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M E M O R A N D U M

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

FROM: SFWMD Staff Environmental Advisory Team

DATE: March 27, 2018

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

Moderate shower activity is forecast for this weekend. High pressure is building from the north behind a frontal boundary which moved southwestward across the District overnight. Some spotty light showers will linger south and east today before dry conditions spread across the area this evening. The next frontal system will move into the District Friday night and Saturday. Expect moderate shower activity to accompany the front mainly north and northeast Friday afternoon/night and then mainly over the southern half of the District Saturday. The frontal boundary is then expected to become diffuse with some scattered showers persisting mainly east Sunday and Monday.

Kissimmee

Tuesday morning stages were 56.4 feet NGVD (1.2 feet below schedule) in East Lake Toho, 53.4 feet NGVD (1.2 feet below schedule) in Toho, and 49.7 feet NGVD (1.3 feet below schedule) in Kissimmee-Cypress-Hatchineha; headwater stages were 46.4 feet NGVD at S-65A and 25.9 feet NGVD at S-65D. Mean recession rates for the last week were 0.21 and 0.20 feet per week in East Lake Toho and Toho, respectively (preferred range of 0.15 - 0.2 feet per week) and 0.06 feet per week in Kissimmee-Cypress-Hatchineha (preferred rate is to not exceed 0.2 feet per week). Tuesday morning discharges were: 365 cfs at S-65, 251 cfs at S-65A, and 322 cfs at S-65E. Dissolved oxygen concentration in the Kissimmee River averaged 7.8 mg/L for the week. Kissimmee River mean floodplain depth on Sunday was 0.08 feet.

Lake Okeechobee

Lake Okeechobee stage is 14.02 feet NGVD having decreased 0.24 feet over the past week and 0.93 feet over the last month. Lake stages have receded approximately 3.2 feet from the October 2017 peak following Hurricane Irma, but exceeded 15.0 feet NGVD for 161 days, the longest period since the winter of 2005/2006. The high water and associated turbidity have had substantial impacts on the submerged aquatic and emergent vegetation coverage in the nearshore areas of the Lake, which would benefit from lower stages near the end of the 2018 dry season. The rapid recession rate of nearly one foot per month is not ideal for fish and wildlife breeding season conditions but will hasten the return of light penetration to the sediments in the nearshore region for important habitat recovery. It will also help avoid higher stages in the summer, which are correlated with algal blooms on the Lake.

Estuaries

Total inflow to the St. Lucie Estuary averaged 161 cfs over the past week with no flow coming from Lake Okeechobee. Salinity stayed about the same throughout the estuary. The seven-day average salinity at the US1 Bridge is in the fair range for adult eastern oysters. The highest weekly ranges of chlorophyll *a* were 4.64 – 9.89 µg/L in the South Fork.

Total inflow to the Caloosahatchee Estuary averaged 705 cfs over the past week with 369 cfs coming from the Lake. Salinity decreased in the upper part of the estuary and stayed about the same in the lower part. 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 Val I-75 is forecast to be 4.9 in two weeks with no flow through S-79. Salinity conditions between Val I-75 and Ft. Myers are good for tape grass. Salinity conditions are in the good range for adult eastern oysters at Cape Coral and Shell Point. Chlorophyll *a* concentrations over the last week at Beautiful Island were 7.63 – 28.12 µg/L, at Ft. Myers were 4.07 – 8.57 µg/L, and at Shell Point were 1.26 – 11.44 µg/L. Dissolved oxygen levels at Beautiful Island were 5.22 – 10.02 mg/L, at Ft. Myers were 5.35 – 7.55 mg/L, and at Shell Point were 4.67 – 7.54 mg/L. Given the current estuarine conditions, there are no ecological benefits associated with freshwater releases from Lake Okeechobee.

Stormwater Treatment Areas

Over the past week, the STAs/FEBs received approximately 9,100 acre-feet of Lake releases. The total amount of Lake releases sent to the STAs/FEBs in WY2018 (since May 1, 2017) is approximately 106,600 acre-feet. Most STA cells are at or above target depths, except many of the STA-5/6 EAV cells which are below target. Operational restrictions are in place for vegetation rehabilitation in STA-1E, STA-2, and STA-3/4, and for construction related activities in STA-1W. This week, if 2008 LORS recommends Lake releases to the WCAs and the conditions allow, releases will be sent to STA-2 Flow-way 1 and the A-1 FEB/STA-3/4 Western Flow-way.

Everglades

Recession rates across the Everglades basins increased from the previous week. Those rates are creating mostly fair foraging conditions for wading birds. The rates would need to slow to be considered good, especially in WCA-3A where the rate last week was significantly above the optimal rate. Slowing the recession rate across the entire system would have ecological benefit, but the most pronounced benefit would be achieved in northern WCA-3A and Rotenberger Wildlife Management Area. Maintaining open water conditions around the near record number of wading birds nesting at the Alley North colony in northeast WCA-3A is important to protect those nests from terrestrial predators. Over-drying in this part of the system also puts the peat soils at risk and increases the likelihood of damaging wild fires. Stage decreases in Taylor Slough and the Everglades National Park panhandle this past week were more rapid than last week at 0.07 to 0.52 feet. Water depths range from 1 to 8 inches above the historical averages. In Florida Bay, salinities increased 0.4 psu on average this past week, and remain 2 psu below to 2 psu above the historical averages.

Supporting Information

KESSIMMEE BASIN

Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 0.31 inches of rainfall in the past week and the Lower Basin received 0.77 inches (SFWMD Daily Rainfall Report 3/26/2018).

Upper Kissimmee Basin

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

Table 1. Average discharge (cfs) for the preceding seven days, one-day stage (feet NGVD), and departures from KCOL flood regulation (R) or temporary schedules (T, A, or S). Provisional, real-time data are from SFWMD.
Report Date: 3/27/2018

Water Body	Structure	7-day Average Discharge (cfs) ¹	Stage Monitoring Site ²	Lake Stage (feet)	Schedule Type ³	Schedule Stage (feet)	Daily Departure (feet)						
							3/25/18	3/18/18	3/11/18	3/4/18	2/25/18	2/18/18	2/11/18
Lakes Hart and Mary Jane	S62	5	LKMJ	60.4	R	60.8	-0.4	-0.5	-0.4	-0.3	-0.2	-0.1	0.1
Lakes Myrtle, Preston, and Joel	S57	0	S57	60.6	R	60.8	-0.2	-0.1	-0.1	-0.1	-0.1	0.0	0.0
Alligator Chain	S60	0	ALLI	63.4	R	63.8	-0.4	-0.5	-0.4	-0.3	-0.2	-0.1	0.0
Lake Gentry	S63	0	LKGT	61.1	R	61.3	-0.2	-0.3	-0.2	-0.1	0.0	0.0	0.0
East Lake Toho	S59	149	TOHOE	56.5	R	57.7	-1.2	-1.2	-1.2	-1.1	-0.9	-0.7	-0.6
Lake Toho	S61	338	TOHOW, S61	53.5	R	54.7	-1.2	-1.2	-1.2	-1.1	-1.0	-0.8	-0.6
Lakes Kissimmee, Cypress, and Hatchineha	S65	361	KUB011, LKIS5B	49.8	R	51.0	-1.2	-1.2	-1.1	-0.8	-0.9	-1.0	-1.3

¹Seven-day average of weighted daily means through midnight.

²Names of in-lake monitoring sites and structures used to determine lake stage; if more than one site is listed, an average is reported.

³T = temporary schedule, R = USACE flood control schedule, S = temporary snail kite schedule, A = projected ascension line, N/A = not applicable or data not available.
DATA ARE PROVISIONAL

Lower Kissimmee Basin

Discharges at Lower Basin structures are shown in Table 2. SFWDAT depth maps for the Phase I restoration area are shown in Figure 8. Kissimmee River floodplain stages at selected stations are shown in Figure 9.

Table 2. One-day and seven-day averages of discharge at S-65x structures, of dissolved oxygen concentration in the Phase I area river channel, and water depth in the Phase I area floodplain. Data are provisional real-time data from SFWMD.

Report Date: 3/27/2018

Metric	Location	1-Day Average		Average for the Preceding 7-Days ¹								
		3/25/2018	3/25/18	3/18/18	3/11/18	3/4/18	2/25/18	2/18/18	2/11/18	2/4/18	1/28/18	1/21/18
Discharge (cfs)	S-65	366	361	400	461	715	968	1,000	810	785	583	572
Discharge (cfs)	S-65A	250	245	258	319	539	764	796	647	625	468	506
Discharge (cfs)	S-65D ²	250	329	343	430	730	1,047	1,018	940	857	656	692
Stage (feet NGVD)	S-65D ²	25.87	25.80	25.66	25.73	25.67	25.79	25.87	25.80	25.82	25.76	25.72
Discharge (cfs)	S-65E ²	250	348	317	441	733	1,088	1,059	978	899	712	730
Discharge (cfs)	S-67	0	0	0	0	0	133	389	350	346	241	97
DO (mg/L) ³	Phase I river channel	7.6	7.8	7.9	7.0	5.9	6.0	6.2	7.8	8.7	9.7	9.5
Mean depth (feet) ⁴	Phase I floodplain	0.08	0.09	0.07	0.09	0.14	0.19	0.22	0.23	0.26	0.19	0.21

¹Seven-day average of weighted daily means through Sunday midnight.

²S-65D discharge combines discharge at S-65D, S-65DX1, and S-65DX2; S-65D stage averages stage at S65D and S65DX1; S65E discharge combines S65E and S65EX1.

³DO is the average for sondes at PC62 and PC33.

⁴1-day spatial average from South Florida Water Depth Assessment Tool (SFWDAT).

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

KCOL Hydrographs (through Sunday midnight)

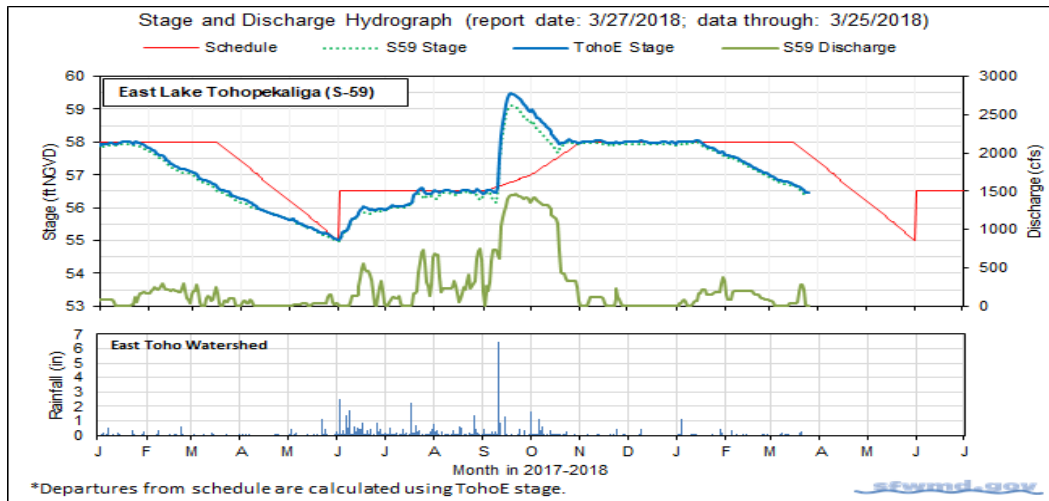


Figure 1.

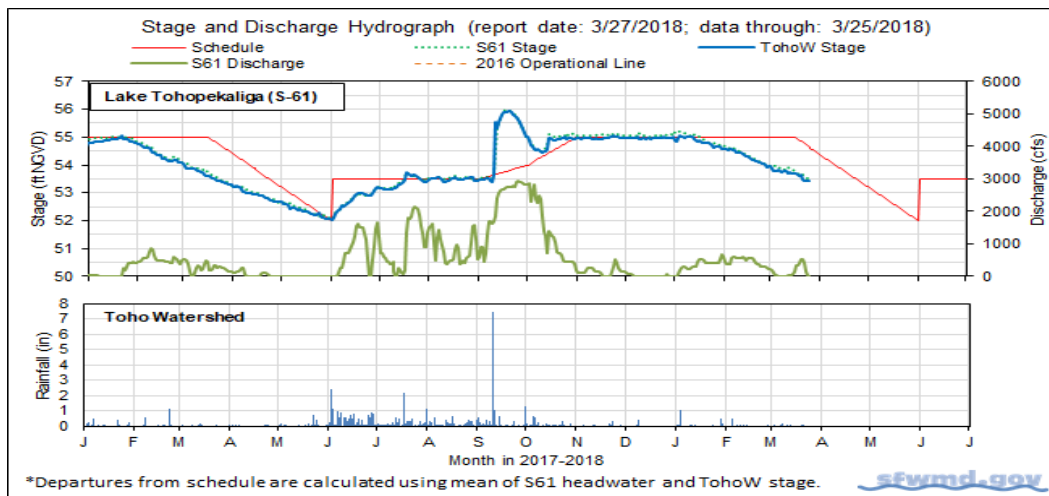


Figure 2.

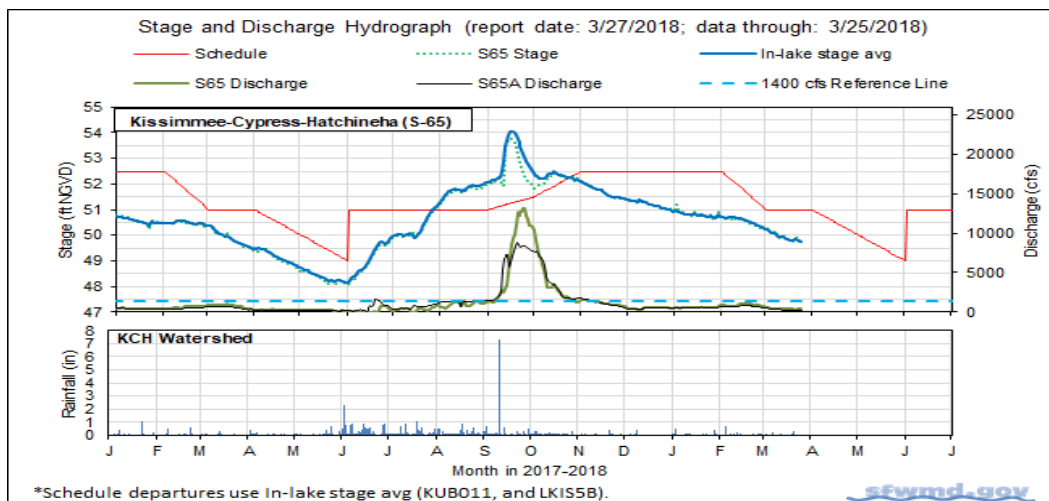


Figure 3.

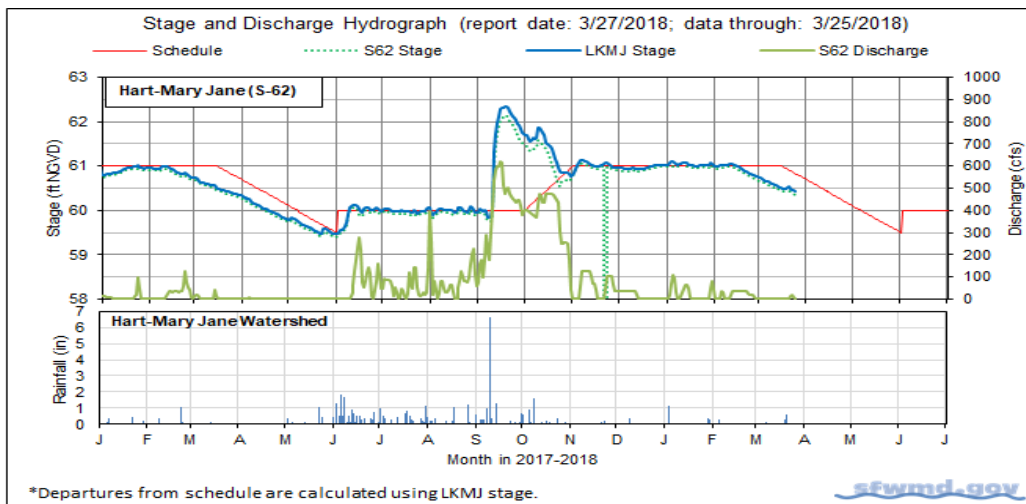


Figure 4.

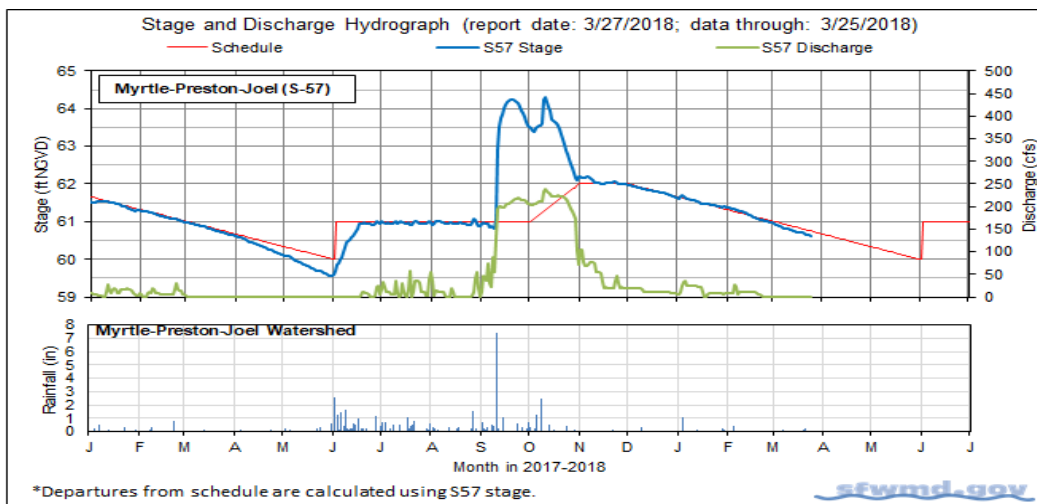


Figure 5.

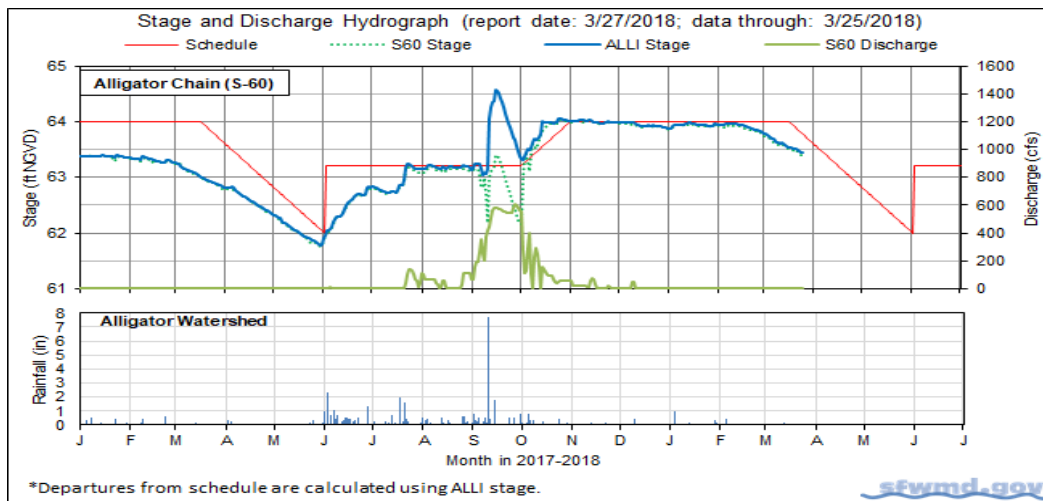


Figure 6.

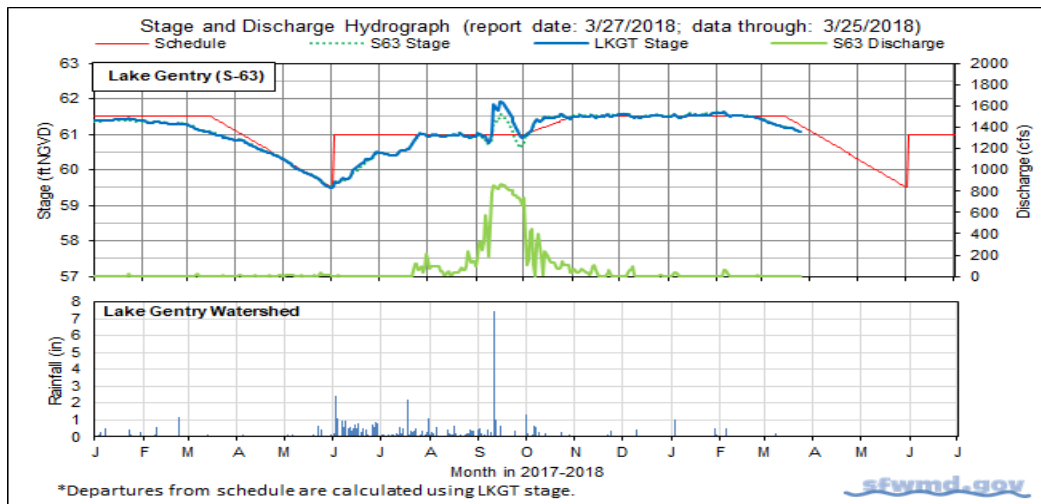


Figure 7.

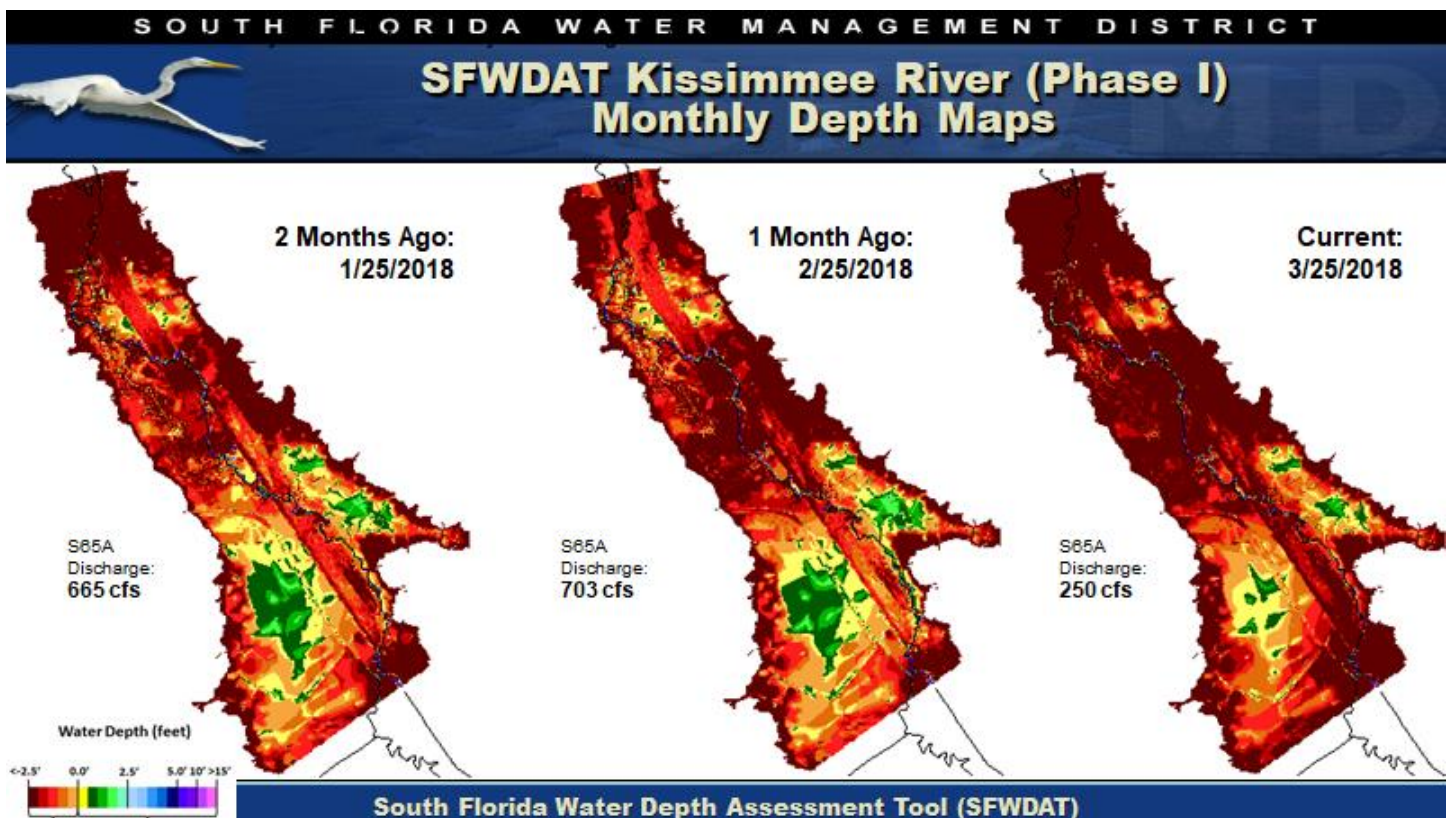


Figure 8. Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to January 16, 2012.

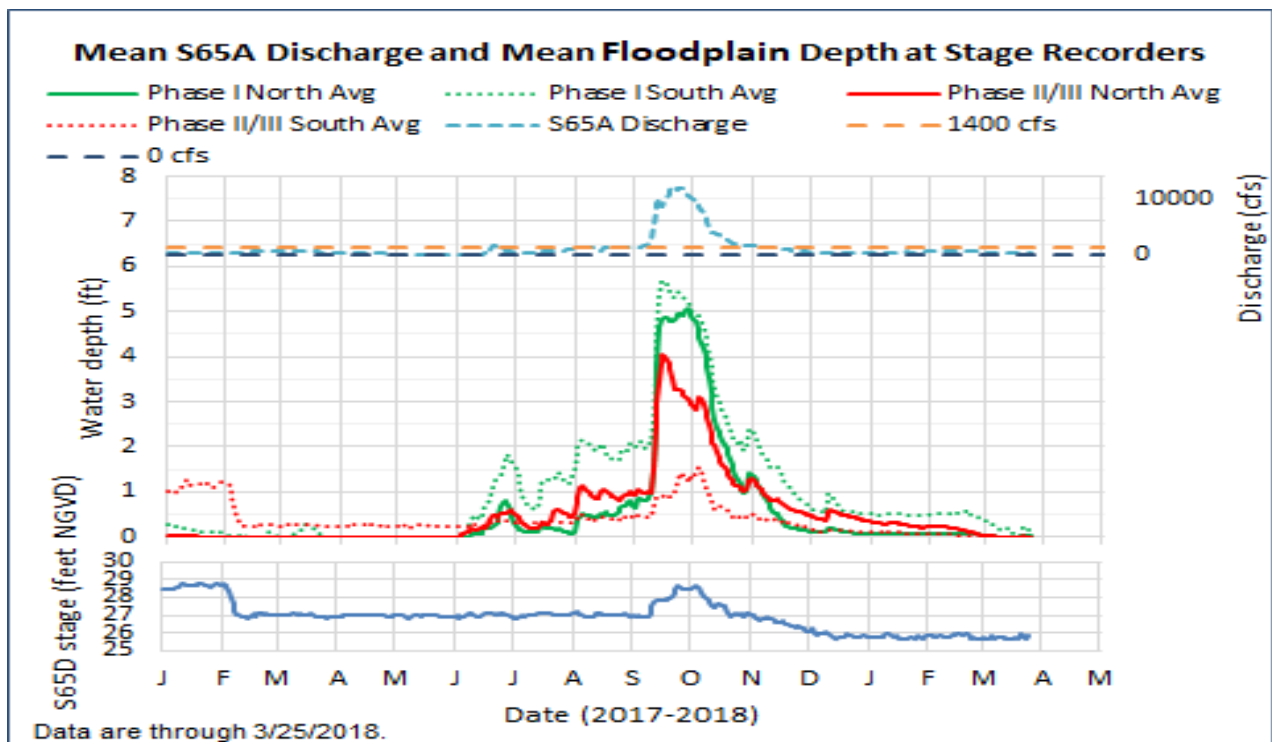
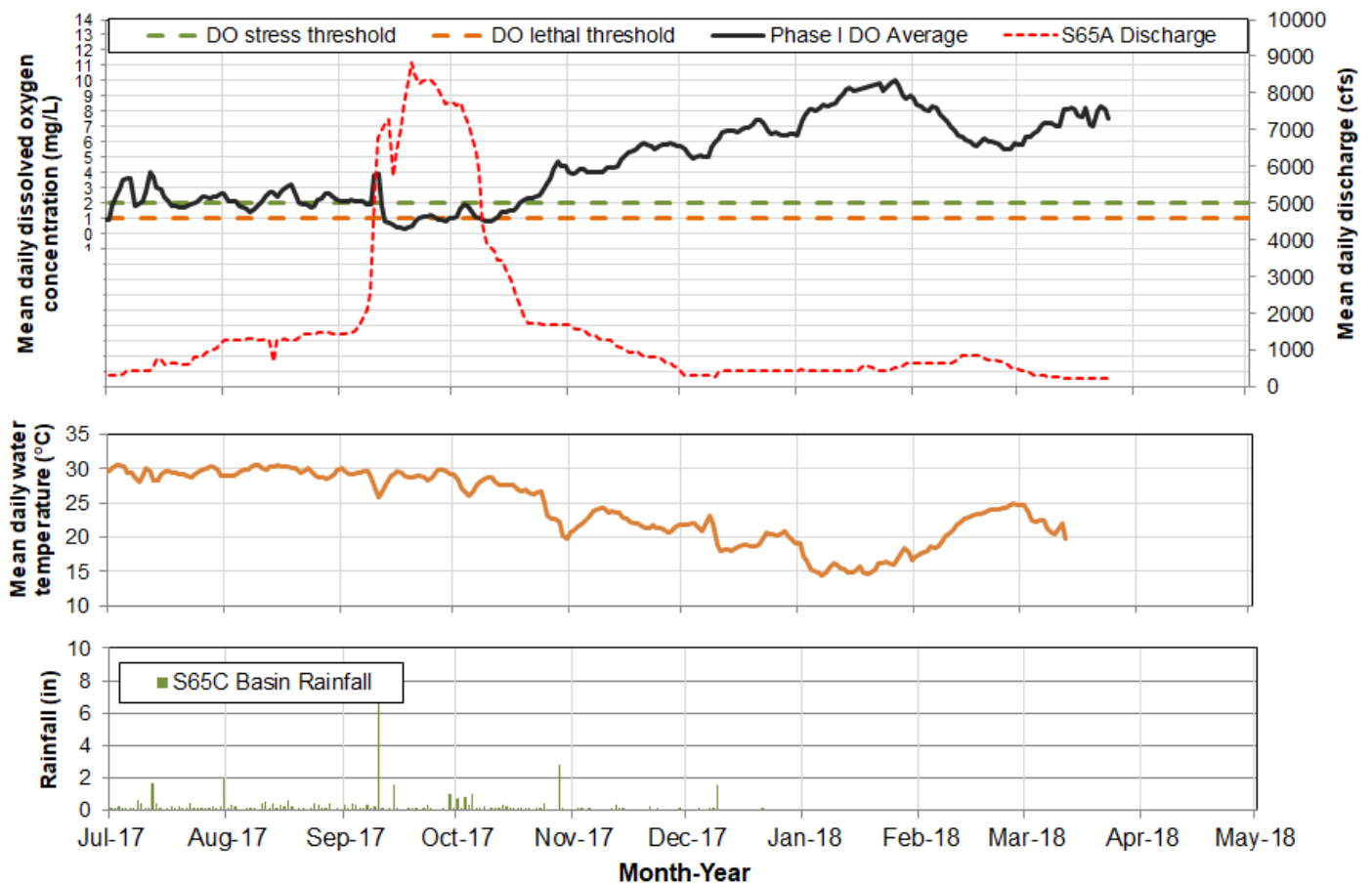


Figure 9. Mean water depth at stage recorders in the northern Phase I, southern Phase I, northern Phase II/III, and southern Phase II/III areas in relation to the S65A discharge and S65D headwater stage.



Report Date: 3/27/2018; data are through: 3/25/2018.

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

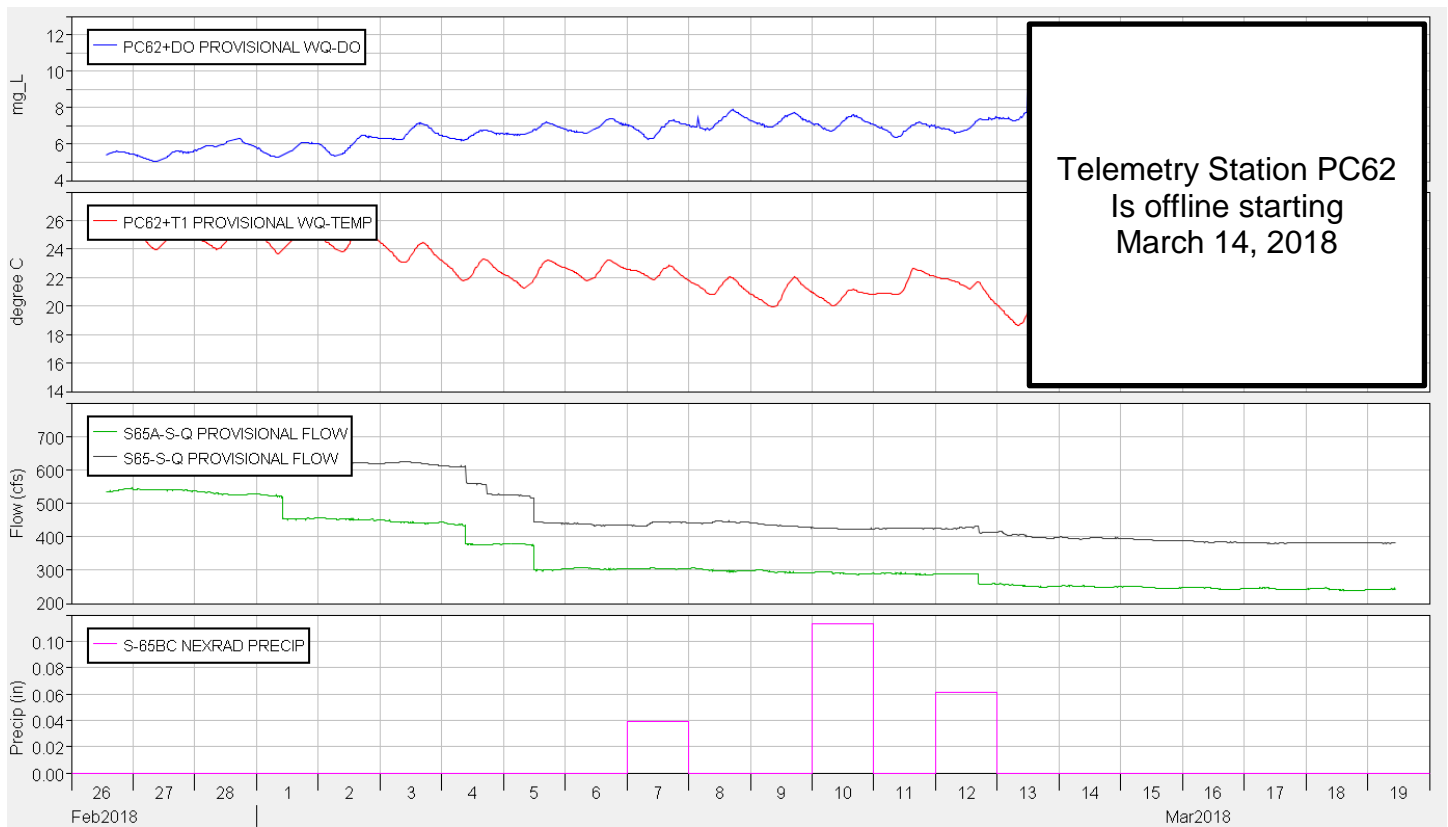


Figure 11. Phase I river channel dissolved oxygen and water temperature (measured at 15-minute intervals) and Pool BC daily rainfall.

Water Management Recommendations

Kissimmee Basin Adaptive Recommendations and Operational Actions

Date	Recommendation	Purpose	Outcome	Source
3/27/2018	No new recommendations.		N/A	
3/20/2018	No new recommendations.		N/A	
3/13/2018	No new recommendations.		N/A	
3/6/2018	No new recommendations.		N/A	
2/27/2018	No new recommendations.		N/A	
2/20/2018	No new recommendations.		N/A	
2/13/2018	No new recommendations.		N/A	
2/6/2018	No new recommendations.		N/A	
1/30/2018	No new recommendations.		N/A	
1/23/2018	No new recommendations.		N/A	
1/16/2018	No new recommendations.		N/A	
1/9/2018	No new recommendations.		N/A	
12/19/2017	Begin discharge of 400 cfs from S67 into Istokpoga Canal.	Increase navigability by scouring channel and reducing sandbar at canal mouth.	Implemented	KB Ops/SFWMD Water Mgt
12/19/2017	Begin a stage recession on January 1 in Lakes Kissimmee-Cypress-Hatchineha starting at stage on January 1 to reach low pool on May 31. Recession rate not to exceed 0.2 ft/week as possible. Subject to SFWMD planned operations hierarchy.	Achieve fish and wildlife benefits by slowing lake stage recession rates relative to the regulation schedule recession rates.	-	KB Ops/SFWMD Water Mgt
12/19/2017	Begin stage recessions on January 15 in Lakes East Toho and Toho starting at stage on January 15, to reach low pools on May 31. Recession rate not to exceed 0.2 ft/week if possible. Subject to SFWMD planned operations hierarchy.	Achieve fish and wildlife benefits by slowing lake stage recession rates relative to the regulation schedule recession rates.	-	KB Ops/SFWMD Water Mgt
12/12/2017	No new recommendations.		N/A	
12/5/2017	No new recommendations.		N/A	
11/28/2017	No new recommendations.		N/A	
11/21/2017	No new recommendations.		N/A	
11/13/2017	No new recommendations.		N/A	
11/1/2017	No new recommendations.		N/A	
10/24/2017	No new recommendations.		N/A	
10/17/2017	No new recommendations.		N/A	
10/10/2017	No new recommendations.		N/A	
10/3/2017	No new recommendations.		N/A	
9/25/2017	No new recommendations.		N/A	
9/19/2017	No new recommendations.		N/A	
9/5/2017	No new recommendations.		N/A	
8/29/2017	No new recommendations.		N/A	
8/22/2017	No new recommendations.		N/A	
8/15/2017	No new recommendations.		N/A	
8/4/2017	Increase S65A discharge by 150 cfs to about 1400 cfs.	Reduce rate of stage rise in KCH.		SFWMD Water Mgt, KB Ops

S65/S65A Limits on Rate of Change in Discharge

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 12. Limits on rate of discharge change at S65/S65A starting with the 2016-2017 Dry Season.

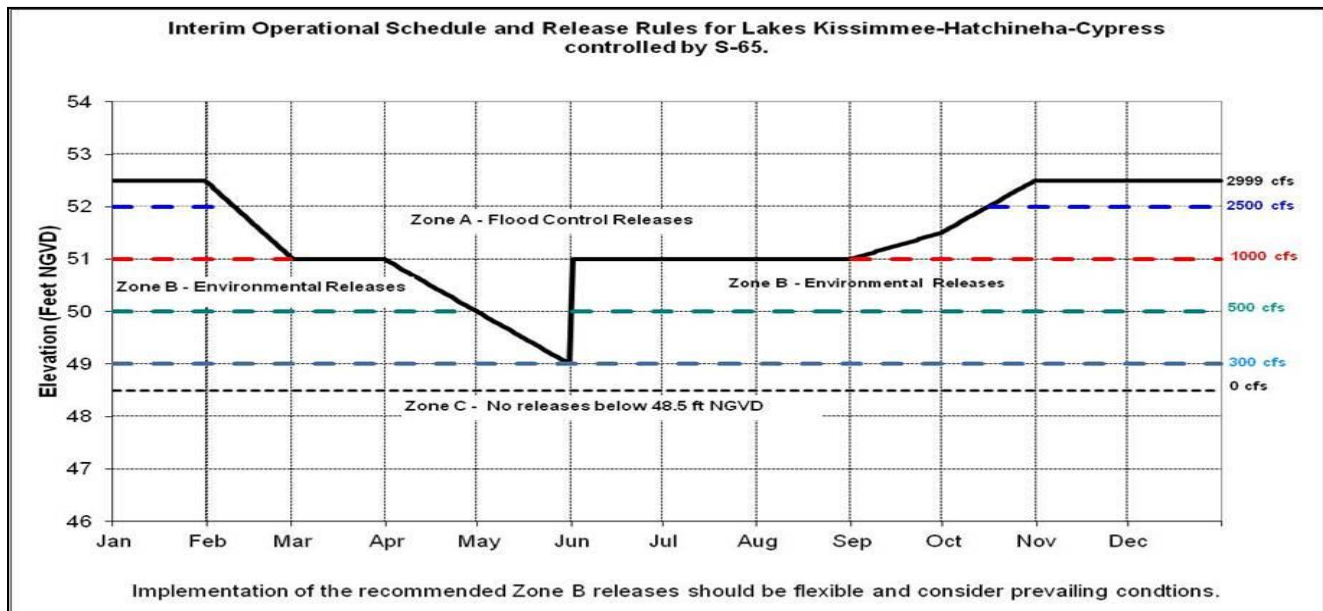


Figure 13. Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years.



Figure 14. The Kissimmee Basin.

LAKE OKEECHOBEE

According to the USACE web site, Lake Okeechobee stage is at 14.02 feet NGVD for the period ending at midnight on March 20, 2018. This value is based on the use of four interior Lake stations (L001, L005, L006 and LZ40) and four perimeter stations (S-308, S-352, S-4 and S-133). The Lake is now 0.93 feet lower than it was a month ago, 3.18 feet lower than its peak in mid-October, and 1.34 feet higher than a year ago (Figure 1). The Lake is now in the Low sub-band (Figure 2). According to RAINDAR, 0.37 inches of rain fell over the Lake during the week March 20, 2018 – March 26, 2018 with most of the watershed receiving similar amounts, while a few basins received between 0.5 – 1.0 inches (Figure 3).

Average daily inflows to the Lake increased from 363 cfs last week to 474 cfs this week, through slight increases from the S-71 and S-72 structures. Only 335 average daily cfs came from the Kissimmee River via the S-65E structures this week, compared to 317 the previous week. The S-71 and S-72 structures and Fisheating Creek contributed a combined 128 average daily cfs compared to 46 cfs the previous week.

Average daily outflows for the Lake increased from the previous week, going from 3,303 cfs to 4,227 cfs; primarily through increases in discharges south through the S-350 structures. S-77 and S-308 discharges were similar to the previous week at 460 cfs and 47 cfs, respectively. Discharges south through the S-350 structures increased from an average of 2,563 cfs the previous week to 3,422 cfs this past week. Discharges to the L-8 canal via Culvert 10A were similar to the previous week at 298 average daily cfs. The corrected evapotranspiration value for the week based on the L006 weather platform solar radiation data was 0.17 inches.

Total Lake inflows and outflows for the last week are detailed in Table 1, as well as the approximate change in Lake stage from each major structure's total flows over the period. Figure 4 shows the combined average daily cfs for inflows and outflows for the Lake over the past eight weeks. These data are provisional and are subject to change.

Based on the Lake Okeechobee wading bird habitat suitability index, there was a decrease of approximately 5,000 acres in habitat with suitable foraging depths for long-legged wading birds from the previous week, with 46,591 acres of suitable depth on March 26. There was also a slight decrease in suitable foraging depths for short or long-legged wading birds, going from 26,550 acres the previous week to 25,591 acres this past week as foraging habitats began to dry out (Figure 5).

Chlorophyll a (Chla) and microcystin values remained low throughout the Lake, likely due to cooler temperatures and high turbidity (Figure 6). The highest chlorophyll a concentrations occurred in Fisheating Bay samples, where the sheltered nature of the bay tends to result in lower turbidity values.

The most recent satellite imagery using the cyanobacteria monitoring product derived from NOAA's OLCI satellite sensor showed cyanobacteria bloom potential has remained very low over the past five months, although there are now a few spots along the shore where the potential is moderate. Potential for elevated cyanobacterial levels were last observed in the northern portion of the Lake in early September 2017 (Figure 7).

Table 1. Average daily inflows and outflows and the approximate depth equivalents on Lake Okeechobee for various structures.

INFLOWS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S65E & S65EX1	335	0.1
S71 & 72	115	0.0
S84 & 84X	0	0.0
Fisheating Creek	13	0.0
S154	0	0.0
S191	0	0.0
S133 P	0	0.0
S127 P	0	0.0
S129 P	0	0.0
S131 P	0	0.0
S135 P	0	0.0
S2 P	6	0.0
S3 P	4	0.0
S4 P	0	0.0
C5	0	0.0
Rainfall	1006	0.4
Total	1480	0.6

OUTFLOWS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S77	460	0.2
S308	47	0.0
S351	1662	0.7
S352	810	0.3
S354	950	0.4
L8	298	0.1
ET	3362	1.4
Total	7589	3.1

PROVISIONAL DATA

Water Management Recommendations

Lake Okeechobee stage is 14.02 feet NGVD having decreased 0.24 feet over the past week and 0.93 feet over the last month. Lake stages have receded approximately 3.2 feet from the October 2017 peak following Hurricane Irma, but exceeded 15.0 feet NGVD for 161 days, the longest period since the winter of 2005/2006. The high water and associated turbidity have had substantial impacts on the submerged aquatic and emergent vegetation coverage in the nearshore areas of the Lake, which would benefit from lower stages near the end of the 2018 dry season. The rapid recession rate of nearly one foot per month is not ideal for fish and wildlife breeding season conditions, but will hasten the return of light penetration to the sediments in the nearshore region for important habitat recovery. It will also help avoid higher lake stages in the summer, which are correlated with algal blooms on the Lake. Long, steady recessions of water levels throughout the dry season may help promote another productive year for wading birds on the Lake as well.

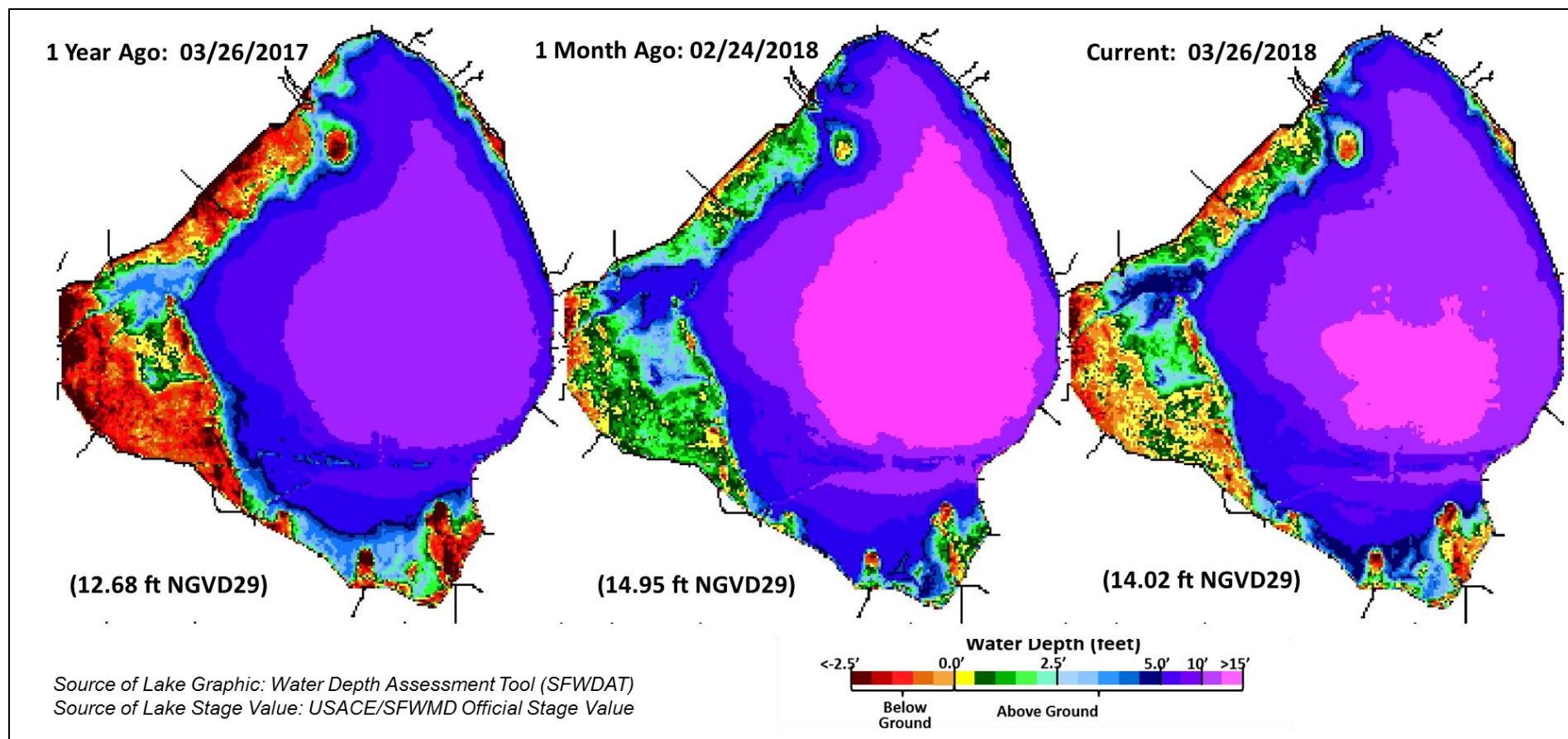


Figure 1. Water depth estimates on Lake Okeechobee based on the South Florida Water Depth Assessment Tool.

Lake Okeechobee Water Level History and Projected Stages

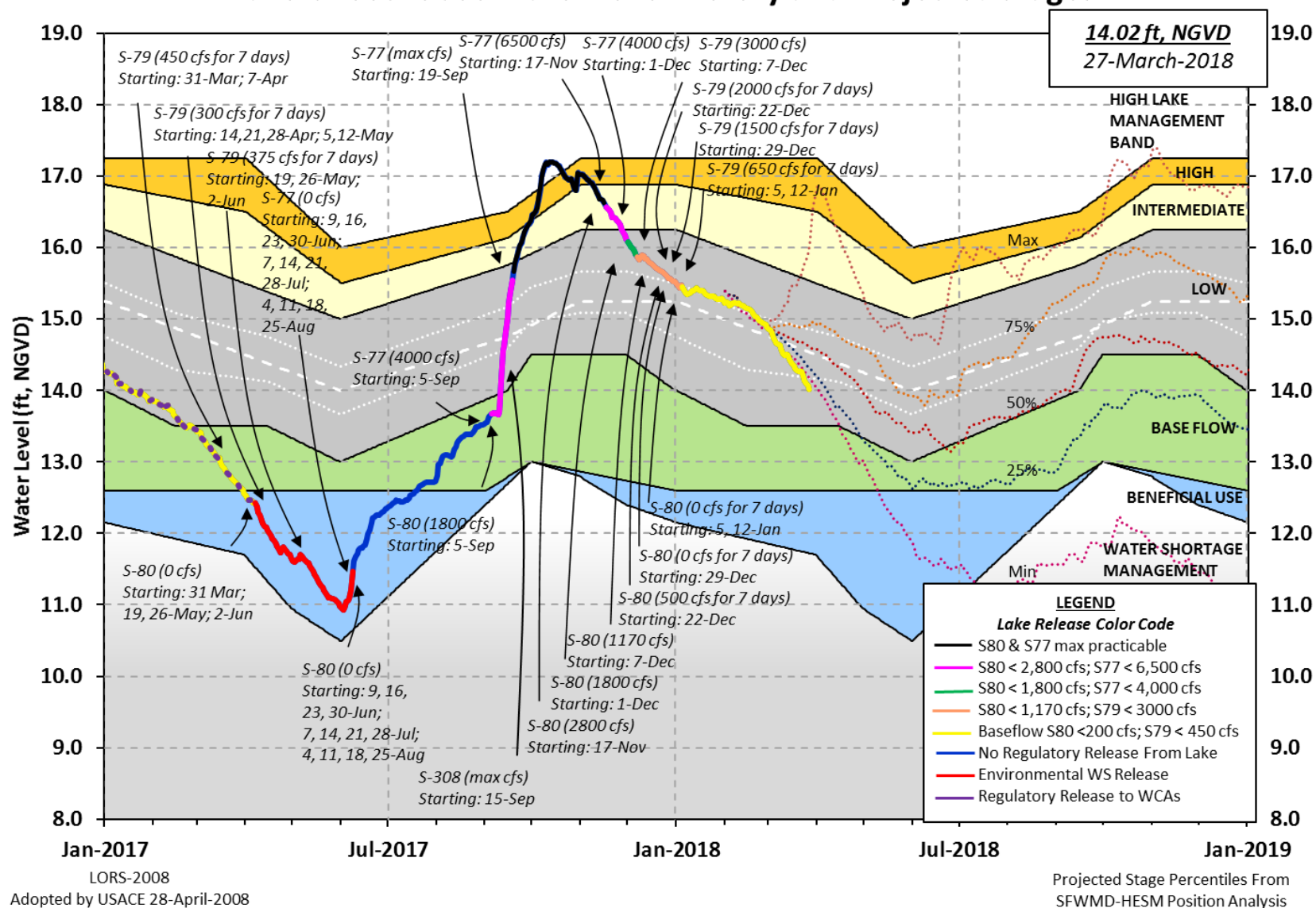


Figure 2. Recent Lake Okeechobee stage and releases, with projected stages based on a dynamic position analysis.

SFWMD PROVISIONAL RAINFALL 7-DAY BASIN RAINFALL ESTIMATES

FROM: 0515 EST, 03/20/2018 THROUGH: 0515 EST, 03/27/2018

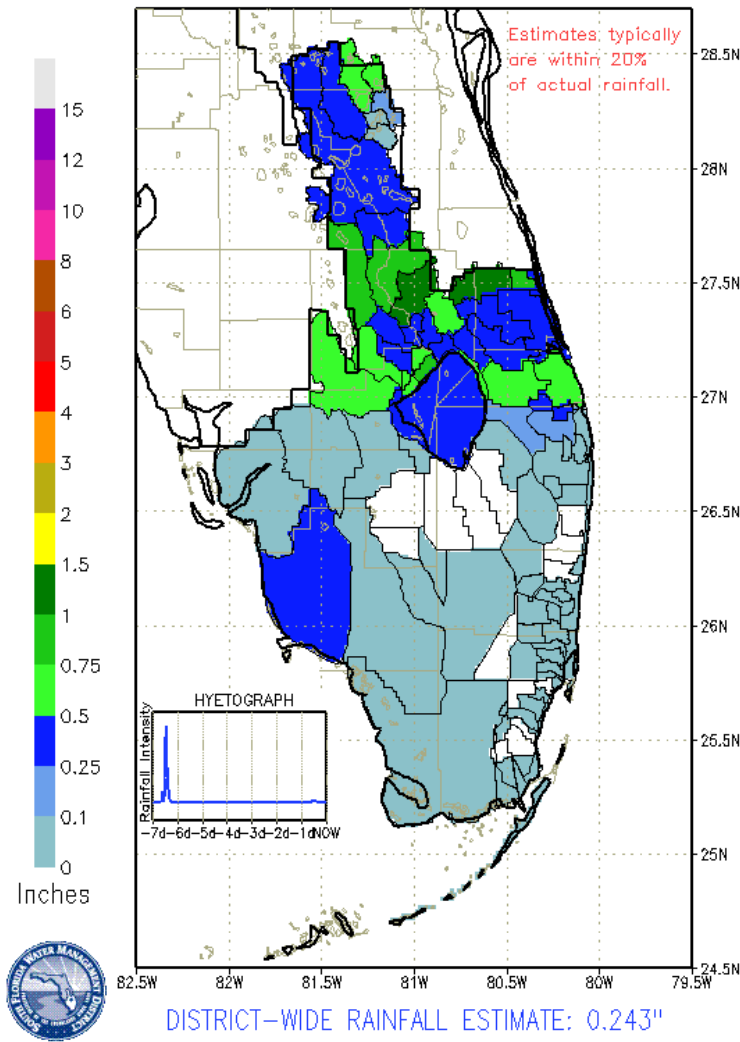


Figure 3. Rainfall estimates by basin.

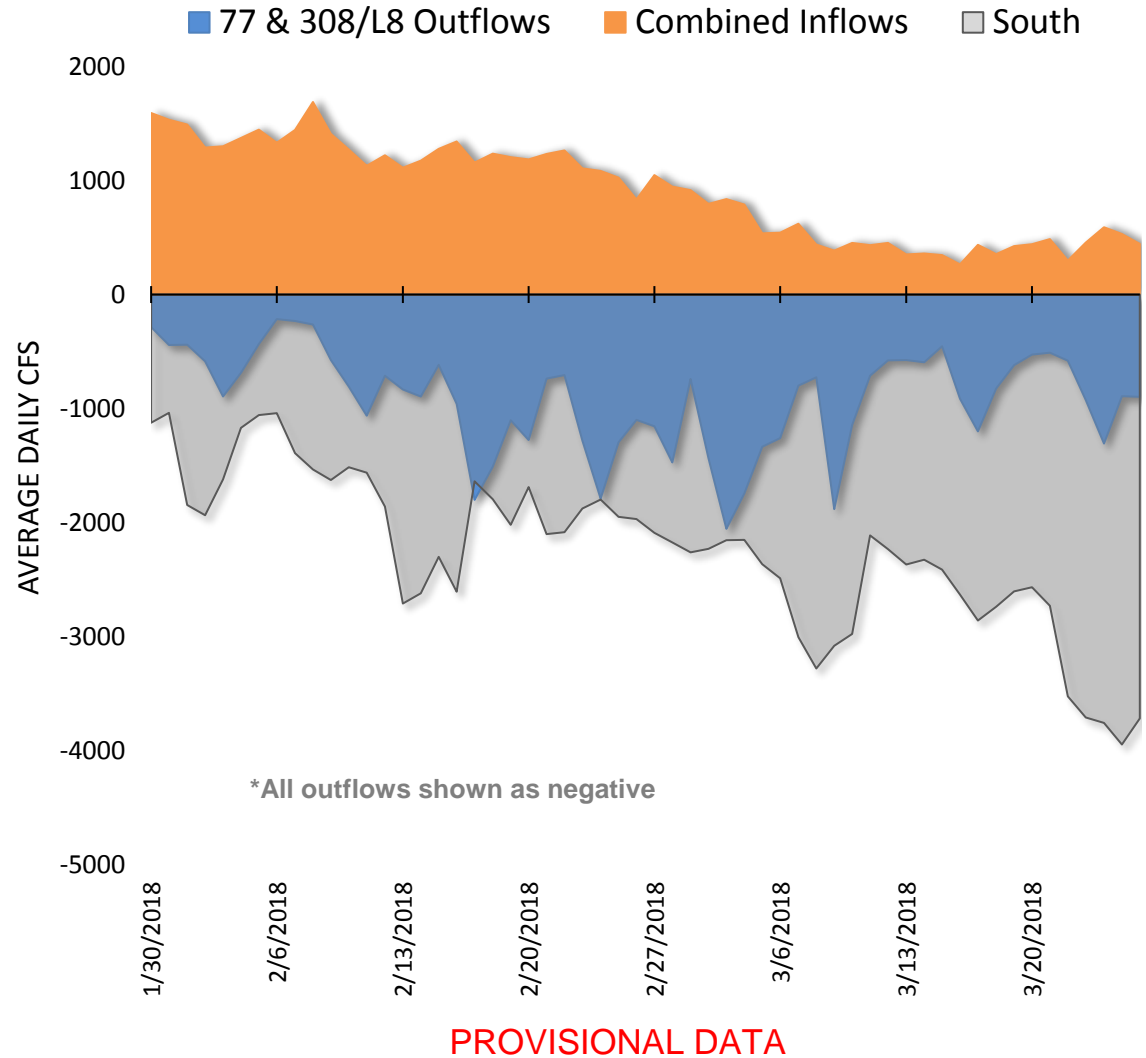


Figure 4. Major inflows and outflows of Lake Okeechobee, including the S350 structures designated as South. Inflows and outflows are shown as positive and negative, respectively, for visual purposes.

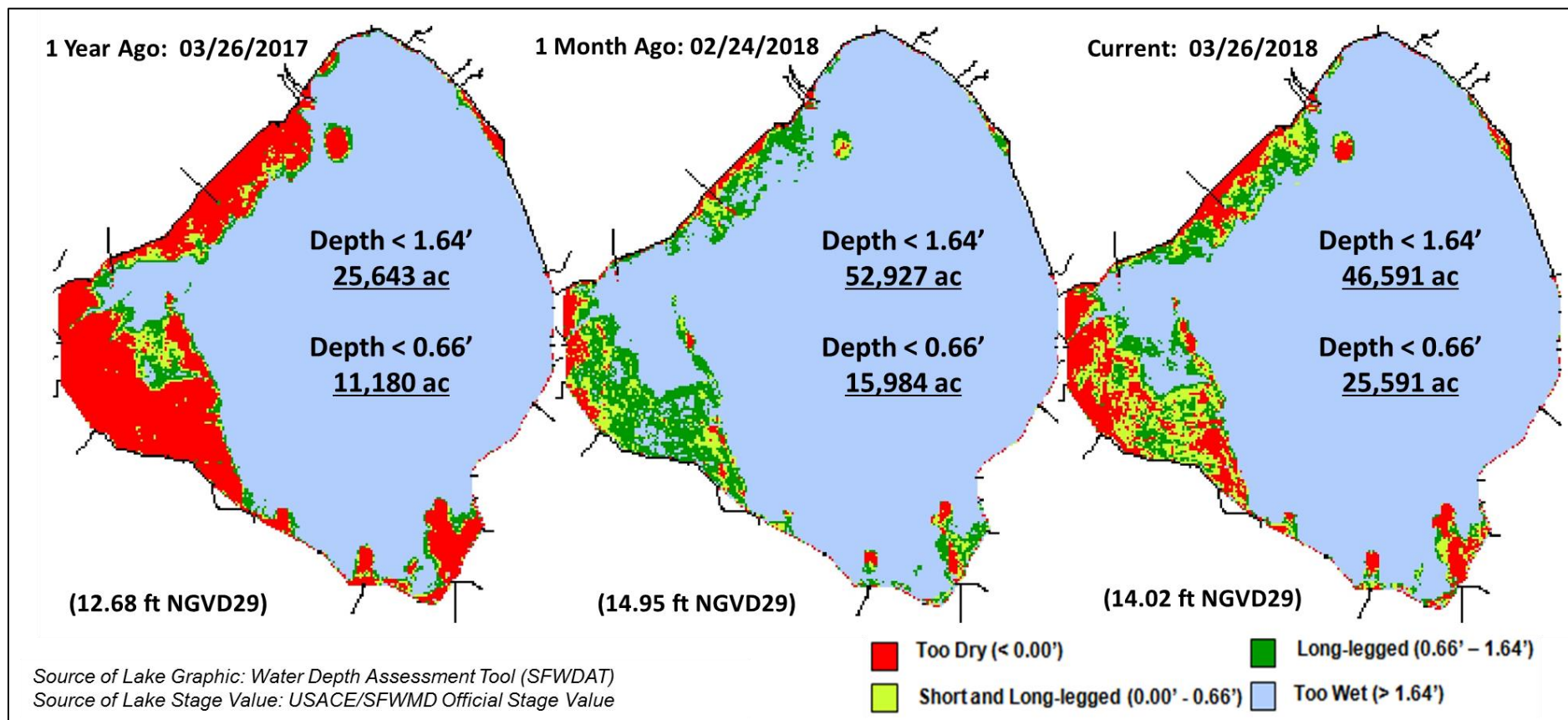
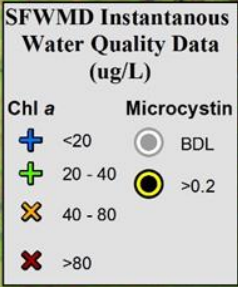


Figure 5. Wading bird habitat suitability index for Lake Okeechobee based on the South Florida Water Depth Assessment Tool.



March 5 - 6, 2018		
Site	Chlorophyll <i>a</i> (µg/L)	Microcystin (µg/L)
Nearshore Stations		
FEBIN	22.7	
FEBOUT	16.4	
KISSR0.0	7.6	BDL
LZ2	12.2	BDL
LZ25A	5.8	
PALMOUT	8.5	
PELBAY3	7.0	
POLE3S	6.4	
POLESOUT	10.0	BDL
RITTAE2	7.9	
Pelagic Stations		
L001	5.1	
L004	4.0	
L005	9.1	BDL
L006	6.2	
L007	5.1	
L008	5.6	
LZ30	7.1	BDL
LZ40	4.6	
CLV10A	4.6	BDL

Figure 6. Chlorophyll *a* (µg/L) and microcystin (µg/L) values for nearshore and pelagic stations for mid-March. Microcystin values below 0.20 µg/L are below detection limit (BDL).

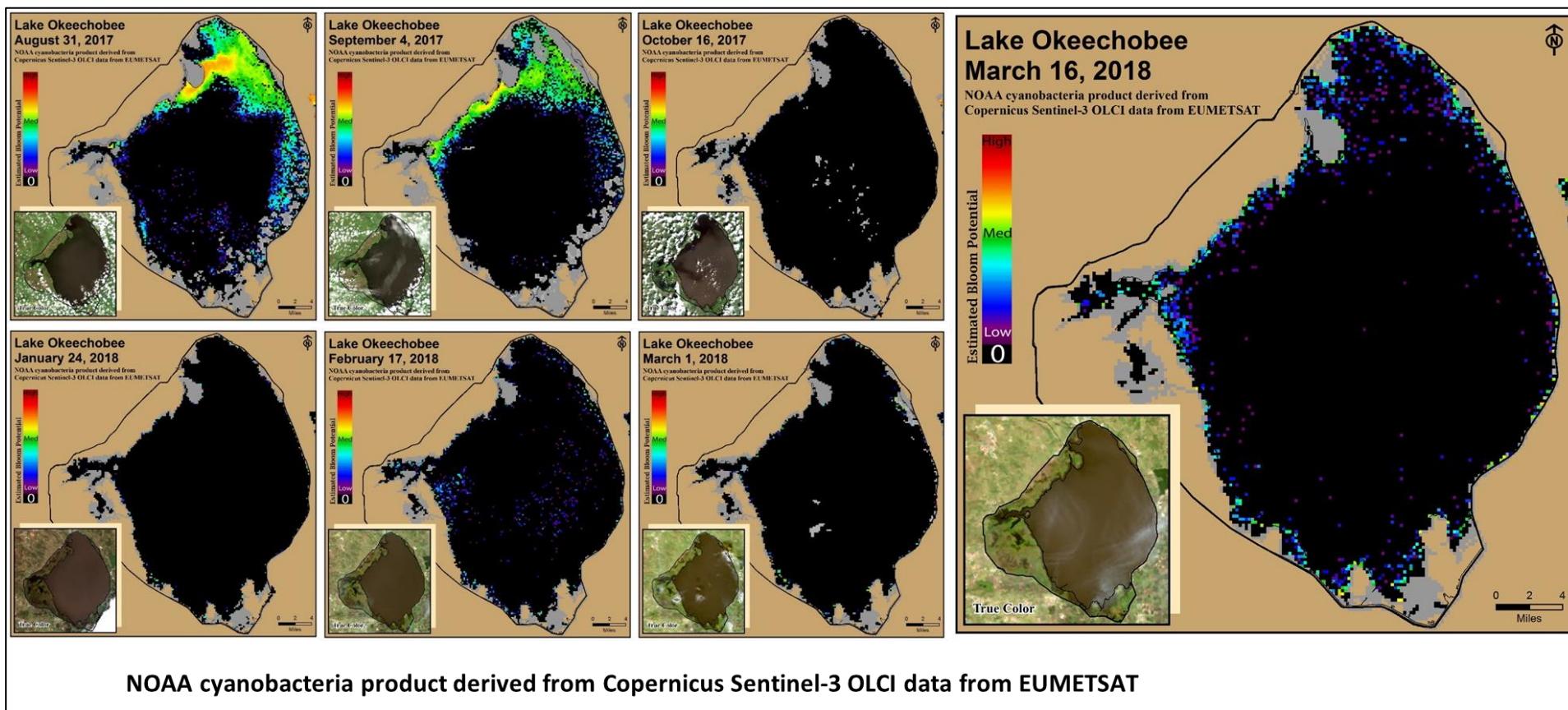


Figure 7. Potential for cyanobacterial blooms on Lake Okeechobee based on NOAA's harmful algal bloom monitoring system derived from Copernicus Sentinel-3 OLCI data from EUMETSAT.

LAKE ISTOKPOGA

Lake Istokpoga stage is 39.10 feet NGVD as of midnight March 26, 2018 and is currently 0.40 feet below its regulation schedule to accommodate construction on downstream structures (Figure 8). Average daily inflows to the lake from Josephine Creek for the week March 20 – March 26, 2018 were the same as the previous week at roughly 20 cfs, while Arbuckle Creek increased from 68 cfs to 111 cfs. Discharges via the S-68 and S-68X structures were again minimal, at just 8 daily cfs. According to RAINDAR, approximately 0.88 inches of rain fell in the Lake Istokpoga basin over the past week.

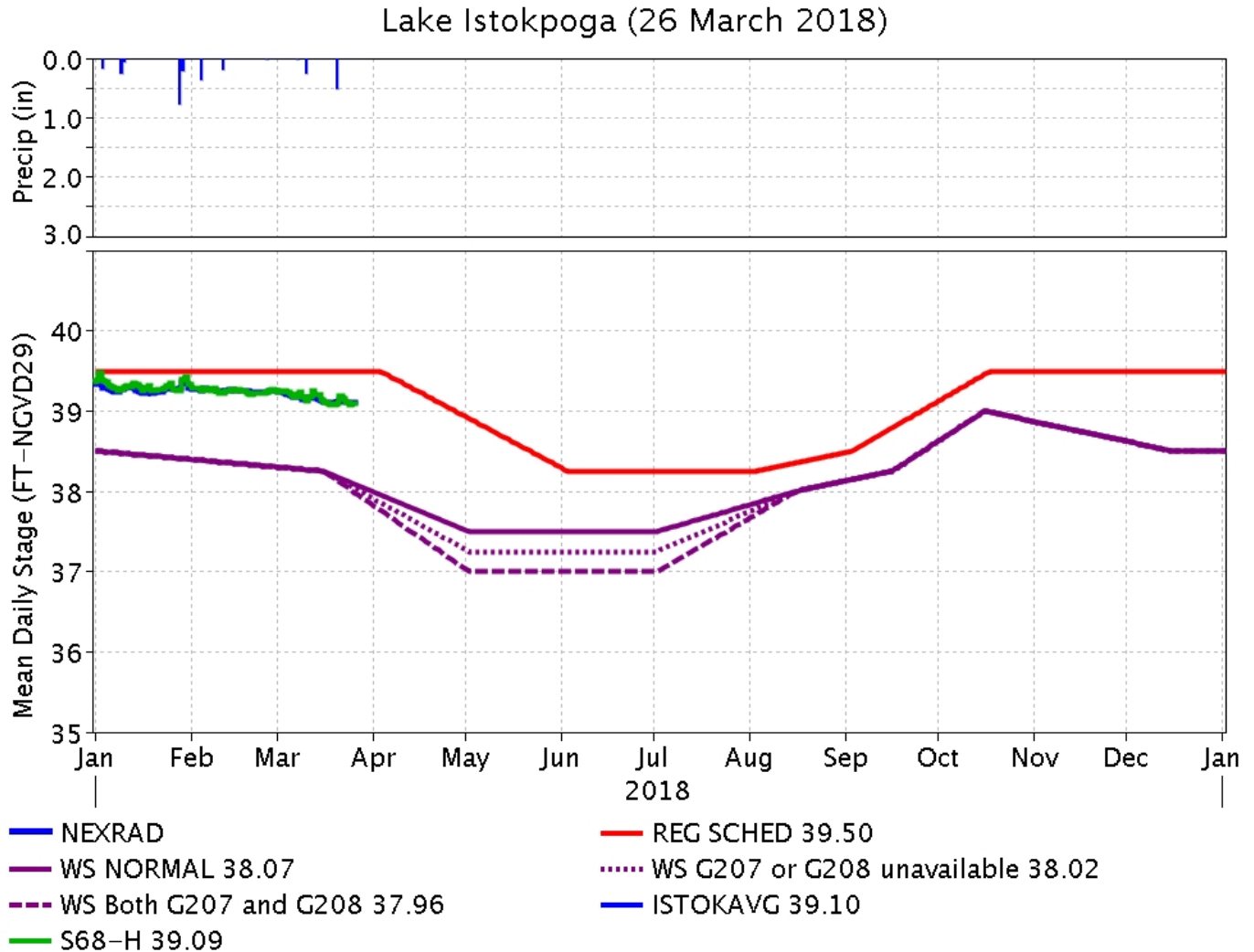


Figure 8. Recent stages on Lake Istokpoga.

ESTUARIES

St. Lucie Estuary:

Last week total inflow into the St. Lucie Estuary averaged about 161 cfs (Figures 1 and 2) and last month inflow averaged about 140 cfs. Last week's provisional averaged inflows from the tidal basin and the structures are shown in Table 1.

Table 1. Weekly average inflows (data is provisional).

Location	Flow (cfs)
Tidal Basin Inflow	103
S-80	0
S-308	47
S-49 on C-24	0
S-97 on C-23	0
Gordy Rd. structure on Ten Mile Creek	58

Over the past week, salinity increased throughout the estuary (Table 2, Figures 3 and 4). The seven-day moving average salinity of the water column (an average of the surface and bottom salinity) at the US1 Bridge is 26.5. Salinity conditions in the middle estuary are in the fair range for adult eastern oysters (Figure 3).

Table 2. Seven-day average salinity at three monitoring sites 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 (North Fork)	23.8 (22.9)	25.5 (25.0)	NA ¹
US1 Bridge	26.2 (25.4)	26.8 (26.1)	10.0-26.0
A1A Bridge	31.3 (30.4)	32.4 (31.6)	NA ¹

¹Envelope not applicable.

Continuous monitoring of water quality is conducted at five Land/Ocean Biogeochemical Observatory (LOBO) stations located in the St. Lucie Estuary and maintained by Florida Atlantic University/Harbor Branch Oceanographic Institute (FAU-HBOI). Data are summarized in Table 3 and station location map is shown in Figure 5.

Table 3. Weekly ranges of instrument depth, chlorophyll *a* (a measure of algal biomass) and dissolved oxygen concentrations at five FAU-HBOI LOBO stations located in the St. Lucie Estuary.

Location	Depth (m)	Chlorophyll <i>a</i> (µg/l)	Average DO (mg/l)	Minimum DO (mg/l)	Maximum DO (mg/l)
SF2	2.70	4.64 - 9.89	2.40	1.49	3.27
SF	1.59	3.12 - 7.87	7.25	6.16	8.63
NF	2.12	3.2 - 6.39	3.67	1.56	5.05
ME	1.87	2.88 - 5.84	6.90	6.27	7.83
IRL-SLE	3.64	0.28 - 3.21	6.75	6.31	7.31

NOAA satellite imagery indicating cyanobacteria bloom potential in the St. Lucie Estuary was unavailable this week.

Caloosahatchee Estuary:

Last week total inflow into the Caloosahatchee Estuary averaged about 705 cfs (Figures 6 and 7) and last month inflow averaged about 739 cfs. Last week's provisional averaged inflows from the structures are shown in Table 4.

Table 4. Weekly average inflows (data is provisional).

Location	Flow (cfs)
S-77	460
S-78	558
S-79	647
Tidal Basin Inflow	58

Over the past week, salinity decreased in the upper part of the estuary (to Ft. Myers Yacht Basin) and increased downstream (Table 5, Figures 8 & 9). The seven-day average salinity values are in the good range for adult eastern oysters at Cape Coral and at Shell Point (Figure 10). Salinity data were not available at Sanibel. The 30-day moving average surface salinity is 4.0 at Val I-75 and 11.4 at Ft. Myers. With no flow through S-79, daily salinity at Val I-75 is forecast in two weeks to be 6.8, and the 30-day moving average is forecast to be 4.9 (Figure 11). Salinity conditions between Val I-75 and Ft. Myers are good for tape grass.

Table 5. 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)	1.8 (3.4)	1.9 (3.5)	NA ¹
*Val I75	3.0 (4.5)	6.0 (7.4)	0.0-5.0 ²
Ft. Myers Yacht Basin	11.1 (11.6)	13.2 (13.6)	NA
Cape Coral	21.7 (21.1)	21.9 (21.3)	10.0-30.0
Shell Point	30.1 (29.5)	29.1 (28.5)	10.0-30.0
Sanibel	NR ³ (NR)	NR (NR)	10.0-30.0

¹Envelope not applicable, ²Envelope is based on a 30-day average, and ³Not Reporting.

*Val I75 is temporarily unavailable (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 6 as concentration ranges of chlorophyll *a* and dissolved oxygen at Beautiful Island, Ft. Myers, and Shell Point in the Caloosahatchee Estuary.

Table 6. 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.

Parameter Name	RECON Monitoring Stations		
	Beautiful Island	Ft. Myers	Shell Point
Chlorophyll <i>a</i> (µg/l)	7.63 – 28.12	4.07 – 8.57	1.26 – 11.44
Dissolved Oxygen (mg/l)	5.22 – 10.02	5.35 – 7.55	4.67 – 7.54

The Florida Fish and Wildlife Research Institute reported on March 23, 2018, that *Karenia brevis*, the *Florida red tide dinoflagellate*, was observed at very low to high concentrations in 29 samples collected from or offshore of Lee County. Fish kills and respiratory irritation were reported in Lee County over the past week.

NOAA satellite imagery indicating cyanobacteria bloom potential in the Caloosahatchee Estuary was unavailable this week.

Water Management Recommendations

Lake stage is in the Low sub-band of 2008 LORS. Tributary hydrological conditions are normal. The 2008 LORS recommends up to 450 cfs at S-79 and up to 200 cfs at S-80. Given the current estuarine conditions, there are no ecological benefits associated with freshwater releases from Lake Okeechobee.

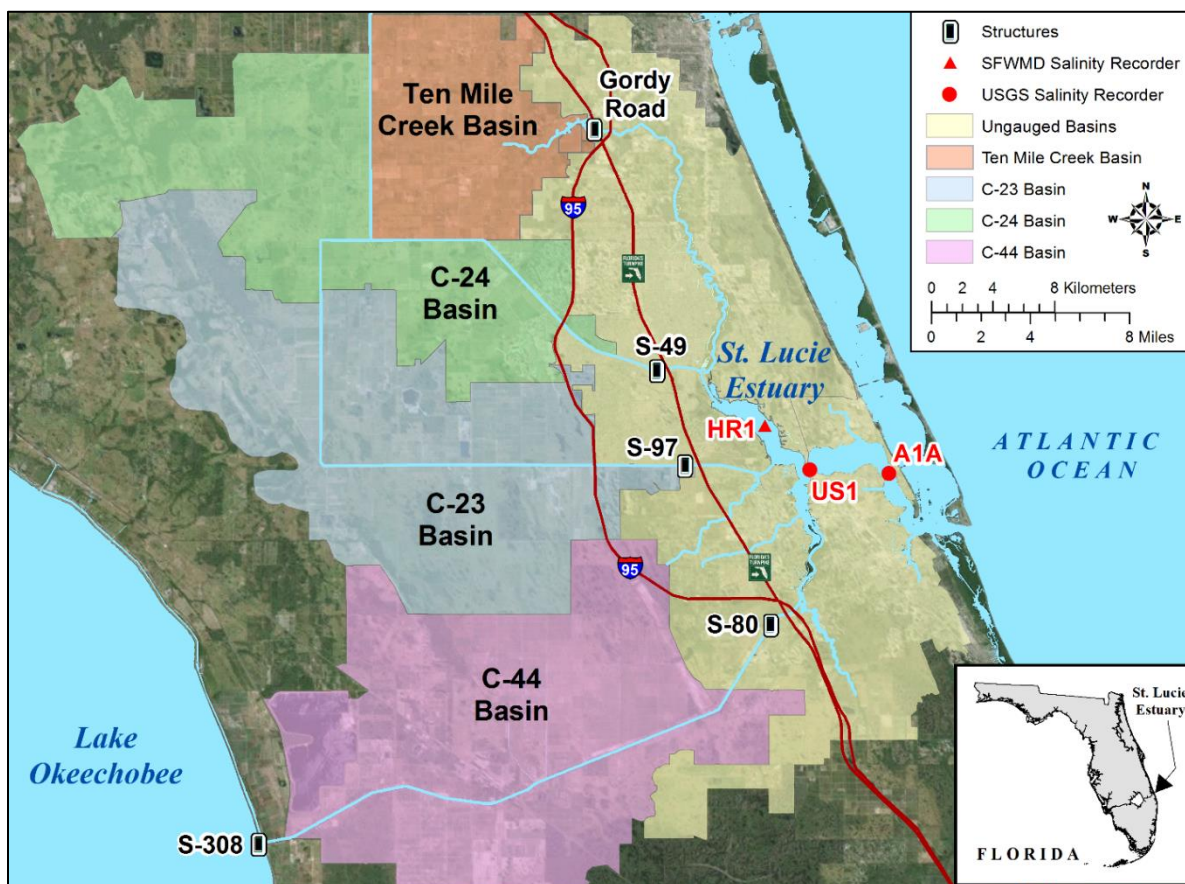


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

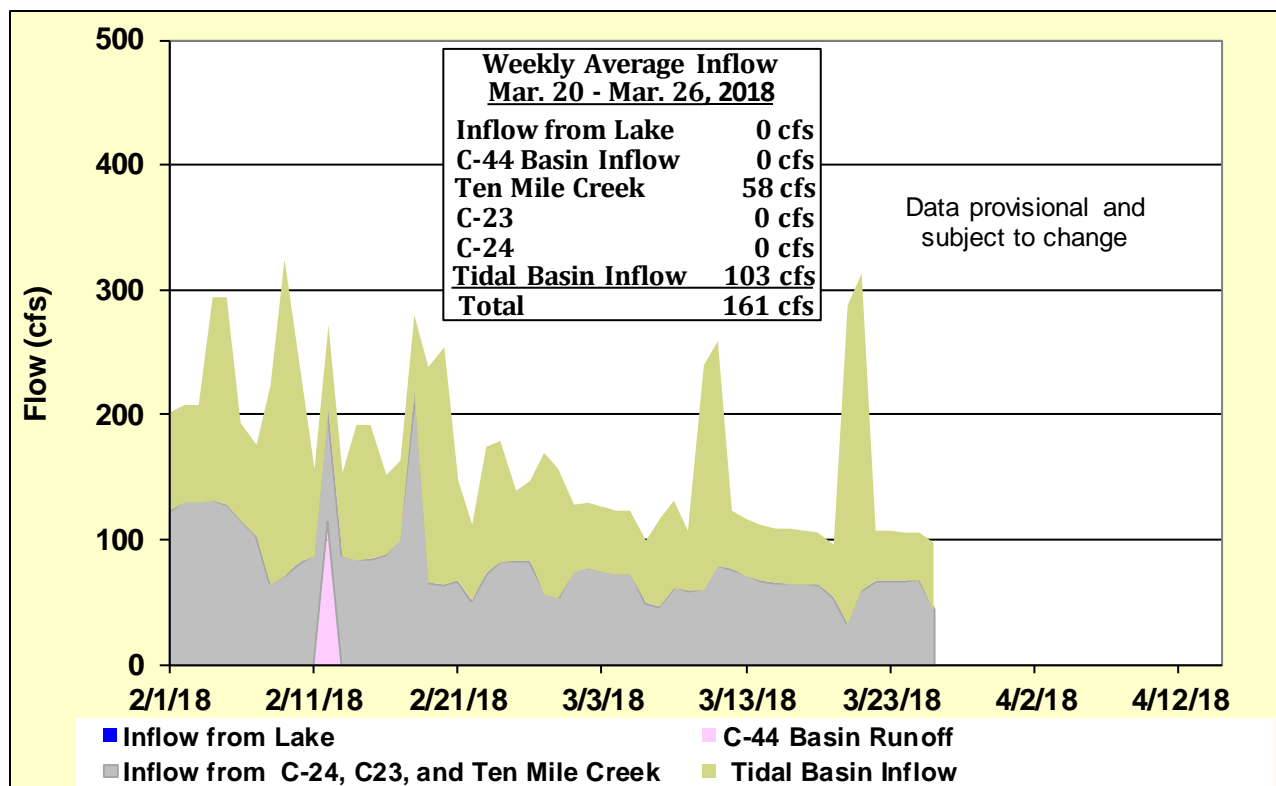


Figure 2. Estimated surface freshwater inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basins into the St. Lucie Estuary.

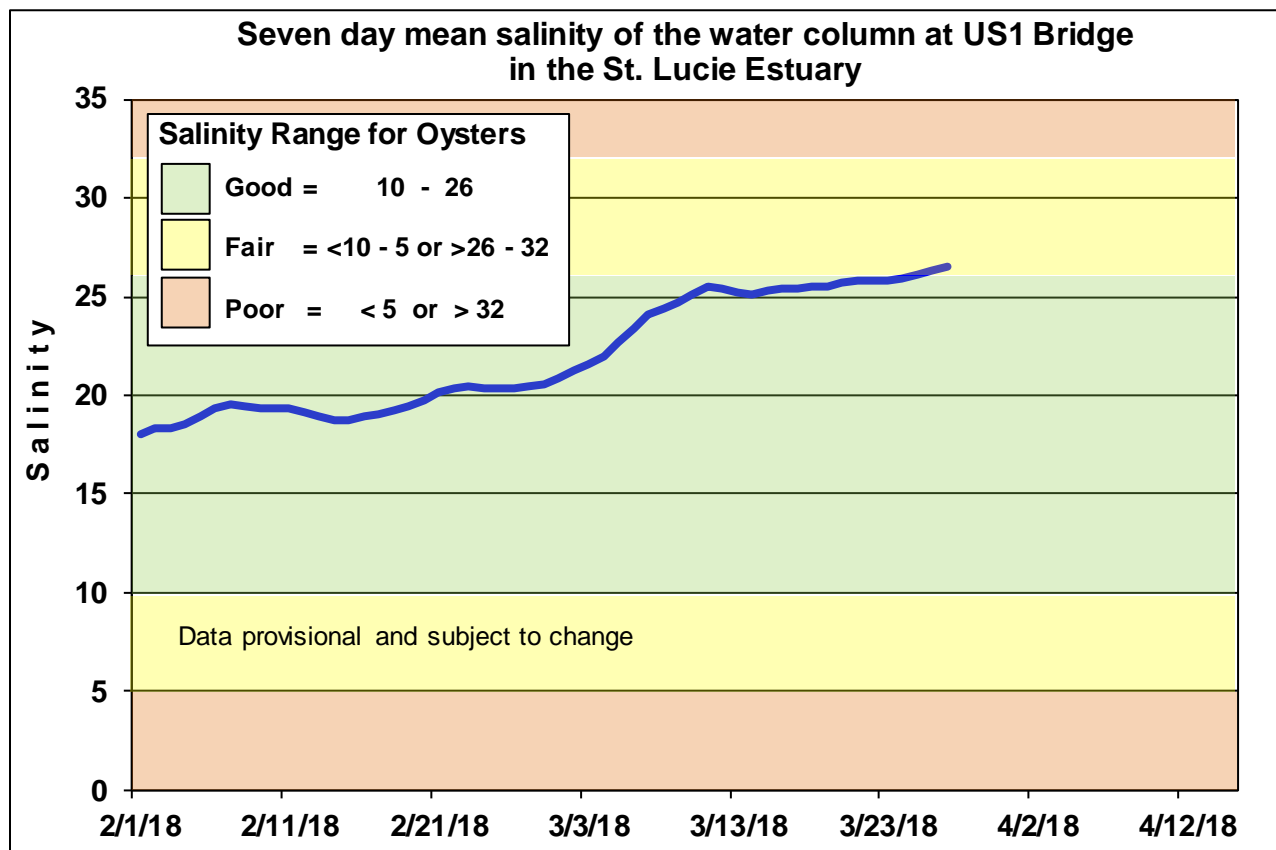


Figure 3. Seven-day mean salinity of the water column at the US1 Bridge.

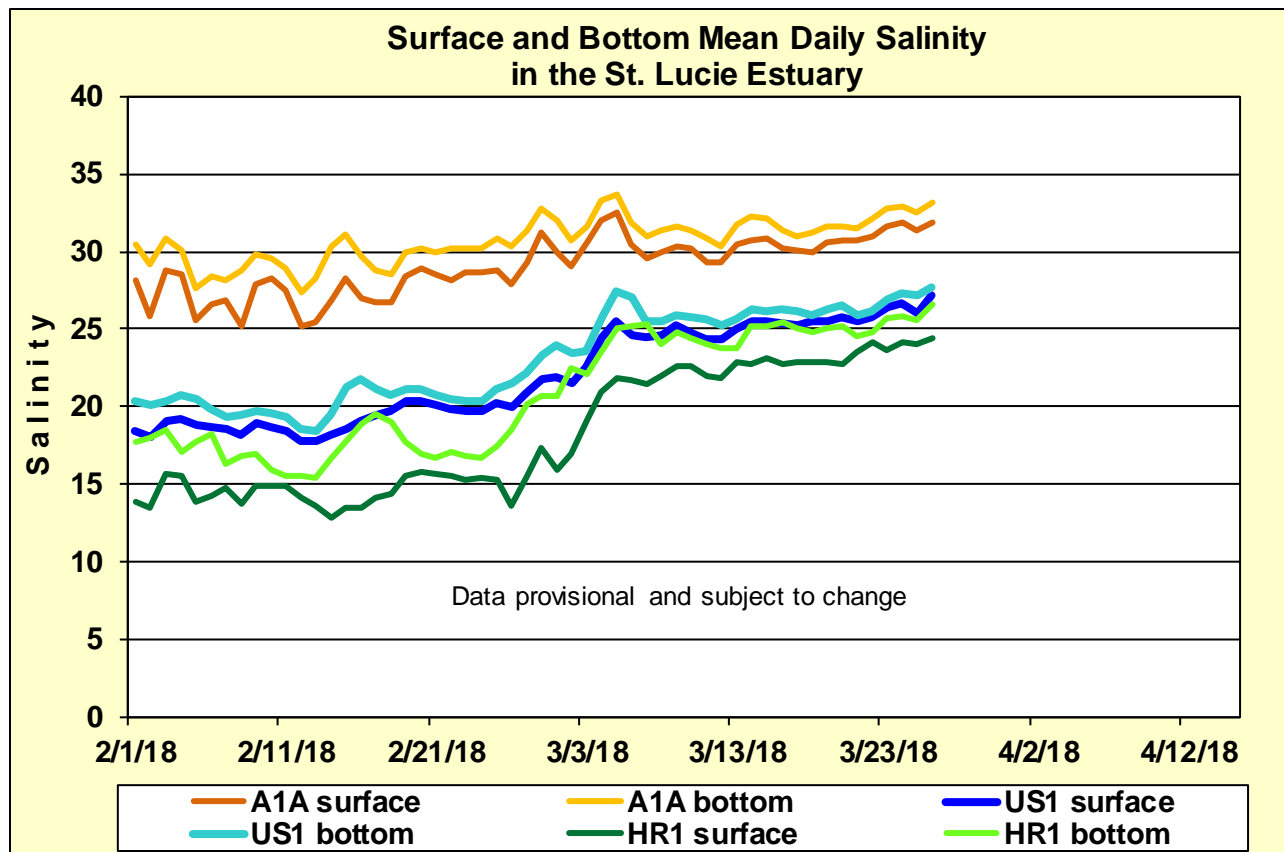


Figure 4. Daily mean salinity at the A1A, US1 and estimated HR1 stations.

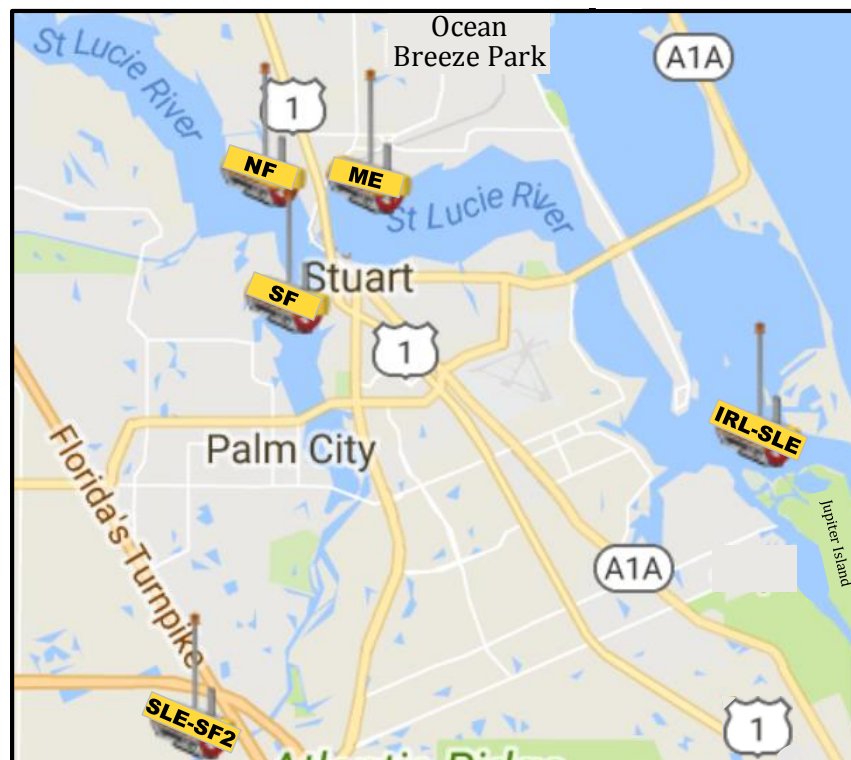


Figure 5. Location of FAU-HBOI LOBO water quality stations in the St. Lucie Estuary.

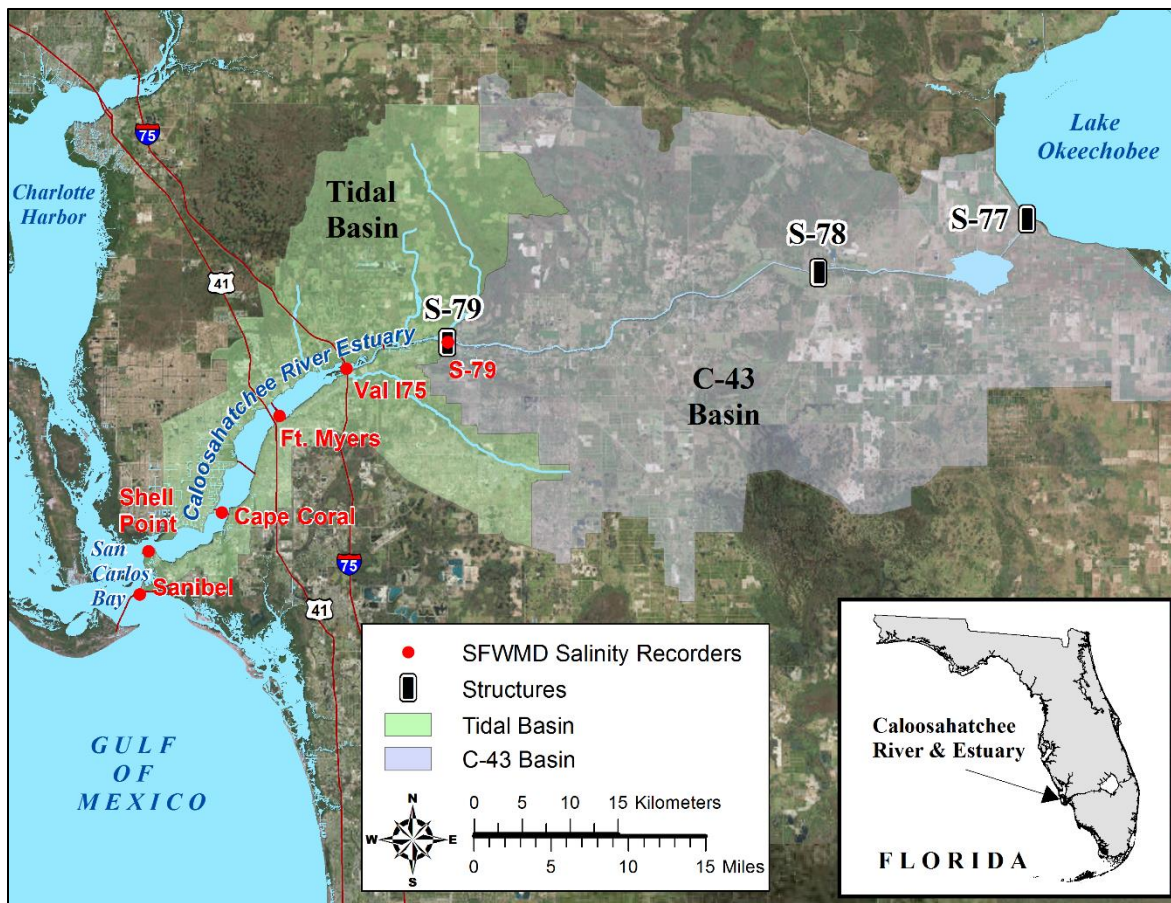


Figure 6. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

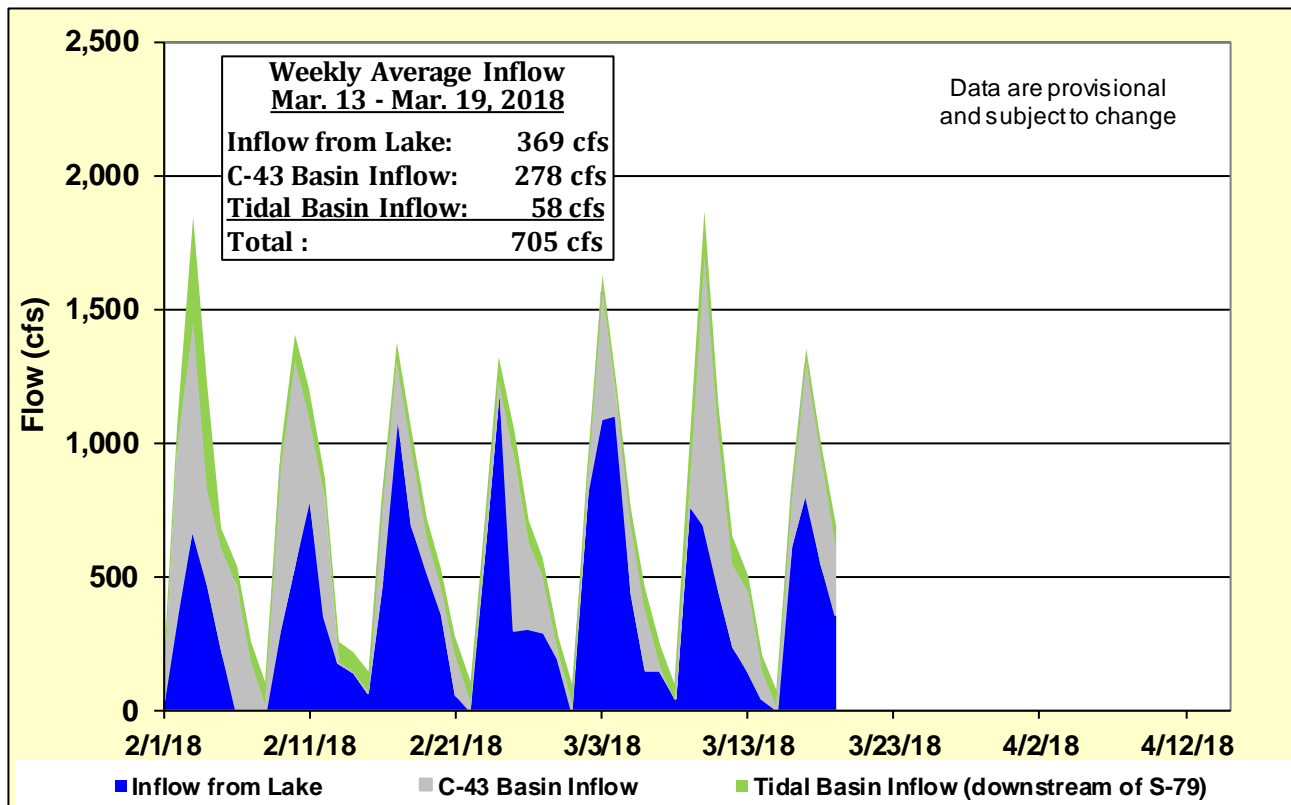


Figure 7. Freshwater inflows from Lake Okeechobee, runoff from the C-43 basin, and tributaries in the tidal basin into the Caloosahatchee River Estuary.

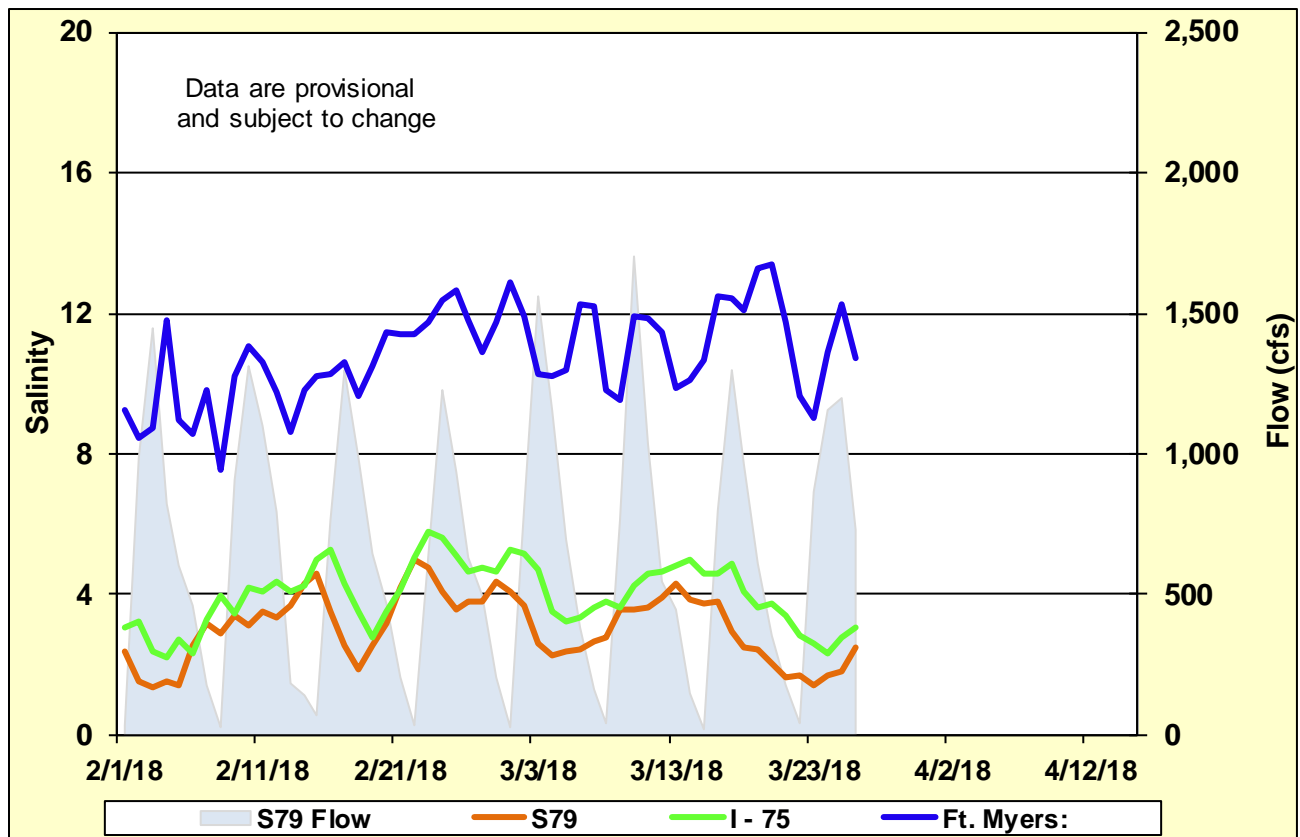


Figure 8. Daily mean flows at S-79 and salinity at upper estuary monitoring stations.

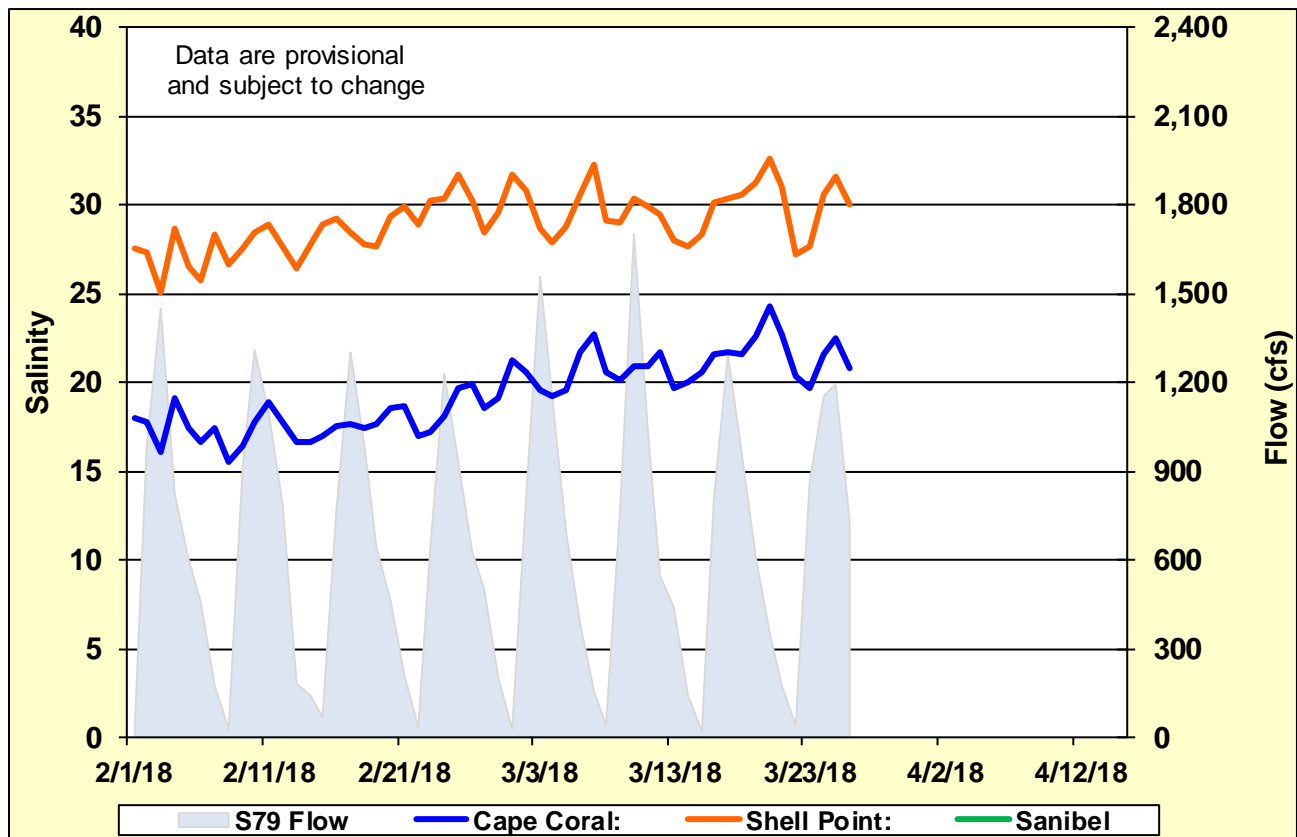


Figure 9. Daily mean flows at S-79 and salinity at lower estuary stations.

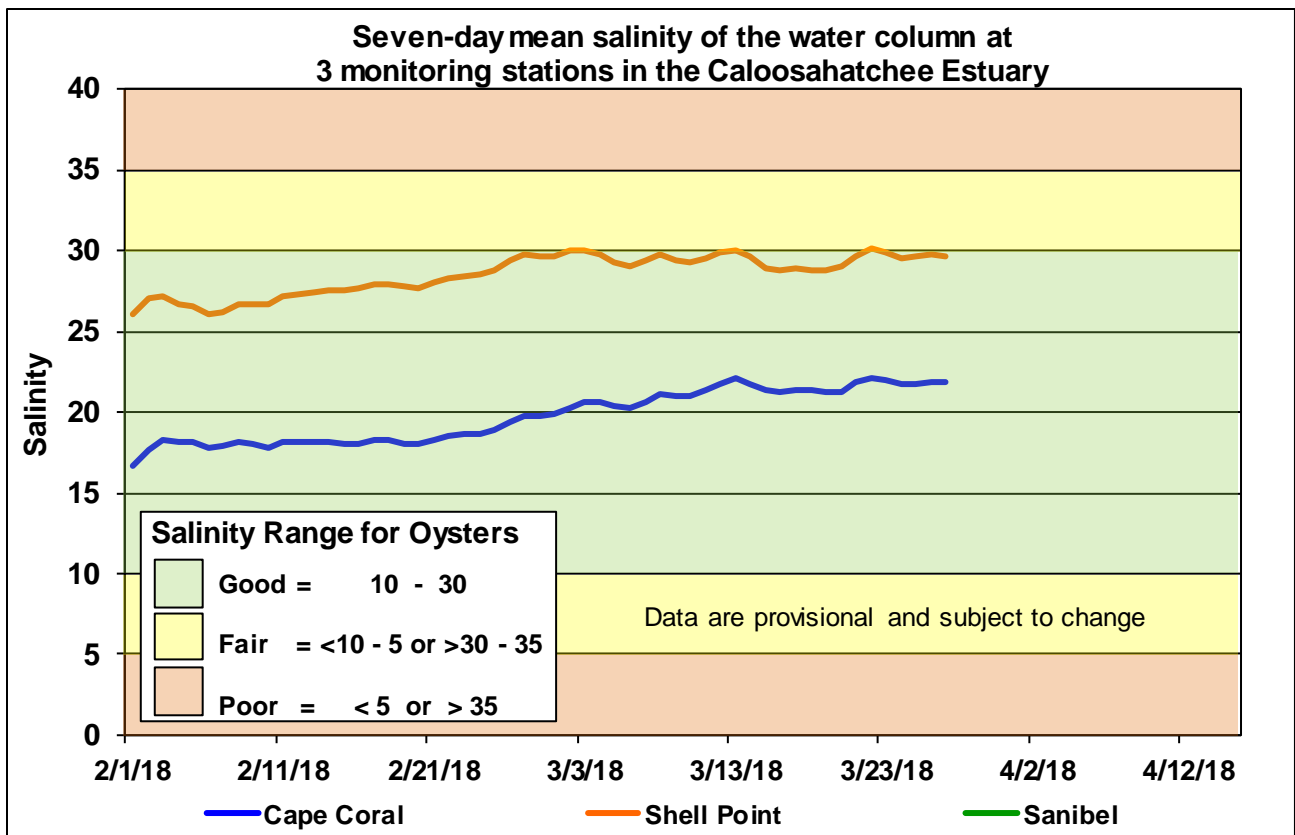


Figure 10. Seven-day mean salinity at Cape Coral Bridge, Shell Point, and Sanibel Bridge monitoring stations.

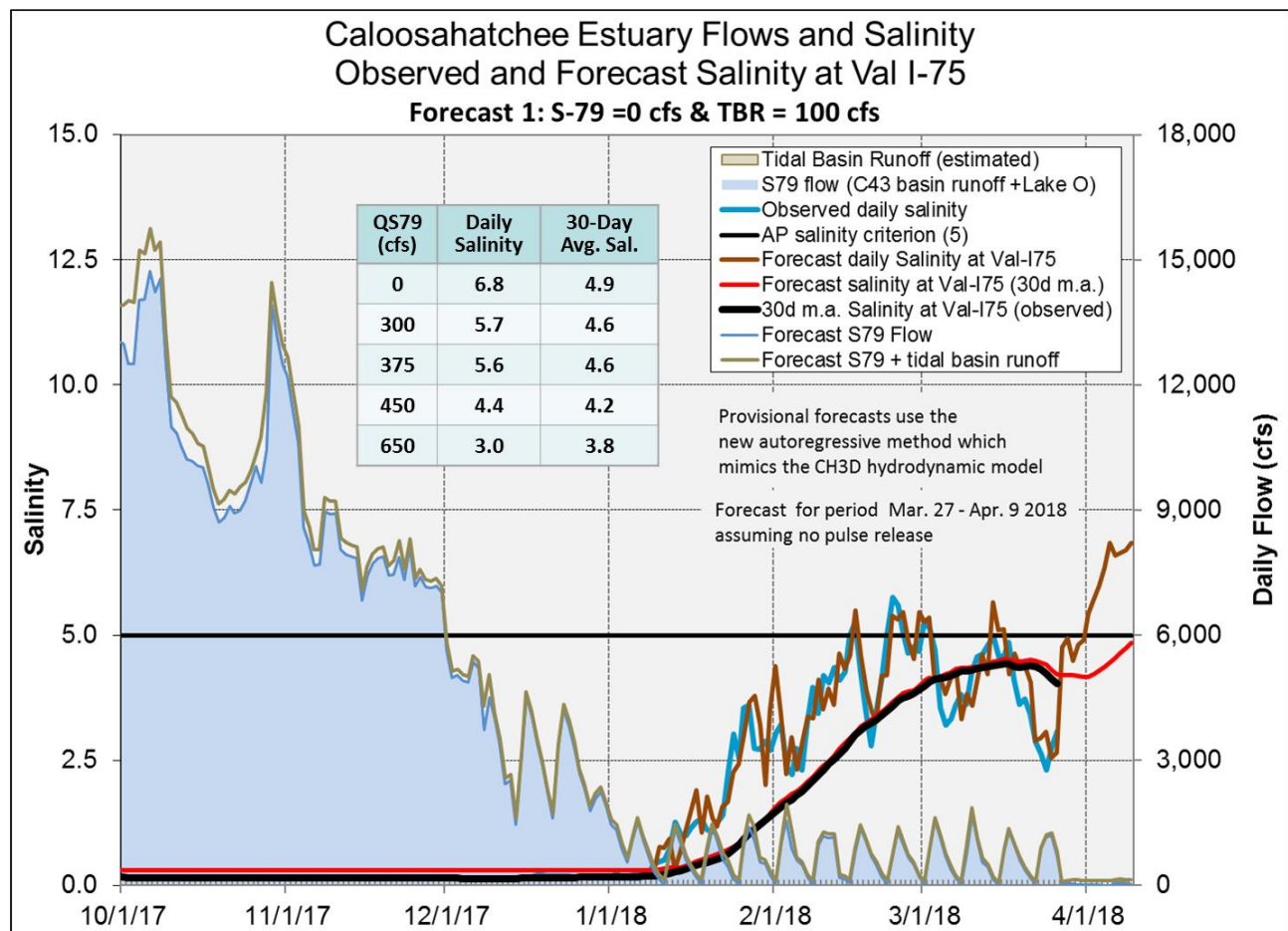


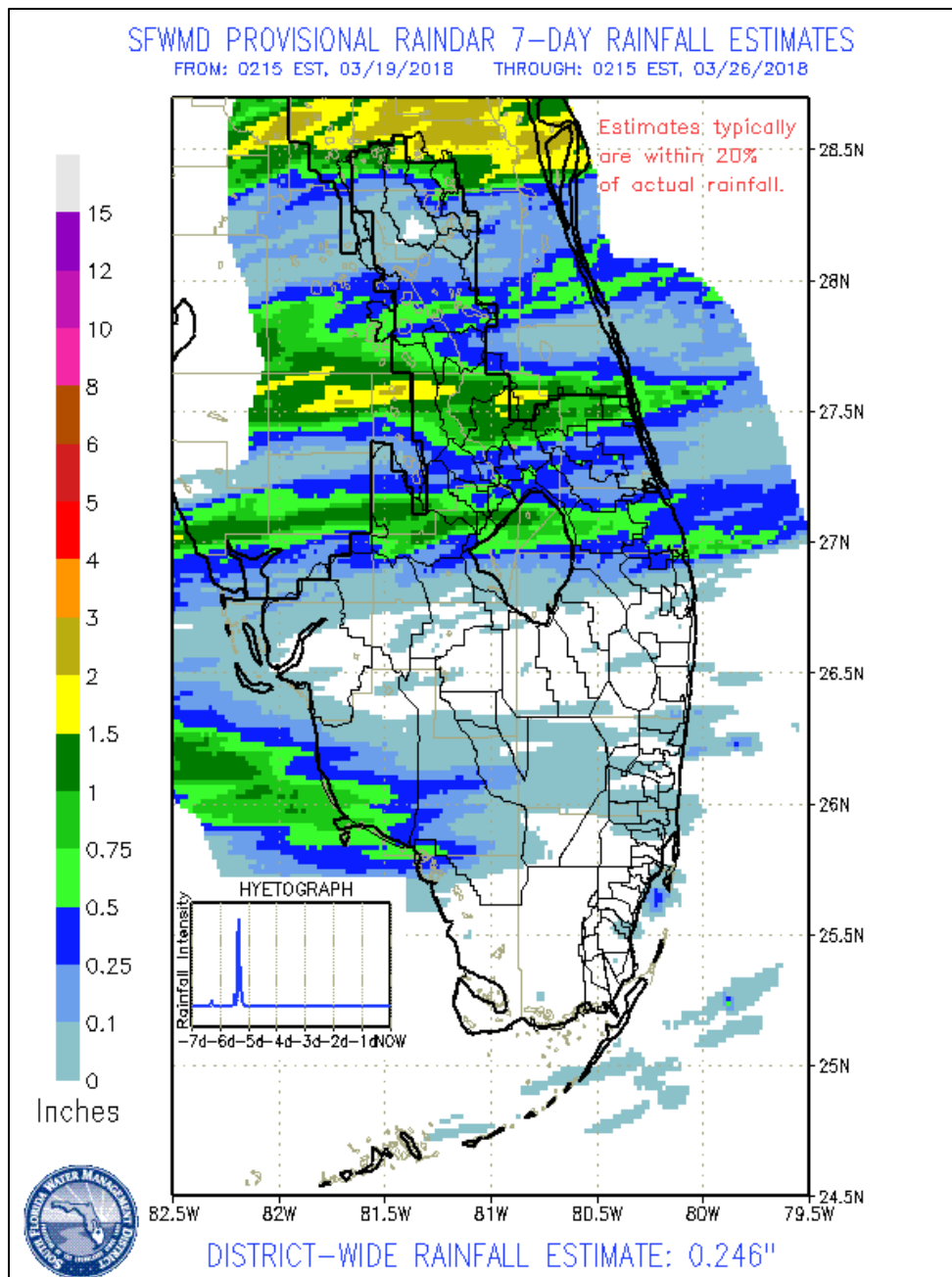
Figure 11. 14-day salinity forecast at Val I-75 assuming no releases at S-79.

EVERGLADES

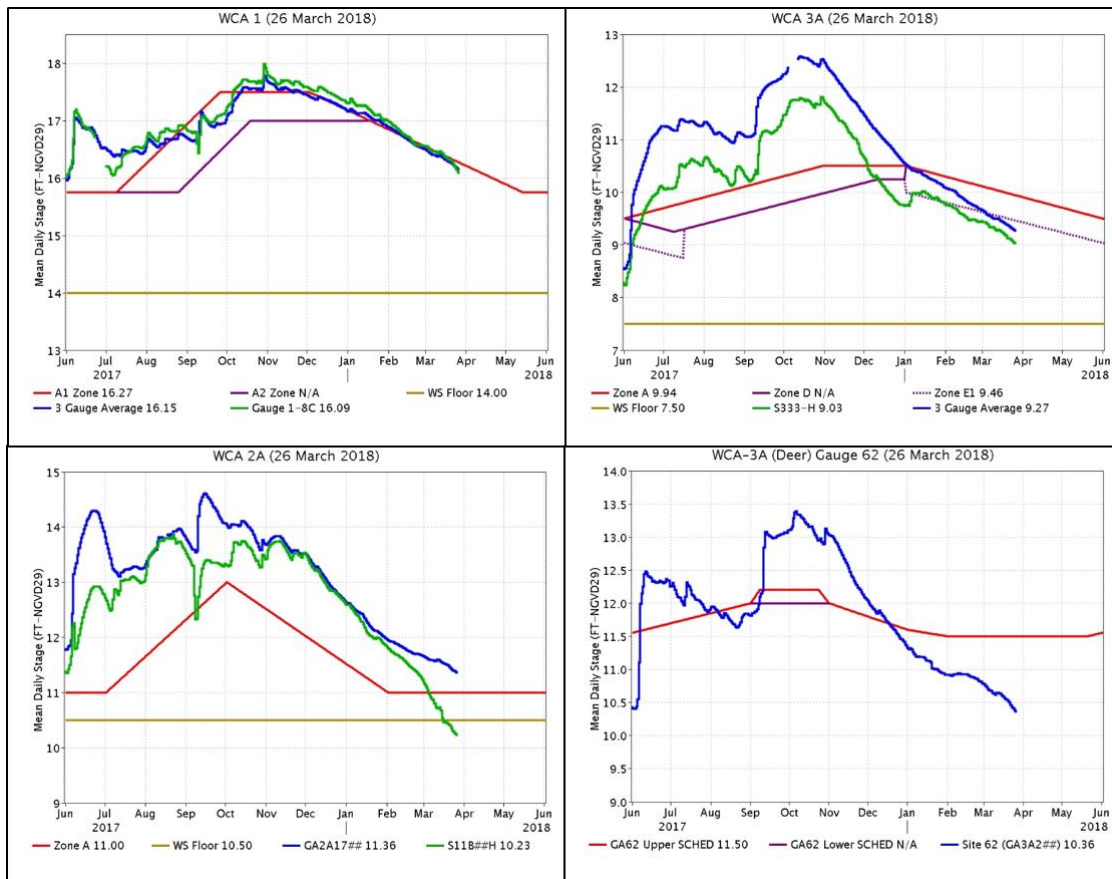
At the gauges monitored for this report, the water depth across the Everglades fell an average of 0.13 feet last week, an increase from the week prior of 0.03 feet. Individual gauge changes in the WCAs ranged from -0.08 feet (WCA-3B) to -0.18 feet (WCA-2B). Pan evaporation increased again and was estimated at 2.10 inches last week.

Everglades Region	Rainfall (Inches)	Stage Change (feet)	
WCA-1	<0.01	-0.13	
WCA-2A	<0.01	-0.13	
WCA-2B	<0.01	-0.18	
WCA-3A	0.03	-0.14	
WCA-3B	<0.01	-0.09	
ENP	0.02	-0.14	

Good
 Fair
 Poor



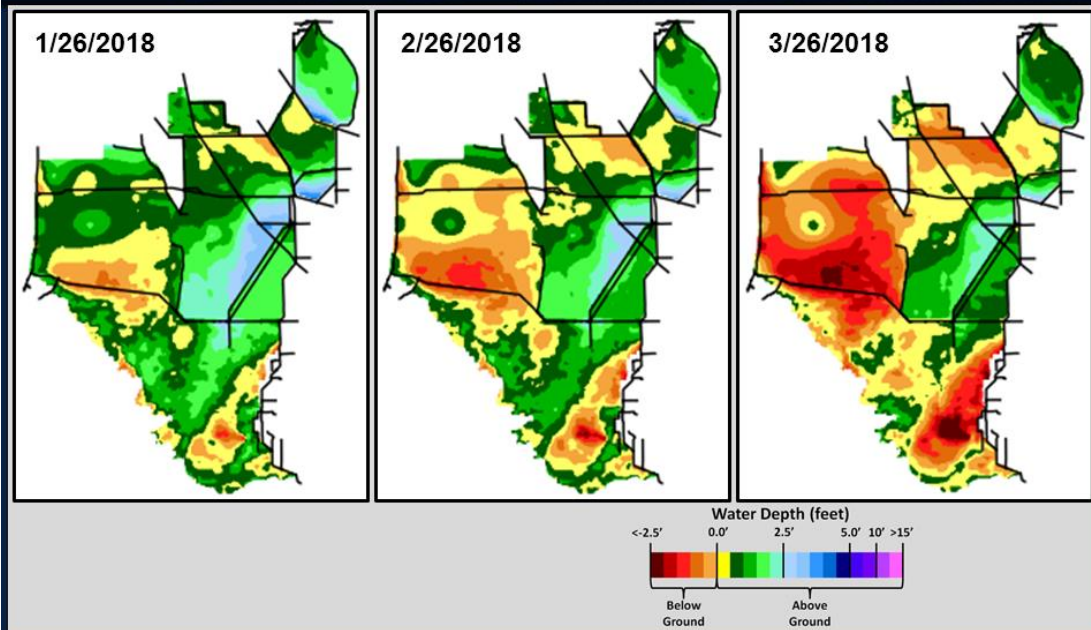
Regulation Schedules: WCA-1 three-gauge average continues trending along the Zone A1 schedule, with the three-gauge average at 0.12 feet below. WCA-2A (subject to a temporary deviation) canal stage at gauge S11B is 0.77 feet below Zone A1 and continues a steep decline. WCA-3A three-gauge average stage is 0.19 feet below Zone E1 and is falling away from the regulation line. WCA-3A at gauge 62 (northwest corner) stage is 1.14 feet below the upper schedule and is falling away from regulation schedule.



Water Depths and Changes: The WDAT tool for spatial interpolation of depth monthly snapshots indicate drying conditions across the Everglades generally moving from north to south within the WCAs. Northern WCA-3A continues a more extreme draw down with water levels now greater than 1.0 feet below ground. Comparing WDAT water levels from present, water depths over the last week fell across most of the Everglades. The northwestern and southeastern portions of WCA-1 rose slightly similar to the last two weeks. The very northern tip of WCA-2A is also slightly wetter than a week ago.



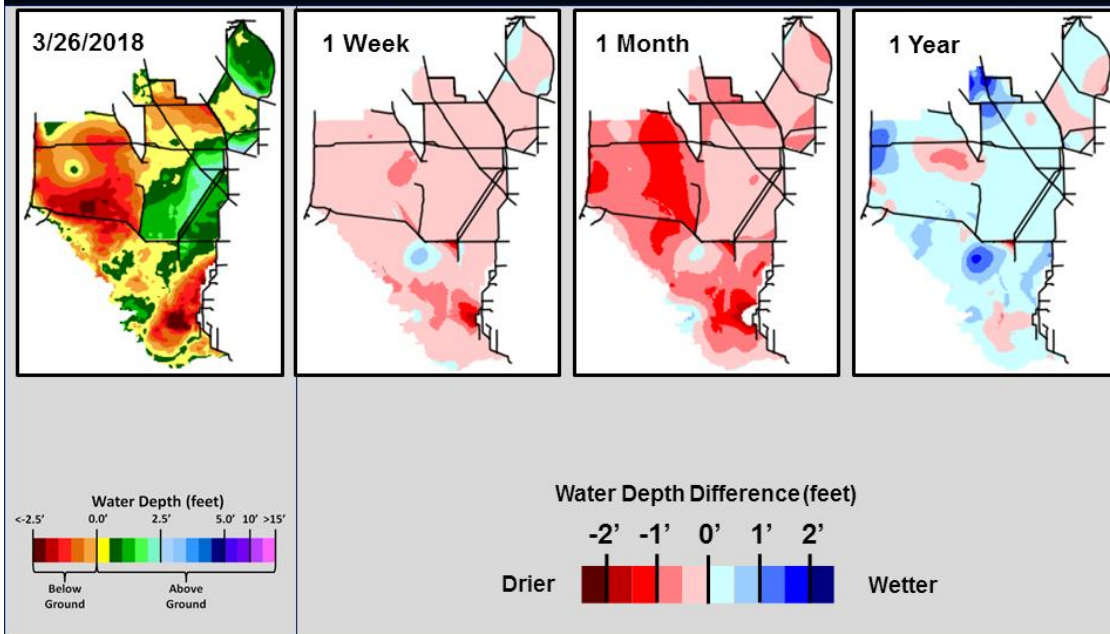
SFWDAT Water Depth Monthly Snapshots



South Florida Water Depth Assessment Tool (SFWDAT)



SFWDAT Everglades Difference Maps (Present - Past)



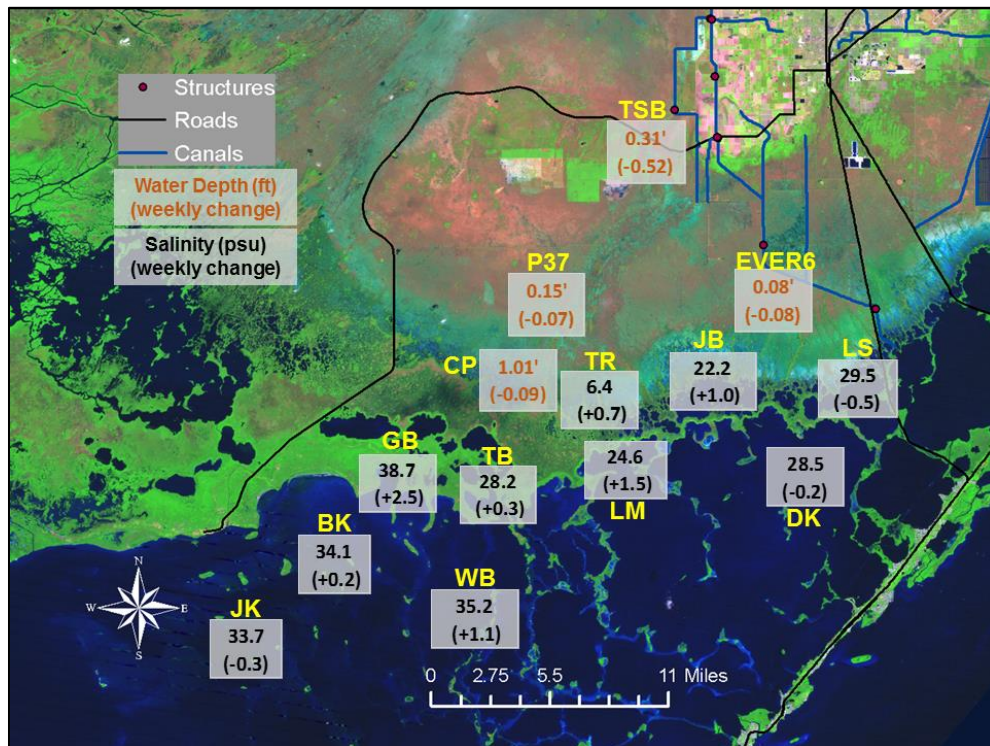
South Florida Water Depth Assessment Tool (SFWDAT)

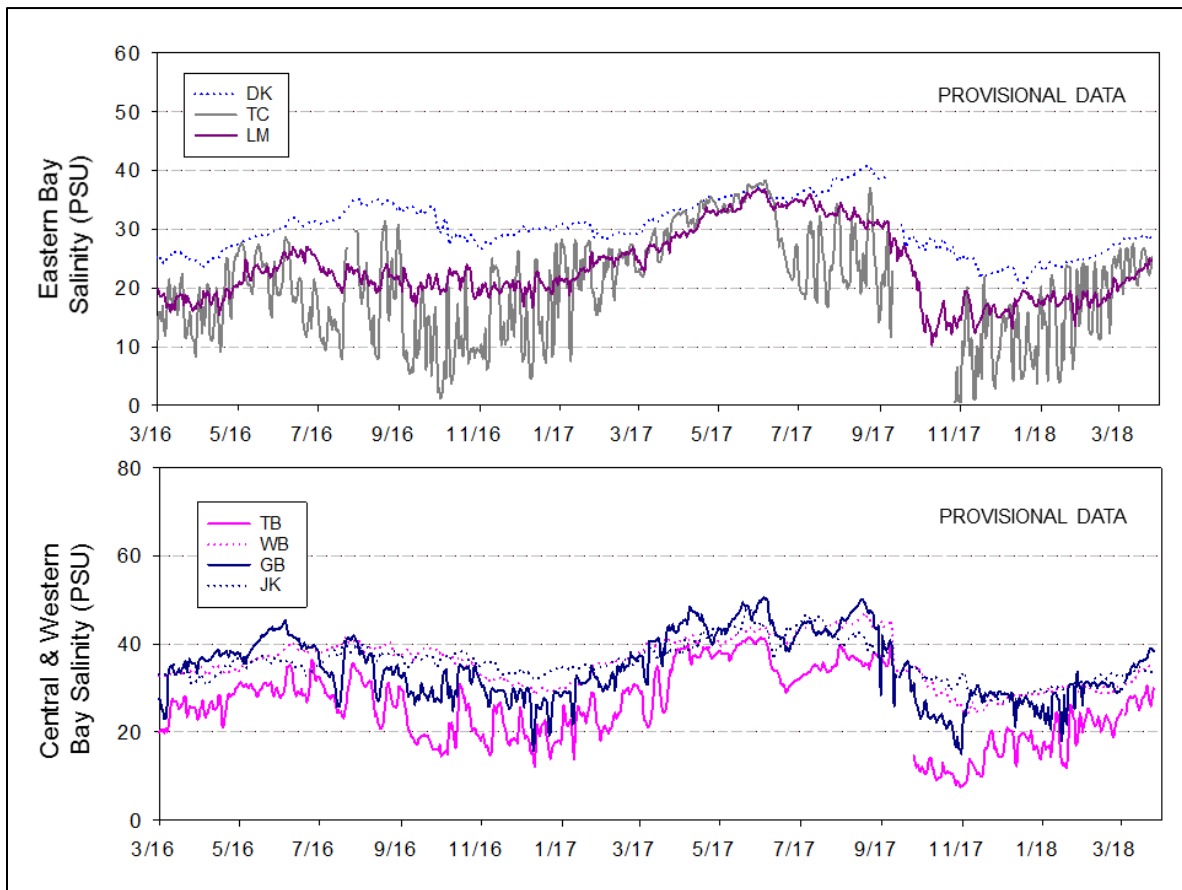
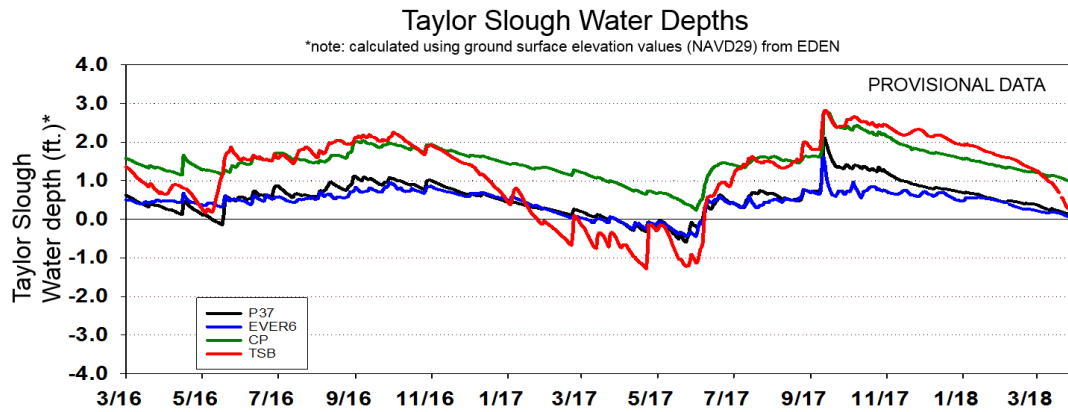
Wading bird flight conducted by SFWMD on March 26, 2018:

- Relatively low numbers of birds are foraging in northern WCA-1 and WCA-2A
- Large flocks are feeding in burn scars in WCA-3A North, western margins of WCA-3A South, and Rotenberger Wildlife Management Area
- 18,000+ white ibis nests in Alley North (there are 4 to 5 inches of standing water around the island)

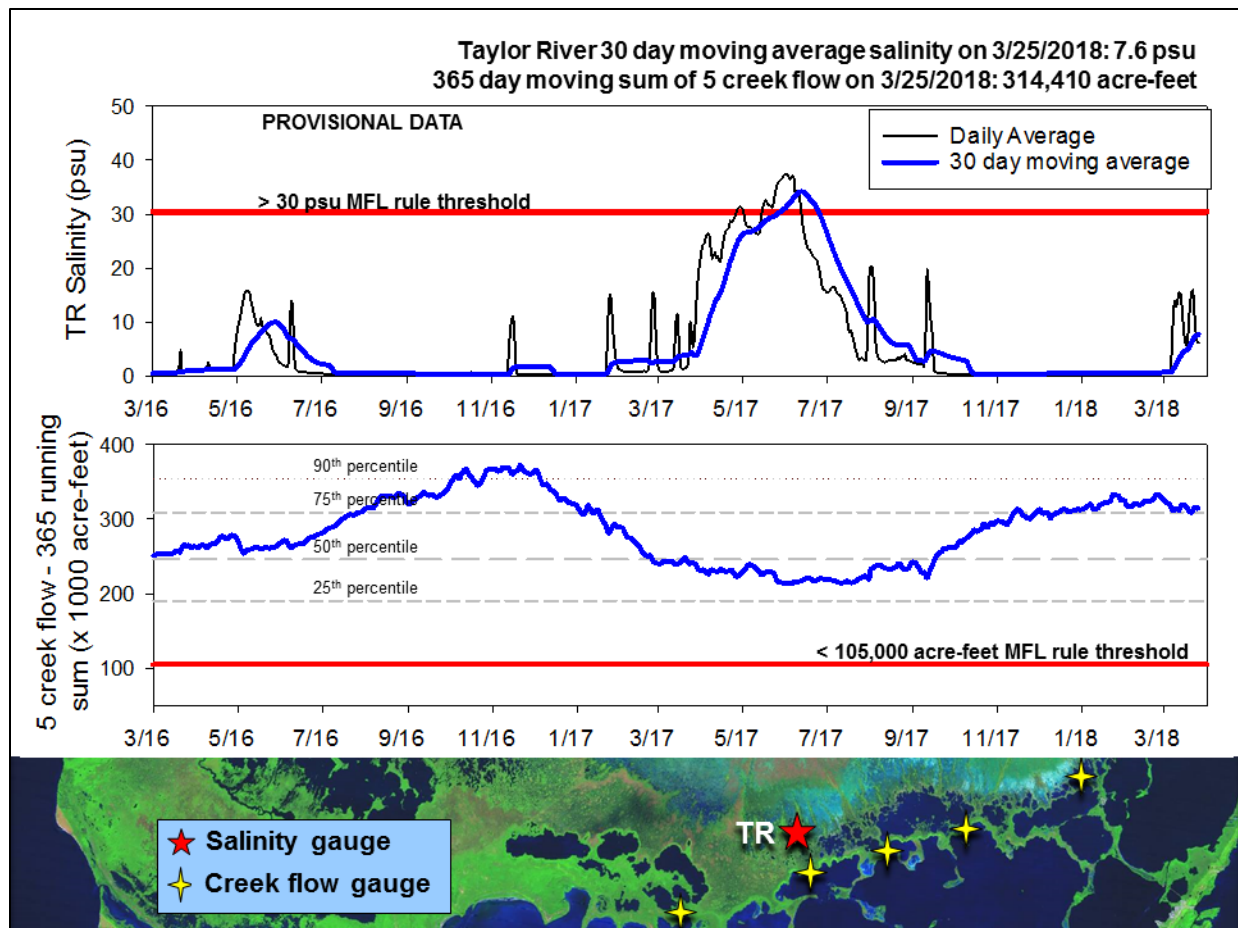
Taylor Slough Stages: Stage decreases in Taylor Slough and the Everglades National Park (ENP) panhandle this past week were more rapid than last week at 0.07 to 0.52 feet after no rain this past week. Water depths range from 0.08 to 1.01 feet and are 1 to 8 inches above the historical averages with the highest divergence in northern Taylor Slough.

Florida Bay Salinities: Salinities in Florida Bay increased 0.4 psu on average this past week with individual station changes ranging from -0.5 psu to +2.5 psu. Salinities ranged from 22 psu in the northeast to 39 psu in the western nearshore. This range is 2 psu below to 2 psu above the historical averages.





Florida Bay MFL: Mangrove zone daily average salinity rose to 16.0 psu before decreasing this past week to end at 5.7 psu on Sunday. The 30-day moving average rose to 5.0 psu. The weekly cumulative flow from the five creeks denoted by yellow stars on the map totaled about only 470 acre-feet for the last week as half the week experienced negative flows. The 365-day moving sum of flow from the five creeks decreased about 4,000 acre-feet over the last week to end at 314,410 acre-feet (still greater than the long-term average of 257,628 acre-feet). Creek flow is provisional data from the USGS and is highly variable.



Water Management Recommendations

Water management that results in slowing the recession rate in northern WCA-3A and Rotenberger Wildlife Management Area continues to have great ecological benefit. Maintaining open water conditions around the Alley North wading bird nesting colony in northeast WCA-3A is important to protect nests from terrestrial predators. Peat soils in that historically over-dried region may also be protected from fire risk by extending the dry season recession in that region. Inflows to Taylor Slough continue to provide ecological benefit by slowing the recession rate in that region. More specific recommendations appear in the summary table below. The red text represents new or modified information or recommendations.

SFWMD Everglades Ecological Recommendations, March 27, 2018 (red is new)

Area	Weekly change	Cause(s)	Recommendation	Reasons
WCA-1	Stage decreased 0.13'	Rainfall, ET, management	Maintain current recession rates, following regulation schedule.	Foster conditions for wildlife and optimal wading bird foraging.
WCA-2A	Stage decreased 0.13'	Rainfall, ET, management	Maintain moderate recession rates between 0.05 and 0.09 feet per week	Foster conditions for wildlife and optimal wading bird foraging.
WCA-2B	Stages decreased by 0.18'	Rainfall, ET, management	Maintain depths at regulation schedule or slightly above.	Protect upstream/downstream habitat and wildlife. Foster conditions for wading bird foraging.
WCA-3A NE	Stages decreased by 0.12'	Rainfall, ET, management	Slow current recession rates to between 0.05 and 0.09 feet per week, water management that provides inflows generates ecological benefit	Protect peat soils and nesting habitat.
WCA-3A NW	Stages decreased by 0.17'	Rainfall, ET, management	Slow current recession rates to between 0.05 and 0.09 feet per week, water management that provides inflows generates ecological benefit	
Central WCA-3A S	Stages decreased by 0.12'	Rainfall, ET, management	Maintain moderate recession rates between 0.05 and 0.09 feet per week	Protect habitat and wildlife, foster conditions for wading bird foraging.
Southern WCA-3A S	Stages decreased by 0.14'	Rainfall, ET, management		
WCA-3B	Stages decreased by 0.09'	Rainfall, ET, management	Maintain depths at regulation schedule.	Protect habitat and wildlife.
ENP-SRS	Stages decreased by 0.14'	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.
Taylor Slough	Stage changes ranged from -0.07' to -0.52'	Rain, ET, inflows	Move water southward as possible	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged -0.5 to +2.5 psu	Rain, ET, inflows, wind	Move water southward as possible	When available, provide freshwater to maintain low salinity buffer and promote water movement.