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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: March 21, 2017

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

Dry through tomorrow evening then scattered showers returning east on Thursday. High pressure over the Gulf of Mexico will continue to dominate our skies through mid-week before a cold front with decent moisture and low level convergence (i.e. windy) pushes southward through the District on Thursday. Light to locally moderate showers focused east of the Lake are expected mainly during before sunset Thursday, then dry and warm conditions prevail Friday through the weekend.

Kissimmee

On Sunday, stage was 1.3 feet below regulation schedule in East Lake Toho, Lake Toho, and Kissimmee-Cypress-Hatchineha (KCH). Over the past week, discharge at S65, S65A, and S65E averaged 885, 681, and 855 cfs, respectively. Tuesday morning discharges were ~725 cfs, and 547 cfs, and 693 cfs, respectively at S65, S65A, and S65E. Dissolved oxygen data in the Kissimmee River averaged 10.4 mg/L over the past week. Kissimmee River mean floodplain depth on Sunday was 0.16 feet. A recommendation was made to reduce S-65 and S-65A discharge by 150 cfs in order to reduce rate of stage decline in KCH.

Lake Okeechobee

As of midnight March 19, 2017, Lake stage was 12.85 feet NGVD and in the Base flow sub-band but 0.25 feet above the Beneficial Use sub-band. The current weekly recession rate of 0.23 feet equates to a projected monthly recession rate of 0.92 feet which is almost double the recommended 0.50 feet per month or lower guideline. At the current recession rate, Lake stage will be in the Beneficial Use sub-band by next week. A too rapid decrease in Lake levels may jeopardize the upcoming nesting season by drying out foraging locations near the colonies and lowering water levels under nests allowing for increased risk of predation. The goal should be to slow the current recession rate and maintain it at below 0.50 feet per month. The most recent wading bird foraging survey indicated that there were more than 10,000 wading birds foraging on the Lake. Wading bird use of the Lake thus far this year is paralleling results for the very successful 2013 wading bird season when in March 2013 over 12,000 birds were foraging on the Lake. The FWC reported sixteen new snail kite nests during their March survey bringing the total to twenty-one nests thus far. A localized surface bloom of *Microcystis aeruginosa* was reported in the Pahokee Marina on March 20, 2017.

Estuaries

Total discharge to the St. Lucie estuary average 104 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 increased slightly throughout the estuary compared to last week. The seven-day average salinity at the US1 Bridge is in the fair range for adult oysters. Total inflow to the

Caloosahatchee estuary averaged 753 cfs over the past week with 627 cfs (83%) coming from the Lake. The 30-day average surface salinity at the Ft. Myers monitoring station is 9.5 and has been below 10 for the past 26 days. The 30-day average surface salinity at Val I-75 is 3.0. Salinity conditions between Val I-75 and Ft. Myers are improving for tape grass. Salinity conditions are in the good range for adult oysters at the Cape Coral Bridge and Shellpoint, while in the fair range at the Sanibel Causeway. The 30-day moving average salinity at the I-75 Bridge is forecast to be 4.2 in the next two weeks if no flow comes through the S-79 structure; however, daily salinity is forecast to reach 6.3.

Stormwater Treatment Areas

Over the past week, the STAs/FEBs received approximately 6,400 acre-feet of Lake releases. The total amount of Lake releases sent to the STAs/FEBs in WY2017 (since May 1, 2016) is approximately 204,100 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 and construction activities in STA-1W. 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

Water levels across the Everglades decreased at a recession rate while categorized as “fair” based on general seasonal criteria, stage conditions at this time and these water depths suggest that faster than – 0.07 feet per week may dry out all areas before the end of the breeding season. Currently tens of thousands of wading birds are nesting in the Everglades with large numbers of ibises and smaller herons expected to start in the next week or two. In Florida Bay water level decreases slowed this week. Northern Taylor Slough, which had the highest rainfall this week, increased by +0.3 feet, but is still below ground. Water levels range from + or - 1 inch from average in Taylor Slough. Compared to long term averages, current salinities are mostly +2 to +6 psu above average. The 30-day moving average at the TR site increased 1.1 to end the week at 3.8 psu.

Supporting Information

KESSIMMEE BASIN

Kissimmee Basin Rainfall

The Upper and Lower Kissimmee Basins received 0.00 inches of rainfall in the past week (SFWMD Daily Rainfall Report 03/21/2017).

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: 3/21/2017

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)						
							3/19/17	3/12/17	3/5/17	2/26/17	2/19/17	2/12/17	2/5/17
Lakes Hart and Mary Jane	S62	8	LKMJ	60.5	R	60.9	-0.4	-0.4	-0.4	-0.2	-0.2	0.0	-0.1
Lakes Myrtle, Preston, and Joel	S57	0	S57	60.8	R	60.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alligator Chain	S60	0	ALLI	63.0	R	63.9	-0.9	-0.9	-0.8	-0.7	-0.7	-0.7	-0.7
Lake Gentry	S63	0	LKGT	61.0	R	61.4	-0.4	-0.4	-0.3	-0.2	-0.2	-0.2	-0.2
East Lake Toho	S59	100	TOHOE	56.6	R	57.9	-1.3	-1.2	-1.1	-0.8	-0.8	-0.5	-0.3
Lake Toho	S61	303	TOHOW, S61	53.6	R	54.9	-1.3	-1.2	-1.1	-0.8	-0.8	-0.6	-0.3
Lakes Kissimmee, Cypress, and Hatchineha	S65	885	LKISSP, KUB011, LKIS5B	49.7	R	51.0	-1.3	-1.0	-0.7	-0.8	-1.1	-1.4	-1.8

* 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: 3/21/2017

Metric	Location	Sunday's 1-day average	Weekly Average**									
			3/19/17	3/12/17	3/5/17	2/26/17	2/19/17	2/12/17	2/5/17	1/29/17	1/22/17	1/15/17
Discharge (cfs)	S-65	758	885	899	877	732	710	507	482	465	473	475
Discharge (cfs)	S-65A	569	681	705	682	569	550	387	378	368	364	368
Discharge (cfs)	S-65D****	813	791	685	721	688	540	538	730	1274	1292	1268
Discharge (cfs)	S-65E****	877	855	737	769	744	597	523	513	398	386	375
DO concentration (mg/L)***	Phase I river channel	10.65	10.43	9.31	8.05	7.66	8.26	8.96	8.54	8.13	7.97	7.94
Mean depth (feet)*	Phase I floodplain	0.16	0.17	0.12	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.07

* 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 PC62 and PC33 .

**** 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
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	
10/25/2016	Allow S65C headwater stage to decline to approximately 33 feet NGVD over the next few days.	To help reduce stage in Pool C to facilitate MacArthur Ditch backfilling	Implemented	USACE/ KB Ops
10/24/2016	No new recommendations.		N/A	
10/17/2016	Temporarily reduce discharge at S65A to 700 cfs following the discharge rampdown schedule in Figure 8a.	To facilitate MacArthur Ditch backfilling over the next 2-3 weeks.	Implemented	KB Operations
10/10/2016	No new recommendations.		N/A	
10/3/2016	No new recommendations.		N/A	

KCOL Hydrographs (through Sunday midnight)

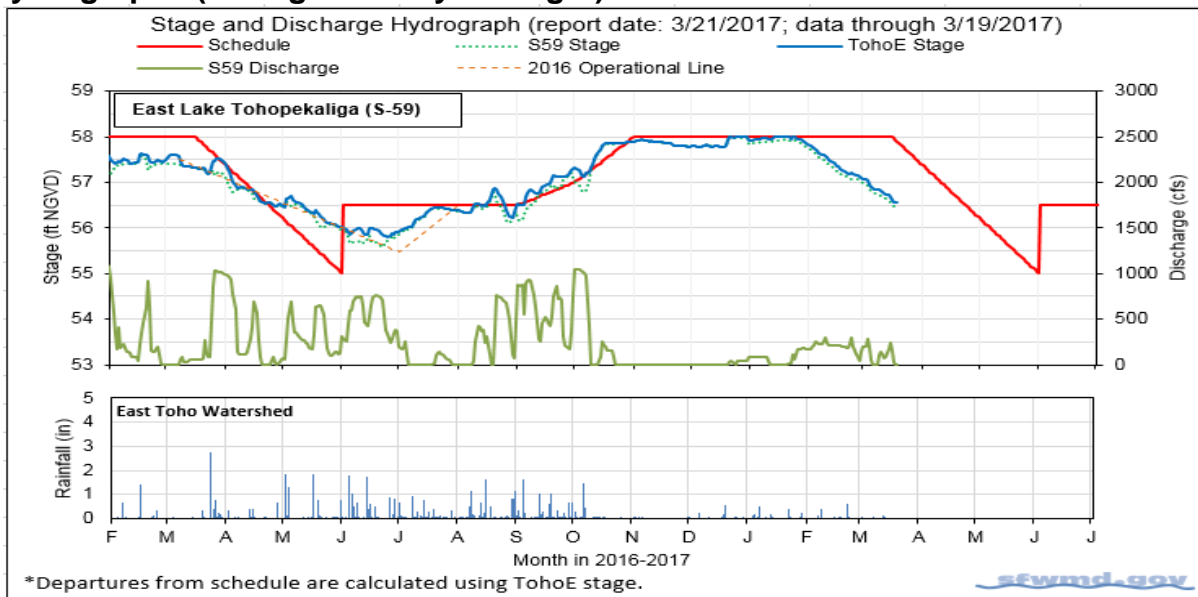


Figure 1.

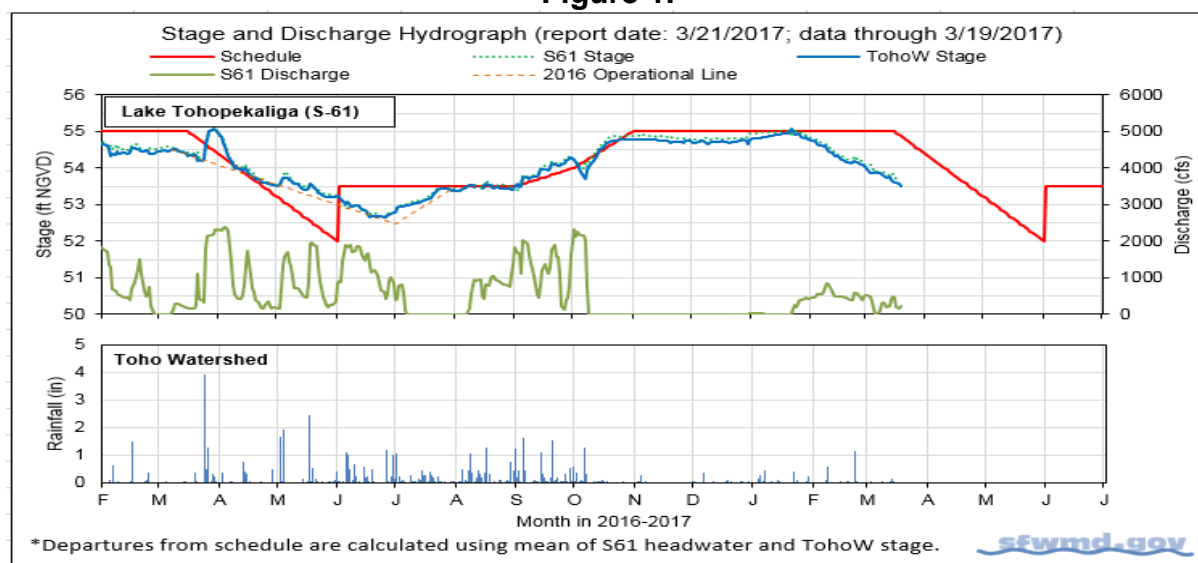


Figure 2.

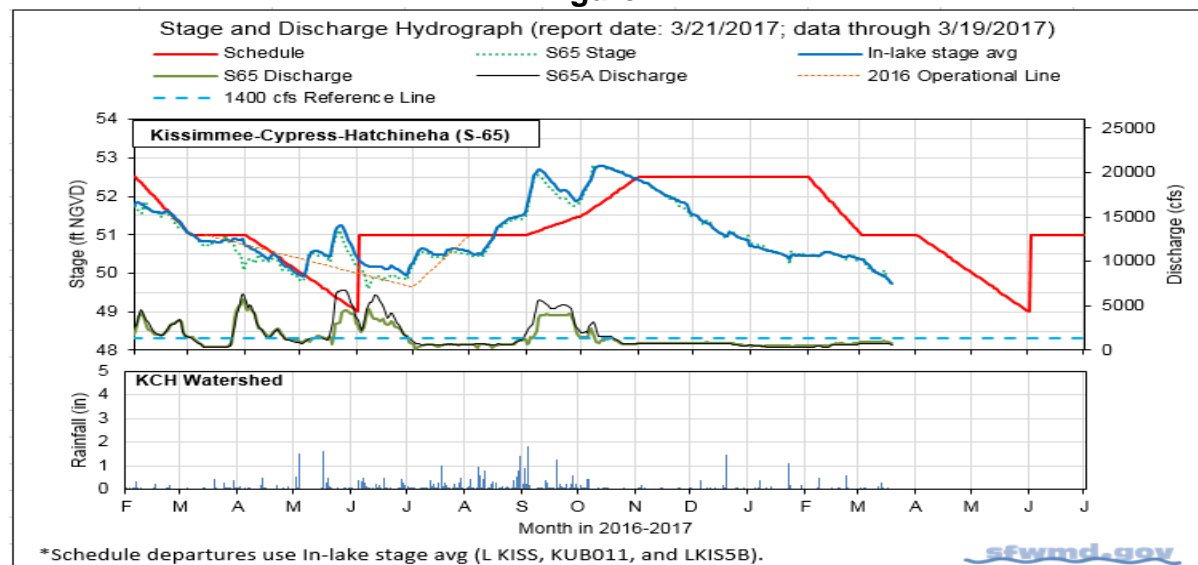


Figure 3.

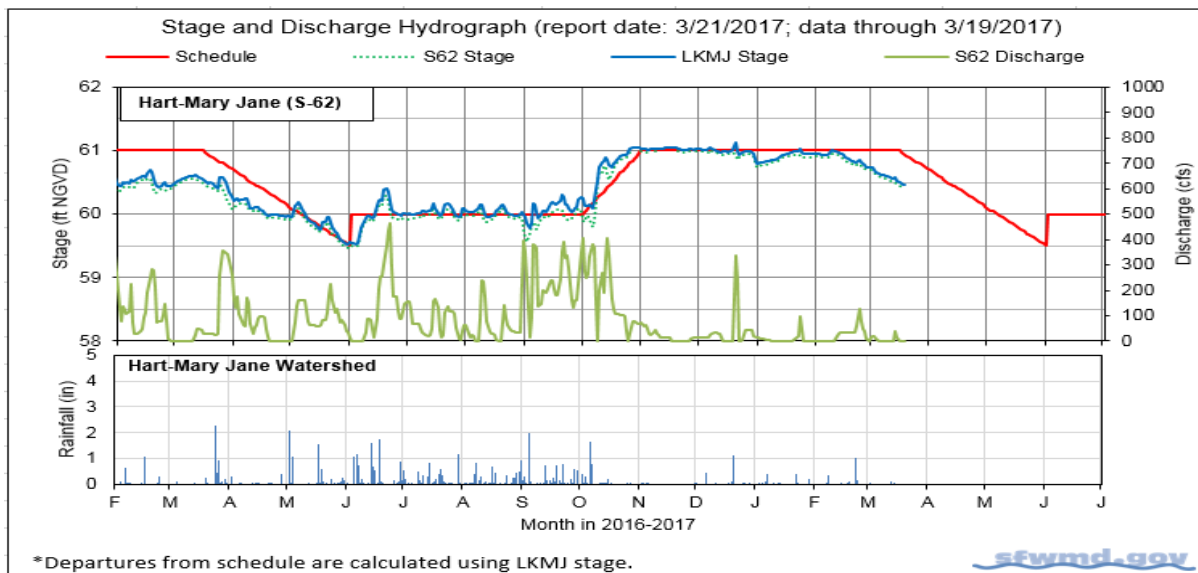


Figure 4.

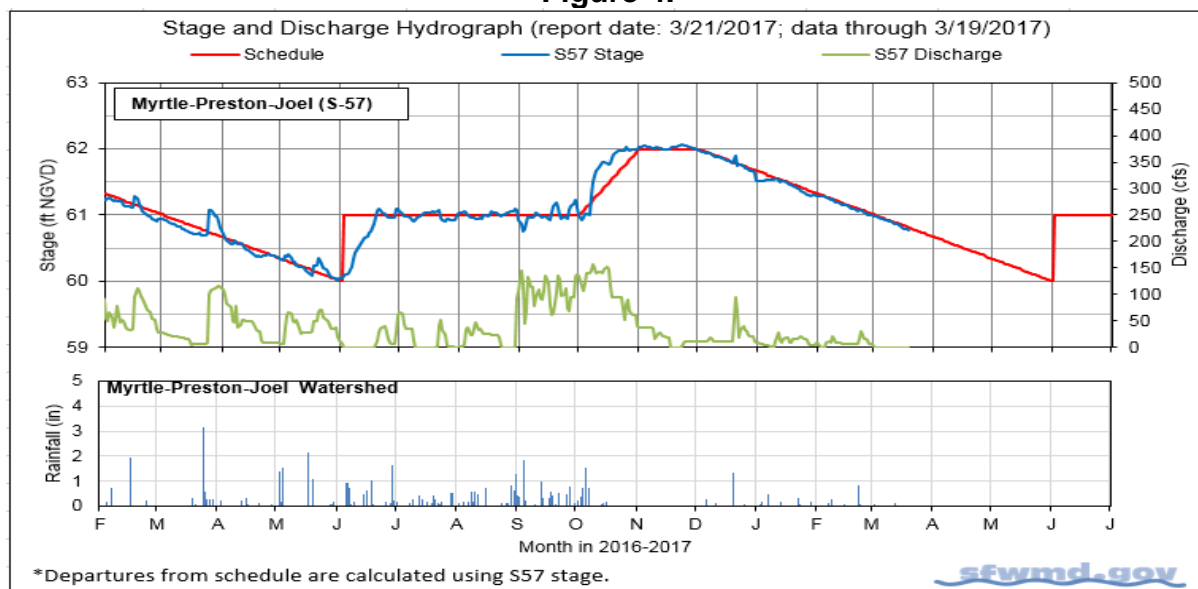


Figure 5.

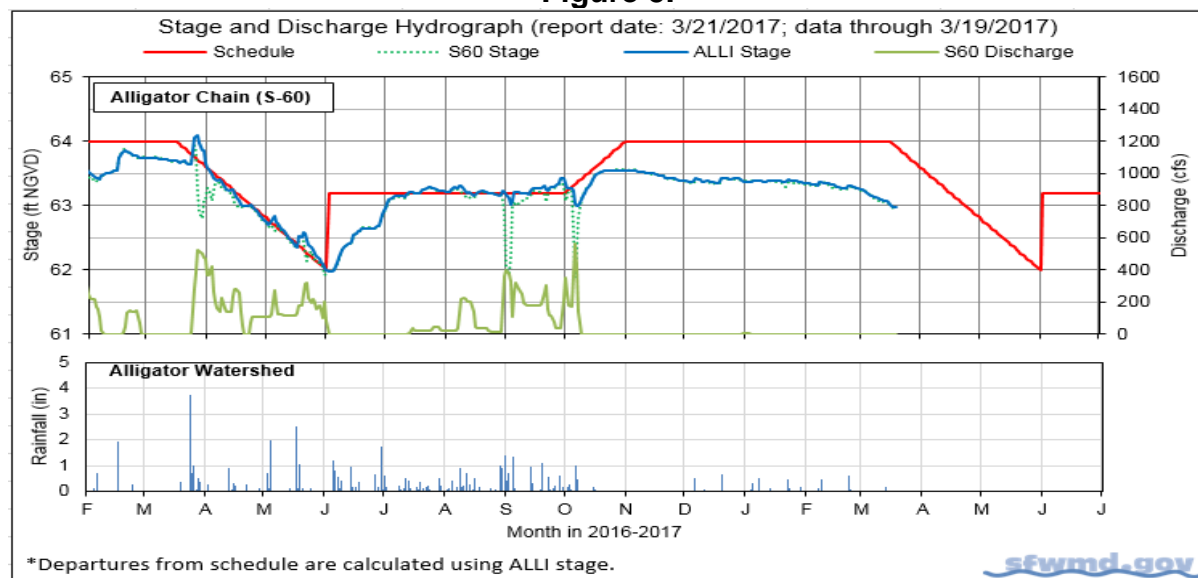


Figure 6.

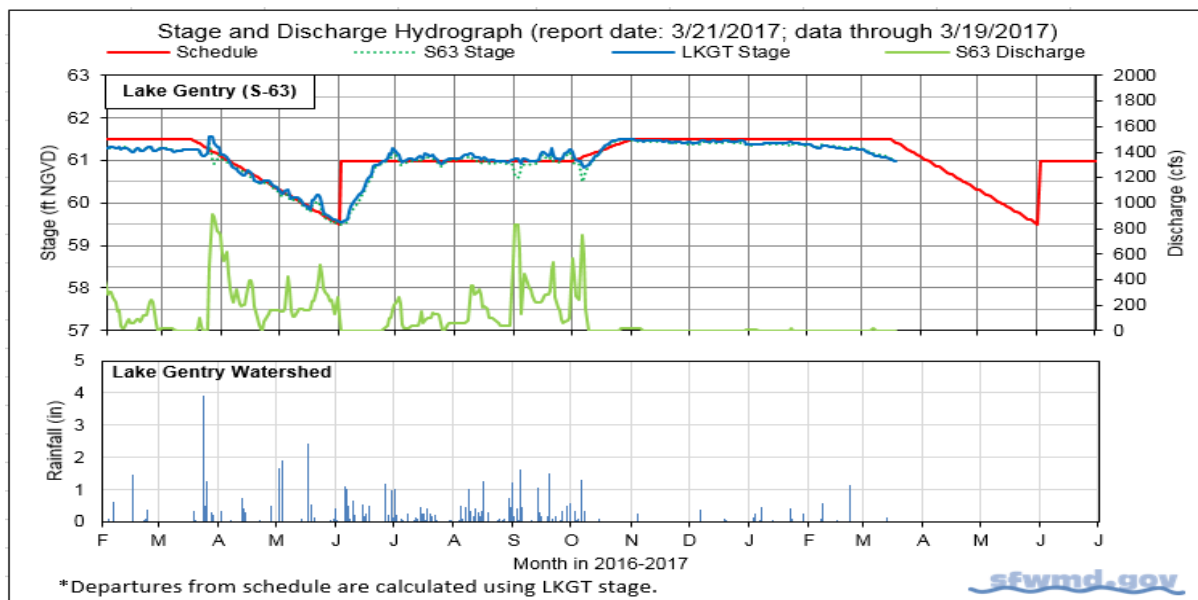


Figure 7.

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.

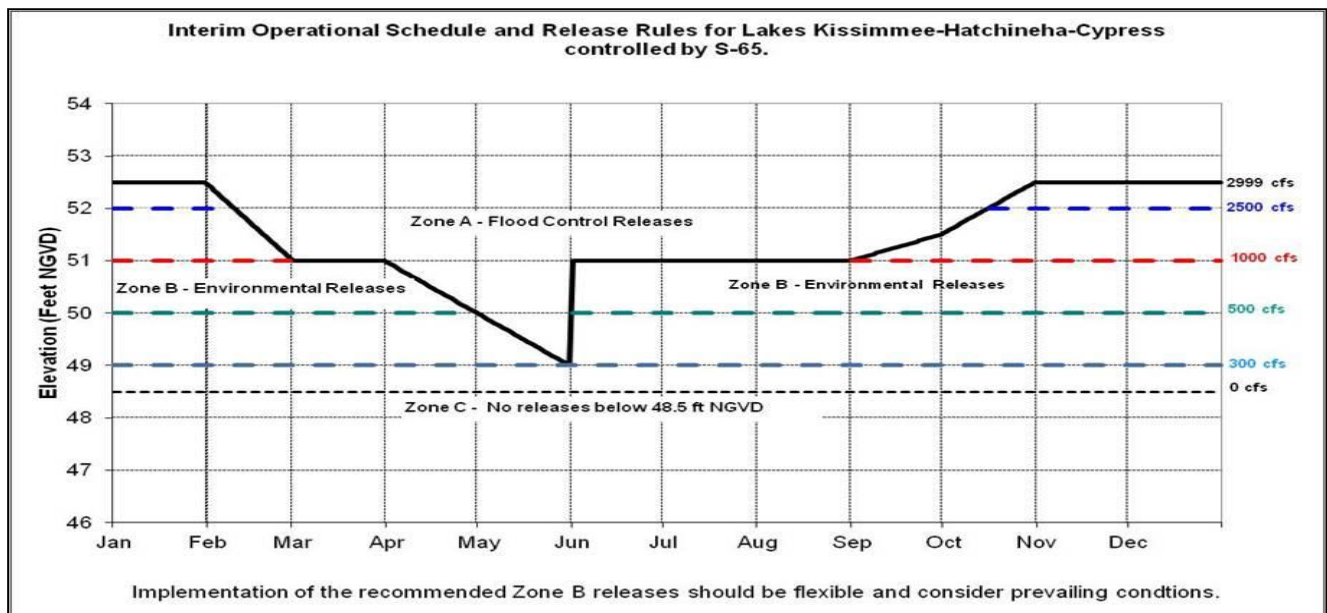


Figure 9. Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years or in Wet Season 2015.

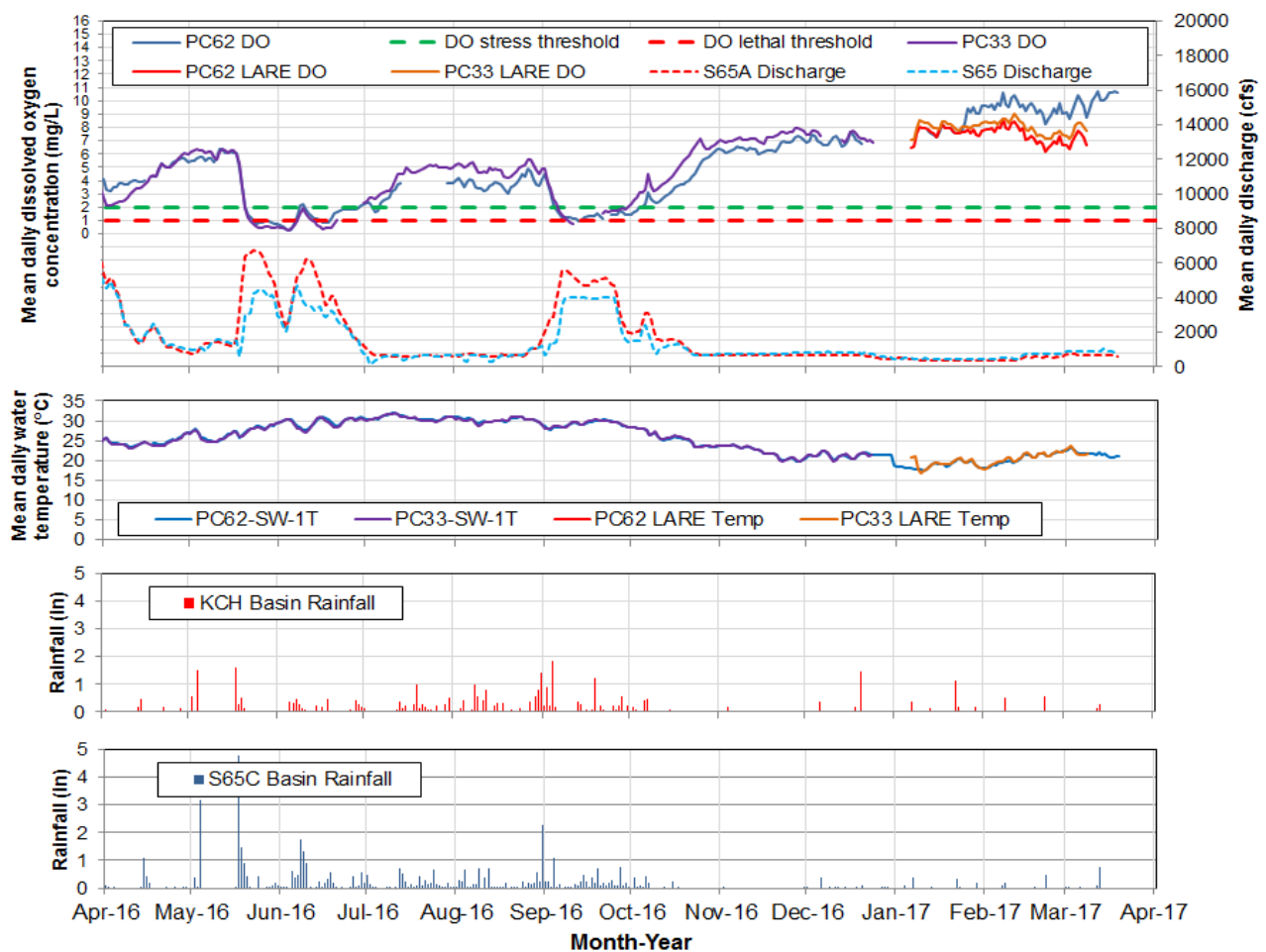


Figure 10. Mean daily Dissolved Oxygen, discharge, temperature and rainfall in the Phase I river channel.

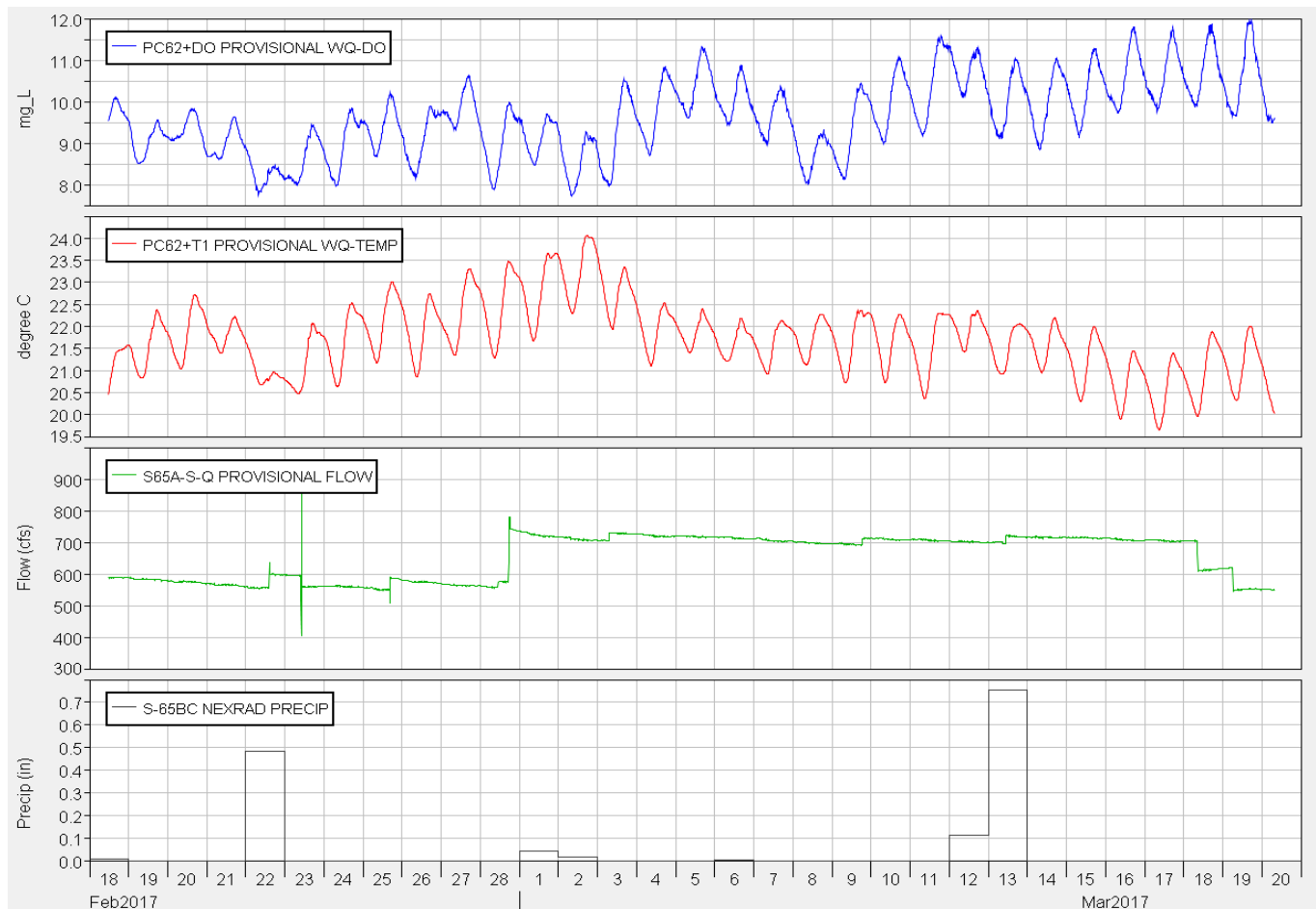


Figure 11. Phase I river channel dissolved oxygen and water temperature (measured at 15 minute intervals) and Pool BC daily rainfall.

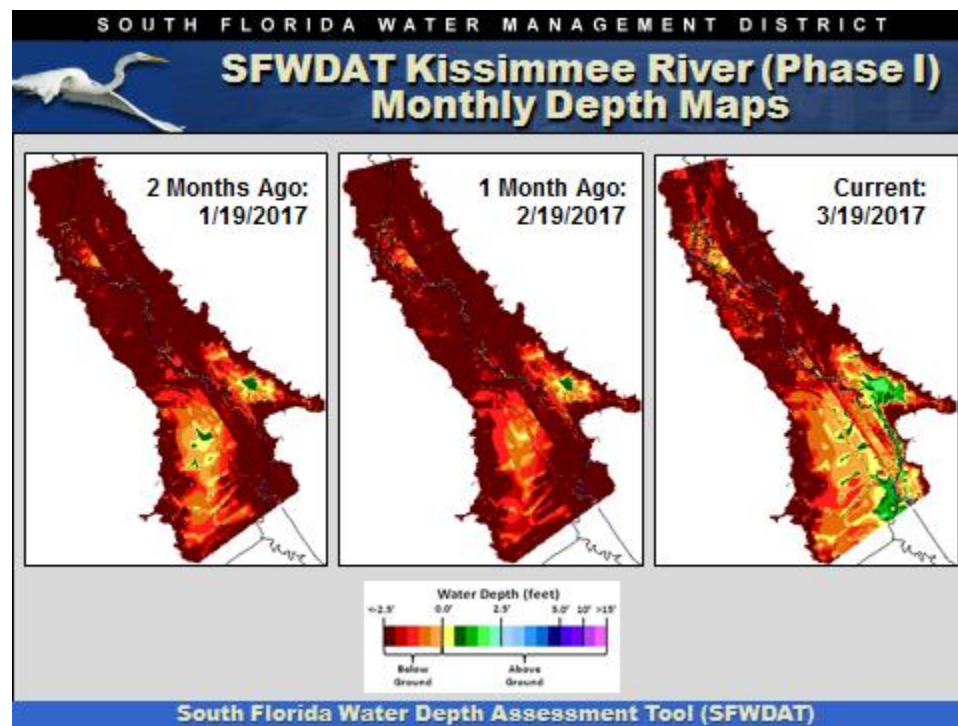
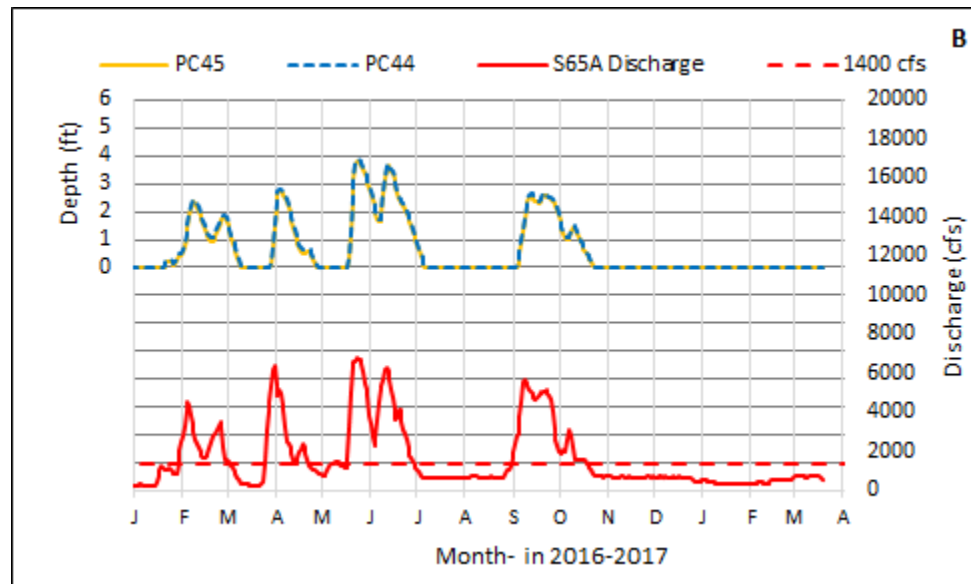
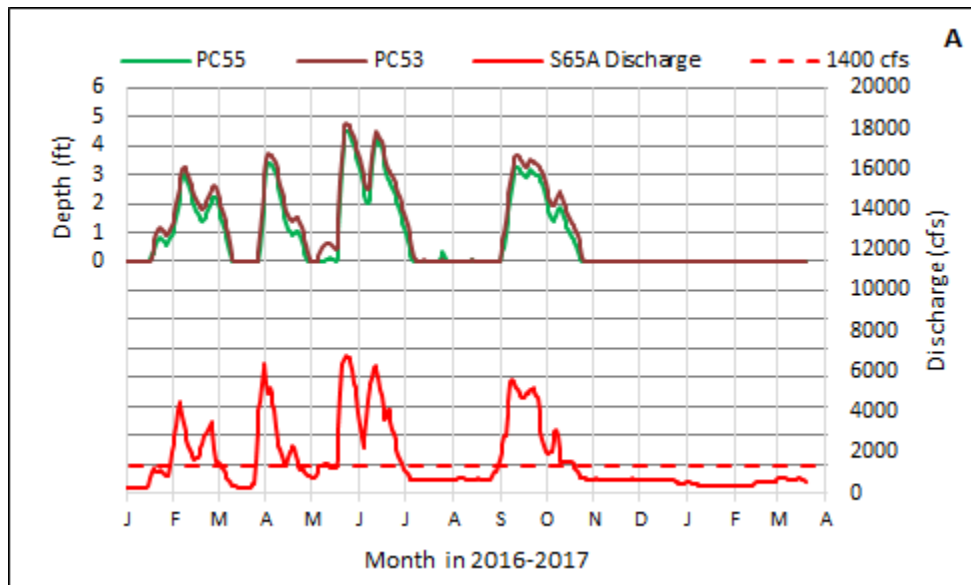


Figure 12. Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to Jan. 16, 2012.



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

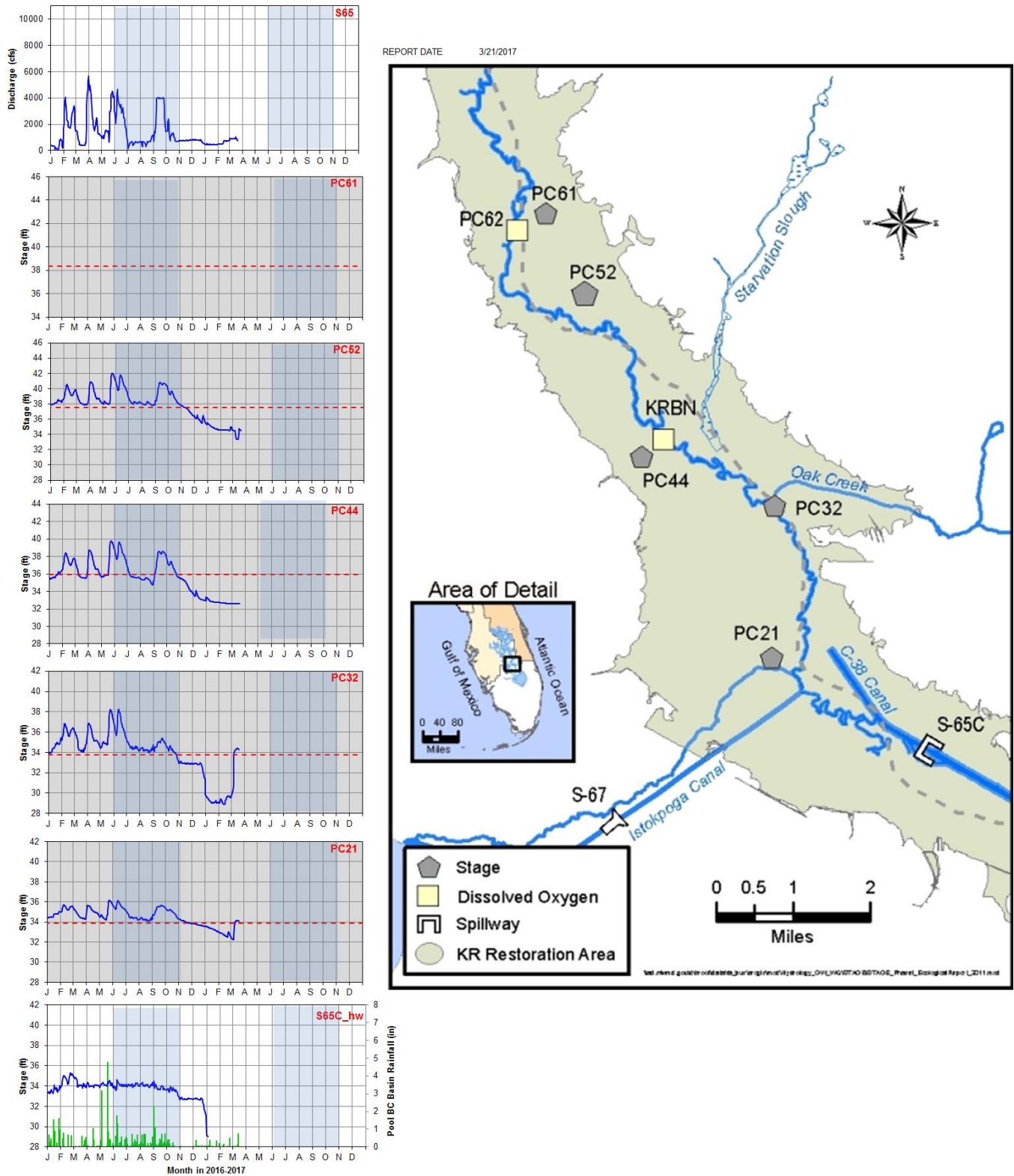


Figure 13. Discharge at S65, stages at five monitoring stations in the Phase I area of the Kissimmee River floodplain, and headwater stage at S65-C since January 1, 2015. The most recent data (~2 weeks) are provisional real-time data from SFWMD DualTrend; previous data are from SFWMD DB-HYDRO (validated).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



Figure 14. The Kissimmee Basin

LAKE OKEECHOBEE

According to the USACE web site, Lake Okeechobee stage is at 12.85 feet NGVD for the period ending at midnight on March 19, 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 0.23 feet over the past week and is 0.70 feet lower than it was a month ago and 2.39 feet lower than it was a year ago (Figure 1). The Lake is currently in the Base flow sub-band (Figure 2). According to RAINDAR, 0.113 inches of rain fell directly over the Lake during the past seven days (Figure 3). Greater amounts of rain fell in the lower Kissimmee basin and in the southern region of the watershed.

Based on USACE reported values, current Lake inflow is approximately 740 cfs as detailed below.

Structure	Flow cfs
S65E	0
S65EX1	879
S154	0
S84 & 84X	0
S71	0
S72	0
C5 (Nicodemus slough dispersed storage)	-140
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 4,143 cfs with 1,642 cfs exiting at S77, 288 cfs exiting at S308 and 122 cfs exiting at the L8 canal through Culvert 10A. Approximately 2,091 cfs is being directed south through S351, S352 and S354. Corrected evapotranspiration value based on the L006 weather platform solar radiation data for this past week increased to 2,758 cfs.

Change in elevation equivalents and average weekly flows (midnight March 13, 2017 to midnight March 19, 2017) for major structures are presented in Figure 4. Weekly average values for S77 and S308 are based on USGS data for the below structure gauges.

Based on the Lake Okeechobee wading bird habitat suitability index, there are currently approximately 26,452 acres of suitable foraging habitat for long-legged birds and 11,714 acres for long and short-legged birds on the Lake (Figure 5). The most recent wading bird foraging survey indicated that there were more than 10,000 wading birds foraging on the Lake (Figure 6). Wading bird use of the Lake thus far this year is paralleling results for the very successful 2013 wading bird season when in March 2013 over 12,000 birds were foraging on the Lake. Currently, conditions are good for wading birds but a slower recession rate is needed to keep wading bird foraging areas hydrated and to help maintain water levels under wading bird nests in the upcoming nesting season thereby reducing the risk of predation by raccoons and other animals.

The FWC reported sixteen new snail kite nests during their March survey bringing the total to twenty-one nests thus far (Figure 7). Of the twenty-one nests, seventeen are still active, three have been deemed successful and one has failed. All of the nests are located within or near the 2015 cattail treatment areas in Moonshine Bay.

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 (March 11 and March 19, 2017) indicates low bloom potential (Figure 8). However, a localized surface bloom of *Microcystis aeruginosa* was reported in the Pahokee Marina on Monday March 20, 2017.

Water Management Recommendations

Lake stage is 12.85 feet NGVD and is in the Base Flow sub-band but 0.25 feet from the top of the Beneficial Use sub-band. The current weekly recession rate of 0.23 feet equates to a projected monthly recession rate of 0.92 feet which is almost double the recommended 0.50 feet per month or less guideline. At the current recession rate, Lake stage will be in the Beneficial Use sub-band by next week. A too rapid decrease in Lake levels may jeopardize the upcoming nesting season by drying out foraging locations near the colonies 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 submerged aquatic vegetation) and faunal (wading birds, snail kites and fish) communities.

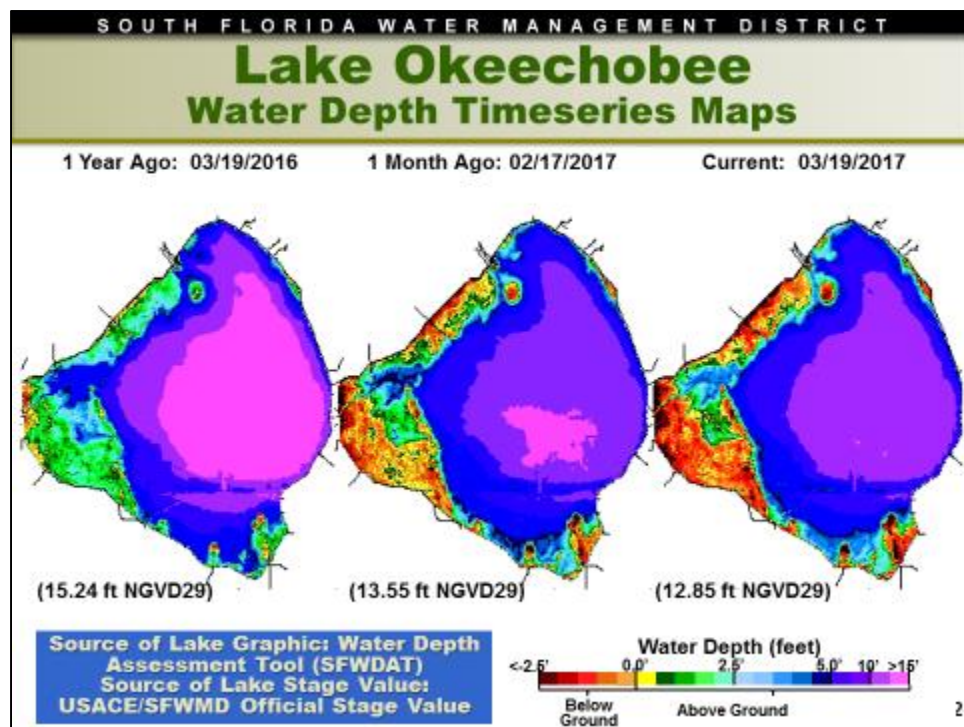
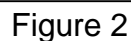


Figure 1



SFWMD PROVISIONAL RAINDAR 7-DAY BASIN RAINFALL ESTIMATES

FROM: 0515 EST, 03/13/2017 THROUGH: 0515 EST, 03/20/2017

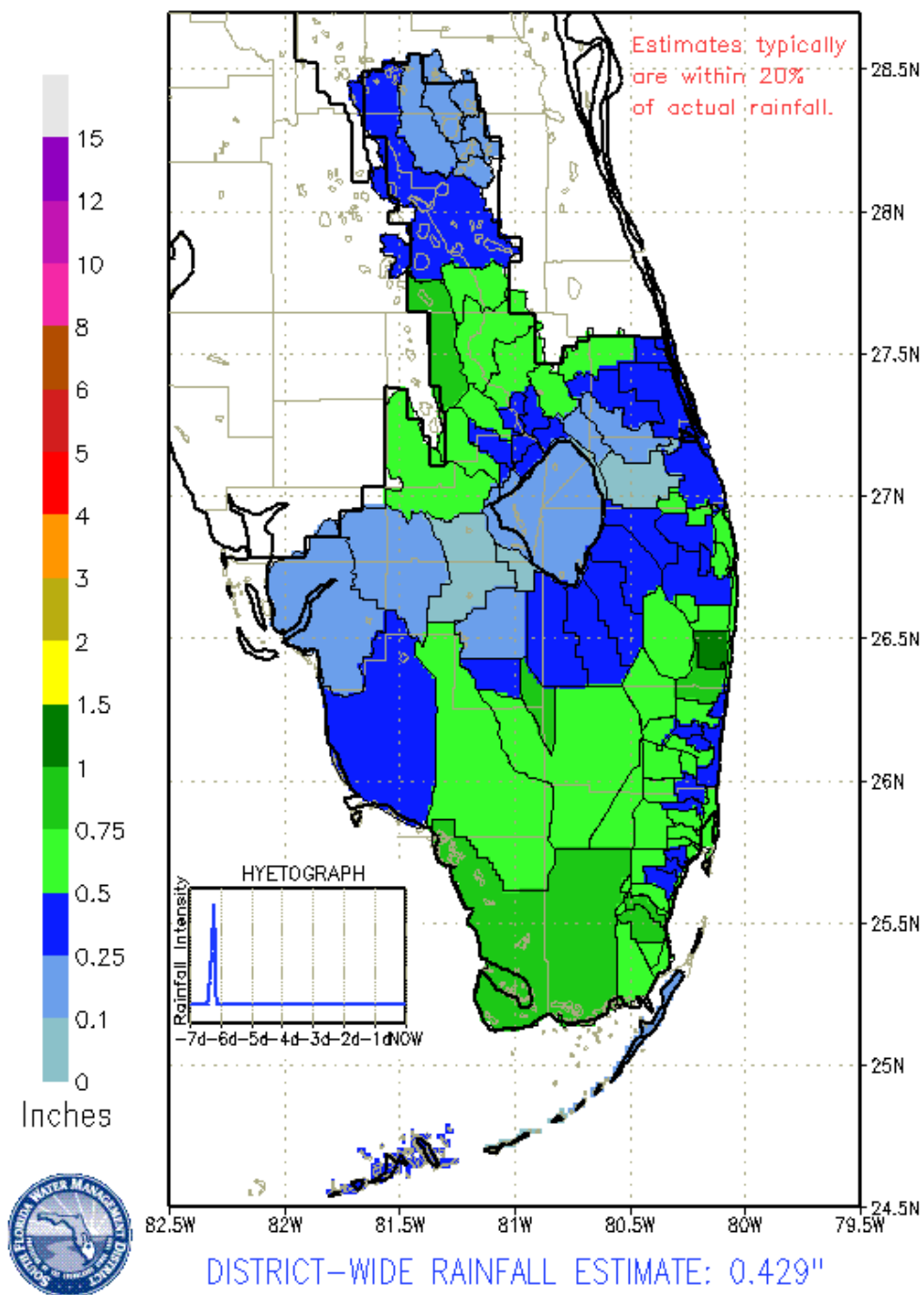


Figure 3

INFLOWS	Average Daily Flow Past Week cfs	Feet of Change Past Week
S65E & S65EX1	852	0.031
S71 & 72	0	0.000
S84 & 84X	0	0.000
Fisheating Creek	16	0.001
Rainfall	N.A.	0.009
OUTFLOWS	Average Daily Flow Past Week cfs	Feet of Change Past Week
S77	1188	0.044
S308	264	0.010
S351	607	0.022
S352	342	0.013
S354	669	0.025
L8	68	0.002
ET	2758	0.101

Figure 4

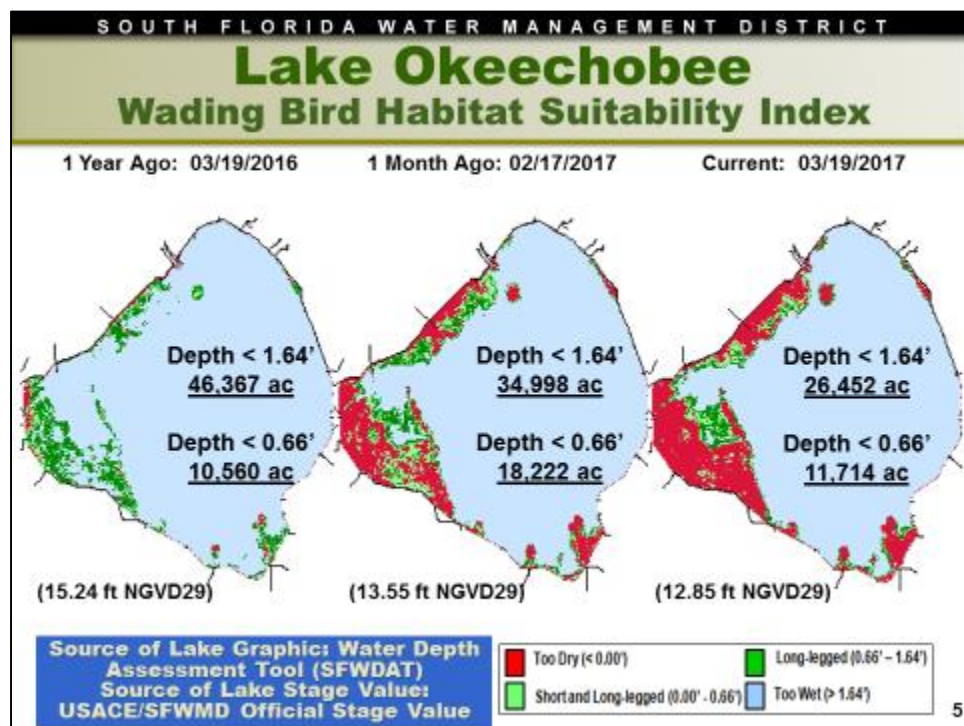


Figure 5

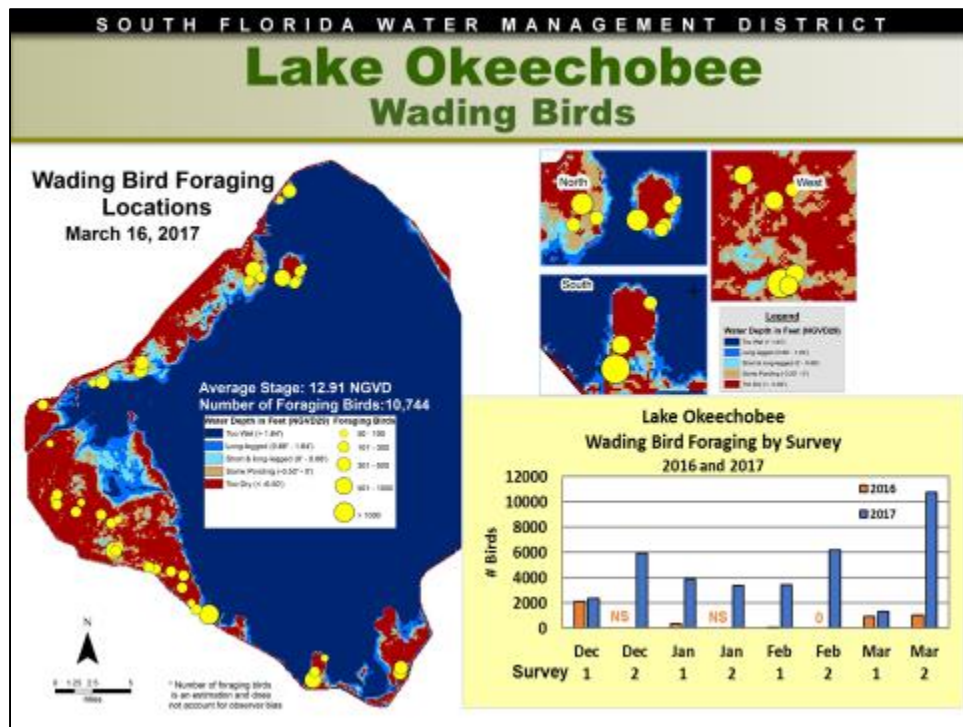


Figure 6



Figure 7

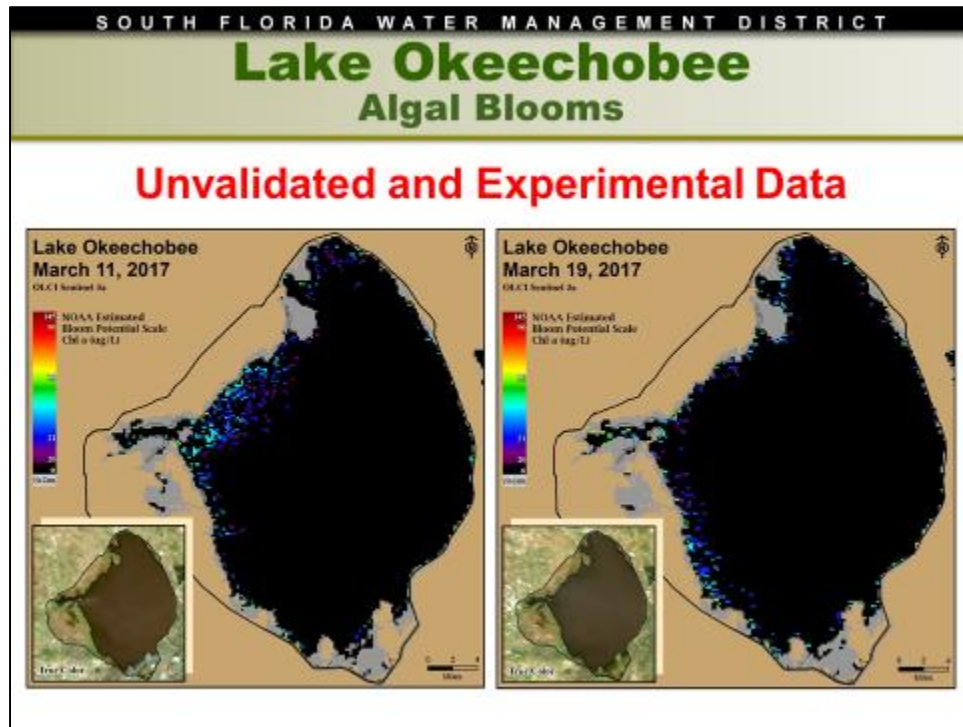


Figure 8

Lake Istokpoga

The Lake Istokpoga regulation schedule is at winter pool stage of 39.50 feet NGVD. Lake stage is 38.81 feet NGVD and is currently 0.69 feet below regulation stage (Figure 9). Average flows into the Lake from Arbuckle and Josephine creeks were 64 cfs and 16 cfs respectively, which is an increase from last week's total flow. Average discharge from S68 and S68X this past week was 95 cfs, a decrease from the previous week's flow. According to RAINДАР, 0.889 inches of rain fell in the Lake Istokpoga watershed during the past seven days. Five active snail kite nests were observed during the March snail kite survey (Figure 10).

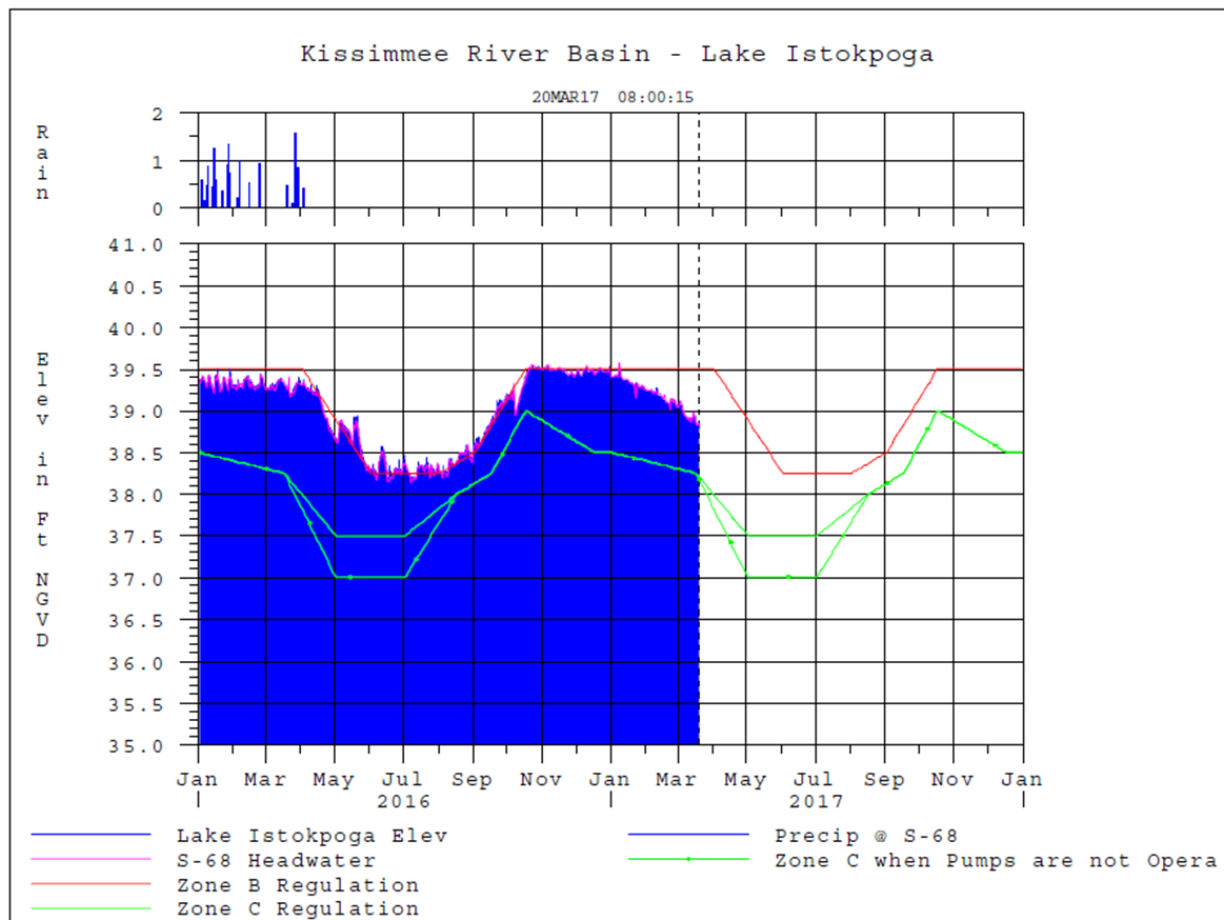


Figure 9

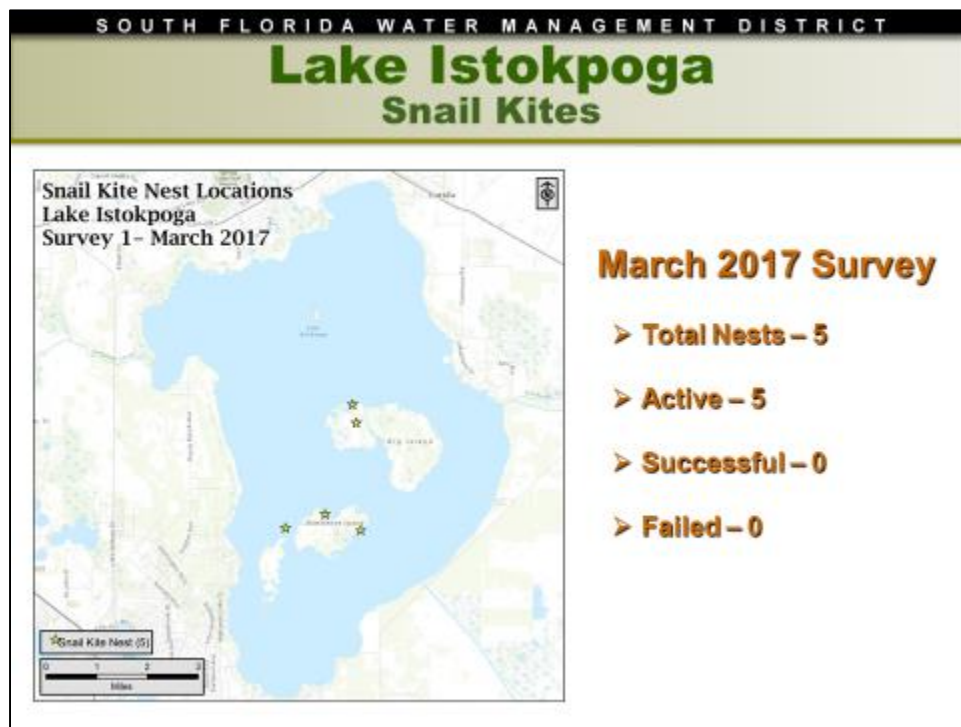


Figure 10

ESTUARIES

St. Lucie Estuary

Over the past week, provisional flows averaged about 0 cfs at S-80, 260 cfs downstream of S-308, 0 cfs at S-49 on C-24, 0 cfs at S-97 on C-23, and 53 cfs from Ten Mile Creek at the Gordy Road Structure. Average inflow from tidal basin tributaries is estimated to be 51 cfs (Figures 1 and 2). Total inflow averaged about 104 cfs last week and 170 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 27.1. 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)	NR ² (24.3)	NR (25.4)	NA ¹
US1 Bridge	27.0 (26.2)	27.3 (26.6)	10.0-26.0
A1A Bridge	32.1 (31.5)	32.9 (32.5)	NA

¹Envelope not applicable, ²Not Reporting

Caloosahatchee Estuary

During the past week, provisional flows averaged approximately 1,050 cfs downstream of S-77, 639 cfs at S-78, and 706 cfs at S-79. Average inflow from tidal basin tributaries is estimated to be 47 cfs (Figures 5 and 6). Total inflow averaged 753 cfs last week and 799 cfs over last month.

Salinity decreased over the past week in the estuary, with the exception of a slight increase in the surface salinity at Cape Coral Bridge (Table 2, Figures 7 and 8). The seven-day average salinity values are within the good range for adult oysters at Cape Coral and at Shell Point and in the fair range at Sanibel (Figure 9). The 30-day moving average surface salinity is 3.0 at Val I-75 and 9.5 at Ft. Myers. The 30-day moving average salinity at Ft. Myers has been below 10 for 26 consecutive days. Salinity conditions between Val I-75 and Ft. Myers are improving. Without discharges at S-79, the 30-day moving average salinity at Val I-75 is forecast be 4.2 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)	1.7 (2.8)	1.7 (2.8)	NA ¹
*Val I75	2.7 (3.5)	4.4 (6.8)	0.0-5.0 ²
Ft. Myers Yacht Basin	8.8 (10.5)	11.2 (13.8)	NA
Cape Coral	18.0 (17.5)	19.1 (20.2)	10.0-30.0
Shell Point	27.3 (27.8)	28.1 (29.3)	10.0-30.0
Sanibel	31.4 (32.8)	31.6 (33.2)	10.0-30.0

¹Envelope not applicable, ²Envelope 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. Live Data will be unavailable until website upgrades are complete.

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)	4.11 – 7.87	3.17 – 12.15 A spike to 18.49	1.40 – 12.57 A spike to 22.30
Dissolved Oxygen (mg/l)	6.79 – 8.96	6.68 – 9.32	No Data

The Florida Fish and Wildlife Research Institute reported on March 17, 2017, that *Karenia brevis*, the Florida red tide organism, persists in Southwest Florida from southern Pinellas to Lee counties. *Karenia brevis* was observed in background to low concentrations in eight samples collected from Lee County.

Water Management Recommendations

Salinity conditions in the upper portion of the Caloosahatchee estuary continue to improve. The 30-day average salinity at the I-75 Bridge is forecast to remain below 5 with no inflow at S-79, but the daily salinity is forecast to reach 6.3 within two weeks. Therefore, it is recommended that runoff from the C-43 basin be supplemented with Lake Okeechobee water as a pulsed release of up to 650 cfs through S-79.

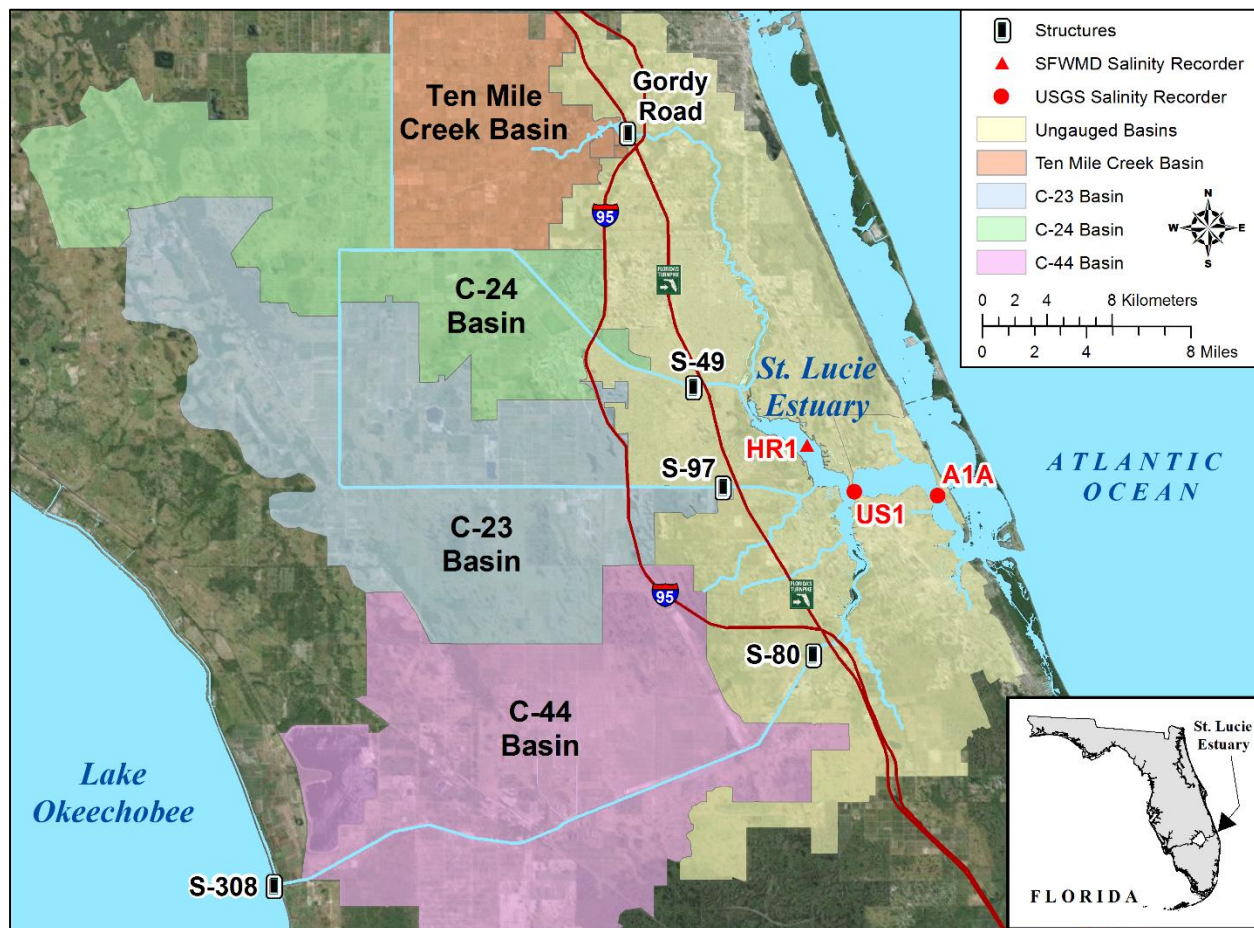


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

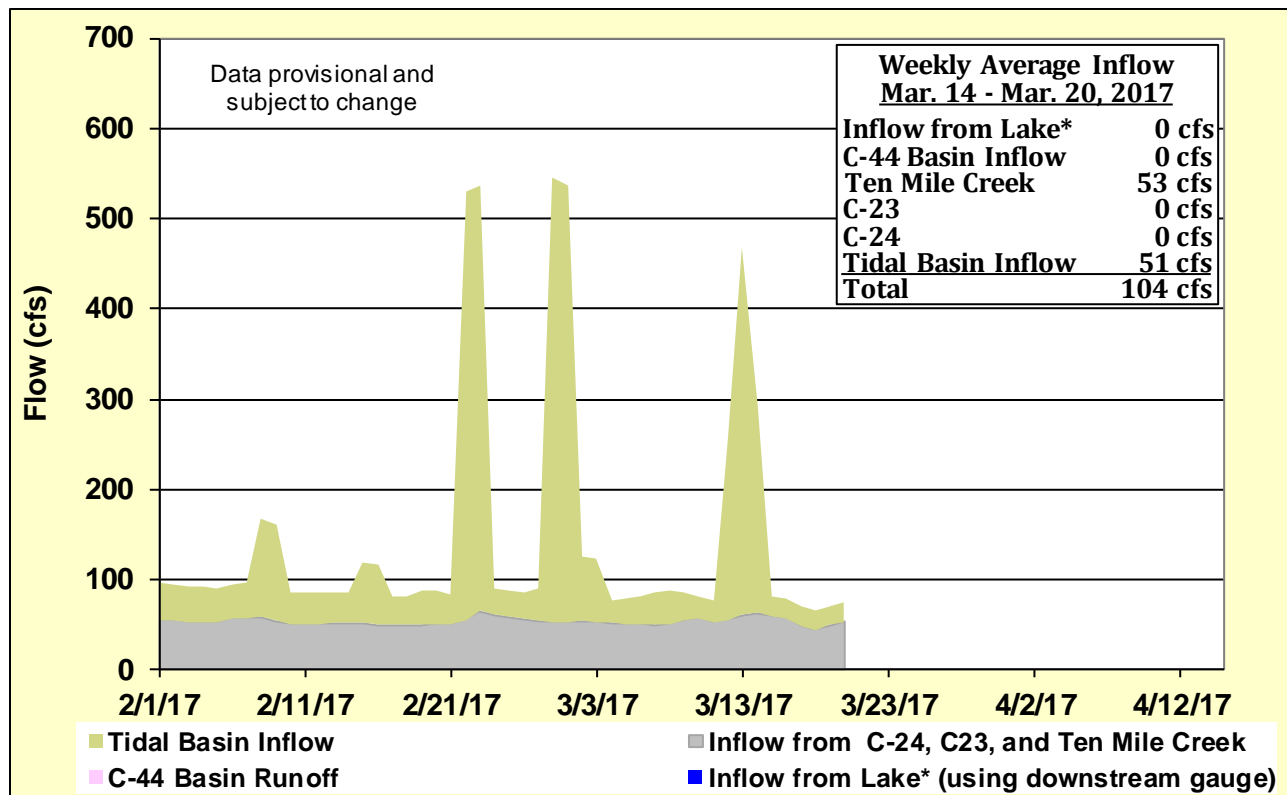


Figure 2. Estimated surface freshwater inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basins into the St. Lucie Estuary.

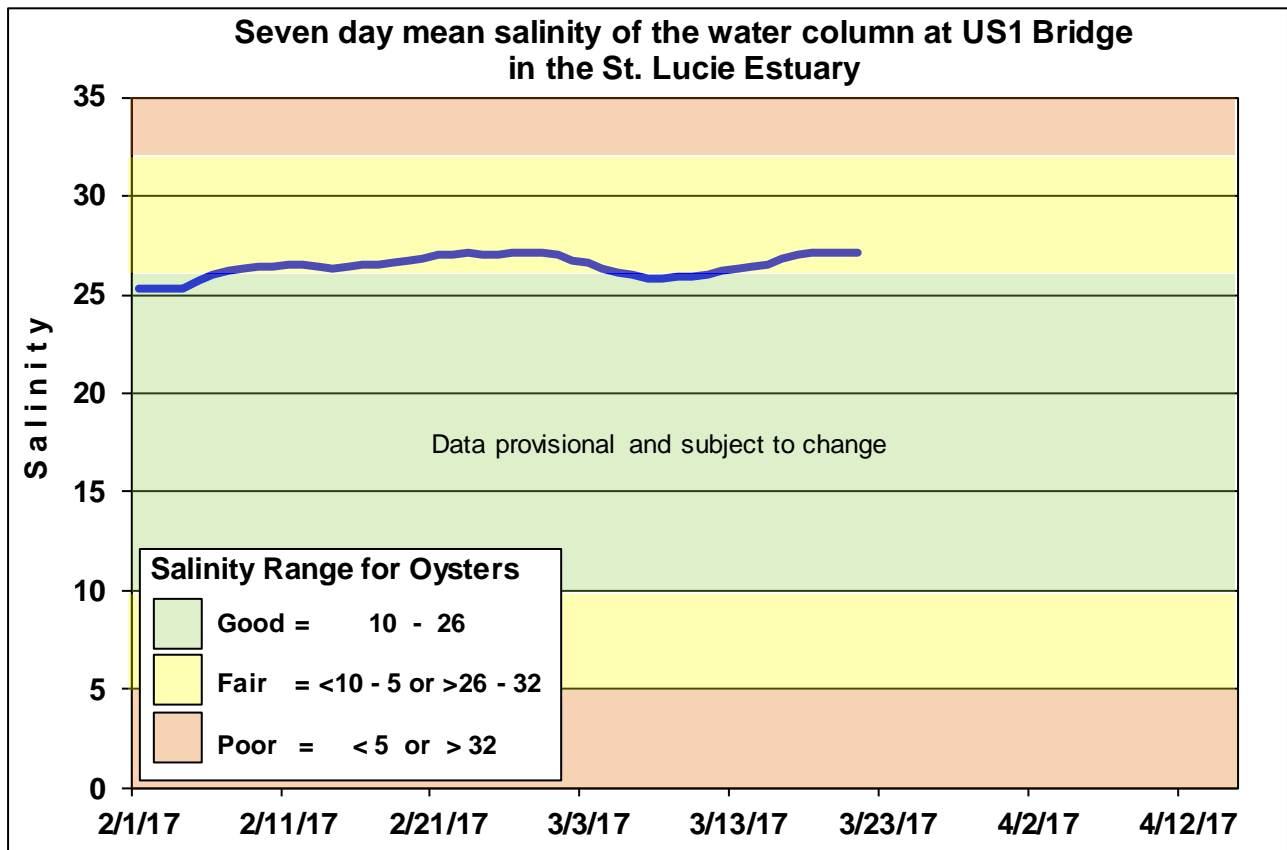


Figure 3. Seven-day mean salinity of the water column at the U.S. Highway 1 Bridge.

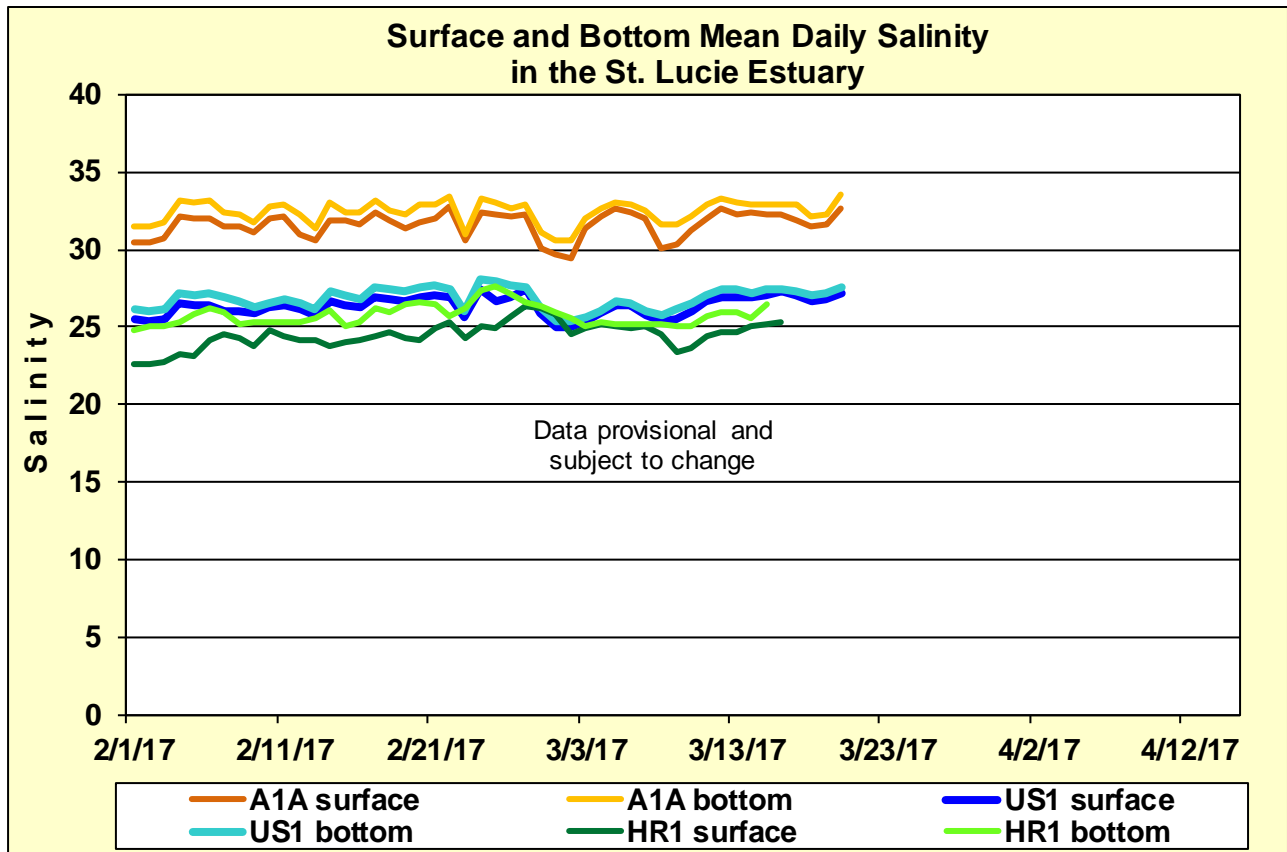


Figure 4. Daily mean salinity at the A1A, US1 and estimated HR1 stations.

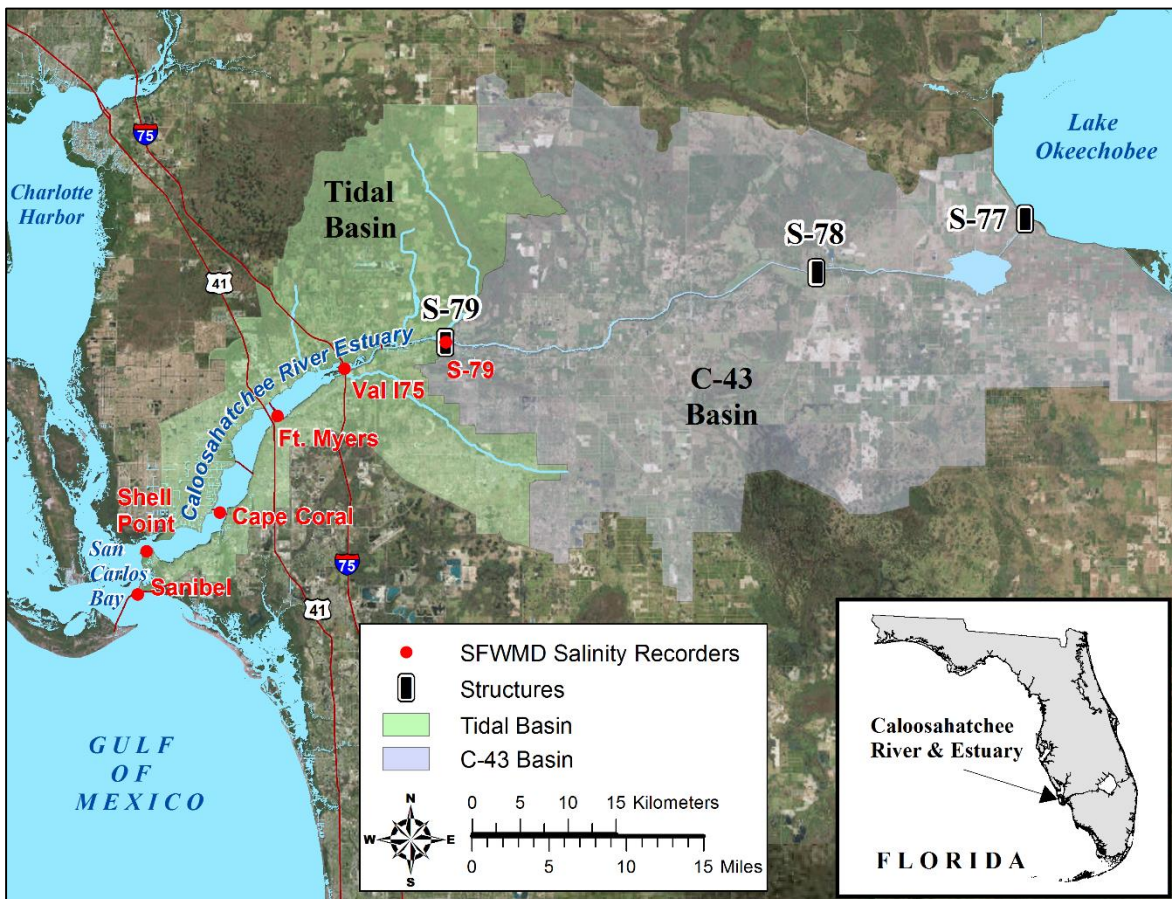


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

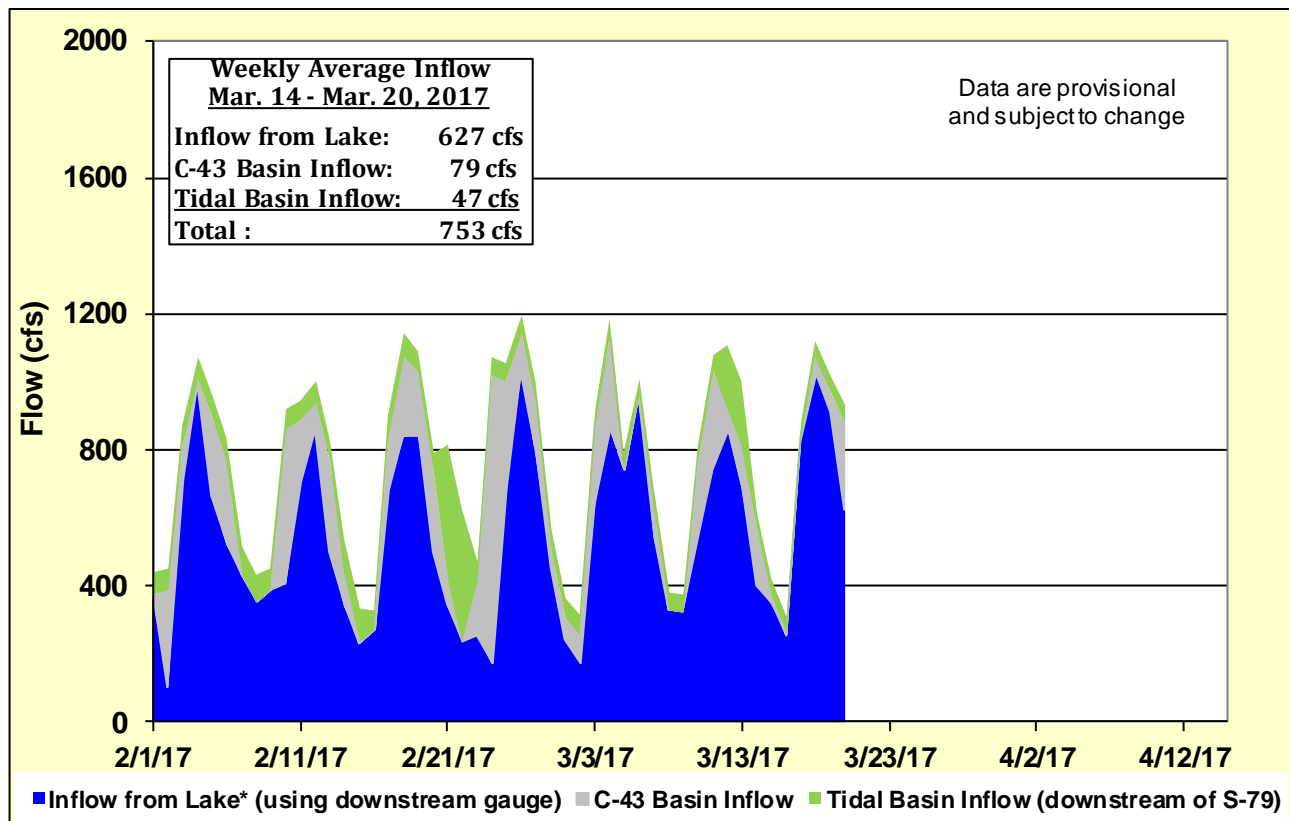
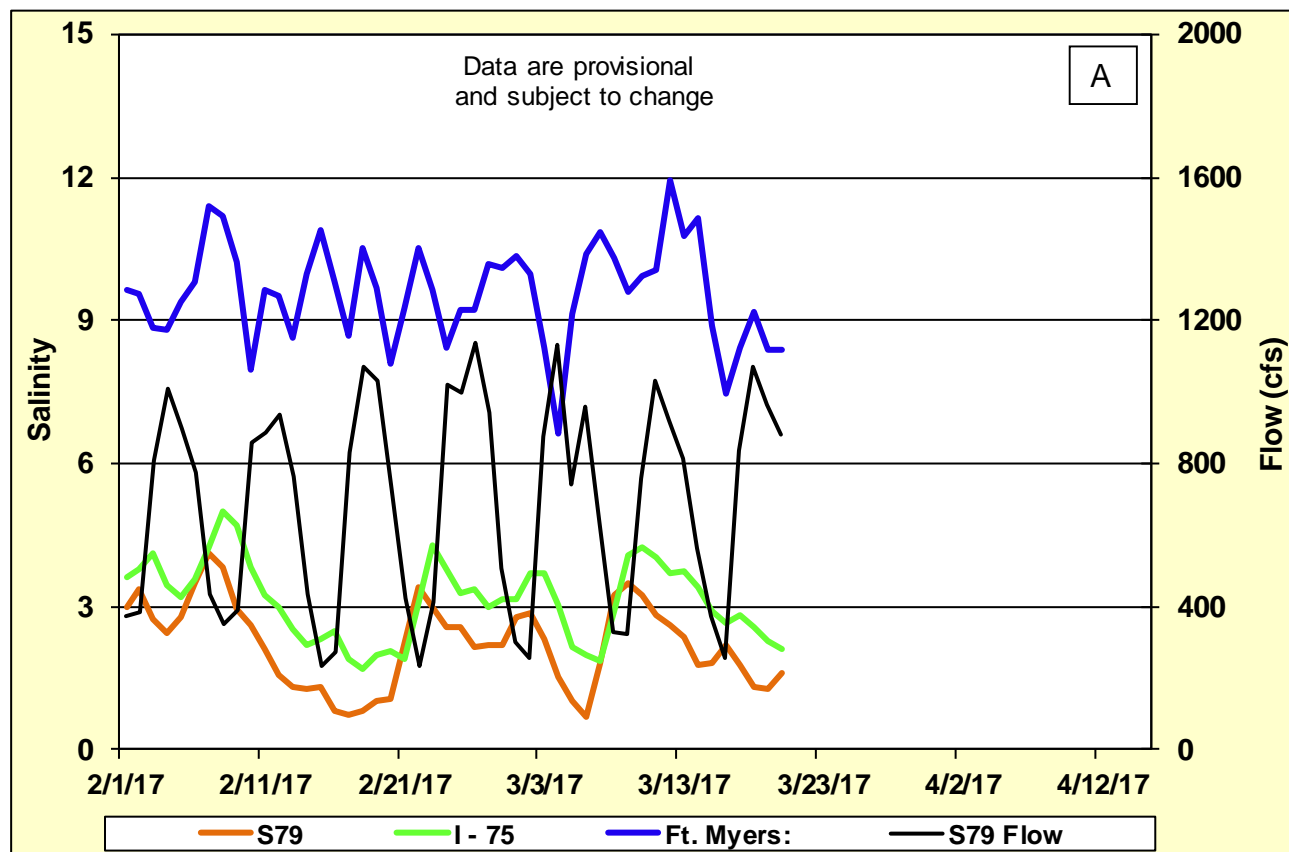


Figure 6. Freshwater inflows from Lake Okeechobee, runoff from the C-43 basin, and tributaries in the tidal basin into the Caloosahatchee River Estuary.



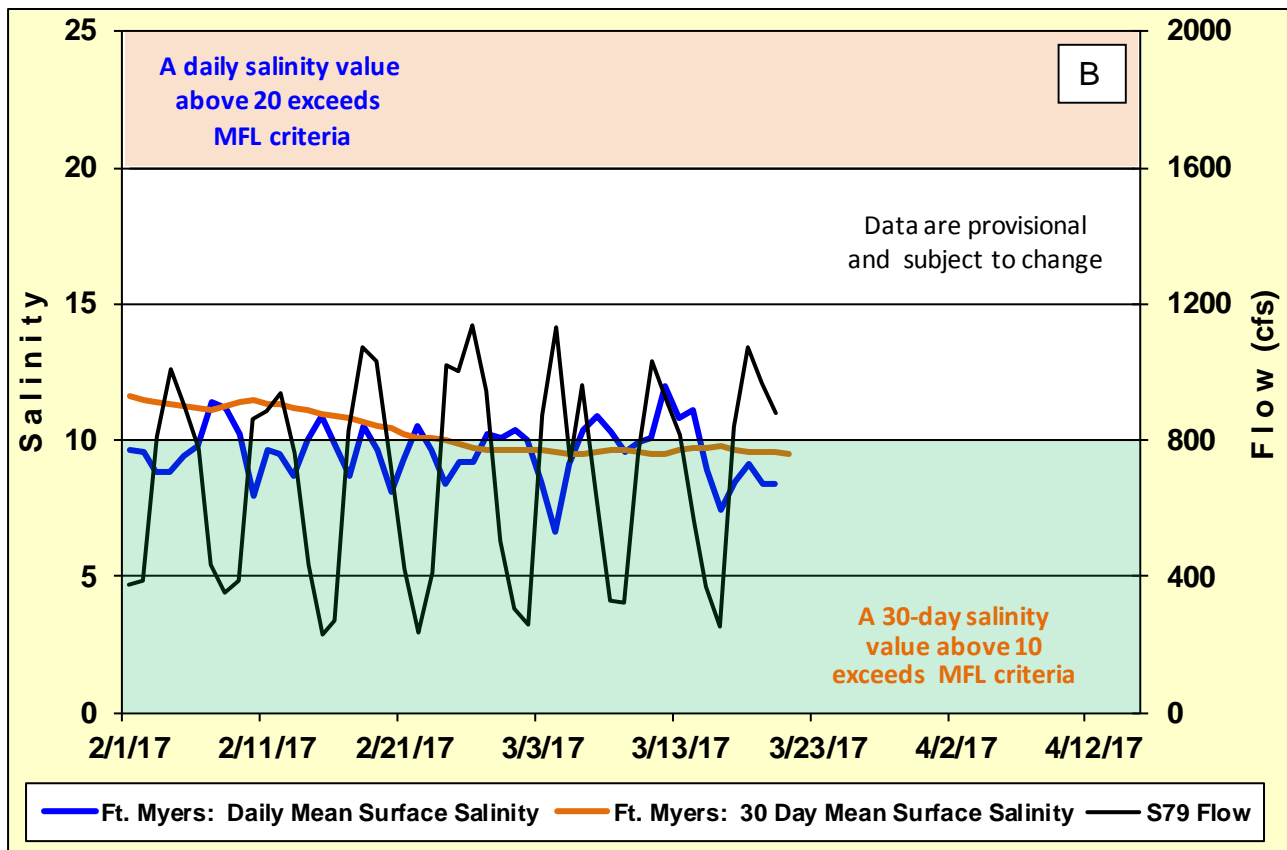


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations (A) and 30-day moving average salinity at Ft. Myers (B).

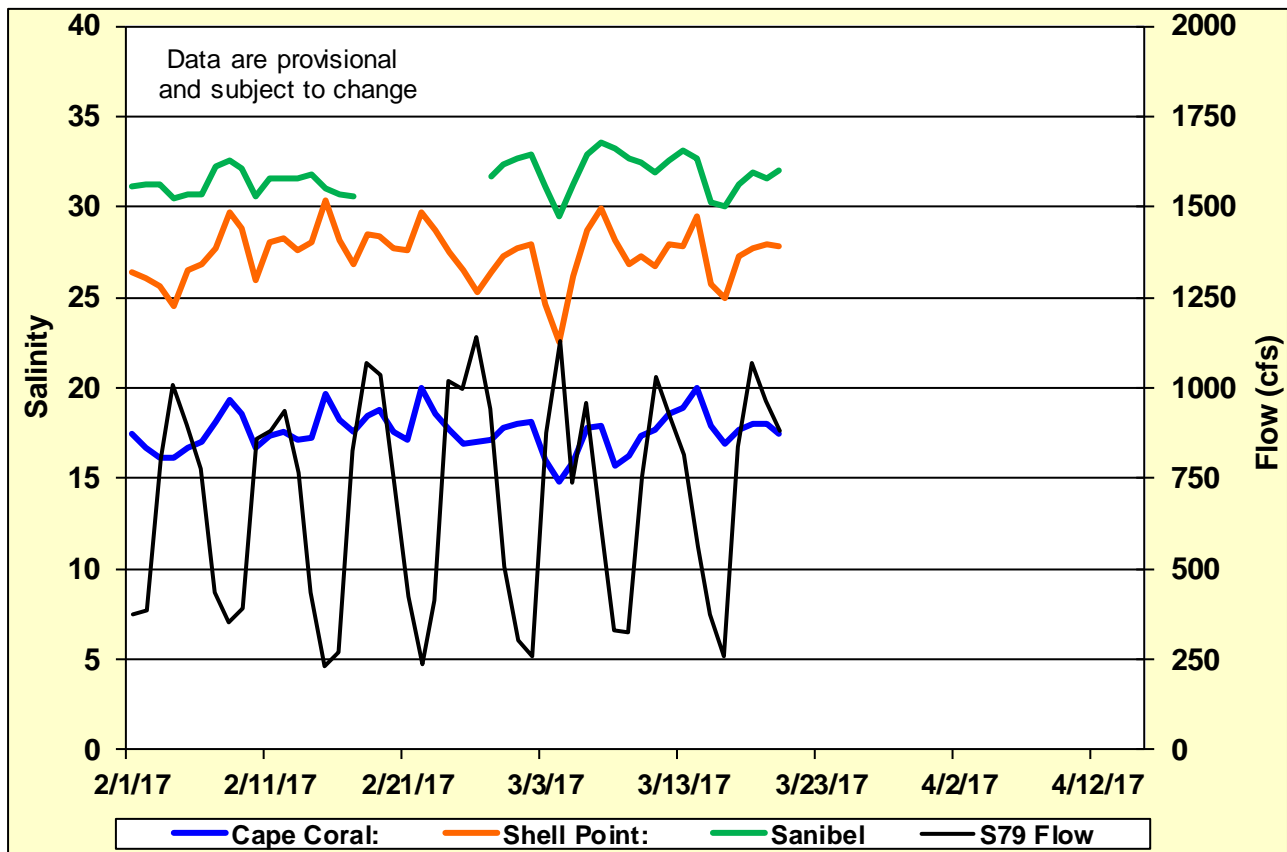


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

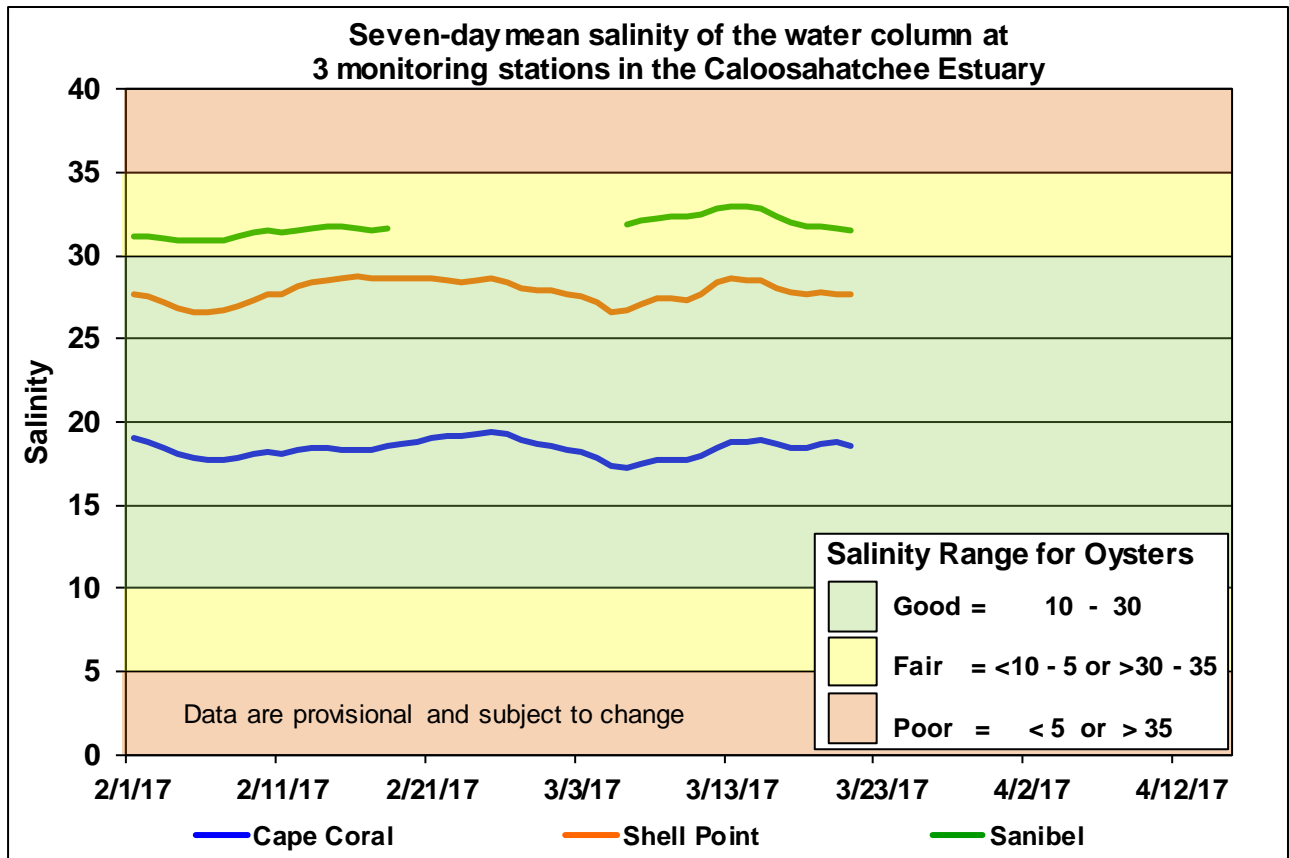


Figure 9. Seven-day mean salinity at Cape Coral Bridge, Shell Point and Sanibel Bridge monitoring stations.

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

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

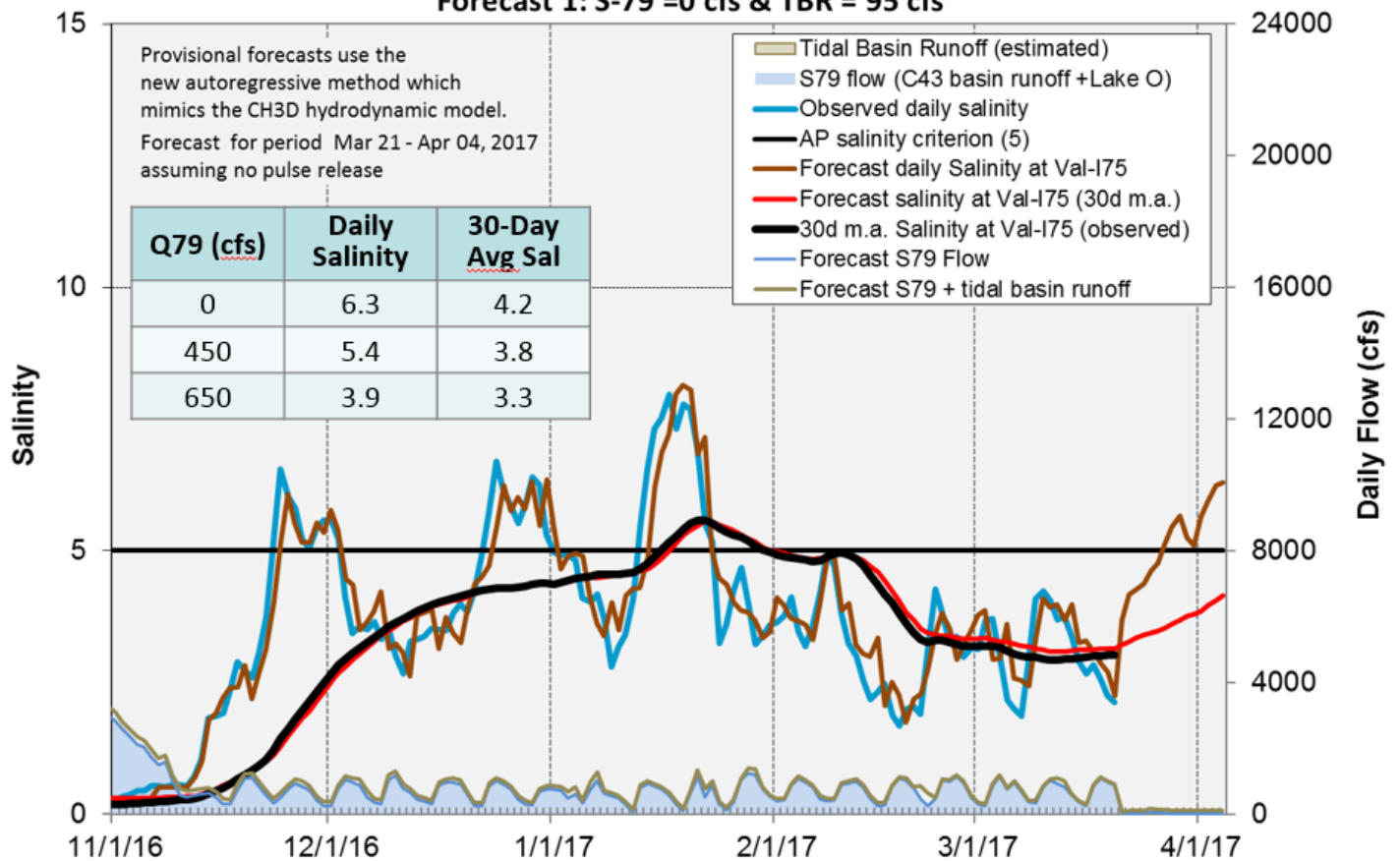


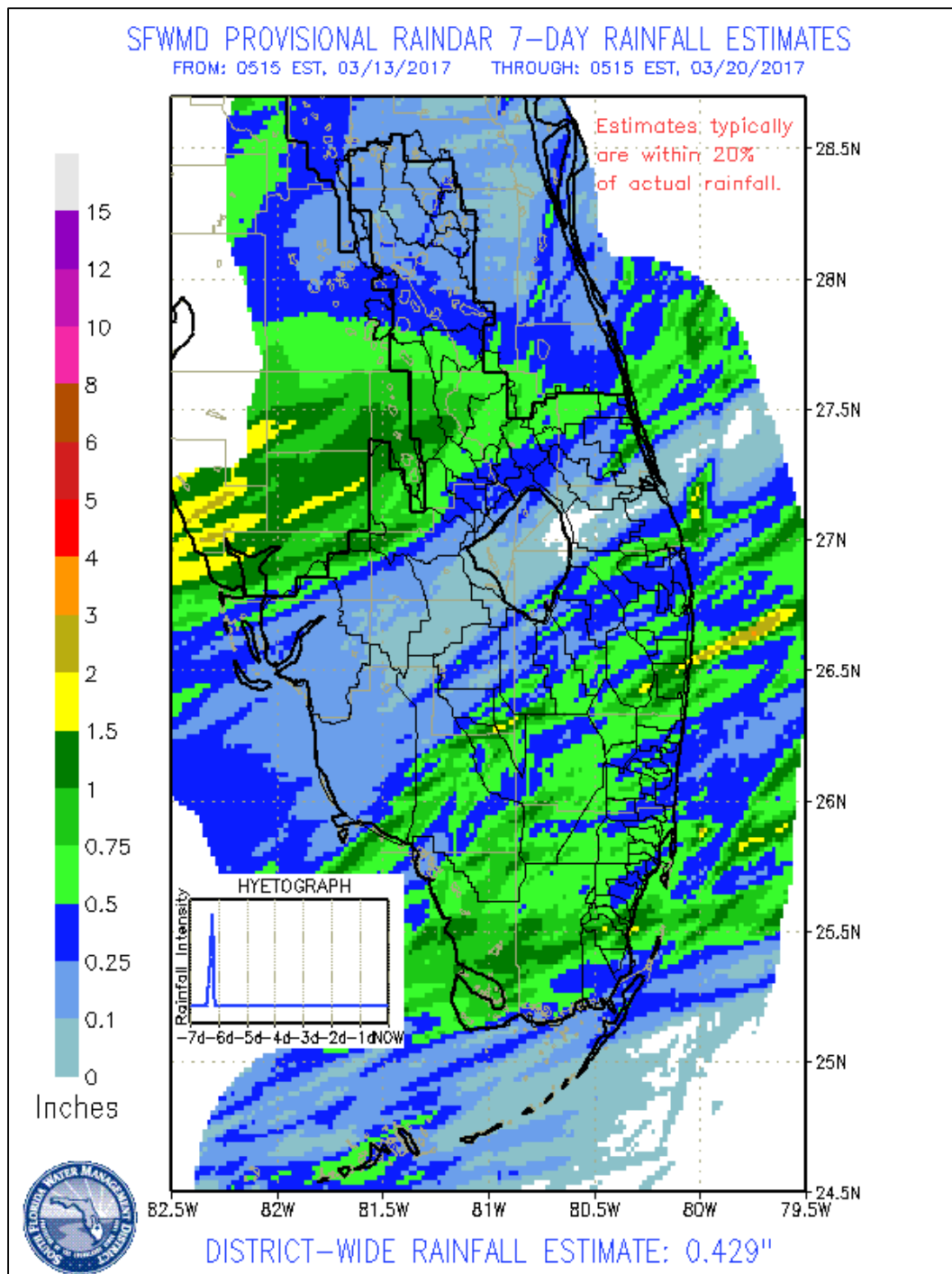
Figure 10. 14-day salinity forecast at Val I-75 assuming no releases at S-79.

GREATER EVERGLADES

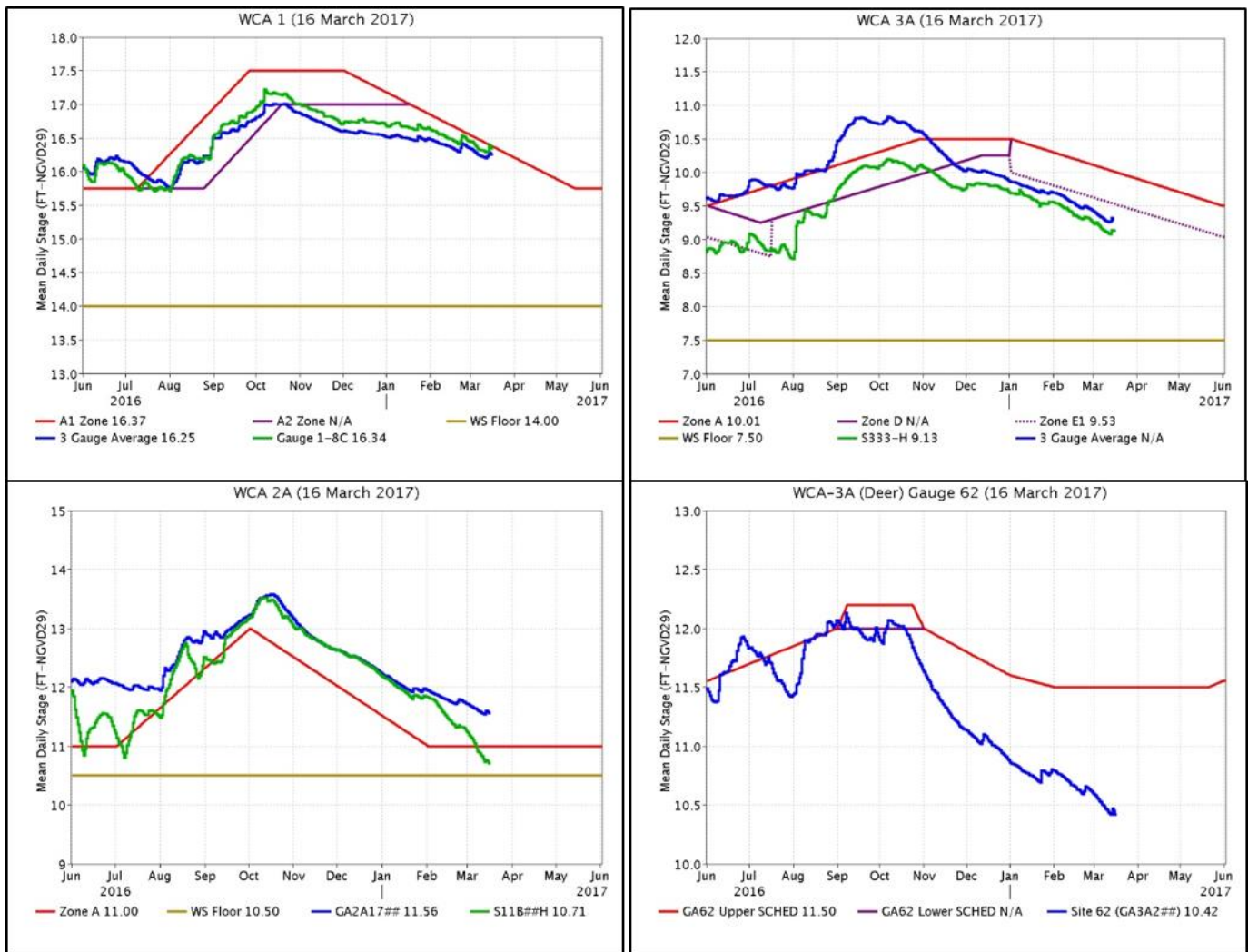
Rainfall over the last week was consistent across the Everglades, averaging 0.65 inches. Averaging the stage recession at gauges throughout the WCAs (except WCA-2B) and Northeast Everglades National Park (ENP) over the past week the recession rate was – 0.05 feet per week.

Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	0.66	-0.04
WCA-2A	0.64	-0.04
WCA-2B	0.59	-0.12
WCA-3A	0.64	-0.07
WCA-3B	0.63	-0.02
ENP	0.76	-0.07

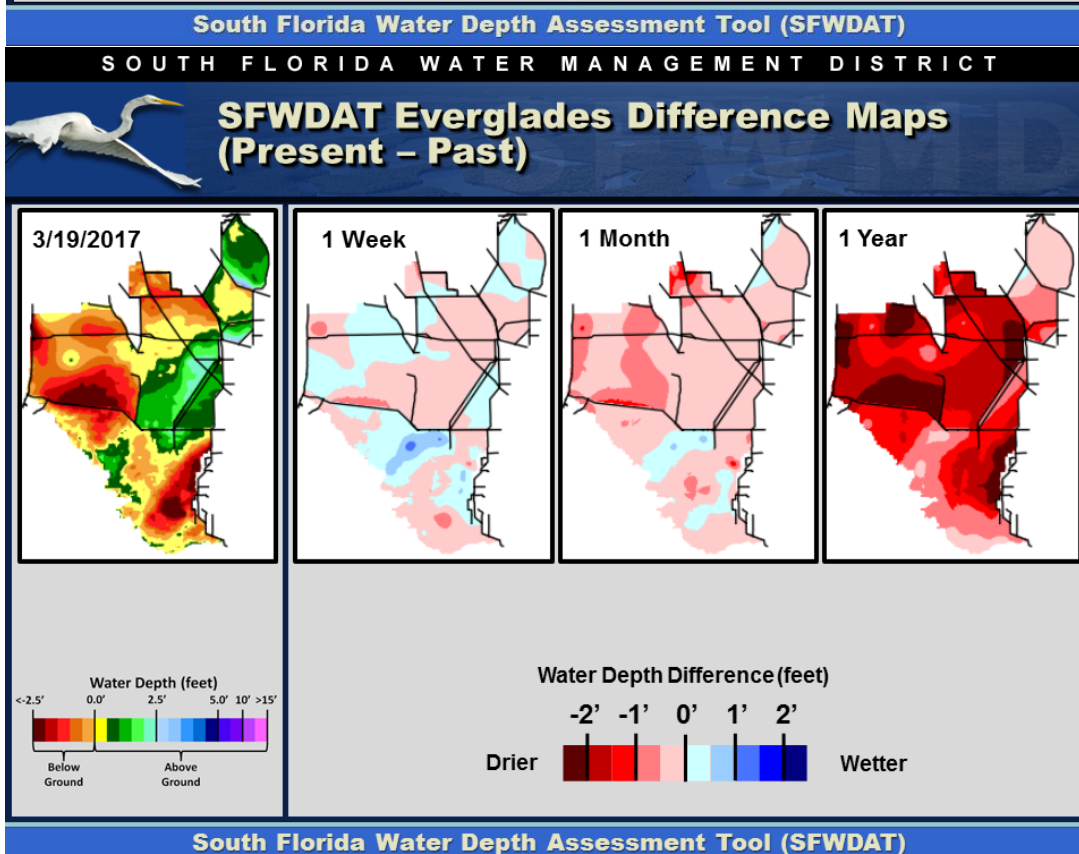
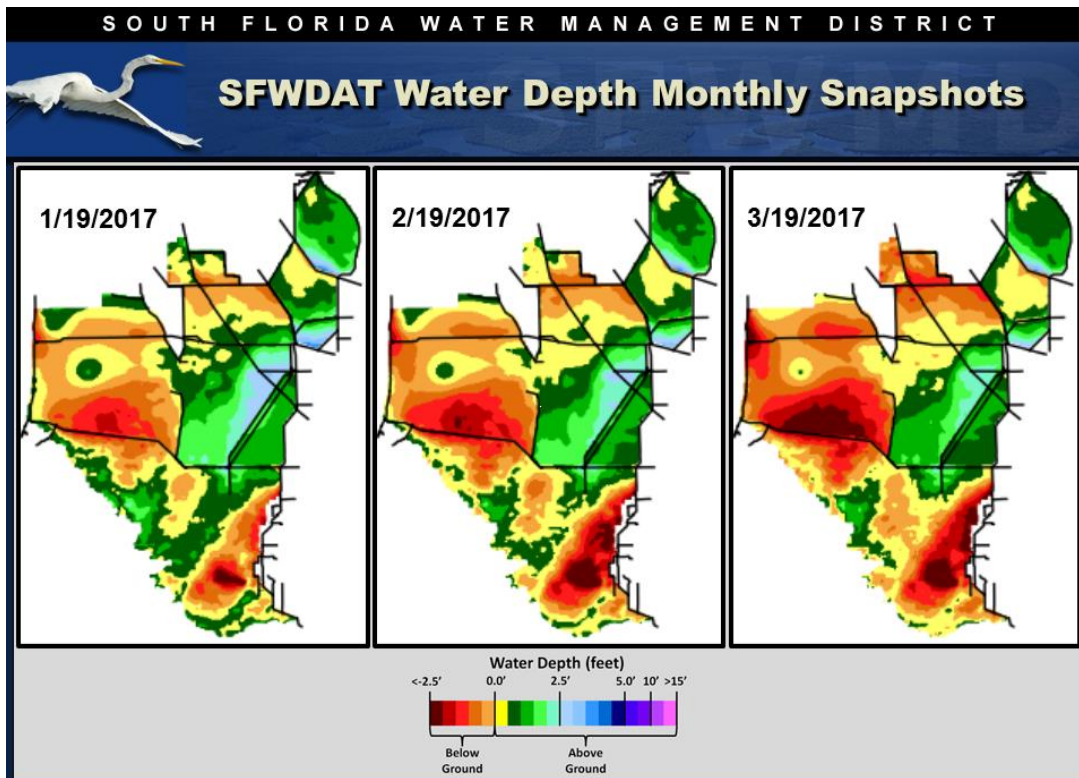
	Good
	Fair
	Poor



Regulation Schedules: WCA-1 and WCA-3A are 0.12 feet and 0.40 feet below regulation schedule, respectively. In WCA-2A the canal stage is 0.56 feet above schedule while the marsh stage is 0.29 feet below. WCA-3A at gauge 62 (Northwest corner) remains greater than one foot below schedule.



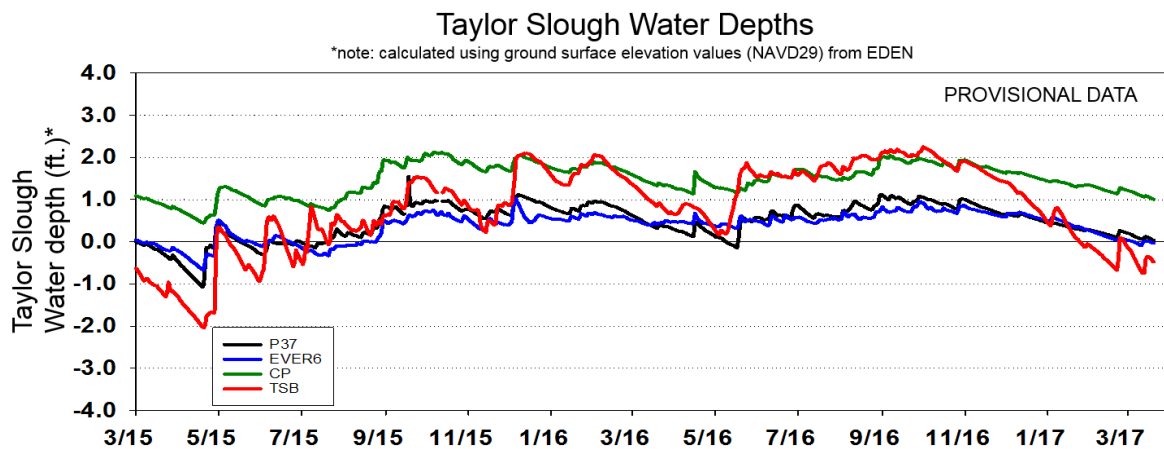
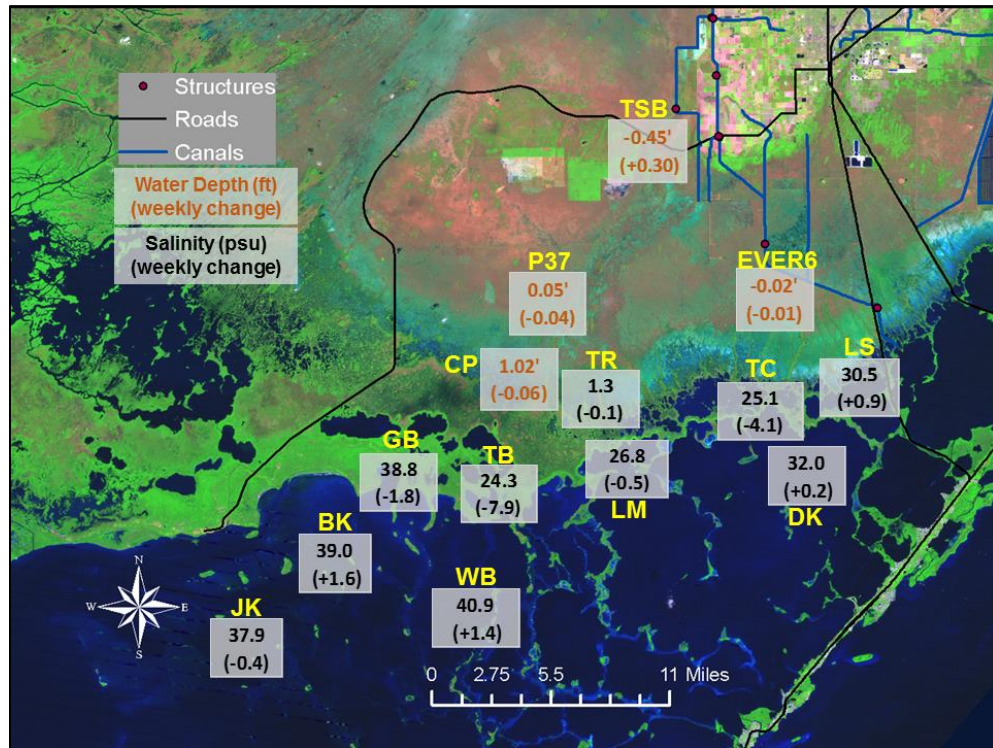
Water Depths and Changes: This week's water depths at monitored gauges other than in WCA-2B range from 0.10 feet (northeast WCA-3A) to 1.75 feet (southern WCA-3A). Over the last week individual gauge changes ranged from 0.0 feet to -0.12 feet. Stages across the Everglades are for the most part lower than they were a week and month ago, and significantly lower than one year ago (of note last year stages were above average).

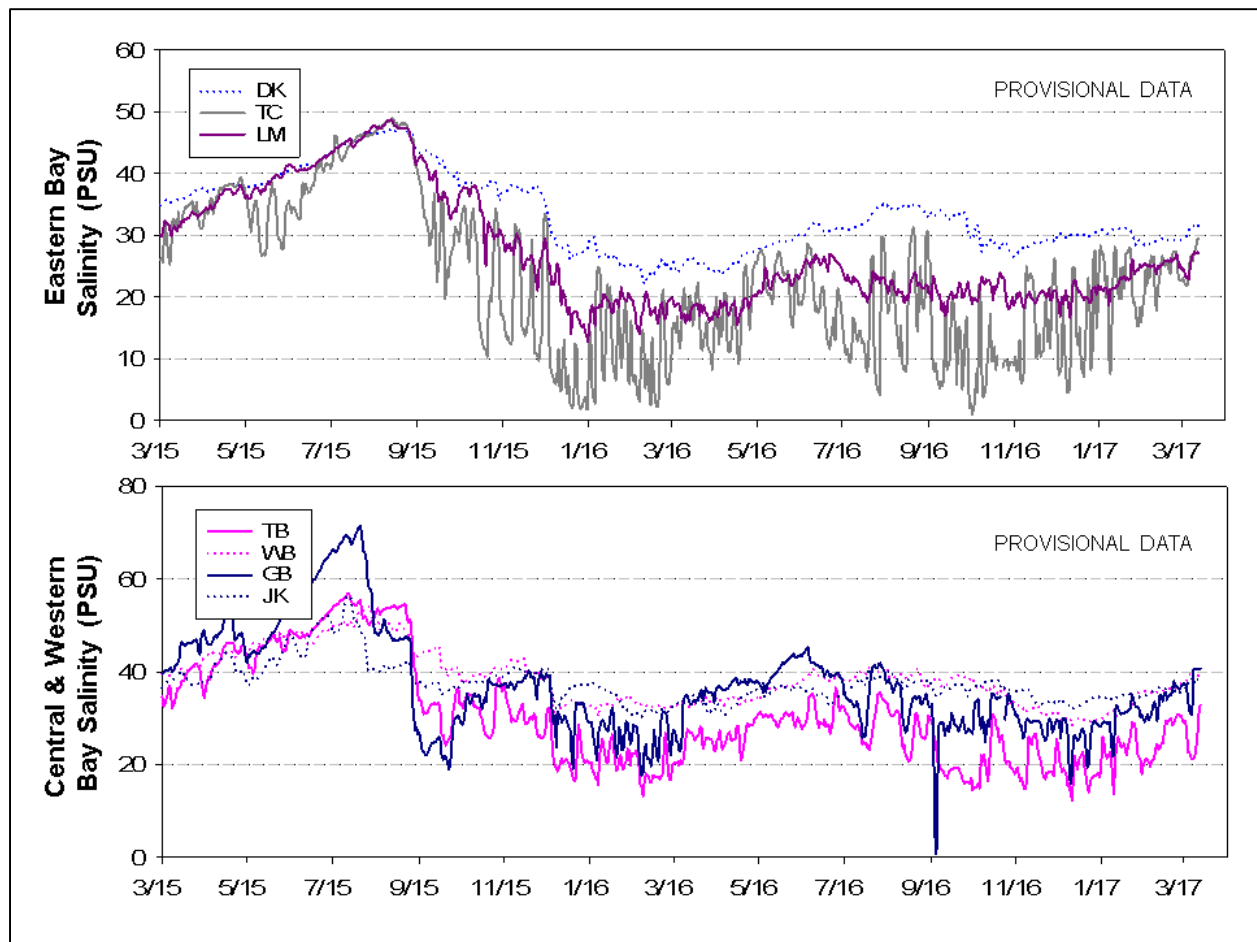


Wading Birds: Large numbers of wading birds were noted feeding throughout the Everglades in areas where depths are currently optimal for wading bird foraging on a wading bird flight conducted on March 20, 2017. The two Wood Stork colonies on the western border of WCA3A-S continue to grow and now contain about 700 nests and many healthy nestlings. Last year, by contrast, there were no stork nests in the WCAs.

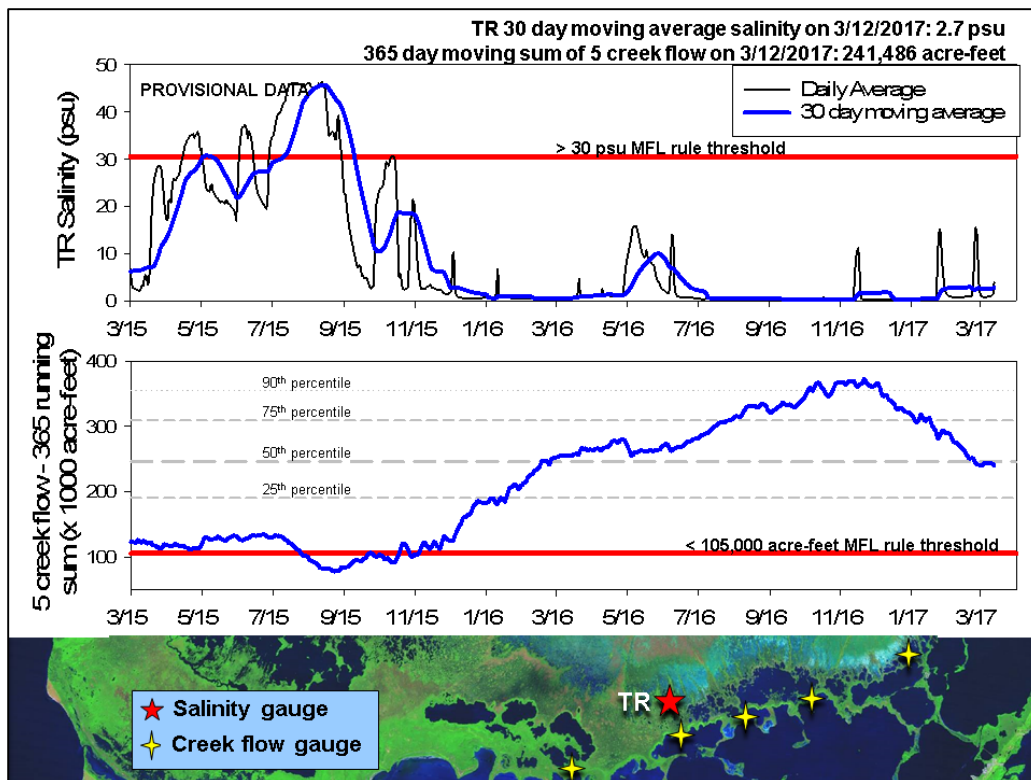
Taylor Slough: Water level decreases slowed this week. Northern Taylor Slough, which had the highest rainfall this week, increased by +0.3 feet, but is still below ground. Water levels range from -1 inch below average in Northern Taylor Slough to 1 inch above average in Southern Taylor Slough.

Florida Bay Salinity: Positive flows resumed by Wednesday last week allowing salinities to decrease along the shoreline. Salinities in the Bay range from 27 psu to 41 psu. Compared to long-term averages, current salinities are mostly +2 to +6 psu above average. Only the central nearshore area is -4 psu below average after decreasing -10 psu since Wednesday.





Florida Bay MFL: The daily average salinity at TR increased to 11 psu by Wednesday before decreasing back to 1.3 psu. The 30-day moving average increased 1.1 to end the week at 3.8 psu. The weekly creek flow from the five creeks was roughly +2,500 acre-feet with positive flows resuming after Tuesday's rains. The 365-day moving sum of flow from the five creeks identified by stars on the map increased about +5,000 acre-feet to end at 246,843 acre-feet (below the long-term average of 257,628 acre-feet).



Water Management Recommendations

- Water levels across the Everglades decreased at a recession rate while categorized as “fair” based on general seasonal criteria, stage conditions at this time and current water depths suggest that faster than – 0.07 feet per week may dry out all areas before the end of the breeding season. Currently tens of thousands of wading birds are nesting in the Everglades with large numbers of ibises and smaller herons expected to start in the next week or two. Wading birds will require slower recession rates in WCA-2A and WCA-3A if they are to nest successfully.
- The seasonal Multispecies Management Team (interagency group related to ERTTP schedule) recommends retaining water to the extent possible to slow recessions everywhere in the Everglades. Recession rates need to be evaluated as a function of previous water depths. While a recession rate faster than -0.15 feet/week might have minimal effect in the very short-term (a week or two), in the long-term it may result in over drying in all but the wettest years.
- Expected upcoming drier than average conditions may result in suspension or curtailment of inflows into WCA-3A and WCA-2A. If the current inflows need to be reduced, we recommend continuing flows into WCA-2A versus 3A.

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

Everglades Ecological Recommendations, Mar. 21st, 2017 (red is new)

Area	Current Condition	Cause(s)	Recommendation	Reasons
WCA-1	Stages decreased -0.04' to -0.05'	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 -0.04'	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 -0.12'	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 -0.05'	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. Prioritize S-11C over S-11A to get water near the Alley North Colony.	Protect habitat and wildlife. Support apple snails and nesting wading birds, particularly in Alley North colony. Reduce fire risk as season progresses. Recession rate at gauge 63 (location closest to Alley North wading bird colony) decreases from -.10 to -.08 feet/week
WCA-3A NW	Stages decreased -0.08'	Rainfall, ET, management		
Central WCA-3A S	Stages decreased -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).	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 -0.05'	Rainfall, ET, management		
WCA-3B	Stages decreased 0.00' to -0.04'	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 snail breeding.
ENP-SRS	Stages decreased -0.07'	ET, rainfall, topography, management	Make discharges to the Park according to the ERTF rainfall plan.	Keep peat wet to promote native habitat and maintain wetland plant and animal communities. Protect habitat and wildlife and prepare for wading bird breeding season.
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 ERTF 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 -0.06' to +0.30'	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	-4 psu below to +6 psu above average	Rain, ET, inflows, wind	Move water southward as possible	Maintain low salinity conditions and prevent early salinity increases.