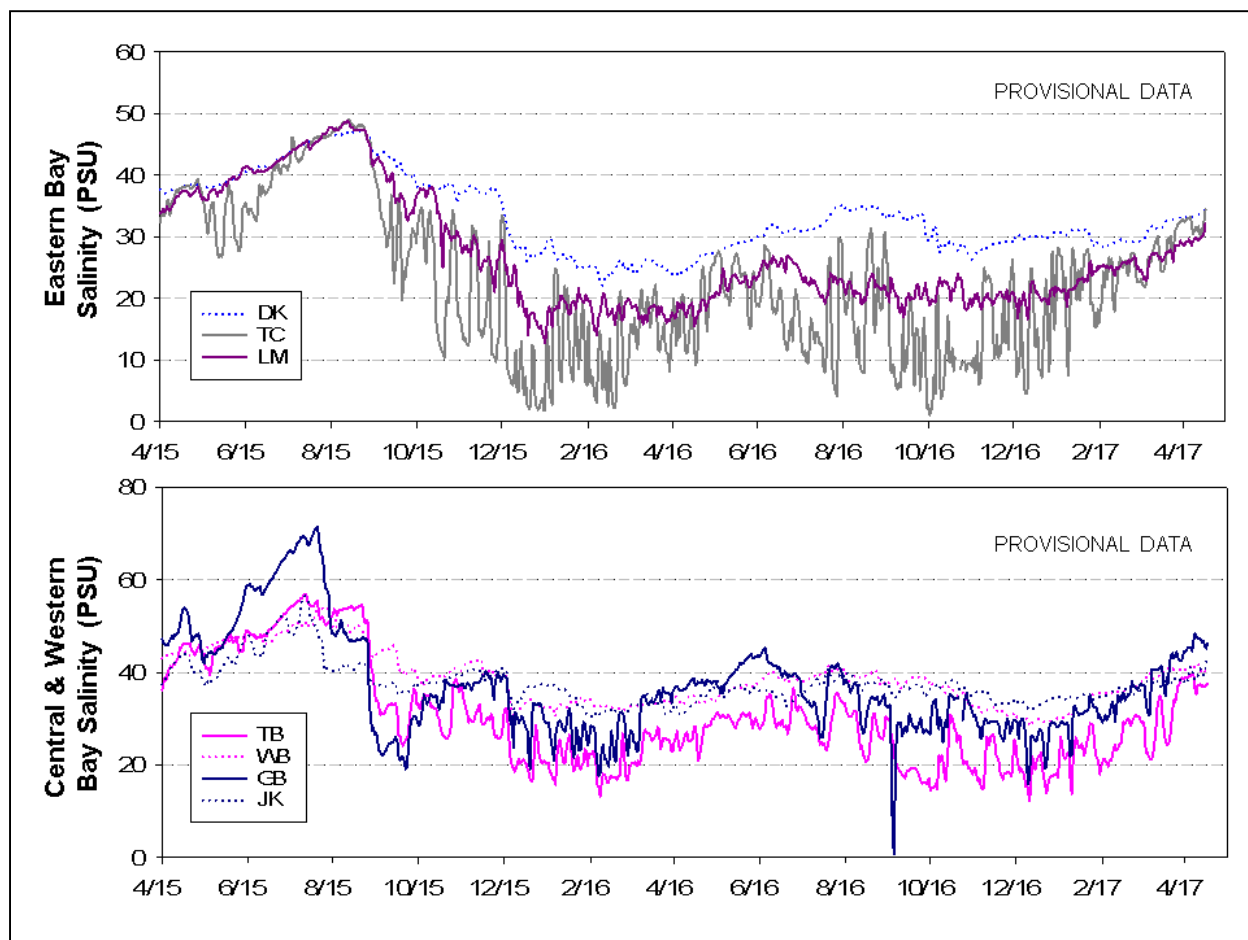
However, many areas are now very dry or are drying rapidly and are unlikely to support foraging birds beyond the end of April (e.g. WCA-2A and WCA3A-N). Slightly wetter conditions in WCA-1, WCA2-B and WCA-3AS are likely to provide foraging conditions until sometime in May. However, recession rates appear to be faster than average for this time of year and if they continue at current rates these wetter areas may dry down sooner than expected.



Taylor Slough: Water levels continued to decrease last week with the exception of the ENP panhandle area (EVER6). The most rapid change over the past week was in Northern Taylor Slough which is typical for this time of year since water levels are below ground. Compared to historic averages, water levels are one inch above average in the panhandle to -five inches below average in Northern Taylor Slough.

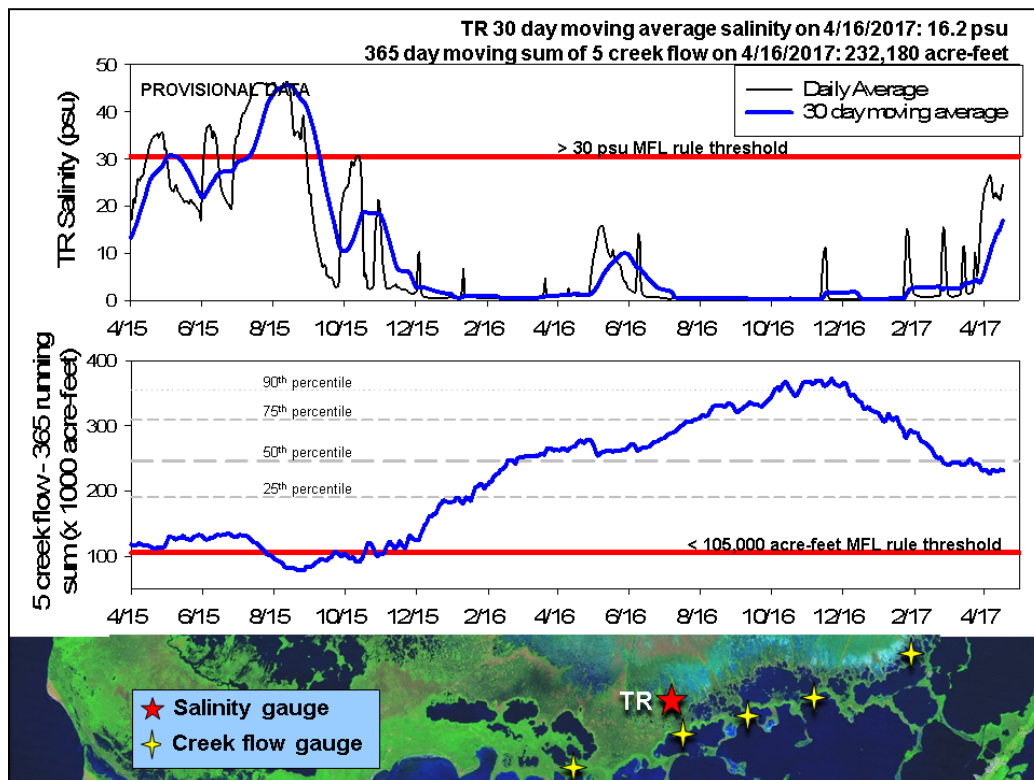
Florida Bay Salinity: Salinities in the Bay are generally elevated at this time of year due to evaporation and low flow/rain. Salinities currently range from 31 psu to 45 psu and are still +three to +nine psu above their long-term averages. The western nearshore area is extremely shallow and salinities rise and fall very quickly.





Florida Bay MFL: Mangrove zone salinities rose slightly over the last week. The daily average salinity at TR ended the week at 24 psu which is two psu higher than last week. The 30-day moving average increased 3.9 units to end the week at 16.2 psu. The weekly creek flow from the five creeks was just over +2,700 acre-feet as a result of recent rainfall.

The 365-day moving sum of flow from the five creeks identified by stars on the map decreased about -300 acre-feet to end at 232,180 acre-feet (below the long-term average of 257,628 acre feet).



Water management recommendations

- Based on current stage conditions and wading bird foraging/nest reconnaissance flights we are continuing to recommend that moderating recession rates in WCA-2A has priority over moderating recession rates in WCA-3A. However, the low water depth conditions in the northern sections of WCA-3A north at gauges 62 (0.11 feet) and 63 (-0.31 feet) suggest that available water routed into those areas would serve to protect that habitat by reducing the risk of muck fires.
- Based on current stage conditions, wading bird foraging/operations reconnaissance flights and a limited stage change analysis we continue support the water management option that routes water into WCA-2A via the S-7. This option seems to be prolonging the optimal foraging conditions currently being seen and modeled in WCA-2A.

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

Everglades Ecological Recommendations, April 17th, 2017 (red is new)

Area	Current Condition	Cause(s)	Recommendation	Reasons
WCA-1	Stages decreased -0.10' to -0.16'	Rainfall, ET, management	Operate for dry season conditions and, when possible, restrict recession rates to -0.03' to -0.07' per week. Moderate reversals, when possible.	Retain water for the upcoming dry season while protecting habitat for apple snail and wading bird breeding season.
WCA-2A	Stages decreased -0.09'	Rainfall, ET, management	Maintain slower recession rates. Retain water and restrict recession rates to less than -0.09' per week. Continue to prioritize WCA-2A inflows.	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 decreased -0.14' to -0.23'	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 decreased -0.10'	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. Continue moving water through S-150 as possible. Water for northwestern 3A (via the G404) is also desired.	Protect habitat and wildlife. Support apple snails and nesting wading birds. Reduce fire risk as water depths are now below ground.
WCA-3A NW	Stages increased 0.40'	Rainfall, ET, management		
Central WCA-3A S	Stages decreased -0.14'	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).	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 breeding.
Southern WCA-3A S	Stages decreased -0.11'	Rainfall, ET, management		
WCA-3B	Stages decreased - 0.04' to -0.32'	Rainfall, ET, management	Restrict recession rates to -0.05' to -0.09' per week.	Protect habitat and wildlife and prepare for wading bird breeding season. Provide conditions to support apple snails.
ENP-SRS	Stages decreased -0.33'	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, wildlife and wading birds.
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 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 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 -0.16' to +0.10'	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	+3 psu to +9 psu above average	Rain, ET, inflows, wind	Move water southward as possible	Maintain low salinity conditions and prevent early salinity increases.